ENVIRONMENTAL IMPACT STATEMENT
APPENDIX N: Record of Interagency Coordination

SAVANNAH HARBOR EXPANSION PROJECT

Chatham County, Georgia and Jasper County, South Carolina

January 2012

(Revised July 2012)

ATTACHMENT 1

Correspondence with SC DHEC concerning Water Quality Certification and Coastal Zone Management Consistency

US Army Corps of Engineers
Savannah District
South Atlantic Division

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SAVANNAH HARBOR EXPANSION PROJECT
OVERVIEW OF COORDINATION WITH SOUTH CAROLINA
WATER QUALITY CERTIFICATION AND CZM CONSISTENCY

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17 Dec 2010 – Letter from USACE to DHEC (David Wilson) 32
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10 Jan 2011 – Letter from USACE to DHEC 37
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13 Jan 2011 – Letter from DHEC to USACE 39
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13 Jan 2011 – Letter from USACE to DHEC 41
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14 Jan 2011 – Letter from DHEC to USACE 42
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21 Jan 2011 – Letter from DHEC-OCRM to USACE 43
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24 Jan 2011 – Letter from USACE to DHEC-OCRM 109
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25 Jan 2011 – Letter from DHEC-OCRM to Corps 111
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31 Jan 2011 – Letter from DHEC-OCRM to USACE 120
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03 Mar 2011 – Letter from DHEC to USACE 122
- Identified areas in which it believed the project did not comply with DHEC WQ regulations
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30 Mar 2011 – Letter from USACE to DHEC 126
- Corps provided some requested information
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30 Mar 2011 – Letter from USACE to DHEC 158
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21 Apr 2011 – Email from USACE (William Bailey) to DHEC-OCRM (Rheta DiNovo) 167
- Corps provided some requested information

13 May 2011 – Email from USACE (W. Bailey) to DHEC (Blair Williams, Christopher Beckham) 168
- Provided requested information on how wetland mitigation plan complies with Mitigation Rule

13 May 2011 – Email from USACE (W. Bailey) to DHEC (C. Beckham) 170
- Confirmed that a Federal navigation project does not pay Water Quality Certification fee

17 May 2011 – Email from DHEC (Wade Cantrell) to USACE (W. Bailey) 171
- Requested assurance the Speece cones will perform as designed and additional supporting information

17 May 2011 – Email from USACE (W. Bailey) to DHEC (C. Beckham, et al.) 172
- Request for meeting with Wetlands Interagency Coordination Team on June 1

18 May 2011 – Email from USACE (W. Bailey) to DHEC (W. Cantrell) 173
- Provided some requested information (hydrodynamic and chloride modeling reports)

18 May 2011 – Email from USACE (W. Bailey) to DHEC (W. Cantrell) 176
- Provided some requested information (additional attachments to same email above)

27 May 2011 – Letter from DHEC-OCRM to USACE 179
- Reiterated that they believe the project does not comply with SC CZM Program
- Will review the information Corps recently provided (13 May)
- Welcome additional discussions

03 Jun 2011 – Email from USACE (W. Bailey) to DHEC (C. Beckham, et al.) 183
- Provided slides of wetland impacts and mitigation presentation

03 Jun 2011 – Email from USACE (W. Bailey) to DHEC (Heather Preston) ..... .267
- Provided records of previous Wetlands Interagency Coordination Team (ICT) meetings

07 Jun 2011 – Email from USACE (W. Bailey) to DHEC (C. Beckham, et al.) 268
- Provided draft Memorandum for Record for Wetlands ICT meeting
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08 Jun 2011 – Email from USACE (W. Bailey) to DHEC (C. Beckham, et al.) 278
- Provided additional information (Mitigation Rule)

16 June 2011 – Letter from DHEC to Corps 280
- Reiterated environmental concerns and approval requirements
- Requested additional information

13 Jul 2011 – Email from USACE (W. Bailey) to DHEC (C. Beckham) 283
- Provided some requested information (draft responses to public comments)

27 Jul 2011 – Email from USACE (W. Bailey) to DHEC (C. Beckham) 286
- Provided some requested information (report on DO system design)

01 Aug 2011 – Email from USACE (W. Bailey) to DHEC (C. Beckham) 325
- Provided some requested information (report on hydrodynamic models)

01 Aug 2011 – Letter from USACE to DHEC 354
- Provided additional information on wetland mitigation SOP calculations

09 Sep 2011 – Email from USACE (W. Bailey) to SAS Executive Office (COL Hall) 356
- Provided information (DO system, adaptive management, wetland analysis)

30 Sep 2011 – Letter from DHEC to USACE 359
- Reiterates objection to Corps' determination of coastal zone consistency
- Public Notification of staff intent to deny certification
- Notify Corps of ability to request a hearing before DHEC Board

07 Oct 2011 – Letter from USACE to DHEC (Clerk of the Board) 373
- Requests a final review conference
- Provides information on issues identified by DHEC staff

17 Oct 2011 - DHEC Notice of Final Review Conference to USACE and GPA 398

24 Oct 2011 – DHEC Notice of Final Review Conference to USACE and GPA (includes allotted times for arguments/rebuttals) 400

04 Nov 2011 – Letter from USACE (Office of Counsel) to DHEC 402
- Agrees to some conditions requested by DHEC

04 Nov 2011 – Letter from USACE to DHEC 403
- Commitment on operation of DO Systems

09 Nov 2011 – Email from USACE (Office of Counsel) to DHEC 405
- Provides Corps position on issues identified by DHEC staff

15 Nov 2011 – Letter with DHEC Final Agency Decision 544
- Agreement that the project meets SC requirements
- Includes consent agreement

15 Nov 2011 – Letter from DHEC to Corps 552
- Provides water quality certification

15 Nov 2011 – Letter from DHEC to Corps 554
- SC does not object to Corps' determination of coastal zone consistency

LIST OF MEETINGS

21 Apr 2011 - Meeting between Corps and DHEC-OCRM
- Corps provided some requested information
- DHEC identified major issues (wetland impacts, DO impacts, endangered species)

12 May 2011 – Meeting between Corps and DHEC
- DHEC reiterated environmental concerns and requested additional information

01 Jun 2011 – Wetlands Interagency Coordination Team meeting (DHEC attended)
- Corps provided information on wetland impacts

28 Oct 2011 – Meeting between Corps and DHEC
- DHEC identifies five major issues

10 Nov 2011– SC DHEC Board Hearing
- Staffs meet to discuss remaining issues
- Staffs reach agreement on issues
- GPA agrees to address two of DHEC's concerns
- DHEC staff recommends approval to their Board
- Board approves project

DHEC

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment

PM-C

cf: DC
DE
DX
CS
PM

S: 10-15

September 29, 2010

Colonel Jeffrey M. Hall
District Engineer
U.S. Army Corps of Engineers
100 W. Oglethorpe Avenue
Savannah, Georgia 31401

RE: The Savannah Harbor Expansion Project (SHEP)

Dear Colonel Hall:

At the September 14, 2010 meeting of the South Carolina Maritime Commission, representatives of the U.S. Army Corps of Engineers (Corps) Savannah District indicated that their schedule would require the South Carolina Department of Health and Environmental Control (SCDHEC) to reach a 401 decision within 60 days of receipt of an application. SCDHEC is typically allowed one year by the Federal permitting agency to issue, waive, or deny a 401 certification. SCDHEC is concerned that 60 days is not an adequate timeframe for a project the size and scope of the SHEP. Please note that upon receipt of a complete application, SCDHEC is required to place the project on public notice for a minimum of 30 days which may be extended to 60 days for major projects. Additionally, SCDHEC is required to issue a notice of proposed decision for 15 days before issuing a final agency decision.

Based on the above, it is the opinion of SCDHEC that 60 days is not adequate to receive public comment and review the application and all supporting documents on a project of this magnitude and reach a 401certification decision. At such time that SCDHEC receives the application and supporting documents, SCDHEC will consult with the Corps on an appropriate timeframe. Thank you for your consideration of this matter. Should you have any questions, please contact Heather Preston at 803-898-3105.

Sincerely,

David E. Wilson, Jr., Chief
Bureau of Water

cc: The Honorable Lindsey O. Graham

Read

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

NOV 4 2010

Executive Office

Mr. David E. Wilson, Jr., Chief
Bureau of Water
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Dear Mr. Wilson:

I refer to your September 29, 2010, letter concerning the Savannah Harbor Expansion Project schedule and the time allotted for the South Carolina Department of Health and Environmental Control's (SCDHEC) review prior to issuance of the Section 401 Water Quality Certification.

It is our intention to submit an application for Water Quality Certification concurrent with the start of public review of the project's draft documents. This action is now scheduled for late November 2010. The project schedule calls for the Section 401 Water Quality Certification to be obtained at the end of the public comment period in late January 2011. We understand that the documents we will be providing are extensive, but their length is a reflection of the numerous detailed investigations that we have conducted. We will coordinate with your staff after release of the project's draft documents to ensure the documents contain all the technical information you need to render a decision on this project. In addition, we will meet with you or your staff to discuss any specific areas of concern in order to help facilitate a decision.

We appreciate your continued support of the US Army Corps of Engineers' efforts to establish and maintain navigable waterways for the benefit of national commerce. We look forward to working with you during the certification process. A copy of this letter is being sent to Senator Lindsey O. Graham, 530 Johnnie Dodds Boulevard, Suite 202, Mt. Pleasant, South Carolina 29464.

Sincerely,

Jeffrey M. Hall
Colonel, US Army
Commanding

Copy

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

Planning Division

NOV 15 2010

Mr. David Wilson
Bureau Chief
South Carolina Department of Health and Environmental Control
Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201-1708

Dear Mr. Wilson:

The Savannah District, US Army Corps of Engineers has prepared a Draft Tier II Environmental Impact Statement (DEIS) and General Reevaluation Report (GRR) to incrementally evaluate deepening the Savannah Harbor Federal Navigation Project to a maximum authorized depth of -48 feet Mean Lower Low Water (MLLW) as authorized by the Water Resources Development Act of 1999 (Public Law 106-53, Section 102(b)(9). The studies evaluated the engineering, environmental, and economic acceptability of various alternatives for the present and future harbor conditions over a 50-year analysis period. The DEIS is being circulated to agencies and the public for a 45-day comment period.

Recommended improvements as outlined in the Maximum Authorized Plan and the tentative National Economic Development (NED) Plan include: channel deepening from the sea through the Harbor Entrance Channel to the Garden City Terminal; channel widening to create meeting areas at Long Island and Oglethorpe Ranges; widening and deepening of the Kings Island Turning Basin; and channel widening at three bends.

In order to avoid, minimize, or compensate for adverse environmental impacts associated with the proposed action, the following mitigation features are proposed:

(1) Acquire and preserve lands adjacent to the Savannah National Wildlife Refuge

(2) Construct a diversion structure, deepen, and close the lower arm of McCoys Cut

(3) Close Rifle Cut

(4) Remove the Tidegate abutments and piers

(5) Construct a rock sill at the mouth of Back River

(6) Fill a broad berm in the Sediment Basin

(7) Construct a sill in Middle River near Disposal Area 2A

(8) Construct a boat ramp on Hutchinson Island

(9) Construct a fish passage structure at the New Savannah Bluff Lock and Dam

(10) Mitigate for striped bass (stocking)

(11) Construct and operate a dissolved oxygen system

(12) Restore brackish marsh in Disposal Area 1S

(13) Recover data from the Ironclad CSS Georgia and other significant archaeological resources

(14) Monitor and adaptively manage the river ecosystem

Please find enclosed one hard copy and one digital video disc (DVD). Pursuant to the Coastal Zone Management Act and the Fish and Wildlife Coordination Act, I request you review this DEIS and GRR and provide any comments you may have, particularly with regard to Water Quality Certification. Please provide your comments no later than 45 days from the date of this letter to Mr. William Bailey, ATTN: PD, US Army Corps of Engineers, Savannah District, 100 West Oglethorpe Avenue, Savannah, Georgia 31401-3640 or by email to CESAS-PD@usace.army.mil.

Sincerely,

William G. Bailey

William G. Bailey
Chief, Planning Division
Savannah District

Enclosures

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
P.O. BOX 889
SAVANNAH, GEORGIA 31402-0889

REPLY TO
ATTENTION OF:

Planning Division

November 15, 2010

JOINT PUBLIC NOTICE
US Army Corps of Engineers, Savannah District,
Post Office Box 889
Savannah, Georgia 31402-0889
and the
Georgia Department of Natural Resources
and the
South Carolina Department of Health and Environmental Control

NOTE: THIS IS A US ARMY CORPS OF ENGINEERS CIVIL WORKS PROJECT

TO WHOM IT MAY CONCERN:

SUBJECT: Notice of Availability of a Draft Tier II Environmental Impact Statement (Draft EIS) and Draft General Reevaluation Report (Draft GRR) pursuant to the authority provided by Section 102(b)(9) of the 1999 Water Resources Development Act for improvements and continued maintenance of the existing Savannah Harbor Federal Navigation Project, Chatham County, Georgia and Jasper County, South Carolina.

The responsible lead agency is the Savannah District, US Army Corps of Engineers. The following agencies served as Cooperating Agencies in preparing the Draft EIS: Environmental Protection Agency - Region IV; National Oceanic and Atmospheric Administration (NOAA) Fisheries Service - Southeast Region; US Fish and Wildlife Service - Southeast Region; and the Georgia Ports Authority.

Notice of the following is hereby given:

a. Pursuant to the relevant provisions of the laws and others as applicable:
   1. The Clean Water Act (33 U.S.C. 1251, et. seq.).
   2. The Endangered Species Act of 1973, as amended (16 U.S.C. 1531, et. seq.).
   3. The National Historic Preservation Act of 1966 (U.S.C. 470, et. seq.) and the Preservation of Historical Archeological Data Act of 1974 (16 U.S.C. 469, et. seq.).
   4. The National Environmental Policy Act of 1969 (42 U.S.C. 4321).
   5. Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1531, et. seq.).
   6. Magnuson-Stevens Fishery Conservation and Management Act, as amended (16 U.S.C. 1801, et. seq.).

7. The Marine Protection, Research, and Sanctuaries Act of 1972, as amended (33 USC 1413)

b. The Savannah District, US Army Corps of Engineers has evaluated the engineering, environmental, and economic acceptability of various alternatives to address navigation problems in Savannah Harbor over a 50-year analysis period. The Draft Tier II EIS and Draft GRR document the results of the investigations and analyses that were conducted. The Savannah District is releasing these documents for public review and comment pursuant to the National Environmental Policy Act (NEPA) while the Department of the Army completes its review.

c. Pursuant to Sections 401 and 404 of the Clean Water Act (33 USC 1344), and Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (33 USC 1413), notice is hereby given that the Savannah District, US Army Corps of Engineers, is considering a proposal for expansion of the Savannah Harbor Navigation Project that includes discharge of fill into navigable waters of the US to construct and maintain submerged berms and nearshore berms, continued discharge of effluent from existing confined disposal facilities into waters of the US, and transportation of sediments dredged from the entrance channel (both new work and continued maintenance material) to the Savannah Ocean Dredged Material Disposal Site (ODMDS). The proposal also includes discharge of dredged material into navigable waters of the US for several mitigation features, including closing Rifle Cut, construction of a flow diversion structure and other modifications at McCoys Cut, deepening the upper portions of Middle and Back Rivers, removing the Tidegate and its abutments, construction of additional features including a submerged sill and berm at the mouth of Back River, a submerged sill at the mouth of Middle River, three dissolved oxygen systems, a fish passage structure at the New Savannah Bluff Lock and Dam, a boat ramp on Hutchinson Island, and restoration of Disposal Area 1S.

d. The Savannah District announces the availability to the public of a Draft EIS and Draft GRR concerning the action. Copies of the Draft EIS and Draft GRR have been furnished to Federal, State, local, and other agencies of interest. Electronic copies of the Draft EIS and Draft GRR can be obtained from the following website: www.sas.usace.army.mil, and a limited number of hard copies are available upon email request to Mr. William Bailey at the following address: CESAS-PD@usace.army.mil.

e. A public workshop will be held during the comment period and is currently scheduled to occur December 15, 2010 at the Savannah Civic Center from 4:00 to 8:00 P.M. (subject to change). US Army Corps of Engineers officials will be available to answer questions, provide information, and accept written and dictated comments.

f. Written statements regarding the Draft EIS and Draft GRR for the proposed action will be received at the Savannah District Office until

12 O'CLOCK NOON, DECEMBER 30, 2010

from those interested in the activity and whose interests may be affected by the proposed action.

EXISTING PROJECT DESCRIPTION:

Savannah Harbor is an approximately 32.5 mile Federal navigation project located along the Savannah River in southeast Georgia. The current Savannah Harbor Navigation Project has an authorized project depth of 30 feet Mean Lower Low Water (MLLW) in the inner harbor (Stations112+000 to 105+000), 36 feet MLLW (Stations 105+000 to 103+000), 42 feet MLLW (Stations 103+000 to 0+000), 42 feet MLLW in the mouth of the entrance channel (Stations 0+000 to –14+000B), and 44 feet MLLW in the remainder of the entrance channel (Stations –14+000B to –60+000B). The current channel width is 600 feet across the ocean bar to the entrance channel (Stations -14+000B to -60+000B), 500 feet from the entrance channel to Kings Island Turning Basin (Stations -14+000B to 103+000, with the exception of 400 feet wide from Stations 58+000 to 59+000, 400 feet from the Kings Island Turning Basin to the Argyle Island Turning Basin, and 200 feet from the Argyle Turning Basin to the upstream limit of the authorized project. Rapid shoaling rates in the Federal navigation channel inhibit the ability to maintain the exact project depth (i.e., -42 feet MLLW) at all times; therefore, the project uses allowable overdepth and advance maintenance procedures to counteract the shoaling effects. The existing Federally-maintained navigation channel includes 2-feet allowable overdepth and up to 6-feet of advance maintenance. Savannah Harbor was last deepened between 1993 and 1994.

DESCRIPTION OF PROPOSED PROJECT IMPROVEMENTS:

The alternative project depths being considered are 44-, 45-, 46-, 47-, and 48-feet within the inner harbor navigation channel. The deepening would follow existing channel side slopes, except in the bend wideners. For the entrance channel oceanward of the jetties, the proposed authorized depths would include the traditional 2-feet of additional depth to address wave effects in each alternative. The project would deepen a portion of the inner harbor from channel Stations 0+000 (near Fort Pulaski) to 103+000 (above the Kings Island Turning Basin), a distance of 103,000 river feet. The Entrance channel or ocean bar channel proposed for deepening begins at Station 0+000 and extends outward to a maximum length of approximately 98,000 feet. The length of the Entrance channel depends on the project depth, since the channel would extend oceanward until the channel depth matches the existing ocean depths. The maximum proposed project length is approximately 38 miles. The tentatively recommended plans are the 47- and 48-foot depth alternatives. The 47-foot depth alternative is the National Economic Development Plan, while the 48-foot alternative is the Maximum Authorized depth alternative. Overdepth dredging and advanced maintenance dredging remain the same as for the existing project and increase the final dredging depths beyond the stated authorized project depths. In addition, confined dredged material disposal areas would remain the same as for the existing project.

PROJECT IMPACTS:

The Draft EIS assesses the potential impacts of the proposed project alternatives on endangered species, wetlands, fisheries, benthic communities, birds, marine mammals, water quality, air quality, environmental justice, historic properties, and potable surface and groundwater resources. The major impacts to biological resources were evaluated using calibrated

hydrodynamic and water quality models that predict changes to salinity and dissolved oxygen due to the proposed harbor deepening. These changes were then evaluated with respect to the species of concern and to resources of special significance, especially to wetlands within the Savannah National Wildlife Refuge (SNWR). The full description of potential environmental impacts and mitigation measures to avoid, minimize, or compensate for adverse environmental impacts associated with the proposed action are included in Section 5 of the Draft EIS.

a. Direct Impacts to Wetlands. There would be direct adverse impacts to wetlands from dredging along the shoreline of the navigation channel at six locations, two of which are within the Savannah National Wildlife Refuge. Four areas are located on the west side of Hutchinson Island, in Georgia waters. One is located on the east side of Hutchinson Island along a portion of the Tidegate abutment in Georgia. The sixth site is located along a portion of the Tidegate abutment in South Carolina. The extent of the impacts would not differ substantially between channel depth alternatives. Of the maximum 30.0 acres affected by excavation, 14.08 acres could be considered wetlands. The other 15.92 acres are considered high ground. The Corps would mitigate for the direct impacts to these wetlands.

b. Indirect Impacts to Wetlands. The proposed action would cause indirect adverse impacts to wetlands because deepening the channel would allow the tides to move further upstream, changing the salinity of those waters. Since tidal freshwater marshes were identified by the US Fish and Wildlife Service as the single most critical natural resource in the harbor, Savannah District focused on identifying project impacts to that resource. The other natural resource agencies concurred with this priority. The majority of the tidal freshwater marshes presently occur between the Houlihan Bridge (GA 25) and the I-95 Bridge. To avoid and minimize adverse environmental impacts to freshwater wetlands, the project would re-route flows in that area as described in the mitigation plan portion of the Draft EIS. To compensate for remaining adverse wetland impacts which vary by depth alternative up to a maximum of 337 acres for the 48-foot alternative, the project would acquire a maximum of 2,683 acres of lands as prioritized by the US Fish and Wildlife Service. Those lands would be added to the Savannah National Wildlife Refuge.

c. Water Quality in the Savannah Harbor. The proposed action would adversely impact dissolved oxygen levels in the harbor if no mitigation were included. To address this potential impact, the Corps included dissolved oxygen systems in the mitigation plan of each depth alternative. The analyses indicate that oxygen injection is the most cost-effective means to raise dissolved oxygen levels in the harbor. Due to site-specific requirements, a land-based injection system of Speece Cones was identified as being the most effective solution. The City of Savannah expressed concerns during the Tier I phase of the project about whether additional harbor deepening would allow salinity to move upriver to the extent that chloride levels would increase to unacceptable levels at the City's water intake in Abercorn Creek. The Corps developed and used a chloride model to predict chloride concentrations at the City's water intake under three different flow conditions -- average river flows, a drought flow, and during a severe drought. The chloride model predicts minimal effects to chloride levels from harbor deepening or the mitigation plans on the City's water intake.

d. Sediment Quality. Although the Tier I assessment did not identify any unacceptable adverse effects from the excavation, transportation, discharge, or management of the new work or Operations and Maintenance (O&M) sediments, additional sediment sampling was completed

in 2006 as part of the Tier II assessment. The results indicated that the only sediment contaminant of concern for the proposed harbor deepening is naturally-occurring cadmium found in Miocene clays that would be dredged and/or exposed during construction. To address potential adverse effects, the project would place the cadmium-laden sediments in confined dredged material disposal areas and cover them with sediments that do not exceed threshold values. The Corps will also sample and monitor cadmium levels in the confined dredged material disposal areas as described in the Sediment Quality Evaluation in the Draft EIS.

e. Confined Disposal Site Effluent Water Quality. The Corps analyzed the expected effluent from the upper harbor confined dredged material disposal areas and found that the constituent requiring the greatest dilution for the new work sediments to meet Georgia Water Quality standards would be copper. This parameter would meet Georgia Water Quality standards at the edge of a mixing zone of about 84 feet in the Savannah River. The constituent requiring the greatest dilution in the lower harbor sediments was found to be ammonia. That parameter would meet South Carolina Water Quality standards at the edge of a mixing zone of about 180 feet in the Wright River. With respect to disposal of sediments in the ocean, no acute or chronic Water Quality criteria would be violated outside the required 4-hour mixing zone. No more than minimal adverse impacts were identified. See the Section 404(b)(1) Evaluation in the Draft EIS for more information.

f. Fisheries Impacts. The Draft Tier II EIS analyses indicated that adverse affects would occur to Striped bass and Shortnose sturgeon if no mitigation were to occur. To offset striped bass habitat loss, the mitigation plan will supplement the budget of the Georgia Department of Natural Resources Striped bass recovery program to enable the State to stock more striped bass in the estuary. To offset habitat loss of Shortnose sturgeon, the mitigation plan will restore access to historic spawning areas through construction and operation of a fish passage structure at the New Savannah Bluff Lock and Dam and protect important juvenile habitat in the lower portion of Middle River.

g. Cultural Resources. Cultural resources in Savannah Harbor include wrecks, harbor modifications, terrestrial sites, and miscellaneous artifacts. The Draft Tier II EIS reports on the potential impacts to known cultural resources and measures included in the project to safeguard those resources from adverse impact. The proposed project would mitigate adverse impacts to the ironclad CSS Georgia by performing archaeological data recovery, excavation, and curation.

h. Threatened and Endangered Species. A Biological Assessment of Threatened and Endangered Species (BATES) has been performed. The BATES concludes that the proposed action "may affect, but is not likely to adversely affect" piping plover, wood stork, West Indian manatee, Right whale and Humpback whales, sea turtles, and Shortnose sturgeon that may be present within the area. The BATES includes conditions that would be followed to protect endangered species during construction and operation of the project.

i. Groundwater Impacts. An extensive study of the subsurface geology along the harbor showed that the proposed action will have insignificant effects on the rate of downward salt-water intrusion into the Upper Floridan aquifer. The full results of the field work, groundwater modeling, and GIS analyses are described in Section 5 of the Engineering Appendix of the Draft GRR.

j. Other Effects. No other potentially significant adverse impacts have been identified. Other effects are discussed in Section 5 of the Draft Tier II EIS.

AUTHORIZATIONS REQUIRED FROM THE STATE OF GEORGIA:

Coastal Zone Consistency. This notice serves as a request to the Georgia Department of Natural Resources, Coastal Zone Management Program for a Coastal Zone Management consistency determination. Savannah District has evaluated the proposed project and believes it is consistent with the Georgia Coastal Zone Management Program to the maximum extent practicable. The State will review the proposed action and determine whether it concurs that the proposed project is consistent with the State's Coastal Zone Management Program to the maximum extent practicable. Any person who desires to comment or object to Georgia Coastal Zone Management Consistency Certification must do so in writing within 30 days of the date of this notice to the Federal Consistency Coordinator, Georgia Department of Natural Resources, Coastal Resources Division, Suite 300, One Conservation Way, Brunswick, Georgia 31520-8687 and state the reasons or basis for the objections.

Water Quality Certification. This notice serves as a request to the Georgia Department of Natural Resources, Environmental Protection Division for Section 401 Water Quality Certification. Section 404 of the Clean Water Act requires this public notice as part of the water quality certification process to authorize the excavation and placement of dredged material, and discharge of weir effluents to waters of the United States. The Georgia Department of Natural Resources, Environmental Protection Division, intends to certify this project at the end of the 45 days in accordance with the provisions of Section 401 of the Clean Water Act, which is required to conduct an activity in, or adjacent to, waters of the State of Georgia. Any person or agency who desires to comment, object, or request a public hearing relative to State Water Quality Certification must do so within 30 days of the State's receipt of this notice, in writing, and state the reasons/basis of objections, or request for a public hearing. Such comments should be submitted to the Georgia Department of Natural Resources, Environmental Protection Division, 205 Butler Street, SE., Suite 1252, Atlanta, Georgia 30334.

AUTHORIZATION REQUIRED FROM THE STATE OF SOUTH CAROLINA:

Coastal Zone Consistency. This notice serves as a request to the South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management for a Coastal Zone Management consistency determination. Savannah District has evaluated the proposed project and believes it is consistent with the South Carolina Coastal Zone Management Program to the maximum extent practicable. The District will submit its evaluation to the South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management in Columbia, South Carolina, who administers the program. The State will review the proposed action and determine whether it concurs that the proposed project is consistent with the State's Coastal Zone Management Program to the maximum extent practicable. Any person who desires to comment or object to South Carolina Coastal Zone Management Consistency Certification must do so in writing within 45 days of the date of this notice to the South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management; 1362 McMillan Avenue, Suite 400, Charleston, South Carolina 29405 and state the reasons or basis for the objections.

Water Quality Certification. This notice serves as a request to the South Carolina Department of Health and Environmental Control for Section 401 Water Quality Certification and serves as a public notice on their behalf. Section 404 of the Clean Water Act requires this public notice as part of the water quality certification process to authorize the excavation and placement of dredged material, and discharge of weir effluents to waters of the United States. The South Carolina Department of Health and Environmental Control will review this project in accordance with the provisions of Section 401 of the Clean Water Act, which is required to conduct an activity in, or adjacent to, waters of the State of South Carolina. Any person or agency who desires to comment, object, or request a public hearing relative to State Water Quality Certification must do so within 60 days of the date of this notice, in writing, and state the reasons/basis of objections, or request for a public hearing to the South Carolina Department of Health and Environmental Control, Division of Water Quality, Bureau of Water, 2600 Bull Street, Columbia, South Carolina 29201-1708.

DEPARTMENT OF THE ARMY EVALUATION:

Environmental Impact Statement. The Draft EIS documents the conclusions of studies on the potential impacts of construction and maintenance of this proposed project. This assessment includes an assessment of several alternatives and the potential environmental impacts. Savannah District announces the availability of this Draft EIS for public review and comment. The District is coordinating the document with interested parties while the Department of Army completes its review of this proposal.

Evaluation Factors. The decision whether to proceed with the project as proposed will be based on an evaluation of the probable impacts, including cumulative impacts of the proposed action. That decision will reflect the national concern for both protection and use of important resources. The benefits that reasonably may be expected to accrue from the proposal will be balanced against the reasonably foreseeable detriments. All factors that may be relevant to the proposal will be considered, including the cumulative effects thereof. Among those are conservation, economics, general environmental concerns, navigation and, in general, the needs and welfare of the people. Individual assessments within the Draft EIS include the following:

a. Threatened and Endangered Species. A Biological Assessment of Threatened and Endangered Species (BATES) has been prepared for this project and is included as an appendix to the Draft EIS. The District is coordinating this BATES with the US Fish and Wildlife Service and NOAA Fisheries Service, along with its determination that the project, as proposed with conditions, is not likely to adversely affect listed species.

b. Section 404 Evaluation. A Section 404 Evaluation has been prepared in accordance with Section 404(b)(1) Guidelines of the Clean Water Act for the proposed discharges of dredged or fill material and weir effluent into waters of the United States. This evaluation is included in the Draft EIS. The Section 404 (b) (1) Evaluation concluded that the proposed discharges associated with this project comply with the Guidelines.

c. Section 103 Evaluation. The suitability of dredged material for transport to and disposal into the approved ocean disposal site has been evaluated pursuant to Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972. This evaluation is included in the Draft EIS. The evaluation concluded that new work and Operation and Maintenance sediments from the proposed project are suitable for transport and disposal in the Savannah Harbor Ocean Dredged Material Disposal Site. This conclusion is being coordinated with EPA Region IV for their concurrence.

d. Cultural Resources. Existing information was reviewed to identify known cultural resources that could potentially be impacted by the proposed project. Investigations were conducted to determine the impact on known significant sites. Additional surveys would be performed along the proposed bend wideners and proposed channel extension to confirm that significant cultural resources are not located in those areas. Additional surveys would be performed at the nearshore berm site and at the proposed sites for the submerged berms along the bar channel if those sites would be used. If a significant resource is identified, the District would make an assessment of measures to avoid or mitigate impacts to that resource. The results of

these additional evaluations would be coordinated with the Georgia State Historic Preservation Office.

Public Hearing. Any person who has an interest that may be affected by this proposed action may request a public hearing. The request must be submitted in writing to the Savannah District Commander, Colonel Jeffrey M. Hall, within the comment period of this notice, and must clearly set forth the interest which may be affected and the manner in which the interest may be affected by this action.

Point of Contact. If there are any questions concerning this public notice, please contact Mr. William G. Bailey, Chief, Planning Division at CESAS-PD@usace.army.mil.

William G. Bailey

William G. Bailey
Chief, Planning Division
Savannah District
US Army Corps of Engineers

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

Executive Office

NOV 15 2010
(copy)

Mr. C. Earl Hunter
Commissioner
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Dear Mr. Hunter:

The Savannah District, US Army Corps of Engineers has prepared a Draft Tier II Environmental Impact Statement (DEIS) and General Reevaluation Report (GRR) to incrementally evaluate deepening the Savannah Harbor Federal Navigation Project to a maximum authorized depth of -48 feet Mean Lower Low Water (MLLW) as authorized by the Water Resources Development Act of 1999 (Public Law 106-53, Section 102(b)(9). The studies evaluated the engineering, environmental, and economic acceptability of various alternatives for the present and future harbor conditions over a 50-year analysis period. The DEIS is being circulated to agencies and the public for a 45-day comment period.

Recommended improvements as outlined in the Maximum Authorized Plan and the tentative National Economic Development (NED) Plan include: channel deepening from the sea through the Harbor Entrance Channel to the Garden City Terminal; channel widening to create meeting areas at Long Island and Oglethorpe Ranges; widening and deepening of the Kings Island Turning Basin; and channel widening at three bends.

In order to avoid, minimize, or compensate for adverse environmental impacts associated with the proposed action, the following mitigation features are proposed:

(1) Acquire and preserve lands adjacent to the Savannah National Wildlife Refuge

(2) Construct a diversion structure, deepen, and close the lower arm of McCoys Cut

(3) Close Rifle Cut

(4) Remove the Tidegate abutments and piers

(5) Construct a rock sill at the mouth of Back River

(6) Fill a broad berm in the Sediment Basin

(7) Construct a sill in Middle River near Disposal Area 2A

(8) Construct a boat ramp on Hutchinson Island

(9) Construct a fish passage structure at the New Savannah Bluff Lock and Dam

(10) Mitigate for striped bass (stocking)

(11) Construct and operate a dissolved oxygen system

(12) Restore brackish marsh in Disposal Area 1S

(13) Recover data from the Ironclad CSS Georgia and other significant archaeological resources

(14) Monitor and adaptively manage the river ecosystem

Enclosed, you will find one hard copy and one digital video disc (DVD). Pursuant to the Coastal Zone Management Act and the Fish and Wildlife Coordination Act, copies of this Draft EIS and GRR have been provided to the Office of Ocean and Coastal Resource Management Policy and Planning Division and the Bureau of Water Division. Comments should be provided no later than 45 days from the date of this letter to Mr. William Bailey, ATTN: PD, US Army Corps of Engineers, Savannah District, 100 West Oglethorpe Avenue, Savannah, Georgia 31401-3640 or by email to CESAS-PD@usace.army.mil.

Sincerely,

Jeffrey M. Hall
Colonel, US Army
Commanding

Enclosures

#22

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

Bureau of Water
2600 Bull St
Columbia SC 29201

Water Quality Certification

Applicant: US Army Corps of Engineers, Savannah District P/N: 2010 SHEP

Pursuant to R.101.C., Water Quality Certification, the SC Department of Health and Environmental Control (Department) will not consider your application complete for processing until you publish notice of the application in a newspaper and submit the required fee. In addition, the names and addresses of all adjacent property are required before your application is considered complete. Please be advised that other information may be required in order for the Department to determine if the application is deemed complete for processing. Details of the additional requirements follow:

1. **Public Notice**: Pursuant to R. 61-101, Water Quality Certification, a notice in the newspaper must contain information explaining the location, nature and extent of the proposed activity. The notice must indicate a fifteen (15) day comment period and be published in a newspaper of local or general circulation in the county where the activity is proposed to take place for one day. **You must provide SC DHEC with an affidavit of publication from the newspaper within fifteen (15) days of publication. You must publish the following notice and submit an affidavit of publication before SC DHEC can continue processing your application.**

   PUBLIC NOTICE P/N: 2010 SHEP
   (*Applicant*) has applied to the South Carolina Department of Health and Environmental Control for a Water Quality Certification to (*Brief description of work*) for (*Public/Private*) use in (*Name and Location of Waterbody*). Comments will be received by the South Carolina Department of Health and Environmental Control at 2600 Bull St, Columbia SC 29201-1797, Attn: Chris Beckham, Division of Water Quality until (*Insert Date - 15 days from date of this notice).*

2. **List of Adjacent Property Owners:** The Department requires a list containing the names and addresses of all property owners who own property adjacent to the project area.

3. **Fee**: Pursuant to R. 61-30, Environmental Protection Fees, the SC Department of Health and Environmental Control is authorized to collect application fees for Water Quality Certification. The following fee is now due to the Department of Health and Environmental Control:

   US Army Corps of Engineers, Savannah District
   Joint Public Notice Number: 2010 SHEP
   Issue Date: November 15, 2010
   Total Due: $ 1,000.00

- The Department has 180 days to complete action on an application for 401 Water Quality Certification or the assessed fee must be returned. The180 days includes only those days in which the application is actively being reviewed by the Department; the clock stops when information is requested and the SC Department of Health and Environmental Control is waiting on a response. **Accordingly, the 180 day clock will not start until we have received an affidavit of publication, the list of adjacent property owners, and the appropriate fee.**

- If you have questions regarding this 401 Water Quality Certification public notice requirement, please contact the Project Manager, Chris Beckham, at 803-898-4261 or other available 401 Water Quality Certification staff at 803-898-4300.

401 Water Quality Certification Application Fee

US Army Corps of Engineers, Savannah District
Joint Public Notice Number: 2010 SHEP
Issue Date: November 15, 2010
Total Due: $ 1,000.00

Please return this page with your check (made payable to SC Department of Health and Environmental Control) and your affidavit of publication to:

SC Department of Health and Environmental Control
Bureau of Water
Attn: Chris Beckham, Project Manager
2600 Bull St
Columbia SC 29201-1797

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment

#16

~~DE~~
PD
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DP
DX
DWC

December 3, 2010

Jeffrey M. Hall, Colonel, US Army, Commanding
US Army Corps of Engineers, Savannah District
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Dear Colonel Hall:

The South Carolina Department of Health and Environmental Control (Department) is in receipt of the Joint Public Notice issued by the Savannah District on November 15, 2010, regarding the Notice of Availability of the Draft Environmental Impact Statement for the improvements and continued maintenance of the Savannah Harbor Federal Navigational Project. This notice announces that authorization is required from the Department in accordance with the South Carolina Coastal Zone Management Program and Section 401 of the Clean Water Act. The notice further provides for comment periods of 45 days for individuals interested in commenting on the Coastal Zone Management Consistency Certification and 60 days for commenting on the 401 Water Quality Certification respectively. It is also understood based on your November 4, 2010 letter to the Department, that these certifications will be required from the Department at the end of these public comment periods.

As the Department explained in our prior correspondence of September 29, 2010, this is an extremely complex project with significant implications for the State of South Carolina and we do not believe that this short period of time will allow us adequate time to receive public comment and review the application and all supporting documents. As you are aware, Section 401 of the Clean Water Act allows the State a reasonable period of time not to exceed one year to act upon an application for a 401 Water Quality Certification and the Department has determined that one full year is needed. Furthermore, the Federal Coastal Zone Management Act in 930.41(a) allows for 60 days for State concurrence and an additional 15 days pursuant to 930.41(b) if requested by the State in writing. Please take this letter as the Department's formal request under 930.41(b) for additional time to review this project. Furthermore, the Department has concerns about the appropriateness of a federal agency deeming an activity consistent with our Coastal Zone Management program based on a Draft EIS.

Please note that the Department would be required to deny these certifications if adequate time is not provided for complete review of this project.

Sincerely,

Earl Hunter

Earl Hunter, Commissioner
SC Department of Health and Environmental Control

CC: Robert (Bob) King, Deputy Commissioner, EQC
Carolyn Boltin-Kelly, Deputy Commissioner, OCRM
David Wilson, Chief, EQC Bureau of Water

File

DNR Historic
Preservation Div

2010 DEC -9 PM 2:49

December 7, 2010

South Carolina Archives & History Center
History & Heritage For All Generations

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.

- 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

Copy

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

Planning Division

DEC 17 2010

Mr. C. Earl Hunter
Commissioner
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Dear Mr. Hunter:

On November 15, 2010, the Savannah District, US Army Corps of Engineers distributed the Savannah Harbor Expansion (SHEP) Draft General Reevaluation Report (GRR) and Tier II Environmental Impact Statement (EIS) to incrementally evaluate deepening the Savannah Harbor Federal Navigation Project. Notice of these draft documents and a 45-day public comment period was published in the Federal Register on November 26, 2010. Based on this publication, the public comment period is scheduled to end January 10, 2011. Since the release of these documents, the Savannah District has received several requests to extend the public comment period. Based on these requests, the public comment period has been extended for an additional 15 days bringing the end of the comment period to January 25, 2011.

In addition, please attach a copy of the enclosed errata sheet inside the front cover of the GRR and EIS documents.

Should you have questions or comments please send them to my attention at: Savannah District, US Army Corps of Engineers, 100 West Oglethorpe Avenue, Savannah, Georgia 31401-3640 or by email to CESAS-PD@usace.army.mil.

William G. Bailey
Chief, Planning Division

Enclosure

ERRATA SHEET

Savannah Harbor Expansion Draft GRR and EIS

Section 101 of the Water Resources Development Act of 1999 authorizes a project at a depth up to -48 feet subject to concurrence by the Secretaries of the Army, Commerce and Interior, and the Administrator of the Environmental Protection Agency (EPA). The Draft EIS described the potential impacts of all depths evaluated between -42 and -48 feet, as required by the legislation. Within the range of feasible depths, the -47 feet plan is the tentatively selected National Economic Development (NED) plan and complies with Army policy. The Maximum Authorized Plan of -48 feet is supported by the non-Federal sponsor. The final GRR and the EIS will contain a recommended plan agreed to by the Secretaries of the Army, Commerce, and Interior, and the Administrator of EPA.

References to the Maximum Authorized Plan of -48 feet were made in several places in the Draft GRR and EIS for describing the effects of the greatest, deepest alternative. These references should not be interpreted as a recommendation or preference for that alternative over the tentatively selected -47 feet NED. The following table identifies examples of references to the -48 feet alternative as indicated above. Again this is not an all inclusive list; therefore, this understanding applies to other locations throughout the draft GRR and EIS that use the nomenclature to describe the effects of the deepest alternative.

SHEP Draft GRR & EIS -48-feet Plan References		
Report Section	Page Number	Section/ Paragraph
GRR, Engineering Appendix	1	1,3
GRR, Real Estate Appendix	3	1
EIS	3-19	3.04
EIS	5-105	5.5.1

ERRATA SHEET

Copy

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

Planning Division

DEC 1 7 2010

Mr. David Wilson
Bureau Chief
South Carolina Department of Health and Environmental Control
Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201-1708

Dear Mr. Wilson:

On November 15, 2010, the Savannah District, US Army Corps of Engineers distributed the Savannah Harbor Expansion (SHEP) Draft General Reevaluation Report (GRR) and Tier II Environmental Impact Statement (EIS) to incrementally evaluate deepening the Savannah Harbor Federal Navigation Project. Notice of these draft documents and a 45-day public comment period was published in the Federal Register on November 26, 2010. Based on this publication, the public comment period is scheduled to end January 10, 2011. Since the release of these documents, the Savannah District has received several requests to extend the public comment period. Based on these requests, the public comment period has been extended for an additional 15 days bringing the end of the comment period to January 25, 2011.

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Should you have questions or comments please send them to my attention at: Savannah District, US Army Corps of Engineers, 100 West Oglethorpe Avenue, Savannah, Georgia 31401-3640 or by email to CESAS-PD@usace.army.mil.

William G. Bailey
Chief, Planning Division

Enclosure

ERRATA SHEET

Savannah Harbor Expansion Draft GRR and EIS

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References to the Maximum Authorized Plan of -48 feet were made in several places in the Draft GRR and EIS for describing the effects of the greatest, deepest alternative. These references should not be interpreted as a recommendation or preference for that alternative over the tentatively selected -47 feet NED. The following table identifies examples of references to the -48 feet alternative as indicated above. Again this is not an all inclusive list; therefore, this understanding applies to other locations throughout the draft GRR and EIS that use the nomenclature to describe the effects of the deepest alternative.

SHEP Draft GRR & EIS -48-feet Plan References		
Report Section	Page Number	Section/ Paragraph
GRR, Engineering Appendix	1	1,3
GRR, Real Estate Appendix	3	1
EIS	3-19	3.04
EIS	5-105	5.5.1

ERRATA SHEET

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

Bureau of Water
2600 Bull St
Columbia SC 29201

Public Notice # 2010-SHEP

Public Notice Date: December 30, 2010

DEPARTMENT DECISION
NOTICE OF DEPARTMENT DECISION
WATER QUALITY CERTIFICATION AND
CONSTRUCTION IN NAVIGABLE WATERS PERMIT

The South Carolina Department of Health and Environmental Control (Department), acting on an application for Water Quality Certification pursuant to Section 401 of the Federal Clean Water Act, and Construction in Navigable Waters Permit pursuant to R. 19-450. et. Seq., 1976 SC Code of Laws has reached a proposed decision for the project described below:

US Army Corps of Engineers, Savannah District
Savannah Harbor Expansion Project
Savannah River
Jasper County
P/N 2010 SHEP

Section 401 of the Clean Water Act allows the State a reasonable period of time not to exceed one year to act upon an application for a 401 Water Quality Certification. The Savannah District of the US Army Corps of Engineers (Corps) has notified the Department that the Water Quality Certification for this project must be received by the end of the public comment period in late January 2011. This time period is not adequate to conduct the necessary review to fulfill the regulatory obligations pursuant to Section 401 of the Clean Water Act; Department Regulation 61-101, Water Quality Certification; and Department Regulation 19-450, Permits for Construction in Navigable Waters.

The proposed project includes extensive environmental impacts that must be thoroughly reviewed by the Department. The public notice that was issued by the Corps on November 15, 2010, notes that the project violates water quality standards and the applicant proposes to mitigate for these impacts through a mechanical oxygenation system. The project could also potentially cause direct and indirect impacts to over 1,000 acres of wetlands. These impacts and the extensive mitigation proposal that is included in the draft EIS must also be reviewed by the Department. The Department must also determine if there are feasible alternatives that reduce the adverse consequences on water quality and classified uses. The timeframe imposed by the Corps prevents the Department from reviewing comments from the public and the resource agencies prior to noticing a decision on the project. Coordination with the resource agencies is necessary for the Department to determine if the project has the potential to impact waters containing Federally recognized rare, threatened, or endangered species. Because the Savannah District did not allow adequate time to acquire and consider all of the information necessary to conduct a thorough review of the project, the Department has not been able to determine if the project is consistent with the certification requirements of Section 401 of the Clean Water Act, and does not have a reasonable assurance that the proposed project will be conducted in a manner consistent with the certification

requirements of Section 401 of the Clean Water Act. Accordingly, the Department proposes to deny Water Quality Certification for the proposed project without prejudice.

A copy of the plans submitted by the applicant is available for review in the office of the Division of Water Quality, Bureau of Water.

Additional information about the technical aspects of this application is available from Chris Beckham, the project manager, at 803-898-4261.

The issuance of this Notice of Department Decision represents a final staff decision that may be appealed. Please see the attached page titled "Notice of Appeal Procedure" for details.

Chuck Hightower, Section Manager
Water Quality Certification and
Wetland Program Section

cc: US Army Corps of Engineers,
Charleston District Office
SCDHEC, Region 8 Offices
SCDHEC-OCRM, Charleston Office

Notice of Appeal Procedure
Pursuant to S.C. Code Section 44-1-60

1. This decision of the S.C. Department of Health and Environmental Control (Department) becomes the final agency decision 15 calendar days after notice of the decision has been mailed to the applicant or respondent, unless a written request for final review accompanied by a filing fee in the amount of $100 is filed with the Department by the applicant, permittee, licensee, or affected person.

2. An applicant, permittee, licensee, or affected person who wishes to appeal this decision must file a timely written request for final review with the Clerk of the Board at the following address or by facsimile at 803-898-3393. A filing fee in the amount of $100 made payable to SC DHEC must also be received by the Clerk within the time allowed for filing a request for final review. However, if a request for final review is filed by facsimile, the filing fee may be mailed to the Clerk of the Board if the envelope is postmarked within the time allowed for filing a request for final review.

   Clerk of the Board
   SC DHEC
   2600 Bull Street
   Columbia, SC 29201

3. In order to be timely, a request for final review must be received by the Clerk of the Board within 15 calendar days after notice of the decision has been mailed to the applicant or respondent. If the 15th day occurs on a weekend or State holiday, the request is due to be received by the Clerk of the Board on the next working day. The request for final review must be received by the Clerk of the Board by 5:00 p.m. on the date it is due. A request for final review will be returned to the requestor if the filing fee is not received on time as described above.

4. The request for final review should include the following:
   a. the grounds on which the Department's decision is challenged and the specific changes sought in the decision
   b. a statement of any significant issues or factors the Board should consider in deciding whether to conduct a final review conference
   c. a copy of the Department's decision for which review is requested

5. If a timely request for final review is filed with the Clerk of the Board, the Clerk will provide additional information regarding procedures. If the Board declines in writing to schedule a final review conference, the Department's decision becomes the final agency decision and an applicant, permittee, licensee, or affected person may request a contested case hearing before the Administrative Law Court within 30 calendar days after notice is mailed that the Board declined to hold a final review conference.

The above information is provided as a courtesy; parties are responsible for complying with all applicable legal requirements.

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

JAN 10 2011

Executive Office

Mr. Chuck Hightower
Water Quality Certification and Wetland Program Section, Section Manager
South Carolina Department of Health and Environmental Control
Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201-1797

Dear Mr. Hightower:

The purpose of this letter is to address the proposed South Carolina Department of Health and Environmental Control (SC DHEC), Department Decision, Public Notice # 2010-SHEP, Public Notice Date: December 30, 2010.

In this proposed Department Decision, you indicated that SC DHEC proposes to deny, without prejudice, water quality certification for the Savannah Harbor Expansion Project (SHEP). The SC DHEC based its proposed decision on not having an adequate amount of time to acquire and consider all of the information necessary to conduct a thorough review in order to determine that the proposed project will be conducted in a manner consistent with the requirements of Section 401 of the Clean Water Act (CWA).

It appears that the proposed SC DHEC decision is based upon a misunderstanding concerning the pertinent time periods. I believe that SC DHEC may want to withdraw its proposed decision and not waive its obligations under Section 401 of the CWA.

The November 15, 2010 Joint Public Notice (JPN) and the November 26, 2010 publication of the Draft EIS and GRR in the Federal Register (FR) triggered two separate time periods under two different federal statutes. The JPN triggered a CWA time period and the FR notice triggered a National Environmental Policy Act (NEPA) time period.

Pursuant to the White House Council on Environmental Quality (CEQ) federal regulations that implement NEPA (40 C.F.R. § 1506.10(c)), the Corps must provide a minimum 45-day public comment period. Initially, the Corps set the closing date of the NEPA public comment period on January 10, 2011. Upon several requests, including one from SC DHEC, I extended the public comment period and agreed to accept comments until January 25, 2011. The time period established under NEPA is only intended to apply to comments on the Draft GRR and Draft EIS from the public and federal, state, and local agencies. Given the extensive public and resource agency involvement in this project over the past decade, this is a reasonable amount of time for the initial NEPA public comment period.

Under the CWA, SC DHEC has a reasonable period of time (which shall not exceed one year) to act on the Corps' request for water quality certification. The closing of the NEPA public comment period does not change the fact that SC DHEC has a reasonable period of time under the CWA to act on the Corps' request for water quality certification.

The Corps' request for Section 401 water quality certification under the CWA began on November 15, 2010, which was the date of the JPN. Please tell me what you consider to be a reasonable period of time for SC DHEC action, and when SC DHEC anticipates rendering a final determination on the Corps' water quality certification request.

We appreciate and look forward to our continued collaboration on this project with you, other federal and state resource agencies, and the public. If you have any questions, please let me know.

Sincerely,

/Jeffrey M. Hall

Jeffrey M. Hall
Colonel, US Army
Commanding

CF:
Mr. Henry McMaster, Attorney General, State of South Carolina
Mr. Earl Hunter, Commissioner, SC Department of Health and Environmental Control
Clerk of the Board, SC Department of Health and Environmental Control

D H E C
PROMOTE PROTECT PROSPER

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

January 13, 2011

Jeffrey M. Hall, Colonel, US Army, Commanding
US Army Corps of Engineers, Savannah District
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Re: Savannah Harbor Expansion Project

Dear Colonel Hall:

The South Carolina Department of Health and Environmental Control (Department) has received your letter dated January 10, 2011. In this letter, you suggested that the Department might want to withdraw its proposed decision on the Savannah Harbor Expansion Project (SHEP) and not waive its obligation under Section 401 of the Clean Water Act. The letter also asked that the Department tell you what we would consider a reasonable timeframe to make a decision on the project.

During a meeting of the Savannah Maritime Commission in September 2010, the US Army Corps of Engineers (Corps) announced that the project schedule for the SHEP allowed 60 days to obtain the Section 401 Water Quality Certification (Certification). Following this meeting, the Department sent a letter dated September 29, 2010, in which a request was made to allow additional time to complete the Certification for this project. In a letter dated November 4, 2010, you made note that the project schedule calls for the Certification to be obtained at the end of the public comment period in late January 2011. On November 15, 2010, the Corps issued the public notice for the draft Environmental Impact Statement (EIS) and concurrently submitted the application for the Certification. This public notice allowed the public 60 days to submit comments to the Department. Thus, in accordance with your November 4, 2010 letter, the Certification was to be obtained at the end of this 60-day time period.

In a subsequent letter, dated December 3, 2010, the Department informed you that the allotted time frame of 60 days was not adequate, and asked for a time period of one year to make a 401 Water Quality Certification decision on the SHEP project. The Department considers one year to be a reasonable period of time to review the multiple volumes of documents and reports that comprise the draft EIS and to provide for public input as required by S.C. Regulation 61-101, *Water Quality Certification*. Since the Department received no response to our request for additional time, the decision was made to move forward with the Notice of Department Decision published on December 30, 2010. Furthermore, this decision does not constitute a waiver of the Department's obligation under Section 401 of the Clean Water Act. Rather, this decision proposes to deny the 401 Water Quality Certification for the project. According to South

Carolina state law, this decision becomes final 15 days after it was mailed to the applicant, unless a timely appeal is received; however, since this proposal is to deny the project without prejudice, the Corps has the option to resubmit the application for a 401 Water Quality Certification.

Please do not hesitate to contact me at 803-898-0369, if I can be of further assistance.

Sincerely,

Chuck Hightower, Section Manager
Water Quality Certification & Wetlands Section

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

January 13, 2011

Executive Office

Mr. Chuck Hightower
Water Quality Certification and Wetland Program Section, Section Manager
South Carolina Department of Health and Environmental Control
Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201-1797

Dear Mr. Hightower:

In your letter, dated January 13, 2011, you said that South Carolina Department of Health and Environmental Control (SC DHEC) had not received a response from the Corps on your request for sufficient time to make a decision on water quality certification for the Savannah Harbor Expansion Project (SHEP). My letter of January 10, 2011, gave you that response by clearly stating that under the Clean Water Act (CWA), SC DHEC has a reasonable period of time (which shall not exceed one year) to act on the Corps' request for water quality certification.

In my previous letter, I asked you what you consider to be a reasonable period of time for SC DHEC action. In your current letter, you have said that SC DHEC considers one year a reasonable amount of time. The Corps' request for Section 401 water quality certification under the CWA began on November 15, 2010, which was the date of the Joint Public Notice (JPN). Accordingly, a reasonable period of time, which shall not exceed one year, won't expire until November 2011.

As I see it, SC DHEC can take until November 2011 as allowed by the CWA; or, SC DHEC can let the proposed Department Decision, Public Notice # 2010-SHEP, Public Notice Date: December 30, 2010 become final. I reiterate my position that SC DHEC withdraw its proposed decision and take the time allowed to act on the Corps' request for water quality certification.

We appreciate and look forward to our continued collaboration on this project with you, other federal and state resource agencies, and the public. If you have any questions, please let me know.

Sincerely,

Jeffrey M. Hall
Colonel, US Army
Commanding

CF:
Mr. Henry McMaster, Attorney General, State of South Carolina
Mr. Earl Hunter, Commissioner, SC Department of Health and Environmental Control
Clerk of the Board, SC Department of Health and Environmental Control

D H E C

PROMOTE PROTECT PROSPER

January 14, 2011

Jeffrey M. Hall, Colonel, US Army, Commanding
US Army Corps of Engineers, Savannah District
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Re: Permit - Savannah Harbor Expansion Project (SHEP)

Dear Colonel Hall:

The South Carolina Department of Health and Environmental Control (Department) received your letter dated January 13, 2011. As you are aware, the Department issued a Notice of Department Decision on December 30, 2010, in which we proposed to deny the 401 Water Quality Certification for the SHEP due to the fact that the time provided for Department review was inadequate. In your recent letter, you state that the Corps' request for 401 certification under the Clean Water Act began on November 15, 2010, and that "SC DHEC can take until November 2011" to provide its 401 certification in this matter. The Department also confirmed with you in a January 14, 2011, telephone conversation that the project schedule now provides for the November 2011 date for the 401 certification decision.

Based on this new information, the Department hereby rescinds the Notice of Department Decision dated December 30, 2010, for the above-referenced permit. The Department will continue to process the permit application with the new 401 certification timeframe expiring November 2011.

Please do not hesitate to contact me at 803-898-0369, if I can be of further assistance.

Sincerely,

Chuck Hightower, Section Manager
Water Quality Certification & Wetlands Section
SCDHEC – Bureau of Water

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

January 21, 2011

Jeffrey M. Hall, Colonel, US Army, Commanding
US Army Corps of Engineers, Savannah District
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Re: Savannah Harbor Expansion Project (SHEP)

Dear Colonel Hall:

I am writing you to determine whether the Department of the Army, Savannah District, Corps of Engineers letter dated, January 13, 2011, allows the South Carolina Department of Health and Environmental Control Office of Ocean and Coastal Resource Management (SCDHEC OCRM) additional time to review the SHEP DEIS for consistency with the South Carolina Coastal Zone Management Program. The Savannah District - COE response allows for SCDHEC to have until November 2011 to conduct its review as allowed by the Clean Water Act. Does this timeframe also apply to the concurrence of the consistency determination by SCDHEC OCRM?

If the consistency review is not included, I am requesting that you allow more time for SCDHEC OCRM to conduct a thorough review of the DEIS pursuant to Federal Regulation Part 930.42(b). Specifically, this regulation states "In considering whether a longer or additional extension period is appropriate, the Federal agency should consider the magnitude and complexity of the information contained in the consistency determination." Given the complexity and the magnitude of the documentation provided in the DEIS, the SCDHEC OCRM feels that 75 days (60 + 15 day extension previously requested in a December 3, 2010, letter to you) is not a sufficient amount of time to review the document. SCDHEC OCRM requests that you offer the same amount of time for review of the DEIS for consistency with the South Carolina Coastal Zone Management Program as you have allowed for the review for DHEC's water quality Certification program.

I look forward to your response. If you would like to discuss this issue or have any questions, please contact Blair Williams of my staff at (843) 953-0232.

Sincerely,

Carolyn Boltin-Kelly, Deputy Commissioner
Office of Ocean and Coastal Resource Management

cc: William G. Bailey, Corps of Engineers, Savannah District
Heather Preston, SCDHEC BOW

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Richard B. Russell Federal Building
75 Spring Street, S.W.
Atlanta, Georgia 30303

ER 10/1039
9043.1

January 21, 2011

Colonel Jeffrey M. Hall
U.S. Army Corps of Engineers
Savannah District
100 W. Oglethorpe Avenue
Savannah, Georgia 31401-3640

RE: Savannah Harbor Expansion Project, General Reevaluation Report (GRR) and Draft Tier II Environmental Impact Statement (DEIS)

Dear Colonel Hall:

The Department of the Interior (Department) has reviewed the subject documents. The Savannah Harbor Expansion Project (SHEP) involves deepening the harbor from the current inner harbor depth of 42 feet by as much as 6 feet to a maximum authorized depth of 48 feet. Authorizing language in the Water Resources Development Act of 1999 stipulates that the project may proceed only after the Secretary of the Interior, Secretary of Commerce, and Administrator of the Environmental Protection Agency approve the selected plan and determine that the associated mitigation plan adequately addresses its potential environmental impacts. The subject documents describe various models that were developed to predict changes to the environment resulting from alternative channel depths and mitigation measures. Predicted changes to the environment include: salinity increases, loss of tidal freshwater marsh, reduced striped bass reproduction and recruitment, negative impacts to shortnose sturgeon habitat, reduced dissolved oxygen (DO), and potential exposure of wildlife to cadmium in dredged sediments.

General Comments

Plan Selection

The Corps of Engineers' (Corps) analysis shows that incremental net economic benefits of the alternatives are maximized at a depth of 45 feet, decrease from 45 to 47 feet, and are negative at 48 feet. The 47-foot depth provides the greatest total net economic benefits and is identified as the national economic development (NED) plan. The maximum authorized depth of 48 feet is the locally preferred plan (LPP) of the non-Federal cost share sponsor, the Georgia Ports Authority. The additional economic benefits of the LPP relative to the NED plan (about 1 percent more), but higher costs (about 6 percent more), represent negative incremental net benefits. The DEIS states the tentatively recommended plan is either the 47-foot alternative (NED plan) or the 48-foot alternative (LPP), although three other federal agencies must approve final plan selection and have expressed reservations about the deeper alternatives.

The Department's preferred plan for deepening Savannah Harbor is the 45-foot depth alternative, because it minimizes the loss of freshwater tidal wetlands, impacts to Savannah National Wildlife Refuge (NWR), and risk and uncertainty of impacts to trust fish and wildlife resources. Previous channel deepening projects have reduced tidal freshwater marsh within the Savannah River estuary from about 12,000 acres to about 3,300 acres. The majority of the remaining freshwater tidal wetlands occur on Savannah NWR. Further deepening the channel from its present depth of 42 feet would further reduce this important and increasingly rare national resource. At the NED plan depth (47 feet), a net loss of 223 acres of tidal freshwater wetlands is predicted after flow-diversion mitigation is implemented. At the LPP depth (48 feet), a net loss of 337 acres of tidal freshwater wetlands is predicted after flow-diversion mitigation is implemented. The loss of an additional 114 acres of freshwater tidal wetlands associated with the LPP would represent a 50 percent increase in impacts to the Savannah NWR over the NED plan and a cumulative loss of approximately 10 percent of the basin's remaining freshwater tidal wetlands. For this reason, the Department does not support the LPP.

Sea Level Rise

The potential effect of sea level rise on wetland habitats is mentioned throughout the DEIS. The document discusses drought, sea level rise, and channel deepening, but does not analyze the interaction between these major influences. In Appendix C (Mitigation Planning) and elsewhere in the DEIS, the Corps suggests that if the rate of sea level rise exceeds the historic rate, the proposed compensatory mitigation (e.g., land additions to the Savannah NWR for the loss of 223 acres of freshwater tidal wetlands under the NED plan) would overcompensate project impacts, because some of those acres would have converted to brackish or salt marsh without the project. The Corps proposes to reassess sea level rise effects in the future and assign "advance mitigation" credits to the project for use with future actions. The Department objects to this proposal, because sea level rise would have a negligible impact in the upper estuary if not for the cumulative impacts of previous harbor deepening. The rate of sea level rise is uncertain and substantial impacts resulting from sea level rise are likely well into the future. Conversely, the impacts of further harbor deepening will begin almost immediately. In addition, due to the complexity of the system and limitations of the models, the Department has concerns that the models may underestimate wetland impacts. The Department regards "advance mitigation" in this context as the functional equivalent of a mitigation bank, and U.S. Fish and Wildlife Service (FWS) Mitigation Policy (64 FR 49229-49234) does not allow the use of NWR lands for mitigation banks to compensate for the effects of activities authorized by the Department of the Army under Section 10 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Therefore, the Department does not support the concept of advance mitigation based on a future evaluation of the relative impacts of sea level rise. We do support, however, obtaining a waiver in this instance from the Corps' policy to implement the agency-coordinated level of mitigation for the base year (the year construction is completed) impacts, rather than mitigating for the project's average annual impacts or reassessing sea level rise impacts in the future.

Monitoring/Adaptive Management

Assuring the effectiveness of the mitigation features proposed in the DEIS is essential to the Department's approval of the selected project plan. These features were developed using pre-construction data and models to predict potential effects to the estuary. The DEIS states that natural variation alone will nearly guarantee that conditions during the first few years after construction are different from those under which the models were first calibrated. Currently, the Monitoring and Adaptive Management Plan proposes 5 years post-construction monitoring of key mitigation features, which we believe is not long enough. It is the Department's position that 10 years post-construction monitoring is necessary for the adaptive management process to

work; i.e., to ensure that impacts to natural resources in this complex system resulting from project construction are limited to those predicted. Further, the Department recommends a more precise definition of observed conditions that would prompt changes to the mitigation features, and a time-line for making decisions and taking corrective actions thereafter. The Department is also concerned that funding for adaptive management will depend upon the Corps' annual appropriations process. It is relatively certain that impacts to trust resources of the Department will occur following construction, but the effectiveness of the mitigation features is much less certain. Therefore, the Department cannot agree that the proposed mitigation adequately addresses project impacts unless contingency funding for monitoring and adaptive management is assured.

The Department is concerned about the reliance on the hydrodynamic and water-quality models in the Adaptive Management Plan (AMP, Appendix D). The Plan does not include ecological performance measures to independently evaluate the effectiveness of the mitigation for the deepening of the Savannah Harbor. The models were developed to evaluate potential resource impact from deepening and to evaluate various mitigation actions to minimize environmental degradation of valued resources. The mitigation plan results in major changes to flow dynamics of the Lower Savannah River Estuary. Six of the seven mitigation features involve alterations to flow paths. The expected result of the mitigation is that the post-construction ecosystem will function in a similar manner to the pre-construction ecosystem. The monitoring data, along with ecological performance measures, should be used to evaluate the effectiveness of the mitigation features.

The AMP does not include ecosystem performance measures for the majority of the resources that the mitigation is trying to protect. The only ecological performance measure found was for the re-vegetation of Area 1S. For the other resources, the Corps proposes to use a modified version of the draft Federal Expectation for Hydrodynamic and Water-Quality Model Calibration and Confirmation performance measures. The intent is to collect additional data, simulate pre- and post-project scenarios with the models, evaluate the calibration of the models, re-calibrate the models (if necessary), and then evaluate the effectiveness of the mitigation.

It is not clear in the AMP how the draft Federal Expectation for Hydrodynamic and Water-Quality Model Calibration and Confirmation performance measures equates to ecological performance measures. The hydrodynamic and water-quality models currently do not meet these model calibration goals in many areas of the system (see Tetra Tech, 2006; Appendices B-K, P, and Q). If the current models do not meet the calibration performance goals, how will evaluating the model calibration performance for the post-project inform resource decision makers if the ecosystem is being protected by the mitigation features?

It is important to perform a post audit of the models to better assess their predictive capacity and uncertainties. Model calibration goals are not the same as ecological performance measures. By relying solely on the post audit of the models for the evaluation of the mitigation, an opportunity for utilizing the tremendous amount of data and analysis that were used to develop the DEIS is not being realized. The development of the DEIS involved tremendous amounts of data collection and analysis of various resources that needed protection. These data and analyses should be used in developing ecosystem performance measures. The ecosystem performance measure could be expressed as the magnitude, duration and frequency of the parameter of interest and appropriate thresholds for actions by resource agencies.

There are references in the Plan of the using the monitoring data to show if "...impacts are occurring beyond the range of those expected" and the monitoring data "...will be useful in identifying whether any impacts are occurring beyond the range of those expected" (p. 27). The expected range of impacts was never defined in the AMP. At every sampling and gaging location for a resource of concern, an ecological performance measure should be developed to define the expected ecosystem response to the deepening mitigation.

There is currently a network of 12 real-time gages that collect water level, velocity, specific conductance, and (or) temperature. Many of these stations have been collecting data since the most recent deepening in 1994. The AMP outlines additional stations that will be added to the network. These data, along with discrete sampling data, and ecological performance measures can be analyzed directly to evaluate the effectiveness of the mitigation features.

Many of the funding figures appear to be inconsistent between sections of the AMP and between the AMP and the GRR. For example, chloride sampling is listed at $100,000 on page 18 and $80,000 on page 24, marsh data collection is listed at $18,000 on page 17 and $20,000 on page 24, and long-term monitoring is listed at $347,000 on page 37 and $428,400 in the GRR.

Cadmium

Procedures for disposing of sediments that contain cadmium concentrations exceeding 14 parts per million (ppm) are discussed in three parts of the DEIS: 1) Section 5.4.2.2; 2) Appendix D - Monitoring and Adaptive Management; and 3) Appendix M - Sediment Quality Evaluation. These discussions are unclear and inconsistent. In particular, we recommend clarifying the proposed cadmium monitoring program. The Department recommends a program of monitoring wildlife activity in disposal areas and cadmium levels in bird tissues that is independent of the Dredge Material Containment Area (DMCA) capping criteria. Wildlife monitoring should begin with sediment placement and continue as long as all other monitoring of the DMCA. Tissue monitoring should occur: 1) prior to sediment placement to collect baseline data; 2) during sediment placement; and 3) post placement until 3 consecutive years of samples contain cadmium concentrations that are less than the potential adverse effect level, which is to be determined. The Department supports the sampling protocol (species and timing) described in Appendix D, page 23; and requests that the Corps continue to coordinate with the FWS prior to completion of the final EIS to finalize plans for biological monitoring within DMCAs, including tissue sampling.

The Department accepts the Corps' use of 4 ppm cadmium concentration in capping material as a trigger for remedial action in DMCAs. The Department understands that the Corps will move a DMCA to higher priority in the rotation for Operations and Maintenance (O&M) sediment placement and vegetation monitoring if 25 cumulative acres are found to have a cadmium concentration greater than or equal to 4 ppm. Sampling and placement will continue until the DMCA has less than 25 cumulative acres with a cadmium concentration greater than or equal to 4 ppm.

Risk and Uncertainty Analysis

The Savannah estuary is a complex system and predicting how this system may respond to substantial physical alterations (channel deepening, flow diversions, etc.) is fraught with uncertainties, which are well acknowledged within the DEIS. However, based on an analysis prepared by Kinetic Analysis Corporation (KAC), the DEIS concludes that the hydrodynamic model probably over-predicts salinity and under-predicts dissolved oxygen; i.e., the model errs towards the side of simulating conditions worse than would actually occur. We believe this

analysis may seriously misrepresent the risk associated with the water quality predictions. It is quite possible that the hydrodynamic model does not predict worst-case conditions. With the exception of the new channel depth, the KAC analysis relied upon the existing geometry of the Savannah River estuary. Several mitigation measures would significantly modify the system geometry, including significant flow diversion at McCoys Cut, closing Rifle Cut, filling the Back River sediment basin, and removing the tide gate. Flow routing and flow volume in the three main river channels would become significantly different from the current system. Therefore, we believe the degree of risk and uncertainty regarding expected water quality impacts, and in turn, wetland impacts, is considerably higher than the KAC analysis suggests. For this and other reasons, the Department recommends extending the proposed post-construction monitoring from 5 years to 10 years.

Specific Comments

Abstract

Page 1. The first paragraph of the Abstract discusses channel depths and then states that 70% of vessels do not call on Savannah at their maximum capacity or design draft, which implies that all light-loading is due to channel depth limitations. The Corps should include information on the percentage of vessels with loads constrained by channel depth and the percentage of light-loading due to other factors, such as prior calls at other ports. Additionally, the DEIS should include the predicted percentage of ships that will call on the port fully loaded or leave fully loaded if the channel is deepened.

Section 3, Alternatives

3.05, Tentatively Recommended Plan, page 3-22. The first paragraph of this section states that the tentatively recommended plan is either the 47-foot alternative or the 48-foot alternative. The third paragraph describes the tentatively recommended plan as the 48-foot alternative. The Errata Sheet of December 17, 2010, states that various references to the 48-foot alternative throughout the GRR and DEIS "should not be interpreted as a recommendation or preference for that alternative over the tentatively selected -47 feet NED [plan]." On September 9, 2010, the FWS provided comments on preliminary drafts of the GRR and DEIS, identified -45 feet as its preferred alternative for deepening the harbor and stated it did not support the 48-foot alternative. The final EIS will necessarily need to revise this section to discuss the multi-agency rationale for what is ultimately determined as the final plan selection.

3.11, Future Conditions Without the Project, page 3-29. This section states that 70% of vessels do not call on Savannah at their maximum capacity or design draft, which implies that all light-loading is due to channel depth limitations. The Corps should include information on the percentage of vessels with loads constrained by channel depth and the percentage of light-loading due to other factors, such as prior calls at other ports. Additionally, the DEIS should include the predicted percentage of ships that will call on the port fully loaded or leave fully loaded if the channel is deepened.

Section 4, Affected Environment

4.01.2, Geology, page 4-7. The amount of dredged material by station for both inner harbor and outer harbor do not match between Section 3 (Table 3-8, pg. 3-27; Table 3-9, pg. 3-28) and

Section 4 (Table 4-4, pg. 4-7; Table 4-5, pg. 4-7). The Department recommends corrections for clarity.

4.02.4, Surface Water, pages 4- 13-14. The discussion on DO standards is confusing. The new DO standard established by the State of Georgia is not less than 5.0 mg/L throughout the year with an instantaneous minimum of 4.0 mg/L. A number of site-specific DO standards are listed. For clarity, this section should explain how the new standard of 5.0 mg/L compares to the measured monthly ranges of DO in the Savannah River at the currently authorized depth of 42 feet.

4.04, Marine and Estuarine Resources, page 4-20. This section states that optimum striped bass spawning success requires salinity less than 1.7 ppt. Studies on the Savannah River indicate that striped bass spawn almost exclusively in areas where maximum salinity near the surface is less than 1.0 ppt. The Department recommends revision to state salinity of less than 1.0 ppt is optimum.

4.06, Invasive Species, page 4-43. This section should discuss the common reed (*Phragmites australis*) as an invasive species. The document states elsewhere (page 4-55, section 4.07) that common reed will probably dominate the confined disposal facilities (CDFs). We believe that the common reed in the CDFs is the invasive strain. According to the U.S. Geological Survey (USGS), the invasive strain originated in Europe and was possibly spread via ships' ballast. Section 5 of the final EIS should evaluate the potential for the invasive strain to crowd out native species in marshes adjacent to the CDFs.

4.06, Invasive Species, page 4-43, (2nd Comment). This section addresses only one pathway, ballast water, for introduction of aquatic invasive species. Introduction of invasive species in the Savannah Harbor, both aquatic and terrestrial, is not limited to ballast water. Insects in pallets, or plants and seeds in soil on containers, are two examples of other pathways. Invasive species can dramatically alter an ecosystem, which is a major concern for the Savannah NWR. This section should address other pathways and terrestrial systems as well as aquatic systems.

4.07, Terrestrial Resources, page 4-47. The Savannah NWR is 29,175 acres, not 25,600 acres.

4.08, Wetlands and Floodplains, page 4-62. This section refers to a 1992 Planning Aid Report, but the FWS report in question is dated September 16, 1982.

Section 5, Environmental Consequences

5.1.1.1, Impacts from Excavation of Wetlands, page 5-1. The text states that the first two entries in Table 5-1 are Refuge lands, but the table labels the first three entries as Refuge lands. Figure 5-1 is illegible, but appears to depict the Kings Island Turning Basin along with another area for dredging. It is unclear where the third area of excavation is located (we believe 96+000 to 97+000). Figure 5-2 appears to depict the non-Refuge portion of excavation from 86+000 to 88+500, but it too is unclear. A proximity map would help locate these areas in relation to the Savannah NWR.

5.1.1.2, Impacts from Excavation of Wetlands, page 5-6. The discussion in the opening paragraph references Figure 5-52 as CDF 1S; however, Figure 5-52 is a picture of Old Fort Jackson (on p. 5-134). We believe the correct reference is to Figure 5-4 on page 5-7.

5.1.1.2, Impacts from Excavation of Wetlands, page 5-6 (2nd comment). The Corps proposes to restore up to 45 acres at Area 1S on the Savannah NWR, using 14.5 acres as "advance mitigation" for direct impacts to salt marsh. These impacts include widening channel bends and turning basins both on and off the Savannah NWR. "Advance mitigation" is the functional equivalent of a mitigation bank. FWS Mitigation Policy (64 FR 49229-49234) does not allow the use of NWR lands for mitigation banks; therefore, the Department cannot support the 14.5 acres as "advance mitigation."

5.1.1.2, Impacts from Excavation of Wetlands, page 5-6 (3rd comment). This section discusses wetland restoration on site 1S. Successful wetland restoration is dependent on three primary factors: soil, hydrology and vegetation. The proposed dredged material removal should expose the original wetland soil and restore the site to the elevation of adjacent marshes. Construction of a "feeder" creek system toward the interior of the restoration site from Middle River will facilitate tidal exchange; however, if restored elevations do not properly restore tidal flow, invasive vegetation with almost no wildlife value may occupy the site. The desired vegetation outcome on the site is to establish a mixed brackish marsh, similar to adjacent marsh. Chinese tallow tree and common reed, both highly invasive exotic species, have been identified in the marshes near the restoration site. Monitoring the success of the re-vegetation for 5 years should include control measures for exotic and invasive species, if detected.

5.1.2.1 Indirect Impacts to Wetlands, page 5-9. This section references a USGS report, by the Cooperative Research Unit, titled "Simulation of Water Levels and Salinity in the Rivers and Tidal Marshes in the Vicinity of the Savannah National Wildlife Refuge, Coastal South Carolina and Georgia" but does not provide the reference. Suggest the Final EIS include the reference (Conrads et al, 2006) in the text and in the References section.

5.1.2.1 Indirect Impacts to Wetlands, page 5-10: This section states "In March 2007, the Federal Cooperating Agencies discussed a USGS proposal to revise the linkage to increase its usefulness for evaluating potential mitigation measures." but the proposal was rejected. Suggest the Final EIS include a short explanation, and relevant information, on how this decision was reached.

5.1.2.2, Indirect Impacts to Wetlands, page 5-12. This section states that the primary stress to tidal freshwater marsh is prolonged drought, which is not supported by evidence. In 1875, when the controlling depth of the navigation channel was 12-15 feet, the Savannah estuary supported an estimated 12,000 acres of tidal freshwater marsh. In 2005, when the controlling depth was 42 feet, the estuary supported only 3,269 or 4,072 acres (depending on study method used). This section should instead state that the inland intrusion of salt water resulting from channel deepening is a constant stress on tidal freshwater marsh, and that prolonged drought exacerbates this stress.

5.1.2.2, Indirect Impacts to Wetlands, page 5-13. This section states the Corps evaluated the effects of sea level rise on tidal freshwater marsh. The Department maintains that sea level rise would have a negligible impact on the Savannah NWR if not for the cumulative impact of previous harbor deepening.

5.1.2.3, Mitigation – Flow Routing, page 5-29. This section examines various alterations to rivers and creeks to reduce the impacts to tidal freshwater marsh. It states that the proposed mitigation for the 47-foot alternative is predicated on a "base year" (immediately following construction) impact of 223 acres instead of a project-life average annual impact consistent with

Corps policy. The average annual impact is lower than 223 acres due to the effect of sea level rise during the next 50 years that would occur without the project. The Department maintains that sea level rise would have a negligible impact on the Savannah NWR if not for the cumulative impact of previous harbor deepening. Therefore, we support obtaining a waiver from the Corps' policy in this instance to instead implement the agency-coordinated level of mitigation.

5.2.1, Water Quality, Dissolved Oxygen, pages 5- 37-39. This section should compare the modeled DO levels in the Savannah River under the LLP and NED depth plans with the State of Georgia's DO standard. The new Georgia DO standard is not less than 5.0 mg/L throughout the year, with an instantaneous minimum of 4.0 mg/L.

5.2.3 Chloride Concentrations, page 5-54: The document states the "The Corps had an Independent Technical Review performed of the chloride model by a staff member of the USGS in Columbia, SC. The reviewer expressed about the ability of the model to make reliable predictions at the low chloride concentrations occurring at the City's intake." Suggest the Final EIS explain "what" the reviewer expressed and include documentation of the reviewer's expertise.

5.2.5, Contingency for City of Savannah Water Intake System, page 5-60. This section describes a secondary (supplemental) water supply intake line for the City of Savannah to be constructed if needed. Based on a preliminary review, the Department would prefer intake Site 1, because intake Site 2 is likely to adversely affect more wetland and wildlife habitat. The Department requests further coordination to evaluate impacts and make recommendations if the supplemental intake site is needed in the future.

5.3.2. B, Mitigation to Impacts to Fisheries, page 5-96. The Corps proposes to fund a stocking program for striped bass based on the amount of spawning and early life stage habitat lost due to water quality changes resulting from harbor deepening: "*the extent of the stocking needed could be reduced to the amount of habitat predicted to be impacted by the project. Thus, the percentage of habitat loss could be multiplied by the cost for a full-scale stocking program to determine the amount that would be sufficient to compensate for the habitat loss that is expected.*" The expected loss of habitat is 2.9% for the 45-foot alternative and 26.9% for the 47-foot alternative. The final EIS should include a proposal to monitor/measure post-construction loss of striped bass habitat. The final adaptive management plan should address striped bass, and if habitat loss exceeds the amount predicted, include provisions and assurances to increase stocking funds accordingly.

5.4.2.2, Sediment Quality Evaluation, pages 5-100-101. This section should clarify whether the Corps intends to collect 30 or 86 sediment samples per DMCA. The Department has previously stated a concern that 30 samples are not enough. The Corps proposes taking samples 15 cm deep: the Department recommends 86 samples of the cap material per DMCA taken 30 cm deep. The DEIS sometimes refers to 7 ppm of cadmium in the capping material to trigger remedial action. The Department recommends substituting a threshold of 4 ppm throughout the DEIS for clarity. This section should fully summarize bird tissue monitoring, which is partially summarized in Appendix D, page 23, and Appendix M, page 84. The Department understood that the Corps had agreed to bird tissue monitoring independent of monitoring cadmium soil concentration levels. Tissue monitoring should occur: 1) prior to sediment placement to collect baseline data; 2) during sediment placement; and 3) post placement until 3 consecutive years of samples contain cadmium concentrations that are less than the potential adverse effect level,

which is to be determined. The Department requests that the Corps continue to coordinate with the FWS prior to completion of the final EIS to finalize plans for biological monitoring within DMCAs, including tissue sampling.

5.5, Groundwater, page 5-105. Groundwater conditions were simulated with a constant pumping rate 200 years into the future to estimate the timing of sea water intrusion into the Upper Floridan Aquifer. The DEIS states elsewhere that Chatham and Effingham counties are experiencing population growth, and it is reasonable to assume that industrial water use may also increase with the potential harbor expansion. For the final EIS, the Department recommends revisiting the groundwater simulations with consideration of likely increases in pumping rates.

5.7, Marine and Estuarine Resources, pages 5-109-113. This section discusses direct dredging impacts and generally concludes that expected impacts are minor. However, the text does not describe the long-standing striped bass spawning season window that restricts dredging and is likely largely responsible for the minor impacts conclusion. On Page 14 of Appendix H is a statement that hydraulic dredging is not conducted in Savannah Harbor during the striped bass spawning season. The Corps should revise Section 5.7 and other relevant sections to discuss the striped bass spawning window, and describe where and when hydraulic harbor deepening dredging is restricted.

5.7.1.1, Direct Dredging Impacts, page 5-110. The flow of the Savannah River is highly variable within and between years; therefore the Corps should specify the period of record used for the following calculation: *"the average daily freshwater flow in the Savannah River at Clyo is about 11,290 cfs."* The analysis presented in this paragraph should use data that represents the seasonal timing and flow conditions typical during channel maintenance operations, and if necessary, revise the conclusions based on this analysis.

5.21.1, Other Items/Factors of Concern, page 5-156. This section covers the introduction of invasive species through ballast water, but should also address other pathways through ports, such as insect larva in pallets (e.g., red bay ambrosia beetle), or seeds and plants 'hitchhiking' in soil on containers.

5.22, Mitigation, page 5-157. The Department disagrees with this statement: *"The Corps believes that with implementation of the Mitigation Plan and Monitoring and Adaptive Management Plan, the proposed action would not have significant adverse impacts on the environment."* Under the 47- and 48-foot alternatives, which the Corps identifies as the tentatively recommended plans, the Savannah estuary would lose an estimated 223 and 337 acres of tidal freshwater marsh, respectively. We have identified loss of tidal freshwater marsh as the *"most important impact criterion in the Savannah Estuary"* (page 5-10). In-kind mitigation for this loss is not possible; therefore, significant adverse impacts remain even with implementation of the mitigation plan for the 47- and 48-foot alternatives. This is why the Department prefers the 45-foot alternative among the action alternatives, because it minimizes the loss of freshwater tidal wetlands, impacts to Savannah National Wildlife Refuge (NWR), and risk and uncertainty of impacts to trust fish and wildlife resources.

Appendix B, Biological Assessments for Threatened and Endangered Species
Section 8.02.4 – Impacts to Federally Listed Threatened and Endangered Species, West Indian Manatee, page 83. Manatees have been observed on the Savannah NWR since 1987. Six manatees were observed on the Savannah NWR on August 26, 2010, at a rice trunk on the Wildlife Drive. This area is directly across from Port Wentworth on the Back River. In

September of 2008, four manatees were found in the Savannah River (Front River) downstream of the Georgia Ports Authority Ocean Terminal that had been killed in a ship-related incident. This section states that manatee occurrence in the area is rare. Manatees have site fidelity to summer habitat sites, therefore, the FWS would expect the six observed on the Savannah NWR to return. The Georgia Department of Natural Resources (GADNR) has data on manatee mortality and public sightings in the Savannah River. From FWS personnel's observations and discussions with the GADNR, the FWS would not characterize manatee occurrence as rare. Usage is regular enough to characterize manatee occurrence in the Savannah River estuary as a small summer resident population.

Appendix C, Mitigation Planning

IV.A. Reducing Impacts – Hydrodynamic and Water Quality Modeling, page 30. This section states that the proposed mitigation for the 47-foot alternative is predicated on a "base year" (immediately following construction) impact of 223 acres instead of a project-life average annual impact consistent with Corps policy. The average annual impact is lower than 223 acres due to the effect of sea level rise during the next 50 years that would occur without the project. The Department maintains that sea level rise would have a negligible impact on the Savannah NWR if not for the cumulative impact of previous harbor deepening. Therefore, we support obtaining a waiver from the Corps' policy in this instance to instead implement the agency-coordinated level of mitigation.

IV.D. Reducing Impacts – Improvements to Dissolved Oxygen, page 39. The MACTEC engineering firm's report on the test of a DO injection system concluded that the system could improve a DO deficit by 0.6-0.7 mg/l. An independent peer review by USGS found that this conclusion was not supported by the data. The USGS review found instead that the natural tidal cycle accounted for most of the variation in DO levels during the demonstration. This section of the final EIS should address the USGS report. The uncertainty regarding the results of the efforts to improve DO deficiencies is additional justification for expanding the water quality monitoring efforts from 5 to 10 years.

V.A. Replacement /Compensation – Restoration/Enhancement/Creation, pages 48-50. The acreages mentioned on these pages do not correspond with those found in other places in the DEIS. Pages 48 and 50 mention 15.68 acres of brackish marsh lost, while DEIS sections 5.1.1.1 and 5.1.1.2 mention 14.08 acres. Appendix C, pages 49 and 50 state the restoration area is 45 acres, while page 49 states the restoration area is 42 acres. Figure 19 on page 49 depicts two restoration areas of 34 and 8 acres for a total of 42 acres. Section 5.1.1.2 page 5-6 states the restoration area is 42 acres. The Department recommends correcting any mistakes in these sections or explaining the apparent inconsistencies.

This section discusses wetland restoration on site 1S for direct impacts to brackish marsh. The desired vegetation outcome is to establish a mixed brackish marsh, similar to adjacent marsh, on the site. Chinese tallow tree and common reed, both highly invasive exotic species, have been identified in the marshes near the restoration site. Monitoring the success of the re-vegetation for 5 years should include control measures for exotic and invasive species, if detected.

On page 49, it is not clear what is meant by "*The Corps would expand our restoration acreage to include their acreage (1.7 acres).*" Please clarify.

On page 50, the Corps states it intends to restore all of Area 1S, using a portion for "advance mitigation." The Department regards "advance mitigation" in this context as the functional equivalent of a mitigation bank, and FWS Mitigation Policy (64 FR 49229-49234) does not allow the use of NWR lands for mitigation banks.

V.B. - Preservation, page 54. This section states that the proposed mitigation for the 47-foot alternative is predicated on a "base year" (immediately following construction) impact of 223 acres instead of a project-life average annual impact consistent with Corps policy. The average annual impact is lower than 223 acres due to the effect of sea level rise during the next 50 years that would occur without the project. The Department maintains that sea level rise would have a negligible impact on the Savannah NWR if not for the cumulative impact of previous harbor deepening. Therefore, we support obtaining a waiver from the Corps' policy in this instance to instead implement the agency-coordinated level of mitigation.

V.B. - Preservation, page 57. The following statement is misleading: "*If a higher rate of sea level rise actually occurs, some of the freshwater marshes would convert to more saline species, so they would not be available for impact by harbor deepening.*" These marshes are at risk to sea level rise only because of the cumulative effect of previous harbor deepening. Tidal freshwater marshes would not be at risk due to sea level rise at the harbor's original depth. Additionally, the impacts to freshwater marsh from harbor deepening will occur quickly compared to the timeframe for sea level rise.

V.B. - Preservation, pages 57-60. These pages discuss sea level rise and the possibility of over-mitigating if sea level rises faster than projected. The Corps proposes to reassess sea level rise at the end of the project's life in 50 years and assign wetlands mitigation credits to the project in an amount equivalent to the over-mitigation. The Department regards "advance mitigation" in this context as the functional equivalent of a mitigation bank, and FWS Mitigation Policy (64 FR 49229-49234) does not allow the use of NWR lands for mitigation banks. This section, among others in the DEIS, also states that the proposed mitigation for the 47-foot alternative is predicated on a "base year" (immediately following construction) impact of 223 acres instead of a project-life average annual impact consistent with Corps policy. The average annual impact is lower than 223 acres due to the effect of sea level rise during the next 50 years that would occur without the project. The Department maintains that sea level rise would have a negligible impact on the Savannah NWR if not for the cumulative impact of previous harbor deepening. Therefore, we support obtaining a waiver from the Corps' policy in this instance to instead implement the agency-coordinated level of mitigation.

V.C. - Compensation, page 65. This section discusses a fishway at New Savannah Bluff Lock and Dam as the primary mitigation feature for the project's impacts to shortnose sturgeon. Fishway effectiveness varies considerably and is difficult to predict. If effective, this measure would provide shortnose sturgeon upstream passage to the Augusta shoals and other riverine spawning areas. Dam removal would represent a more certain means to provide both upstream and downstream passage for shortnose sturgeon and other species, and would also restore riverine characteristics to this portion of the basin; therefore, the Department would prefer dam removal in lieu of a fishway. The Department requests that the Corps continue to coordinate with the FWS to finalize plans for either fishway design and construction or dam removal.

V.C. - Compensation, page 72-73. This section describes a secondary (supplemental) water supply intake line for the City of Savannah to be constructed if needed. Based on a preliminary review, the Department would prefer intake Site 1, because intake Site 2 is likely to adversely

affect more wetland and wildlife habitat. The Department requests further coordination to evaluate impacts and make recommendations if the supplemental intake site is needed in the future.

VI.A. Mitigation Plans - Wetlands, page 81. We believe the statement: "*The plug would be constructed of fill and rock and would extend to EL 10 (above the Mean High Water line)*" is incorrect. It is our understanding that the plug in Rifle Cut will extend to EL 10 above mean low water, which is 2 feet above mean high water -- not 10 feet, as indicated.

VI.A. Mitigation Plans - Wetlands, page 90 and Section VIII – Timing of Construction, page 113. This section should discuss the timing of acquiring the mitigation lands. The Department recommends beginning no later than the start of construction and completing the acquisitions within 2 years.

VI.A. Mitigation Plans - Wetlands, pages 92-93. The Corps proposes to restore the entire site at CDF 1S, using a portion as "advance mitigation" for direct impacts to salt marsh. Claiming credit for restoration to offset as-of-yet unidentified impacts elsewhere in the future is the functional equivalent of a mitigation bank. FWS Mitigation Policy (64 FR 49229-49234) does not allow the use of NWR lands for mitigation banks; therefore, the Department cannot support restoration at this site as advance mitigation.

Successful wetland restoration is dependent on three primary factors: soil, hydrology and vegetation. The proposed dredged material removal should expose the original wetland soil and restore the site to the elevation of adjacent marshes. Construction of a "feeder" creek system toward the interior of the restoration site from Middle River will facilitate tidal exchange; however, if restored elevations do not properly restore tidal flow, invasive vegetation with almost no wildlife value may occupy the site. The desired vegetation outcome is to establish a mixed brackish marsh, similar to adjacent marsh, on the site. Chinese tallow tree and common reed, both highly invasive exotic species, have been identified in the marshes near the restoration site. Monitoring the success of the re-vegetation for 5 years should include control measures for exotic and invasive species, if detected.

The following statement, from page 92, is inconsistent with the text of DEIS Section 5.1.1.2: "*Calculations derived from the SOP indicate that approximately 25.8 acres of restored saltmarsh would be required to mitigate for the 14.08 acres of impact. When combined with the 1.7 acres of previous mitigation, the resulting acreage of the mitigation site would be 25.8 acres.*" Adding 1.7 acres of mitigation to 25.8 acres equals 27.5 acres.

VI.B. Mitigation Plans – Dissolved Oxygen. Was the *Draft Savannah Harbor TMDL for Dissolved Oxygen* released by the U.S. Environmental Protection Agency in April 2010 evaluated for effects of the mitigation plan? With the changes in the flow dynamics, the Front River will have less flow and the residence times in the Harbor will increase. These changes could have a substantial impact on the waste load allocation. The effects on the allowable waste load to the system by the Project are not only caused by the deepening of the navigation channel but also the mitigation features affecting the flow dynamics of the estuary.

More than two years (2009 and 2010) of flow data have been collected on the Front, Middle, and Little Back Rivers. Six of the seven mitigation features involve alterations to flow paths in the system. Has the two years of measured flow been thoroughly compared with the flow predictions of the model? The *Draft Savannah Harbor TMDL* showed a frequency distribution

for the Little Back River. The model comparisons should include daily tidally filtered flows, flow volumes over specified periods, and flow partitioning between the three rivers under various flow regimes.

VI.E. Mitigation Plans - Chlorides, page 104. This section describes a secondary (supplemental) water supply intake line for the City of Savannah to be constructed if needed. Based on a preliminary review, the Department would prefer intake Site 1, because intake Site 2 is likely to adversely affect more wetland and wildlife habitat. The Department requests further coordination to evaluate impacts and make recommendations if the supplemental intake site is needed in the future.

VII. Consideration of 2008 USACE/USEPA Mitigation Rule, page 107. The DEIS uses county population projection data to estimate the percent increase in impervious surfaces, but should probably also consider industrial development adjacent to the Savannah River, in part due to harbor expansion. For example, a large industrial warehousing complex is proposed adjacent to the Refuge that would involve paving several thousand acres of forest land. The storm water runoff associated with these surfaces is a key threat to the sustainability of adjacent wetlands, which this section should address in the final EIS.

VIII. Timing of Construction, page 113. The table indicates that the Corps will provide funding to GADNR for the striped bass stocking program in late 2015 or early 2016. To offset project impacts that begin when construction is complete, GADNR must have stocking capacity in place in the first spawning season following construction. The Department recommends that the Corps transfer funding for the striped bass stocking program when dredging is initiated, which should provide enough lead time to develop stocking capacity.

Appendix D, Monitoring and Adaptive Management Program

There are inconsistencies of scope of work, roles, and required funding throughout. Strongly suggest a thorough update of Appendix D to bring this to current status and necessary funding. The GaWSC is ready to assist with this.

The USGS Georgia Water Science Center (GaWSC) led the effort in 2006 to develop the Monitoring Plan for the proposed SHEP. This was created from feedback from a multi-agency team with a broad-based variety of expertise that has been involved with the SHEP planning over the years. Much has changed with the SHEP since this plan was first developed five years ago, and subsequently the monitoring plan needs updating. The GaWSC has installed a considerable amount of additional monitoring locations that were originally outlined in the 2006 monitoring plan since its release, and this needs to be properly documented. Additionally, the GaWSC, in collaboration with the multi-agency team, has over the last two years performed the installation and operation of a chloride monitoring network for the City of Savannah water intakes on Abercorn Creek, and more detail regarding the initial results of this work should also be factored into Appendix D. The GaWSC is ready to assist in updating the monitoring plan to reflect the latest scope, roles, and budgetary needs.

Several new monitoring technologies have become available since the original plan was written in 2006. Real-time groundwater chloride monitoring should be considered as an early-warning system for the aquifers in case of damage to the confining layer. The GaWSC currently is performing similar monitoring in the Brunswick, Georgia area. Several existing USGS groundwater monitoring sites along the Savannah River channel could be upgraded to enable real

time monitoring of chloride concentrations. With the deployment of index-velocity stream gages currently in place, there are also techniques now available to estimate the sediment load flux within the Savannah Harbor and surrounding estuary using a sediment surrogate approach. These techniques were developed by the GaWSC and can be beneficial in providing insight into the environmental impacts caused by transported sediments as well as provide operational benefits to the management of the channel and port. It is anticipated that because a considerable amount of the proposed monitoring is already in place, a significant cost savings could be found to help offset the implementation of these new monitoring technologies to make a more robust monitoring effort for the SHEP.

Finally, with a large share of the monitoring data now being available in real-time, the ability to visualize and alert water resource managers and stakeholders of the real-time conditions in the Savannah River Estuary are presently available. The USGS real-time webpage, NWISWeb, currently displays all data being collected in the SHEP at http://waterdata.usgs.gov/ga/nwis/current/?type=flow&group_key=basin_cd. The USGS has developed a real-time alerting system can be activated to electronically notify individuals when parameter(s) have exceeded a pre-defined threshold (for example, see http://water.usgs.gov/wateralert/). A crucial part of any monitoring plan should now include the ability to disseminate the information using visualization and information delivery tools in order to keep stakeholders informed and allow water managers to make informed decisions in a real-time manner.

3. GOALS OF AN ADAPTIVE MANAGEMENT PLAN, page 5-6. It is stated that if a mitigation feature is changed, monitoring will continue for an additional year. This period may be too short depending on the feature that was changed, when the change was made, and the hydrologic condition for the additional year. The ecosystem has a much different response during wet and dry years.

5.B. Pre-construction Monitoring – Major Components, page 7. The Hydrologic Monitoring Plan is five years old and needs to be updated to reflect the current gaging network, advances in monitoring technologies, and changes in gaging costs for installation and annual operation and maintenance. The Hydrologic Monitoring Plan was edited by the U.S. Geological Survey (USGS) S.C. *and* Ga. Water Science Centers.

The length of the sampling period of "one lunar cycle" is not clear. Is it a 25-hour period, 14-, or 28-day cycle? With what has been learned about the dynamics of the system and data collection, is this the most cost-effective period to collect data for evaluating the ecosystem and the performance of the models?

The section on physical monitoring indicates that the project would fund USGS to collect pre-construction hydrologic data for "up to one year," but all references to pre-construction monitoring on page 8 are to "one year." The Department recommends 1 year of pre-construction monitoring.

5.C. Pre-construction Monitoring – Details of the Monitoring, page 8 and Figure 3. There are two existing water quality stations on Back River (021989784 and 021989791), and one on Front River (02198920), that have long-term salinity data. The Department recommends using this long-term salinity data set, from the end of the last harbor deepening construction to the start of any new deepening construction, as baseline salinity conditions for these sites and to supplement the 1 year of pre-construction water quality monitoring.

5.C. Pre-construction Monitoring – Details of the Monitoring, page 8. Pre-construction monitoring for 1 year is intended to create or supplement a pre-project baseline. However, information based on only 1 year of data may not provide an adequate baseline. Using existing longer-term data from water quality stations on Back River and Front River should help address this problem (see previous comment on Appendix D, section 5.C, page 8 and Figure 3). Similarly, wetland and fishery studies performed during project planning represent useful baseline information. This section and others in the final EIS should describe in greater detail developing baseline conditions for the various monitoring parameters. In addition, this section states: "*Monitoring would be conducted between the time a decision is made on implementing a harbor expansion and the time the construction begins which would affect aquatic resources in the inner harbor.*" If construction is delayed for more than 1 year after a decision for harbor expansion, the Department recommends continuing pre-construction monitoring until construction begins.

The proposed water-quality parameters are not described. To be more complete, the full contingent of parameters available for continuous monitoring should be listing, which are: water temperature, specific conductance, pH, dissolved oxygen, and turbidity. Each parameter brings a specific scientific benefit to the monitoring plan, as well as complements each other with diagnostic troubleshooting of equipment failure.

5.C. Pre-construction Monitoring – Details of the Monitoring, page 9, Figure 3. This figure needs to be updated to reflect current (2011) real-time network.

5.C. Pre-construction Monitoring – Details of the Monitoring, Page 10. The USGS Georgia Water Science Center currently performs all of the monitoring in the SHEP

The funding figures are 5-years old and need to be revisited.

5.C. Pre-construction Monitoring – Details of the Monitoring, Page 12. The goals of the Intense Monitoring are not clear. "This sampling would address those constituents that…cannot be monitored by continuous recorders." The parameters and constituents listed; river discharge, flow volumes, flow velocity, flow direction, water surface elevation, depth, salinity, dissolved oxygen, water temperature, turbidity, pH, and specific conductance, can be monitored continuously. The remaining constituents are a short list: suspended solids, 5-day biochemical oxygen demand (BOD), and chlorides. Other parameters, constituents, and rates to consider are nutrients, long-term BOD, nitrification rates, sediment oxygen demand rate, re-aeration rates and tidal marsh dissolved-oxygen production/depletion rates.

Based upon the results of the initial chloride monitoring performed by the GaWSC, the Department recommends that SHEP chloride monitoring include a real-time index velocity streamgage at Bear Creek, and full chloride monitoring stations at Abercorn Creek (near the intakes) and on the Savannah River at I-95. Much of the monitoring infrastructure is already in place at the last two stations. The Bear Creek streamgage and some of the water-quality instrumentation would need to be reinstalled.

5.C. Pre-construction Monitoring – Details of the Monitoring, Page 14. The Georgia Fish and Wildlife Cooperative Research Unit, not the South Carolina Fish and Wildlife Cooperative Research Unit, have the fisheries personnel available to monitor the movement of fish.

5.E. Summary, Page 15. In the Cost Summary, Oversight and Contracting are listed under "Biological" but not under "Geomorphic." Should the there be a similar item under "Geomorphic"?

6.B. MONITORING DURING CONSTRUCTION-Major Components, page 16. "On a regular basis, the Corps would assess how well the … models predict…" What is the frequency of this assessment? Every 4 months? Were other locations for sampling chlorides concentrations considered, such as the mouth of Abercorn Creek and I-95?

6.C. MONITORING DURING CONSTRUCTION-Details of Monitoring, page 18. Were other locations for sampling chlorides concentrations considered, such as the mouth of Abercorn Creek and I-95?

6.D. MONITORING DURING CONSTRUCTION-Reporting, Page 19. What is the reporting interval between the end of the 4-month data- collection periods and the release of the model evaluation reports?

6.E. MONITORING DURING CONSTRUCTION-Cost Summary, Page 19. In the Cost Summary, Oversight and Contracting are listed under "Biological" but not under "Geomorphic." Should the there be a similar item under "Geomorphic"?

7.A. Post-construction Monitoring –Goals, page 20. Are there details for the Transfer Efficiency Study of the dissolved-oxygen system? The data collection for the demonstration project was inadequate to show any conclusive effect of the injection system on the receiving waters.

7.B. Post-construction Monitoring – Major Components, page 21. The Corps commits to biological monitoring when soil cadmium concentration is greater than or equal to 4 ppm, but does not define biological monitoring. The Department understood the Corps had agreed to tissue cadmium sampling independent of soil cadmium sampling. Tissue sampling should occur: 1) prior to sediment placement to collect baseline data; 2) during sediment placement; and 3) post placement until 3 consecutive years of samples contain cadmium concentrations that are less than the potential adverse effect level, which is to be determined.

The Department accepts the Corps' use of 4 ppm cadmium concentration in capping material as a trigger for remedial action in DMCAs. The Department understands that the Corps will move a DMCA to higher priority in the rotation for O&M sediment placement and vegetation monitoring if 25 cumulative acres are found to have a cadmium concentration greater than or equal to 4 ppm. Sampling and placement will continue until the DMCA has less than 25 cumulative acres with a cadmium concentration greater than or equal to 4 ppm.

This section states that the Corps will sample the top 15 cm of the cap material. The Department recommends sampling the top 30 cm of the cap material. This section also states that the Corps will conduct biological monitoring when soil cadmium concentrations exceed 4 ppm if the area "cannot be covered by O&M sediments within 6 months." This approach would risk a failure to conduct biological monitoring in an area that the Corps intends to cover within 6 months, but for whatever reason, may not. The Department recommends biological monitoring when concentrations exceed 4 ppm without regard to when the Corps intends to cover the area with O&M sediments.

The Department requests that the Corps continue to coordinate with the FWS prior to completion of the final EIS to finalize plans for biological monitoring within DMCAs, including tissue sampling.

7.B. Post-construction Monitoring – Major Components, page 22. No monitoring is proposed for striped bass, but should be. We recommend a post-project assessment of striped bass habitat using the water quality monitoring data and updated water quality simulations. Model updates are already planned that would facilitate a low-cost assessment using the established striped bass habitat criteria. The Department recommends comparing conditions during the fourth year of post-project monitoring with pre-construction predicted habitat impacts, and formulating corrective actions as necessary based on the results.

7.B. Post-construction Monitoring – Major Components, page 23. The Department supports the sampling protocol (species and timing) described in this section, with one exception (or clarification). Sampling when the CDFs are wet is proposed for April and September. However, the next sentence says three individuals of two species (six total) "will be collected **each year**" (emphasis added). We recommend revising this to state that these six individuals will be collected twice a year (April and September) when the CDFs are wet.

7.C. Post-construction Monitoring – Details of the Monitoring, page 24. The DEIS shows various post construction monitoring ranging from 2 to 5 years. It is not unlikely that a drought or high-flow period lasting several years would occur during the post-construction monitoring period, which would complicate comparisons with pre-construction monitoring data. In addition, tidal freshwater wetlands respond slowly to salinity change. Therefore, the Department recommends increasing wetland and continuous water quality monitoring from 5 years post-construction to 10 years.

8.B Performance Measures – Post-construction Monitoring, page 28. We recommend developing a detailed data analysis plan for the post-construction water quality monitoring. The mitigation features will significantly alter the system, which will complicate the comparisons of pre- and post-construction conditions to determine the efficacy of the mitigation measures. A recent example of the need for such as plan was the re-oxygenation demonstration performed for the Savannah Harbor Expansion project. Monitoring data was collected, but the analysis of that data failed to conclusively quantify the effect of the demonstration project in the highly variable DO dynamics of the system.

8.B Performance Measures – Post-construction Monitoring, page 29. Concerning the revegetation of Area 1S, grading the site and its feeder creeks to the proper elevations is essential to avoid establishing invasive vegetation (e.g., Chinese tallow tree) that have little or no wildlife value. The discussion and table in this section should specify criteria for successful establishment of native wetland plants. Monitoring the success of the re-vegetation for 5 years should include control measures for exotic and invasive species, if detected.

9.B. Adaptive Management-Decision Making Process, Decision Process, page 30. This section describes an informal inter-agency review process for monitoring data and reports during the 5-year post-construction monitoring period. Within 1 year after the 5-year post-construction monitoring period, the Corps would prepare a consolidated report of the various monitoring programs, followed by 30 days of agency review, an unspecified time period for further report revision, public review, and a potential elevation process. This time-line for making decisions on adaptive management actions would likely require a minimum of 1.5 years after the 5-year

post-construction monitoring period, and could take much longer. The Department recommends compressing this process so that final decisions on corrective actions are reached within 1 year after the monitoring period. In addition, because we have recommended extending the duration of post-construction monitoring from 5 years to 10 years, we also recommend preparing and reviewing a consolidated report of the various monitoring programs at the end of 5 years, and again at the end of 10 years following project construction, to ensure that adaptive management decisions can be made when it becomes apparent that a problem exists, and in a timely manner.

9.B. Adaptive Management- Decision Making Process, pages 30-31. Appendix D contains two sections "9.B" – the second one should be "9.C."

9.B. Adaptive Management-Decision Making Process, Decision Criteria, page 31-32. The Federal modeling performance goals in the plan are those provided by review agencies in 2001 during hydrodynamic model development. Because the agencies were aware of the complexity of the system and model limitations, we allowed considerable latitude in the performance of the models. We are concerned that adopting the same tolerances for the performance of the constructed project is inappropriate, because actual impacts could differ substantially from the predicted impacts without triggering remedial action. Based on earlier coordination, the Corps modified the tolerances for achieving a goal of <1 ppt salinity to +/- 0.1 ppt, and we support this change. The goal for salinity in the range of 1-5 ppt has not been modified, and would allow considerable impact without triggering action. As proposed, a range of 0.5 to 1.5 ppt is acceptable for a salinity goal of 1 ppt (+/- 50%), while a range of 0.89 to 1.09 ppt is acceptable for a salinity goal of 0.99 ppt (+/- 10%). We recommend modifying the goal for salinity in the range 1-5 ppt to +/- 10 % (not +/- 0.5 ppt as currently stated) to make it more consistent with other goals and triggers for adaptive management.

10. Adaptive Management – Implementing Warranted Modifications, pages 32-33. This section states that the "Corps would seek and obtain its funds for this phase each year through the normal budget process," which concerns the Department. It is relatively certain that impacts to trust resources of the Department will occur following construction, but the effectiveness of the mitigation features is much less certain. Therefore, the Department cannot agree that the proposed mitigation plan adequately addresses project impacts unless contingency funding for monitoring/adaptive management activities is assured.

This section should also discuss an implementation schedule for needed corrective actions. The Department recommends initiating construction, or other appropriate remedial actions, within 1 year of a decision to modify a mitigation feature.

10.C. Adaptive Management – Monitoring after Implementing an Adaptive Management Feature, page 35. The Corps proposes to monitor the performance of corrective actions under the adaptive management program. It is unlikely that 1 year of post-construction monitoring is sufficient to determine the outcome of the action in a system as dynamic as the Savannah estuary. The Department recommends 3 years of post-construction monitoring of adaptive management actions.

11.B. Long Term Monitoring – Major Components, page 36. The Corps proposes to fund four water monitoring stations to determine whether the mitigation features are functioning as intended. A fifth station, Station 021989784, is located at the intake of the freshwater supply system for the 3,000 acres of managed wetlands on Savannah NWR and is therefore especially

important for monitoring project impacts to the Refuge. The Department recommends adding it to the Corps' list of supported stations.

Appendix L, Cumulative Impact Analysis

8.B. Wetlands, Page 16. This appendix does not include a section header to separate Section B, Tidal Freshwater Marsh, from Section A, Savannah NWR Freshwater Waterfowl Management Operations. We believe page 16 is the appropriate location for this.

8.B. Wetlands – Historic Basis, page 21. Figure 5 and the associated text do not provide an accurate representation of marshes in 1854. Most of the salt marsh shown on Figure 5 is in the Wright River system, not the Savannah system. The demarcation between freshwater marsh, brackish marsh, and salt marsh is not supported by historical information. As stated on page 20, Appendix L, tidal forest in the mid-1700's extended to the junction of Back River and the Savannah River, and brackish marshes extended to near the mouth of the river. Appendix Q, page 22, mentions that Hutchinson Island was used extensively for rice culture, which requires freshwater. Between the mid-1700's and mid-1800's, only minor modifications were made to the Savannah River. This information indicates that the depiction of marsh type extent in Figure 5 and the resulting areal estimates are mistaken, and that the freshwater limit extended to about river mile 7 in the mid-1850's. Figure 5 shows the interface at about river mile 19. The Department recommends correcting these errors.

Section 8.B. Wetlands – Present Condition, Tidal Freshwater Marshes, page 25. Figure 6 and the associated text do not provide an accurate representation of marshes in 1999. USGS estimates based on detailed field studies and Corps estimates based on the hydrodynamic model are generally consistent, but are substantially different from the estimates shown in Figure 6. The Department recommends corrections for clarity.

8.B. Wetlands – Present Actions/Stresses and Future Actions/Stresses, pages 27-28. This section states that the primary stress to tidal freshwater marsh is prolonged drought, which is not supported by evidence. In 1875, when the controlling depth of the navigation channel was 12-15 feet, the Savannah estuary supported an estimated 12,000 acres of tidal freshwater marsh. In 2005, when the controlling depth was 42 feet, the estuary supported only 3,269 or 4,072 acres (depending on study method used). This section should instead state that the inland intrusion of salt water resulting from channel deepening is a constant stress on tidal freshwater marsh, and that prolonged drought exacerbates this stress.

This section also states that the Corps evaluated the effects of sea level rise on tidal freshwater marsh. The Department maintains that sea level rise would have a negligible impact within the Savannah NWR if not for the cumulative impact of previous harbor deepening.

8.B. Wetlands – Alternatives to Mitigate for Cumulative Effects – Tidal Freshwater Marshes, page 32. The acres listed for preservation for the 48-foot project (2,094) are not consistent with the acres listed elsewhere in the document (2,683). The Department recommends corrections for clarity.

8.C. Wetlands – Saltmarsh and Brackish Marsh, page 32. The discussion of the mitigation for the loss of non-freshwater tidal marshes is confusing. Previous sections – Appendix C, Section V, and elsewhere – speak of impacts to 14.08 acres of salt and brackish marsh with 42 (or 45) acres listed as mitigation for the 44-foot alternative. Appendix C lists 15.68 acres of

brackish marsh loss for all the proposed harbor deepening alternatives. This Appendix lists the loss of 3.0 acres of brackish marsh and 12.68 acres of saltmarsh, which equals the 15.68 acres of brackish marsh mentioned in Appendix C. This is confusing because both 14.08 acres and 15.68 acres are listed as marsh loss for either the 44-foot alternative or all alternatives. Also, the acreage proposed for restoration is not clear. The Department recommends revisions for clarity.

8.C. Wetlands – Saltmarsh and Brackish Marsh, page 33. Most of the salt marsh in the estimate provided in the "Present Condition" section is in the Wright River system, and not in the Savannah River system. The Department recommends corrections for clarity.

Appendix M - Sediment Quality Evaluation

7.3. Monitoring and Contingency Plan, pages 83-86. The Department recommends taking samples of the cap material to a depth of 30 cm instead of the 15 cm depth proposed. This section also cites 7 ppm cadmium concentration as the trigger for remedial action: we recommend this section be revised to be consistent with Appendix D (Section 7.B) which identifies 4 ppm as the trigger.

We recommend biological monitoring when cadmium exceeds 4 ppm regardless whether the Corps plans to cover the area with O&M sediments within 6 months. This section, and others, should define biological monitoring in the context of cadmium in disposal areas. The Department recommends a program of monitoring wildlife activity in disposal areas and cadmium levels in bird tissues that is independent of the Dredge Material Containment Area (DMCA) capping criteria. Wildlife monitoring should begin with sediment placement and continue as long as all other monitoring of the DMCA. Tissue monitoring should occur: 1) prior to sediment placement to collect baseline data; 2) during sediment placement; and 3) post placement until 3 consecutive years of samples contain cadmium concentrations that are less than the potential adverse effect level, which is to be determined. The Department supports the sampling protocol (species and timing) described in Appendix D, page 23, and requests that the Corps continue to coordinate with the FWS prior to completion of the final EIS to finalize plans for biological monitoring within DMCAs, including tissue sampling.

Our recommendations necessitate revisions to the "Decision Matrix for Cadmium Sampling" on page 86, including: remove references to 7 ppm cadmium concentrations; remove "if necessary" in reference to tissue sampling; do not differentiate between areas slated for covering before or after 6 months; and continue wildlife use studies until tissue monitoring is completed.

Appendix Q, Risk and Uncertainty Analysis in Environmental Evaluation and Approach

4.A. Uncertainty in Wetland Impact Predictions, page 7. Based on an analysis prepared by Kinetic Analysis Corporation (KAC), this section concludes that the hydrodynamic model probably over-predicts salinity and under-predicts dissolved oxygen, i.e., the model errs towards the side of simulating conditions worse than would actually occur. We believe this analysis may seriously misrepresent the risk and uncertainty associated with the water quality predictions. With the exception of the new channel depth, the KAC analysis relied upon the existing geometry of the Savannah River estuary. Several mitigation measures would significantly modify the system geometry, including significant flow diversion at McCoys Cut, closing Rifle Cut, filling the Back River sediment basin, and removing the tide gate. Flow routing and flow volume in the three main river channels would become significantly different from the current system. Therefore, we believe the degree of risk and uncertainty regarding expected water

quality impacts, and the resulting wetland impacts, is considerably higher than the KAC analysis suggests, which is one of the reasons why the Department recommends extending the proposed post-construction monitoring from 5 years to 10 years.

4.B. Uncertainty in the Amount of Sea Level Rise, page 8. This portion of the DEIS discusses risk and uncertainty in relation to sea level rise and the modeling of impacts to freshwater marsh. This section argues for predicating mitigation on the "base year" impacts (the year construction is complete) instead of average annual impacts over the life of the project (consistent with Corps policy), because "impacts that would occur soon after the base year are those most likely to occur and least subject to uncertainty from more distant projections of future conditions." Average annual impacts are less than base year impacts because sea level rise over 50 years will cause wetland losses without the project. The Department agrees with predicating mitigation on the base year impacts, but for a different reason. The Department maintains that sea level rise would have a negligible impact on Savannah NWR if not for the cumulative impact of previous harbor deepening.

4.C. Risk with Wetland Impact Predictions, page 8. Wetland impacts are inferred from salinity changes predicted by the hydrodynamic model. This section states: "*...the hydrodynamic model has roughly an 80 percent chance of over-predicting salinity levels at low salinity levels, thus leading to an over-prediction of salinity-induced impacts to wetlands. Therefore, the model is considered to present little risk for decision-makers evaluating salinity impacts to wetlands.*" The Department disagrees with this characterization, which was based on analysis by KAC that, with the exception of the new channel depth, relied upon the existing geometry of the Savannah River estuary. Several mitigation measures would significantly modify the system geometry, including significant flow diversion at McCoys Cut, closing Rifle Cut, filling the Back River sediment basin, and removing the tide gate. Flow routing and flow volume in the three main river channels would become significantly different from the current system. Therefore, we believe the degree of risk and uncertainty regarding expected water quality impacts is considerably higher than the KAC analysis suggests, and is a reason we recommend extending the proposed post-construction monitoring from 5 years to 10 years.

5.B. Risk with Dissolved Oxygen Predictions, page 10. This section states that the model slightly under-predicts DO levels and is therefore a good predictor of DO-related impacts. Because the project and the various mitigation features will substantially alter channel geometry of the lower river, and the hydrodynamic models are based on the current geometry, the Department attributes a relatively high degree of uncertainty with the model predictions of water quality impacts, including DO impacts. We recommend that the final EIS recognize and acknowledge this uncertainty. The risk to fish and other resources of underestimating DO impacts is further justification for expanding the monitoring effort beyond the currently proposed 5 years to 10 years.

9.00 REFERENCES

The Draft EIS references a USGS report, by the Cooperative Research Unit, titled "Simulation of Water Levels and Salinity in the Rivers and Tidal Marshes in the Vicinity of the Savannah National Wildlife Refuge, Coastal South Carolina and Georgia" but does not provide the reference. Suggest the Final EIS include the reference (Conrads et al, 2006) as follows:

Conrads PA, Roehl EA, Daamen RC, and Kitchens WM. 2006. Simulation of Water Levels and Salinity in the Rivers and Tidal Marshes in the Vicinity of the Savannah National Wildlife Refuge, Coastal South Carolina and Georgia. US Geological Survey, Scientific Investigations Report 2006–5187, 134 p. Available online at: http://pubs.usgs.gov/sir/2006/5187/pdf/sir20065187.pdf

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Page 236, sections 12.3.1 and 12.3.2. Based on an analysis prepared by Kinetic Analysis Corporation (KAC), this section concludes that the hydrodynamic model probably over-predicts salinity and under-predicts dissolved oxygen, i.e., the model errs towards the side of simulating conditions worse than would actually occur. We believe this analysis may seriously misrepresent the risk and uncertainty associated with the water quality predictions. With the exception of the new channel depth, the KAC analysis relied upon the existing geometry of the Savannah River estuary. Several mitigation measures would significantly modify the system geometry, including significant flow diversion at McCoys Cut, closing Rifle Cut, filling the Back River sediment basin, and removing the tide gate. Flow routing and flow volume in the three main river channels would become significantly different from the current system. Therefore, we believe the degree of risk and uncertainty regarding expected water quality impacts is considerably higher than the KAC analysis suggests, and is a reason we recommend extending the proposed post-construction monitoring from 5 years to 10 years.

Pages 236-237, sections 12.3.3 and 12.3.4. This section states that the model slightly under-predicts DO levels and is therefore a good predictor of DO-related impacts. Because the project and the various mitigation features will substantially alter channel geometry of the lower river, and the hydrodynamic models are based on the current geometry, the Department attributes a relatively high degree of uncertainty with the model predictions of water quality impacts, including DO impacts. We recommend that the final EIS recognize and acknowledge this uncertainty. The risk to fish and other resources of underestimating DO impacts is further justification for expanding the monitoring effort beyond the currently proposed 5 years to 10 years.

The Department appreciates the opportunity to comment on this project. Let me know if you have questions about our comments. I can be reached on (404) 331-4524 or emailed at gregory_hogue@ios.doi.gov.

Sincerely,

Gregory Hogue
Regional Environmental Officer

cc:
Southeast Regional Administrator, Environmental Protection Agency
Southeast Regional Director, NOAA Fisheries Service
Southeast Regional Director, U.S. Fish and Wildlife Service
Field Supervisor, FWS, Athens, GA
Refuge Manager, Savannah NWR
Georgia Water Science Center, USGS
South Carolina Water Science Center, USGS
Senior Advisor for Science Applications, USGS

637-BB-141-EV01, 637-BB-141-EV02

Comment: *"The Department's preferred plan for deepening Savannah Harbor is the 45-foot depth alternative, because it minimizes the loss of freshwater tidal wetlands, impacts to Savannah National Wildlife Refuge (NWR), and risk and uncertainty of impacts to trust fish and wildlife resources. Previous channel deepening projects have reduced tidal freshwater marsh within the Savannah River estuary from about 12,000 acres to about 3,300 acres. The majority of the remaining freshwater tidal wetlands occur on Savannah NWR. Further deepening the channel from its present depth of 42 feet would further reduce this important and increasingly rare national resource. At the NED plan depth (47 feet), a net loss of 223 acres of tidal freshwater wetlands is predicted after flow-diversion mitigation is implemented. At the LPP depth (48 feet), a net loss of 337 acres of tidal freshwater wetlands is predicted after flow-diversion mitigation is implemented. The loss of an additional 114 acres of freshwater tidal wetlands associated with the LPP would represent a 50 percent increase in impacts to the Savannah NWR over the NED plan and a cumulative loss of approximately 10 percent of the basin's remaining freshwater tidal wetlands. For this reason, the Department does not support the LPP."*

Response: The District recognizes the Department of Interior's preference for the 45-foot depth alternative because it would result in the least adverse environmental impacts. The Corps believes the Federal agencies should make their decisions after considering all factors that the proposed action could affect, including economic ones.

The loss/conversion/change in areal distribution of wetland community types within the Savannah Harbor estuary are the result of many factors. As discussed in the EIS, conversion of bottomland hardwoods to rice fields, shoreline/upslope development, sea level rise, etc. have contributed to changes in the amount of tidal freshwater marsh in the Savannah Harbor estuary.

637-BB-141-EV03, 637-BB-141-EV04, 637-BB-141-EV05, 637-BB-141-EV06, 637-BB-141-EV07

Comment: *"The potential effect of sea level rise on wetland habitats is mentioned throughout the DEIS. The document discusses drought, sea level rise, and channel deepening, but does not analyze the interaction between these major influences. In Appendix C (Mitigation Planning) and elsewhere in the DEIS, the Corps suggests that if the rate of sea level rise exceeds the historic rate, the proposed compensatory mitigation (e.g., land additions to the Savannah NWR for the loss of 223 acres of freshwater tidal wetlands under the NED plan) would overcompensate project impacts, because some of those acres would have converted to brackish or salt marsh without the project. The Corps proposes to reassess sea level rise effects in the future and assign "advance mitigation" credits to the project for use with future actions. The Department objects to this proposal, because sea level rise would have a negligible impact in the upper estuary if not for the cumulative impacts of previous harbor deepening.*

The rate of sea level rise is uncertain and substantial impacts resulting from sea level rise are likely well into the future. Conversely, the impacts of further harbor deepening will begin almost immediately. In addition, due to the complexity of the system and limitations of the models, the Department has concerns that the models may underestimate wetland impacts. The Department regards "advance mitigation" in this context as the functional equivalent of a mitigation bank, and U.S. Fish and Wildlife Service (FWS) Mitigation Policy (64 FR 49229-49234) does not allow the use of NWR lands for mitigation banks to compensate for the effects of activities authorized by the Department of the Army under Section 10 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Therefore, the Department does not support the concept of advance mitigation based on a future evaluation of the relative impacts of sea level rise. We do support, however, obtaining a waiver in this instance from the Corps' policy to implement the agency-coordinated level of mitigation for the base year (the year construction is completed) impacts, rather than mitigating for the project's average annual impacts or reassessing sea level rise impacts in the future."

Response: The DEIS provided sufficient analysis of the impacts of drought, sea level rise, and channel deepening on wetlands in the Savannah Harbor estuary to provide the reader with an understanding of the effects of these phenomena. The District carried out all wetland studies and analyses identified by the Wetland Interagency Coordination Team as being required to evaluate the wetland impacts accruing to various project alternatives.

The analysis of sea level rise and its effects on tidal freshwater marsh in the estuary is a requirement of EC 1165-2-211. Additionally, ER 1105-2-100 states "Ecosystem outputs are not discounted, but should be computed on an average annual basis, taking into consideration that the outputs achieved are likely to vary over time". Based on these two requirements, Savannah District determined that the wetland mitigation (purchase of 2,245 acres of land for preservation) for the 47-foot depth channel would over compensate for project impacts in the event sea level rise exceeded historic rates. Nonetheless, the District requested a waiver of the requirements of 1105-2-100 and approval is expected. Mitigation would then be based on the impacts that would occur at the time of construction. Hence, a portion of the original proposal has been removed -- a comparison of impacts after the 50-year life of the project resulting from construction versus those caused by sea level rise. This comparison would have determined how accurately the noted 2,245 acre preservation compensated for project actions and formed the basis for advance mitigation credits.

The Wetland Interagency Coordination Team participated in the development of the procedures which were used to estimate the impacts of the various harbor deepening alternatives on wetlands. Because estuarine systems are so complex, numerical modeling will not be able to capture all of their interactions with absolute accuracy. Nonetheless, the District is confident that these analyses reasonably forecast eventual impacts to wetland community types. The selected alternative includes a post-construction monitoring plan which will empirically evaluate actual wetland impacts, as well as an adaptive management component which will adjust any of the mitigation features, as necessary.
The basis of wetlands preserved [currently 2,265 acres in extent] as mitigation for the adverse impacts of the 47-foot channel deepening has a relationship to the sea level in the project area. USACE has

removed from its proposed action the evaluation of the effects of sea level changes on various wetland community types at the end of the project's 50-year life and use of any over-mitigation as credits toward future wetland losses from project O&M activities.

Concur. The Savannah District has requested a waiver from Section 5, paragraph E-36.c.(1) of ER 1105-2-100 regarding use of the average annual basis to compute the amount of environmental impacts. This waiver is based on the belief that the project should mitigate for the environmental impacts that would occur when the project is implemented and the fact that project impacts are more easily ascertained in the early life of the project, rather than 50-years later.

637-BB-141-EV08, 637-BB-141-EV09, 637-BB-141-EV10, 637-BB-141-EV11

Comment: *"Assuring the effectiveness of the mitigation features proposed in the DEIS is essential to the Department's approval of the selected project plan. These features were developed using pre-construction data and models to predict potential effects to the estuary. The DEIS states that natural variation alone will nearly guarantee that conditions during the first few years after construction are different from those under which the models were first calibrated. Currently, the Monitoring and Adaptive Management Plan proposes 5 years post-construction monitoring of key mitigation features, which we believe is not long enough. It is the Department's position that 10 years post-construction monitoring is necessary for the adaptive management process to work; i.e., to ensure that impacts to natural resources in this complex system resulting from project construction are limited to those predicted. Further, the Department recommends a more precise definition of observed conditions that would prompt changes to the mitigation features, and a time-line for making decisions and taking corrective actions thereafter. The Department is also concerned that funding for adaptive management will depend upon the Corps' annual appropriations process. It is relatively certain that impacts to trust resources of the Department will occur following construction, but the effectiveness of the mitigation features is much less certain. Therefore, the Department cannot agree that the proposed mitigation adequately addresses project impacts unless contingency funding for monitoring and adaptive management is assured."*

Response: Concur. The SHEP's monitoring and adaptive management plan is specifically designed to evaluate the effectiveness of its constituent mitigation features. It is important to note that the plan includes funding to modify/supplement any mitigation feature the monitoring deems necessary.

A review of the monitoring protocol does not reveal a requirement for ten years of post-project monitoring. Five years of post-project monitoring should provide ample data regarding the project's impacts on physical parameters [dissolved oxygen, salinity, etc.] affecting water quality and other concerns, such as fish distribution, etc. However, the monitoring plan will be extended two additional years [to seven] to document the recovery of the CDF 1S marsh restoration site. This time extension would comport with monitoring requirements that the Regulatory Branch of USACE requires of permittees for similar activities.

The Monitoring and Adaptive Management Plan [pages 28-32] provides a discussion of post-construction monitoring and the decision- making process that would determine if additional monitoring and/or mitigation measures are warranted. The plan did not identify specific acceptability criteria for water quality or biologic parameters [page 28] that would trigger the need to implement additional monitoring or modify mitigation measures. This was by design, i.e., there was a concern that a specific threshold for a parameter would limit the judgment of subject matter experts about when/what kind of changes might be needed when the monitoring data becomes available. Namely, the monitoring data might prompt a resource expert to recommend modifying a monitoring protocol and/or changing a particular mitigation measure, even though a specific threshold had not been reached. Further, the potential cumulative impacts of several parameters could become a concern even though the threshold limits had not been exceeded for any one parameter.

Decision points relative to changes in the monitoring plan or mitigation features can be reached at any time during the post-construction monitoring effort. As soon as they are finalized, monitoring data and reports would be made available to the resource agencies in support of this goal. The plan currently provides for a meeting each year between the District and the resource agencies to discuss the data collection and any protocol changes. However, such a meeting could be conducted at any time circumstance/concerns dictate. If the monitoring identifies impacts that are well outside of those predicted, consultation with the resource agencies would begin immediately. Corrective actions could range from a change in the monitoring plan to a cessation of construction activities until a given problem is rectified.

The District would obtain funds for project construction (including monitoring and adaptive management) through its established budget process. The Corps considers monitoring and adaptive management to be mitigation features, so they would be treated as "general navigation features" and budgeted along with funds for the channel deepening. The Corps would consider the project to still be in "Construction" until the end of the monitoring and adaptive management period. After that time, the Corps would budget for operation and maintenance of the channel and its mitigation features through the Operations and Maintenance funding program. The Corps expects the Record of Decision to state that approval of the project is conditioned on performance of the monitoring and adaptive management aspects of the project. That procedure is a method identified by CEQ in their 14 January 2011 guidance titled "Appropriate Use of Mitigation Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact" as being sufficient for a Federal agency to ensure that the monitoring and adaptive management would be performed.

Page 3

637-BB-141-EV12, 637-BB-141-EV13

Comment: *"The Department is concerned about the reliance on the hydrodynamic and water-quality models in the Adaptive Management Plan (AMP, Appendix D). The Plan does not include ecological performance measures to independently evaluate the effectiveness of the mitigation for the deepening of the Savannah Harbor. The models were developed to evaluate potential resource impact from*

deepening and to evaluate various mitigation actions to minimize environmental degradation of valued resources. The mitigation plan results in major changes to flow dynamics of the Lower Savannah River Estuary. Six of the seven mitigation features involve alterations to flow paths. The expected result of the mitigation is that the post-construction ecosystem will function in a similar manner to the pre-construction ecosystem. The monitoring data, along with ecological performance measures, should be used to evaluate the effectiveness of the mitigation features."

Response: The Monitoring and Adaptive Management Plan [pages 30-32 of the Plan] notes that field data collected during the post-construction monitoring and the hydrodynamic and water quality models are the main tools which will be used to determine how the project is performing and if the impacts are generally as expected. Further, page 31 of the Plan details that the District, Cooperating Agencies, and the state Natural Resource Agencies will review this data to determine whether impacts are generally as anticipated or whether changes to a specific project element, per se, and/or the mitigation plan are warranted. Even though the potential impacts of the project were evaluated under a range of likely conditions, the actual circumstances experienced after construction will be somewhat different from those used for evaluation in the project's feasibility phase. Consequently, the hydrodynamic and water quality models will be used to examine post-project performance under actual conditions , e.g., high/ low flows, drought, or some combination of these. The performance [accuracy] of the hydrodynamic and water models will be assessed once during pre-construction monitoring and twice during post-construction monitoring and recalibrated, as necessary. This repetition in modeling assessment/recalibration will improve their predictive accuracy by decreasing their range of uncertainty. The District and the natural resource agencies would use the modeling data [after the post-construction assessment/calibration] and compare it to actual field results to evaluate whether the system is performing as expected.

The Monitoring and Adaptive Management Plan [page 30-31] provides a detailed discussion of how the above agencies will conduct the decision- making process, along with the concurrence process for modifying any project element or an agreed upon mitigation measures.

Concur. Please refer to the previous response concerning use of the monitoring data in the decision making process.

637-BB-141-EV14

Comment: *"The AMP does not include ecosystem performance measures for the majority of the resources that the mitigation is trying to protect. The only ecological performance measure found was for the re-vegetation of Area 1S. For the other resources, the Corps proposes to use a modified version of the draft Federal Expectation for Hydrodynamic and Water-Quality Model Calibration and Confirmation performance measures. The intent is to collect additional data, simulate pre- and post-project scenarios with the models, evaluate the calibration of the models, re-calibrate the models (if necessary), and then evaluate the effectiveness of the mitigation."*

Response: A previous response addressed establishment of guidelines rather than specific environmental/biological performance measures. That notwithstanding, the overall goals are known for important indicator species such as Shortnose sturgeon, for which we do not want to cause drastic shifts in their distribution in the estuary. Based on previous field work and recent model predictions, the areal extent of this habitat in the project area has been determined along with how much of that habitat may be affected by the various deepening alternatives. The adaptive management plan [Plan] provides for a year of pre-construction monitoring which would provide almost real-time data regarding this habitat, as well as a distribution study of Shortnose sturgeon within the entire study area. The Plan includes a five-year post-construction monitoring component for these two study elements, as well as using the hydrodynamic and water quality models to evaluate project performance. Throughout and at the end of post-construction monitoring, resource agencies and the District will interpret all the collected data and reach conclusions regarding the project's overall impact the estuary and any additional measures that may need to be taken to protect the health of a particular element therein.

637-BB-141-EV15

Comment: *"It is not clear in the AMP how the draft Federal Expectation for Hydrodynamic and Water-Quality Model Calibration and Confirmation performance measures equates to ecological performance measures. The hydrodynamic and water-quality models currently do not meet these model calibration goals in many areas of the system (see Tetra Tech, 2006; Appendices B-K, P, and Q). If the current models do not meet the calibration performance goals, how will evaluating the model calibration performance for the post-project inform resource decision makers if the ecosystem is being protected by the mitigation features?"*

Response: The natural resource agencies recognized that modeling could not replicate environmental conditions in the estuary with complete accuracy. Therefore, they established performance goals for the models which had to be generally met by their developers. Before the Corps used those tools to evaluate potential project impacts, the natural resource agencies agreed that the models acceptably met the performance criteria and were acceptable for impact evaluation purposes for this project. The Corps has scheduled three intense hydrodynamic data collection efforts if the project moves to implementation. Those efforts are designed to provide data that would allow the modelers to make the models more accurate, thereby reducing the uncertainties around the calculated values. The Corps expects that those opportunities for recalibration would result in the models exceeding the agencies' original performance expectations. The refined models would allow more accurate comparisons between the observed post-construction data and the values calculated for those conditions.

637-BB-141-EV16, 637-BB-141-EV17

Comment: *"It is important to perform a post audit of the models to better assess their predictive capacity and uncertainties. Model calibration goals are not the same as ecological performance measures. By relying solely on the post audit of the models for the evaluation of the mitigation, an opportunity for utilizing the tremendous amount of data and analysis that were used to develop the DEIS is not being realized. The development of the DEIS involved tremendous amounts of data collection and analysis of various resources that needed protection. These data and analyses should be used in*

developing ecosystem performance measures. The ecosystem performance measure could be expressed as the magnitude, duration and frequency of the parameter of interest and appropriate thresholds for actions by resource agencies."

Response: Concur. Field data collected in the estuary would be used to update/refine models to narrow the range between predicted and observed values.

Concur. As noted previously, the refinement of the models would not be the primary tool used to determine project impacts or the degree/kind of modifications which would be made to the mitigation plan. Instead, those refined models would allow more accurate comparisons between the observed post-construction data and the values calculated for those conditions. It is the comparison between observed post-construction field data and the values calculated for those conditions that would serve as the primary tool to determine project impacts and whether modifications to the mitigation plan are warranted.

Page 4

637-BB-141-EV18

Comment: *"There are references in the Plan of the using the monitoring data to show if "…impacts are occurring beyond the range of those expected" and the monitoring data "…will be useful in identifying whether any impacts are occurring beyond the range of those expected" (p. 27). The expected range of impacts was never defined in the AMP. At every sampling and gaging location for a resource of concern, an ecological performance measure should be developed to define the expected ecosystem response to the deepening mitigation."*

Response: Please see previous response on the establishment of performance measures. The range of values expected a given site would depend on the environmental conditions experienced at that time – river flow, temperature, tides, etc.

637-BB-141-EV19

Comment: *"Many of the funding figures appear to be inconsistent between sections of the AMP and between the AMP and the GRR. For example, chloride sampling is listed at $100,000 on page 18 and $80,000 on page 24, marsh data collection is listed at $18,000 on page 17 and $20,000 on page 24, and long-term monitoring is listed at $347,000 on page 37 and $428,400 in the GRR."*

Response: The chloride sampling costs [pages 18 and 24] differ from those for marsh collection data [pages 17 and 24] because they represent a different time frame, i.e., the expenditures on pages 17 and 18 are for monitoring during construction while the values on Page 24 are for post-project monitoring. The costs for long-term monitoring in the GRR have been corrected to reflect what is included in the Adaptive Management Plan.

637-BB-141-EV20, 637-BB-141-EV21

Comment: *"Procedures for disposing of sediments that contain cadmium concentrations exceeding 14 parts per million (ppm) are discussed in three parts of the DEIS: 1) Section 5.4.2.2; 2) Appendix D - Monitoring and Adaptive Management; and 3) Appendix M - Sediment Quality Evaluation. These discussions are unclear and inconsistent. In particular, we recommend clarifying the proposed cadmium monitoring program. The Department recommends a program of monitoring wildlife activity in disposal areas and cadmium levels in bird tissues that is independent of the Dredge Material Containment Area (DMCA) capping criteria. Wildlife monitoring should begin with sediment placement and continue as long as all other monitoring of the DMCA. Tissue monitoring should occur: 1) prior to sediment placement to collect baseline data; 2) during sediment placement; and 3) post placement until 3 consecutive years of samples contain cadmium concentrations that are less than the potential adverse effect level, which is to be determined. The Department supports the sampling protocol (species and timing) described in Appendix D, page 23; and requests that the Corps continue to coordinate with the FWS prior to completion of the final EIS to finalize plans for biological monitoring within DMCAs, including tissue sampling."*

Response: The District has agreed to conduct bird tissue analysis as part of the monitoring efforts associated with the disposal of sediments having elevated cadmium levels. Wildlife use monitoring and bird tissue analysis would be conducted if sediments in a CDF contain cadmium levels of 4 mg/kg or greater and those sediments cannot be covered with Operation and Maintenance material within 6 months. Section 5 of the EIS, Appendix D, and Appendix M have been revised to indicate this.

Concur. The District will coordinate any bird tissue sampling efforts with the FWS.

637-BB-141-EV22

Comment: *"The Department accepts the Corps' use of 4 ppm cadmium concentration in capping material as a trigger for remedial action in DMCAs. The Department understands that the Corps will move a DMCA to higher priority in the rotation for Operations and Maintenance (O&M) sediment placement and vegetation monitoring if 25 cumulative acres are found to have a cadmium concentration greater than or equal to 4 ppm. Sampling and placement will continue until the DMCA has less than 25 cumulative acres with a cadmium concentration greater than or equal to 4 ppm."*

Response: Concur.

637-BB-141-EV23, 637-BB-141-EV24

Comment: *"The Savannah estuary is a complex system and predicting how this system may respond to substantial physical alterations (channel deepening, flow diversions, etc.) is fraught with uncertainties, which are well acknowledged within the DEIS. However, based on an analysis prepared by Kinetic Analysis Corporation (KAC), the DEIS concludes that the hydrodynamic model probably over-predicts salinity and under-predicts dissolved oxygen; i.e., the model errs towards the side of simulating conditions worse than would actually occur. We believe this analysis may seriously misrepresent the risk associated with the water quality predictions. It is quite possible that the hydrodynamic model does not*

predict worst-case conditions. With the exception of the new channel depth, the KAC analysis relied upon the existing geometry of the Savannah River estuary. Several mitigation measures would significantly modify the system geometry, including significant flow diversion at McCoys Cut, closing Rifle Cut, filling the Back River sediment basin, and removing the tide gate. Flow routing and flow volume in the three main river channels would become significantly different from the current system. Therefore, we believe the degree of risk and uncertainty regarding expected water quality impacts, and in turn, wetland impacts, is considerably higher than the KAC analysis suggests. For this and other reasons, the Department recommends extending the proposed post-construction monitoring from 5 years to 10 years."

Response: Please see previous response concerning extending the post-construction monitoring program from 5 to 10 years.

Please see the District's previous response/rationale why the post-construction monitoring was not extended from five to ten years. Namely, five years of post-monitoring data collection will provide sufficient information for reasoned decision-making for resources of concern within the project area. However, post-construction monitoring of the wetland restoration at Site 1S for consistency with USACE Regulatory requirements.

Page 5

637-BB-141-EC01

Comment: *"The first paragraph of the Abstract discusses channel depths and then states that 70% of vessels do not call on Savannah at their maximum capacity or design draft, which implies that all light-loading is due to channel depth limitations. The Corps should include information on the percentage of vessels with loads constrained by channel depth and the percentage of light-loading due to other factors, such as prior calls at other ports. Additionally, the DEIS should include the predicted percentage of ships that will call on the port fully loaded or leave fully loaded if the channel is deepened."*

Response: The statement is not intended to imply that light loading of containerships is solely due to channel depth limitations. Rather the statement is intended to express in relative terms, to what extent container vessels calling Savannah incur some restrictions due to channel depth. The statement could also be worded as follows: "About 70% of the container ships that currently call at Savannah have design drafts greater than 38 feet, so they would need tidal assistance to safely traverse the channel when fully loaded." Those vessels either arrive and depart in light loaded conditions or have to make use of tides.

Containerships seldom sail at their design drafts. There are many reasons why vessels light load, among them are prior and post port limitations and the channel itself. In some instances a vessel "cubes" out before it "loads" out. To cube out means that a vessel has all of its spaces filled with either laden or empty containers, but the weight of the cargo and containers is such that it does not require the vessel's entire design draft. In other instances, vessels may not arrive or depart a particular port at its design draft because there is not enough cargo imported or exported on that particular leg of their trip. It is

neither possible nor necessary to estimate to percentage of light loads due to various factors. Tables 108, 112, and 113 in the economic appendix show estimated sailing draft distributions of various classes of containerships, and the distributions of sailing drafts in the without project conditions and with each of the alternatives.

637-BB-141-EV25

Comment: *"The first paragraph of this section states that the tentatively recommended plan is either the 47-foot alternative or the 48-foot alternative. The third paragraph describes the tentatively recommended plan as the 48-foot alternative. The Errata Sheet of December 17, 2010, states that various references to the 48-foot alternative throughout the GRR and DEIS "should not be interpreted as a recommendation or preference for that alternative over the tentatively selected -47 feet NED [plan]." On September 9, 2010, the FWS provided comments on preliminary drafts of the GRR and DEIS, identified -45 feet as its preferred alternative for deepening the harbor and stated it did not support the 48-foot alternative. The final EIS will necessarily need to revise this section to discuss the multi-agency rationale for what is ultimately determined as the final plan selection."*

Response: The Corps acknowledges the USDI's preference for the 45-foot depth alternative. The FEIS will contain the views expressed by the Cooperating Agencies, and the document will address all agency comments received during the DEIS process.

637-BB-141-EC02

Comment: *"This section states that 70% of vessels do not call on Savannah at their maximum capacity or design draft, which implies that all light-loading is due to channel depth limitations. The Corps should include information on the percentage of vessels with loads constrained by channel depth and the percentage of light-loading due to other factors, such as prior calls at other ports. Additionally, the DEIS should include the predicted percentage of ships that will call on the port fully loaded or leave fully loaded if the channel is deepened."*

Response: The statement is not intended to imply that light loading of containerships is solely due to channel depth limitations. Rather the statement is intended to express in relative terms, to what extent container vessels calling Savannah incur some restrictions due to channel depth. The statement could also be worded as follows: "About 70% of the container ships that currently call at Savannah have design drafts greater than 38 feet, so they would need tidal assistance to safely traverse the channel when fully loaded." Those vessels either arrive and depart in light loaded conditions or have to make use of tides.

Containerships seldom sail at their design drafts. There are many reasons why vessels light load, among them are prior and post port limitations and the channel itself. In some instances a vessel "cubes" out before it "loads" out. To cube out means that a vessel has all of its spaces filled with either laden or empty containers, but the weight of the cargo and containers is such that it does not require the vessel's entire design draft. In other instances, vessels may not arrive or depart a particular port at its design draft because there is not enough cargo imported or exported on that particular leg of their trip. It is neither possible nor necessary to estimate to percentage of light loads due to various factors. Tables

108, 112, and 113 in the economic appendix show estimated sailing draft distributions of various classes of containerships, and the distributions of sailing drafts in the without project conditions and with each of the alternatives.

637-BB-141-EV26

Comment: *"**4.01.2, Geology, page 4-7.** The amount of dredged material by station for both inner harbor and outer harbor do not match between Section 3 (Table 3-8, pg. 3-27; Table 3-9, pg. 3-28) and Section 4 (Table 4-4, pg. 4-7; Table 4-5, pg. 4-7). The Department recommends corrections for clarity."*

Response: Concur. The tables have been revised for consistency.

Page 6

637-BB-141-EV27

Comment: *"The discussion on DO standards is confusing. The new DO standard established by the State of Georgia is not less than 5.0 mg/L throughout the year with an instantaneous minimum of 4.0 mg/L. A number of site-specific DO standards are listed. For clarity, this section should explain how the new standard of 5.0 mg/L compares to the measured monthly ranges of DO in the Savannah River at the currently authorized depth of 42 feet."*

Response: Concur. The DEIS [page 4-14] has been revised to reflect the details of Georgia's water quality standards for Savannah Harbor. Additional information has been added to provide the reader with a better understanding of existing background dissolved oxygen levels.

637-BB-141-EV28

Comment: *"This section states that optimum striped bass spawning success requires salinity less than 1.7 ppt. Studies on the Savannah River indicate that striped bass spawn almost exclusively in areas where maximum salinity near the surface is less than 1.0 ppt. The Department recommends revision to state salinity of less than 1.0 ppt is optimum."*

Response: Do not concur. The USFWS participated in the Fisheries Interagency Coordination Team which guided the Corps in its evaluations on Striped bass for this project. The Fisheries ICT was comprised of fishery experts from USFWS, NOAA Fisheries, EPA, GA DNR-WRD, and SC DNR. Representatives of those organizations reviewed literature for Striped bass and, in particular, data from studies conducted in the Savannah River Basin. The criteria include the following: "Studies on the Savannah River indicate that striped bass almost exclusively spawn in areas where maximum salinity near the surface is less than one ppt (Van Den Avyle et al 1990, Reinert and Jennings 1998, Will et al 2000)." As a result, the interagency team recommended the Corps use a 90%-tile salinity value of <= 1 ppt to define acceptable Striped bass spawning habitat.

637-BB-141-EV29

Comment: *"This section should discuss the common reed (Phragmites australis) as an invasive species. The document states elsewhere (page 4-55, section 4.07) that common reed will probably dominate the*

confined disposal facilities (CDFs). We believe that the common reed in the CDFs is the invasive strain. According to the U.S. Geological Survey (USGS), the invasive strain originated in Europe and was possibly spread via ships' ballast. Section 5 of the final EIS should evaluate the potential for the invasive strain to crowd out native species in marshes adjacent to the CDFs."

Response: Concur. A discussion of the common reed (Phragmites australis) has been added to the Invasive Species section. Discussion has also been added to Section 5.0 regarding the potential for this invasive species to crowd out native species in marshes adjacent to the CDFs.

637-BB-141-EV30

Comment: *"This section addresses only one pathway, ballast water, for introduction of aquatic invasive species. Introduction of invasive species in the Savannah Harbor, both aquatic and terrestrial, is not limited to ballast water. Insects in pallets, or plants and seeds in soil on containers, are two examples of other pathways. Invasive species can dramatically alter an ecosystem, which is a major concern for the Savannah NWR. This section should address other pathways and terrestrial systems as well as aquatic systems."*

Response: Concur. The discussion of introduction pathways of invasive species has been expanded.

637-BB-141-EV31

Comment: *"The Savannah NWR is 29,175 acres, not 25,600 acres."*

Response: Concur. The acreage for the SNWR on Page 4-47 has been corrected.

637-BB-141-EV32

Comment: *"This section refers to a 1992 Planning Aid Report, but the FWS report in question is dated September 16, 1982."*

Response: Concur. Page 4-62 has been revised.

637-BB-141-EV33

Comment: *"The text states that the first two entries in Table 5-1 are Refuge lands, but the table labels the first three entries as Refuge lands. Figure 5-1 is illegible, but appears to depict the Kings Island Turning Basin along with another area for dredging. It is unclear where the third area of excavation is located (we believe 96+000 to 97+000). Figure 5-2 appears to depict the non-Refuge portion of excavation from 86+000 to 88+500, but it too is unclear. A proximity map would help locate these areas in relation to the Savannah NWR."*

Response: Concur. The text on Page 5-1 has been revised to indicate that the first three areas shown in Figure 5-1 are within Refuge lands. The graphics supporting this discussion have been improved to allow the reader to identify the locations/areal extent of project affected lands more easily.

637-BB-141-EV34

Comment: *"The discussion in the opening paragraph references Figure 5-52 as CDF 1S; however, Figure 5-52 is a picture of Old Fort Jackson (on p. 5-134). We believe the correct reference is to Figure 5-4 on page 5-7."*

Response: Concur. The text on Page 5-6 has been revised to refer to Figure 5-4.

Page 7

637-BB-141-EV35

Comment: *"The Corps proposes to restore up to 45 acres at Area 1S on the Savannah NWR, using 14.5 acres as "advance mitigation" for direct impacts to salt marsh. These impacts include widening channel bends and turning basins both on and off the Savannah NWR. "Advance mitigation" is the functional equivalent of a mitigation bank. FWS Mitigation Policy (64 FR 49229-49234) does not allow the use of NWR lands for mitigation banks; therefore, the Department cannot support the 14.5 acres as "advance mitigation." "*

Response: Restoration of 42 acres of marsh within Disposal Area 1-S exceeds the construction project's mitigation requirements (28.75 acres). Periodically, operation of the existing Federal Navigation Project adversely impacts small amounts of brackish and saltmarsh wetlands through activities conducted at the project's confined disposal facilities. When such instances are anticipated, the District develops mitigation to compensate for the impacts. Coordination with the USFWS and the Wetland Interagency Coordination Team have identified the potential for restoration of roughly 45 acres of brackish marsh at Disposal Area 1-S. Such restoration agrees with the goals of the USFWS and the Savannah National Wildlife Refuge to restore Refuge lands to more ecologically valuable conditions, when possible. Restoration of Disposal Area 1-S is the best potential brackish marsh mitigation activity in the estuary. In the future, the Corps would likely request approval from the Service to complete the remaining restoration of the site if it does not complete that work if/when harbor deepening occurs. Restoration of the entire site at one time would be better for the environment (and the Refuge) than would construction in that area on multiple occasions. The Corps proposes to restore the entire site at one time and consider the acreage that it restores beyond the project's initial mitigation requirement as advance mitigation. Performing mitigation in advance of an impact is generally preferred by natural resource agencies. The Corps is required to perform its mitigation prior to, or at the same time as the activity that causes the impact. Since the Corps would use the advance mitigation to compensate for future impacts resulting from the same overall project – the Savannah Harbor Navigation Project – this would not be a mitigation bank. The advance mitigation acreage would not be available for use by others or for other projects. Instead, it would be reserved for Federal government use as wetland mitigation solely for the Savannah Harbor Navigation Project. Outside interests could not purchase the wetland credits. As a result, the restoration of the remaining roughly 16 acres at Disposal Area 1S should not be considered a mitigation bank.

637-BB-141-EV36

Comment: *"The Corps proposes to restore up to 45 acres at Area 1S on the Savannah NWR, using 14.5 acres as "advance mitigation" for direct impacts to salt marsh. These impacts include widening channel bends and turning basins both on and off the Savannah NWR. "Advance mitigation" is the functional equivalent of a mitigation bank. FWS Mitigation Policy (64 FR 49229-49234) does not allow the use of NWR lands for mitigation banks; therefore, the Department cannot support the 14.5 acres as "advance mitigation."*

Response: Concur. The monitoring plan (Appendix C) has been revised to include monitoring of invasive species at the marsh restoration site on Disposal Area 1-S.

637-BB-141-EV37

Comment: *"This section references a USGS report, by the Cooperative Research Unit, titled "Simulation of Water Levels and Salinity in the Rivers and Tidal Marshes in the Vicinity of the Savannah National Wildlife Refuge, Coastal South Carolina and Georgia" but does not provide the reference. Suggest the Final EIS include the reference (Conrads et al, 2006) in the text and in the References section."*

Response: Concur. The subject reference has been added to both the text and the References section.

637-BB-141-EV38

Comment: *"This section states "In March 2007, the Federal Cooperating Agencies discussed a USGS proposal to revise the linkage to increase its usefulness for evaluating potential mitigation measures." but the proposal was rejected. Suggest the Final EIS include a short explanation, and relevant information, on how this decision was reached."*

Response: Concur. The text has been revised to include details why the decision was made not to modify the model as suggested by the USGS.

637-BB-141-EV39

Comment: *"This section states that the primary stress to tidal freshwater marsh is prolonged drought, which is not supported by evidence. In 1875, when the controlling depth of the navigation channel was 12-15 feet, the Savannah estuary supported an estimated 12,000 acres of tidal freshwater marsh. In 2005, when the controlling depth was 42 feet, the estuary supported only 3,269 or 4,072 acres (depending on study method used). This section should instead state that the inland intrusion of salt water resulting from channel deepening is a constant stress on tidal freshwater marsh, and that prolonged drought exacerbates this stress."*

Response: The EIS provides a detailed discussion regarding the relationship of previous harbor channel deepening and how these modifications fostered a progressive increase in upstream salinity levels. In turn, those increases lessened the extent of tidal freshwater marsh. The subject paragraph was intended to describe the baseline condition with respect to current stresses, e.g., prolonged drought and sea level rise, on the remaining tidal freshwater marsh.

637-BB-141-EV40

Comment: *"This section states the Corps evaluated the effects of sea level rise on tidal freshwater marsh. The Department maintains that sea level rise would have a negligible impact on the Savannah NWR if not for the cumulative impact of previous harbor deepening."*

Response: This section of the document discusses the three actions that will most likely affect the remaining tidal freshwater marsh, viz., prolonged drought, sea level rise, and harbor deepening.

637-BB-141-EV41

Comment: *"This section examines various alterations to rivers and creeks to reduce the impacts to tidal freshwater marsh. It states that the proposed mitigation for the 47-foot alternative is predicated on a "base year" (immediately following construction) impact of 223 acres instead of a project-life average annual impact consistent with Corps policy. The average annual impact is lower than 223 acres due to the effect of sea level rise during the next 50 years that would occur without the project. The Department maintains that sea level rise would have a negligible impact on the Savannah NWR if not for the cumulative impact of previous harbor deepening. Therefore, we support obtaining a waiver from the Corps' policy in this instance to instead implement the agency-coordinated level of mitigation."*

Response: See previous responses on this issue. The District has requested a waiver from Corps policy, i.e., removal of the requirement to use an average annual analysis of project impacts and mitigation requirements.

Page 8

637-BB-141-EV42

Comment: *"This section should compare the modeled DO levels in the Savannah River under the LLP and NED depth plans with the State of Georgia's DO standard. The new Georgia DO standard is not less than 5.0 mg/L throughout the year, with an instantaneous minimum of 4.0 mg/L."*

Response: The discussion [pages 5: 37-39] focuses on the impacts of the various harbor deepening alternatives and how each would affect the dissolved oxygen regime in Savannah Harbor. The proposed oxygen injection system is a mitigation measure which seeks to produce a "zero-sum" as regards dissolved oxygen and is not designed to bring the harbor into compliance with Georgia water quality standards.

637-BB-141-EV43

Comment: *"The document states the "The Corps had an Independent Technical Review performed of the chloride model by a staff member of the USGS in Columbia, SC. The reviewer expressed about the ability of the model to make reliable predictions at the low chloride concentrations occurring at the City's intake." Suggest the Final EIS explain "what" the reviewer expressed and include documentation of the reviewer's expertise."*

Response: The Corps has supplemented the modeling efforts described in the DEIS to address concerns about detection of chloride ions [even at low levels] at the City of Savannah's water supply intake. Those revised analyses are included in the FEIS.

637-BB-141-EV44, 637-BB-141-EV45

Comment: *"This section describes a secondary (supplemental) water supply intake line for the City of Savannah to be constructed if needed. Based on a preliminary review, the Department would prefer intake Site 1, because intake Site 2 is likely to adversely affect more wetland and wildlife habitat. The Department requests further coordination to evaluate impacts and make recommendations if the supplemental intake site is needed in the future."*

Response: If a supplemental water supply intake line were required, the District would select a site that would meet the needs of the City while minimizing impacts to wetlands and fish and wildlife resources [as required by the Section 404 (b)(1) Guidelines]. If impacts to wetlands were unavoidable, required mitigation would be provided.

The District would coordinate details of the construction with the resource agencies if a supplemental intake line is determined to be needed.

637-BB-141-EV46

Comment: *"The Corps proposes to fund a stocking program for striped bass based on the amount of spawning and early life stage habitat lost due to water quality changes resulting from harbor deepening: "the extent of the stocking needed could be reduced to the amount of habitat predicted to be impacted by the project. Thus, the percentage of habitat loss could be multiplied by the cost for a full-scale stocking program to determine the amount that would be sufficient to compensate for the habitat loss that is expected." The expected loss of habitat is 2.9% for the 45-foot alternative and 26.9% for the 47-foot alternative. The final EIS should include a proposal to monitor/measure post-construction loss of striped bass habitat. The final adaptive management plan should address striped bass, and if habitat loss exceeds the amount predicted, include provisions and assurances to increase stocking funds accordingly."*

Response: Concur. The Monitoring and Adaptive Management Plan has been revised to include verification of model predictions regarding impacts to Striped bass habitat. These studies would be conducted during the fourth year of the Post-Construction Monitoring.

637-BB-141-EV47

Comment: *"This section should clarify whether the Corps intends to collect 30 or 86 sediment samples per DMCA. The Department has previously stated a concern that 30 samples are not enough. The Corps proposes taking samples 15 cm deep: the Department recommends 86 samples of the cap material per DMCA taken 30 cm deep. The DEIS sometimes refers to 7 ppm of cadmium in the capping material to trigger remedial action. The Department recommends substituting a threshold of 4 ppm throughout the DEIS for clarity. This section should fully summarize bird tissue monitoring, which is partially summarized*

in Appendix D, page 23, and Appendix M, page 84. The Department understood that the Corps had agreed to bird tissue monitoring independent of monitoring cadmium soil concentration levels. Tissue monitoring should occur: 1) prior to sediment placement to collect baseline data; 2) during sediment placement; and 3) post placement until 3 consecutive years of samples contain cadmium concentrations that are less than the potential adverse effect level, which is to be determined. The Department requests that the Corps continue to coordinate with the FWS prior to completion of the final EIS to finalize plans for biological monitoring within DMCAs, including tissue sampling."

Response: Page 21 of Appendix D of the DEIS says that the Corps would monitor cadmium in the surface of the CDF cap/cover. If the distribution of sediments with cadmium concentration ≥ 4 ppm extends over a cumulative total of 25 acres or more of the capping/covering layer, the Corps would perform biological monitoring within the DMCA if the area cannot be covered by O&M sediments within 6 months. We will clarify this position throughout the EIS, as well as the Corps' intent to take 86 sediment samples in each DMCA where cadmium-laden sediments would be deposited. After receiving the DOI comments, the District examined the depth of plant roots in the CDFs. In general, we found that the majority of the roots of plants found in the CDFs that serve as food for invertebrates average 7.5 inches and extend to 9.2 inches below the surface. Some species with tap roots extend further, but those species are not commonly used for forage by insects, birds, or animals. Based on this inspection, we concur that sampling dry and moist sediments to a depth of 30 cm (12 inches) would be sufficient to characterize the sediment cadmium concentrations that would be available for uptake into biotic systems. In locations with standing water, cadmium would be essentially insoluble and the potential path for uptake would be through invertebrates residing in the upper layers of the sediment. Anoxic conditions would occur a few inches below the sediment surface, so we believe that sampling to a depth of 15 cm (6 inches) is sufficient to characterize the sediment cadmium concentrations in areas with standing water. Once initiated, tissue sampling is initiated, it would be conducted for a period of five years unless tissue levels do not exceed potential adverse levels for three consecutive years. Then no further monitoring would be deemed necessary.

Page 9

637-BB-141-EV48

Comment: *"Groundwater conditions were simulated with a constant pumping rate 200 years into the future to estimate the timing of sea water intrusion into the Upper Floridan Aquifer. The DEIS states elsewhere that Chatham and Effingham counties are experiencing population growth, and it is reasonable to assume that industrial water use may also increase with the potential harbor expansion. For the final EIS, the Department recommends revisiting the groundwater simulations with consideration of likely increases in pumping rates."*

Response: The groundwater pumping rates were simulated using a constant rate for 200 years. The State of Georgia required this approach, which is a conservative one in light of EPD's recent actions to reduce groundwater removal from the Upper Floridan aquifer. GA DNR-EPD has been placed a restriction on any new permits for groundwater withdrawal and they are mandating reductions in

groundwater withdrawal for existing permitees. Based on these EPD initiatives, the analysis in the EIS of project impacts is considered conservative. The District agrees that increased demand for water in Chatham and Effingham counties is likely; however, unless the above mandates are rescinded, this demand will not be met with increased withdrawals from the aquifer.

637-BB-141-EV49

Comment: *"This section discusses direct dredging impacts and generally concludes that expected impacts are minor. However, the text does not describe the long-standing striped bass spawning season window that restricts dredging and is likely largely responsible for the minor impacts conclusion. On Page 14 of Appendix H is a statement that hydraulic dredging is not conducted in Savannah Harbor during the striped bass spawning season. The Corps should revise Section 5.7 and other relevant sections to discuss the striped bass spawning window, and describe where and when hydraulic harbor deepening dredging is restricted."*

Response: Concur. Section 5.7 has been revised to include a discussion of dredging restrictions during the Striped bass spawning season.

637-BB-141-EV50

Comment: *"The flow of the Savannah River is highly variable within and between years; therefore the Corps should specify the period of record used for the following calculation: "the average daily freshwater flow in the Savannah River at Clyo is about 11,290 cfs." The analysis presented in this paragraph should use data that represents the seasonal timing and flow conditions typical during channel maintenance operations, and if necessary, revise the conclusions based on this analysis."*

Response: The EIS is revised to clarify the period of record used in the calculation of average daily freshwater river flow. Some portion of the navigation channel is being maintained every month of the year. The main point of that paragraph was the comparison between the volume flowing through a cutterhead dredge (70 cfs) and that in the entire river (average of 11,290 cfs). A large dredge captures a very small proportion of the volume of water in the Savannah River at any given time. Therefore, entrainment concerns associated with the operation of a hydraulic pipeline dredge are minimal. Even if drought flows of 4,000 cfs occur in the Savannah River estuary when dredging occurs, the same relationship exists and the same conclusion can be made.

637-BB-141-EV51

Comment: *"This section covers the introduction of invasive species through ballast water, but should also address other pathways through ports, such as insect larva in pallets (e.g., red bay ambrosia beetle), or seeds and plants 'hitchhiking' in soil on containers."*

Response: Concur. This section has been revised to include this discussion.

637-BB-141-EV52

Comment: *"The Department disagrees with this statement: "The Corps believes that with implementation of the Mitigation Plan and Monitoring and Adaptive Management Plan, the proposed action would not have significant adverse impacts on the environment." Under the 47- and 48-foot alternatives, which the Corps identifies as the tentatively recommended plans, the Savannah estuary would lose an estimated 223 and 337 acres of tidal freshwater marsh, respectively. We have identified loss of tidal freshwater marsh as the "most important impact criterion in the Savannah Estuary" (page 5-10). In-kind mitigation for this loss is not possible; therefore, significant adverse impacts remain even with implementation of the mitigation plan for the 47- and 48-foot alternatives. This is why the Department prefers the 45-foot alternative among the action alternatives, because it minimizes the loss of freshwater tidal wetlands, impacts to Savannah National Wildlife Refuge (NWR), and risk and uncertainty of impacts to trust fish and wildlife resources."*

Response: That statement has been removed from the EIS. It has been replaced with statements that indicate that the Mitigation and Monitoring and Adaptive Management Plan would provide adequate mitigation for all alternative depths considered.

637-BB-141-EV53

Comment: *"Manatees have been observed on the Savannah NWR since 1987. Six manatees were observed on the Savannah NWR on August 26, 2010, at a rice trunk on the Wildlife Drive. This area is directly across from Port Wentworth on the Back River. In September of 2008, four manatees were found in the Savannah River (Front River) downstream of the Georgia Ports Authority Ocean Terminal that had been killed in a ship-related incident. This section states that manatee occurrence in the area is rare. Manatees have site fidelity to summer habitat sites, therefore, the FWS would expect the six observed on the Savannah NWR to return. The Georgia Department of Natural Resources (GADNR) has data on manatee mortality and public sightings in the Savannah River. From FWS personnel's observations and discussions with the GADNR, the FWS would not characterize manatee occurrence as rare. Usage is regular enough to characterize manatee occurrence in the Savannah River estuary as a small summer resident population."*

Response: The phrase "their occurrence is rare" has been removed from the document.

Page 10

637-BB-141-EV54

Comment: *"This section states that the proposed mitigation for the 47-foot alternative is predicated on a "base year" (immediately following construction) impact of 223 acres instead of a project-life average annual impact consistent with Corps policy. The average annual impact is lower than 223 acres due to the effect of sea level rise during the next 50 years that would occur without the project. The Department maintains that sea level rise would have a negligible impact on the Savannah NWR if not for the*

cumulative impact of previous harbor deepening. Therefore, we support obtaining a waiver from the Corps' policy in this instance to instead implement the agency-coordinated level of mitigation."

Response: See previous response to this issue. The waiver has been requested.

637-BB-141-EV55

Comment: *"The MACTEC engineering firm's report on the test of a DO injection system concluded that the system could improve a DO deficit by 0.6-0.7 mg/l. An independent peer review by USGS found that this conclusion was not supported by the data. The USGS review found instead that the natural tidal cycle accounted for most of the variation in DO levels during the demonstration. This section of the final EIS should address the USGS report. The uncertainty regarding the results of the efforts to improve DO deficiencies is additional justification for expanding the water quality monitoring efforts from 5 to 10 years."*

Response: As proposed, the project includes five years of water quality monitoring. The project would install and operate seven new continuous water quality monitors and use data from other monitors that already collect data in the harbor. The monitoring also includes a Transfer Efficiency Study of the oxygen injection system after installation. The District believes that water quality conditions in Savannah Harbor will have reached equilibrium well before the end of the five-year monitoring plan. Hence, sufficient data will have been collected to ascertain project impacts on the water quality regime.

637-BB-141-EV56

Comment: *"The acreages mentioned on these pages do not correspond with those found in other places in the DEIS. Pages 48 and 50 mention 15.68 acres of brackish marsh lost, while DEIS sections 5.1.1.1 and 5.1.1.2 mention 14.08 acres. Appendix C, pages 49 and 50 state the restoration area is 45 acres, while page 49 states the restoration area is 42 acres. Figure 19 on page 49 depicts two restoration areas of 34 and 8 acres for a total of 42 acres. Section 5.1.1.2 page 5-6 states the restoration area is 42 acres. The Department recommends correcting any mistakes in these sections or explaining the apparent inconsistencies."*

Response: Concur. The Corps has revised the EIS to clarify these numbers.

637-BB-141-EV57

Comment: *"This section discusses wetland restoration on site 1S for direct impacts to brackish marsh. The desired vegetation outcome is to establish a mixed brackish marsh, similar to adjacent marsh, on the site. Chinese tallow tree and common reed, both highly invasive exotic species, have been identified in the marshes near the restoration site. Monitoring the success of the re-vegetation for 5 years should include control measures for exotic and invasive species, if detected."*

Response: Concur. The monitoring plan for the restored wetland area has been revised to include monitoring for invasive species and implementation of control measures, if required.

637-BB-141-EV58

Comment: *"On page 49, it is not clear what is meant by "The Corps would expand our restoration acreage to include their acreage (1.7 acres)." Please clarify."*

Response: The District has revised this section as follows: "The Georgia Ports Authority graded down a 1.7 acre area on Disposal Area 1-S several years ago as mitigation for habitat and functional wetland losses attendant to previous facility upgrade. This area is within the restoration site which will be used as mitigation for the SHEP. Together they will provide a continuous 42.0 acre restored wetland site.

Page 11

637-BB-141-EV59

Comment: *"On page 50, the Corps states it intends to restore all of Area 1S, using a portion for "advance mitigation." The Department regards "advance mitigation" in this context as the functional equivalent of a mitigation bank, and FWS Mitigation Policy (64 FR 49229-49234) does not allow the use of NWR lands for mitigation banks."*

Response: See previous response. Mitigation for all the project's direct wetland impacts can be accomplished via restoring 25.8 acres on Disposal Area 1-S. An additional 14.5 contiguous acres would also be restored on Area 1-S which would be applied to future wetland mitigation needs for future Savannah Harbor upgrades. The additional credits from restoring the remainder of the site would only be used by the Federal government for Savannah Harbor activities. Hence, this would not constitute a wetland mitigation bank, since credits would not be sold to other entities.

637-BB-141-EV60

Comment: *"This section states that the proposed mitigation for the 47-foot alternative is predicated on a "base year" (immediately following construction) impact of 223 acres instead of a project-life average annual impact consistent with Corps policy. The average annual impact is lower than 223 acres due to the effect of sea level rise during the next 50 years that would occur without the project. The Department maintains that sea level rise would have a negligible impact on the Savannah NWR if not for the cumulative impact of previous harbor deepening. Therefore, we support obtaining a waiver from the Corps' policy in this instance to instead implement the agency-coordinated level of mitigation."*

Response: See previous response. Savannah District has requested a waiver from the requirements of ER 1105-2-100.

637-BB-141-EV61

Comment: *"The following statement is misleading: "If a higher rate of sea level rise actually occurs, some of the freshwater marshes would convert to more saline species, so they would not be available for impact by harbor deepening." These marshes are at risk to sea level rise only because of the cumulative effect of previous harbor deepening. Tidal freshwater marshes would not be at risk due to sea level rise*

at the harbor's original depth. Additionally, the impacts to freshwater marsh from harbor deepening will occur quickly compared to the timeframe for sea level rise."

Response: See previous response. The Savannah District has requested a waiver from the requirements of ER 1105-2-100 based on the fact that project impacts to tidal freshwater marshes would occur soon after the harbor is deepened.

637-BB-141-EV62

Comment: *"These pages discuss sea level rise and the possibility of over-mitigating if sea level rises faster than projected. The Corps proposes to reassess sea level rise at the end of the project's life in 50 years and assign wetlands mitigation credits to the project in an amount equivalent to the over-mitigation. The Department regards "advance mitigation" in this context as the functional equivalent of a mitigation bank, and FWS Mitigation Policy (64 FR 49229-49234) does not allow the use of NWR lands for mitigation banks. This section, among others in the DEIS, also states that the proposed mitigation for the 47-foot alternative is predicated on a "base year" (immediately following construction) impact of 223 acres instead of a project-life average annual impact consistent with Corps policy. The average annual impact is lower than 223 acres due to the effect of sea level rise during the next 50 years that would occur without the project. The Department maintains that sea level rise would have a negligible impact on the Savannah NWR if not for the cumulative impact of previous harbor deepening. Therefore, we support obtaining a waiver from the Corps' policy in this instance to instead implement the agency-coordinated level of mitigation."*

Response: See previous responses. The waiver has been requested.

637-BB-141-EV63, 637-BB-141-EV64

Comment: *"This section discusses a fishway at New Savannah Bluff Lock and Dam as the primary mitigation feature for the project's impacts to shortnose sturgeon. Fishway effectiveness varies considerably and is difficult to predict. If effective, this measure would provide shortnose sturgeon upstream passage to the Augusta shoals and other riverine spawning areas. Dam removal would represent a more certain means to provide both upstream and downstream passage for shortnose sturgeon and other species, and would also restore riverine characteristics to this portion of the basin; therefore, the Department would prefer dam removal in lieu of a fishway. The Department requests that the Corps continue to coordinate with the FWS to finalize plans for either fishway design and construction or dam removal."*

Response: Removal of the New Savannah Bluff Lock and Dam cannot be recommended at this time. Although the structure is no longer used to support navigation on the Savannah River, most recent direction from Congress was for the Corps to rehabilitate the structure and convey it to local interests.

Concur. The District will continue to coordinate with the USFWS and the other Cooperating Agencies about the design of the fishway at New Savannah Bluff Lock and Dam.

637-BB-141-EV65

Comment: *"This section describes a secondary (supplemental) water supply intake line for the City of Savannah to be constructed if needed. Based on a preliminary review, the Department would prefer intake Site 1, because intake Site 2 is likely to adversely affect more wetland and wildlife habitat. The Department requests further coordination to evaluate impacts and make recommendations if the supplemental intake site is needed in the future."*

Response: See previous response on this issue.

Page 12

7-BB-141-EV66

Comment: *"We believe the statement: "The plug would be constructed of fill and rock and would extend to EL 10 (above the Mean High Water line)" is incorrect. It is our understanding that the plug in Rifle Cut will extend to EL 10 above mean low water, which is 2 feet above mean high water -- not 10 feet, as indicated."*

Response: Concur. The text has been revised to indicate that the top of the plug in Rifle Cut would be at elevation 10 which is two feet above MHW.

637-BB-141-EV67

Comment: *"This section should discuss the timing of acquiring the mitigation lands. The Department recommends beginning no later than the start of construction and completing the acquisitions within 2 years."*

Response: Concur. The project would begin acquiring the preservation lands the first year that Congress provides construction funds. It is the Corps' and GPA's intent to complete the acquisition within the first two years, but that may not be possible because of number of actions that would need to be completed. The acquisition requirements include completing various real estate actions such as appraisals, Environmental Baseline Surveys, etc. Discussion to this effect has been added to the Mitigation Plan [Appendix C] and Section VIII.

637-BB-141-EV68

Comment: *"The Corps proposes to restore the entire site at CDF 1S, using a portion as "advance mitigation" for direct impacts to salt marsh. Claiming credit for restoration to offset as-of-yet unidentified impacts elsewhere in the future is the functional equivalent of a mitigation bank. FWS Mitigation Policy (64 FR 49229-49234) does not allow the use of NWR lands for mitigation banks; therefore, the Department cannot support restoration at this site as advance mitigation."*

Response: See previous responses concerning restoration of Disposal Area 1S and advance wetland mitigation credits.

637-BB-141-EV69

Comment: *"Successful wetland restoration is dependent on three primary factors: soil, hydrology and vegetation. The proposed dredged material removal should expose the original wetland soil and restore the site to the elevation of adjacent marshes. Construction of a "feeder" creek system toward the interior of the restoration site from Middle River will facilitate tidal exchange; however, if restored elevations do not properly restore tidal flow, invasive vegetation with almost no wildlife value may occupy the site. The desired vegetation outcome is to establish a mixed brackish marsh, similar to adjacent marsh, on the site. Chinese tallow tree and common reed, both highly invasive exotic species, have been identified in the marshes near the restoration site. Monitoring the success of the re-vegetation for 5 years should include control measures for exotic and invasive species, if detected."*

Response: Concur. See previous responses on this issue.

637-BB-141-EV70

Comment: *"The following statement, from page 92, is inconsistent with the text of DEIS Section 5.1.1.2: "Calculations derived from the SOP indicate that approximately 25.8 acres of restored saltmarsh would be required to mitigate for the 14.08 acres of impact. When combined with the 1.7 acres of previous mitigation, the resulting acreage of the mitigation site would be 25.8 acres." Adding 1.7 acres of mitigation to 25.8 acres equals 27.5 acres."*

Response: Page 92 has been revised. The Corps intends to restore about 42 acres of wetlands on Disposal Area 1S, in addition to the 1.7 acres previously graded down by the Georgia Ports Authority.

637-BB-141-EV71

Comment: *"Was the Draft Savannah Harbor TMDL for Dissolved Oxygen released by the U.S. Environmental Protection Agency in April 2010 evaluated for effects of the mitigation plan? With the changes in the flow dynamics, the Front River will have less flow and the residence times in the Harbor will increase. These changes could have a substantial impact on the waste load allocation. The effects on the allowable waste load to the system by the Project are not only caused by the deepening of the navigation channel but also the mitigation features affecting the flow dynamics of the estuary."*

Response: The project includes oxygen injection to offset [mitigate] adverse impacts resulting from all of the deepening alternatives. The District understands that potential impacts to dissolved oxygen are the primary concern in regards to the Savannah Harbor Draft TMDL. The modeling that the Corps performed ensure that the proposed mitigation would remove the adverse effects of harbor deepening on dissolved oxygen levels in the harbor. Water quality experts in EPA or GA DNR have not expressed any concern regarding changes in flow and any potential subsequent impacts to the TMDL from implementation of the harbor deepening or its mitigation.

637-BB-141-EV72

Comment: *"More than two years (2009 and 2010) of flow data have been collected on the Front, Middle, and Little Back Rivers. Six of the seven mitigation features involve alterations to flow paths in the system. Has the two years of measured flow been thoroughly compared with the flow predictions of the model? The Draft Savannah Harbor TMDL showed a frequency distribution for the Little Back River. The model comparisons should include daily tidally filtered flows, flow volumes over specified periods, and flow partitioning between the three rivers under various flow regimes."*

Response: This specific analysis has not been conducted. The District performed all model analyses requested by the Water Quality Interagency Coordination Team.

Page 13

637-BB-141-EV73

Comment: *"This section describes a secondary (supplemental) water supply intake line for the City of Savannah to be constructed if needed. Based on a preliminary review, the Department would prefer intake Site 1, because intake Site 2 is likely to adversely affect more wetland and wildlife habitat. The Department requests further coordination to evaluate impacts and make recommendations if the supplemental intake site is needed in the future."*

Response: See previous response on this issue.

637-BB-141-EV74

Comment: *"The DEIS uses county population projection data to estimate the percent increase in impervious surfaces, but should probably also consider industrial development adjacent to the Savannah River, in part due to harbor expansion. For example, a large industrial warehousing complex is proposed adjacent to the Refuge that would involve paving several thousand acres of forest land. The storm water runoff associated with these surfaces is a key threat to the sustainability of adjacent wetlands, which this section should address in the final EIS."*

Response: Concur. Discussion concerning this proposed facility has been added to the Mitigation Planning Appendix.

637-BB-141-EV75

Comment: *"The table indicates that the Corps will provide funding to GADNR for the striped bass stocking program in late 2015 or early 2016. To offset project impacts that begin when construction is complete, GADNR must have stocking capacity in place in the first spawning season following construction. The Department recommends that the Corps transfer funding for the striped bass stocking program when dredging is initiated, which should provide enough lead time to develop stocking capacity."*

Response: The schedule has been revised to reflect that funding for Striped bass stocking would be made available to the Georgia DNR before dredging occurs in the inner harbor.

637-BB-141-EV76

Comment: *"There are inconsistencies of scope of work, roles, and required funding throughout. Strongly suggest a thorough update of Appendix D to bring this to current status and necessary funding. The GaWSC is ready to assist with this."*

Response: Appendix D has been revised to correct inconsistencies of scope of work, roles and required funding.

637-BB-141-EV77

Comment: *"The USGS Georgia Water Science Center (GaWSC) led the effort in 2006 to develop the Monitoring Plan for the proposed SHEP. This was created from feedback from a multi-agency team with a broad-based variety of expertise that has been involved with the SHEP planning over the years. Much has changed with the SHEP since this plan was first developed five years ago, and subsequently the monitoring plan needs updating. The GaWSC has installed a considerable amount of additional monitoring locations that were originally outlined in the 2006 monitoring plan since its release, and this needs to be properly documented. Additionally, the GaWSC, in collaboration with the multi-agency team, has over the last two years performed the installation and operation of a chloride monitoring network for the City of Savannah water intakes on Abercorn Creek, and more detail regarding the initial results of this work should also be factored into Appendix D. The GaWSC is ready to assist in updating the monitoring plan to reflect the latest scope, roles, and budgetary needs."*

Response: The Corps used the Hydrologic Monitoring Plan that the GaWSC developed with the other resource agencies for the Savannah estuary as the foundation for the hydrodynamic and WQ monitoring efforts. The Corps then modified that plan as needed to address issues specific to the harbor deepening project.

637-BB-141-EV78

Comment: *"Several new monitoring technologies have become available since the original plan was written in 2006. Real-time groundwater chloride monitoring should be considered as an early-warning system for the aquifers in case of damage to the confining layer. The GaWSC currently is performing similar monitoring in the Brunswick, Georgia area. Several existing USGS groundwater monitoring sites along the Savannah River channel could be upgraded to enable real time monitoring of chloride concentrations. With the deployment of index-velocity stream gages currently in place, there are also techniques now available to estimate the sediment load flux within the Savannah Harbor and surrounding estuary using a sediment surrogate approach. These techniques were developed by the GaWSC and can be beneficial in providing insight into the environmental impacts caused by transported sediments as well as provide operational benefits to the management of the channel and port. It is anticipated that because a considerable amount of the proposed monitoring is already in place, a*

significant cost savings could be found to help offset the implementation of these new monitoring technologies to make a more robust monitoring effort for the SHEP."

Response: Based on studies conducted during SHEP together with previous monitoring of groundwater wells, real-time groundwater monitoring is not warranted. The proposed monitoring program includes four groundwater monitoring well pairs to establish a before-project baseline and monitor post-project chloride levels in the upper Floridian aquifer. These wells would be monitored annually. Because of the slow rate of movement of water in the aquifer, that program would provide a sufficient warning system for potential unexpected impacts. Further, the District does not believe that use of new technology to monitor sediment load fluxes is warranted to address potential impacts from this project.

Page 14

637-BB-141-EV79

Comment: *"Finally, with a large share of the monitoring data now being available in real-time, the ability to visualize and alert water resource managers and stakeholders of the real-time conditions in the Savannah River Estuary are presently available. The USGS real-time webpage, NWISWeb, currently displays all data being collected in the SHEP at http://waterdata.usgs.gov/ga/nwis/current/?type=flow&group_key=basin_cd. The USGS has developed a real-time alerting system can be activated to electronically notify individuals when parameter(s) have exceeded a pre-defined threshold (for example, see http://water.usgs.gov/wateralert/). A crucial part of any monitoring plan should now include the ability to disseminate the information using visualization and information delivery tools in order to keep stakeholders informed and allow water managers to make informed decisions in a real-time manner."*

Response: The Monitoring and Adaptive Management Plan [page 10] identifies the USGS SC Water Science Center as a likely organization to conduct the continuous water quality monitoring. Seven new continuous recording water quality stations will be installed by this project. The USGS collects this data at 15-minute interval and can make the continuous real-time data available to resource managers and the general public through the USGS National Water Information System Web (NWIS Web). A program similar to that would provide sufficient real-time water quality monitoring data for the Savannah Harbor estuary.

637-BB-141-EV80

Comment: *"It is stated that if a mitigation feature is changed, monitoring will continue for an additional year. This period may be too short depending on the feature that was changed, when the change was made, and the hydrologic condition for the additional year. The ecosystem has a much different response during wet and dry years."*

Response: The text has been revised to indicate that monitoring would be conducted during the period of construction of an adaptive management feature and for two years thereafter if a mitigation feature is modified.

637-BB-141-EV81

Comment: *"The length of the sampling period of "one lunar cycle" is not clear. Is it a 25-hour period, 14-, or 28-day cycle? With what has been learned about the dynamics of the system and data collection, is this the most cost-effective period to collect data for evaluating the ecosystem and the performance of the models?"*

Response: The Hydrologic Monitoring portion of the Monitoring and Adaptive Management Plan has been updated to clarify that this intense monitoring wpould be performed over a 28-day period.

637-BB-141-EV82

Comment: *"The section on physical monitoring indicates that the project would fund USGS to collect pre-construction hydrologic data for "up to one year," but all references to pre-construction monitoring on page 8 are to "one year." The Department recommends 1 year of pre-construction monitoring."*

Response: Concur. Pre-construction monitoring to establish a baseline will have a one year duration.

637-BB-141-EV83

Comment: *"There are two existing water quality stations on Back River (021989784 and 021989791), and one on Front River (02198920), that have long-term salinity data. The Department recommends using this long-term salinity data set, from the end of the last harbor deepening construction to the start of any new deepening construction, as baseline salinity conditions for these sites and to supplement the 1 year of pre-construction water quality monitoring."*

Response: Concur. The District will consider all existing data when it compiles the pre-construction monitoring information.

Page 15

637-BB-141-EV84, 637-BB-141-EV85, 637-BB-141-EV86

Comment: *"Pre-construction monitoring for 1 year is intended to create or supplement a pre-project baseline. However, information based on only 1 year of data may not provide an adequate baseline. Using existing longer-term data from water quality stations on Back River and Front River should help address this problem (see previous comment on Appendix D, section 5.C, page 8 and Figure 3). Similarly, wetland and fishery studies performed during project planning represent useful baseline information. This section and others in the final EIS should describe in greater detail developing baseline conditions for the various monitoring parameters. In addition, this section states: "Monitoring would be conducted between the time a decision is made on implementing a harbor expansion and the time the construction*

begins which would affect aquatic resources in the inner harbor." If construction is delayed for more than 1 year after a decision for harbor expansion, the Department recommends continuing pre-construction monitoring until construction begins."

Response: Concur. See previous response.

As previously stated, the District will use all available data in determining the pre-construction baseline.

One year of monitoring would be performed before dredging starts in the inner harbor (pre-construction monitoring).

637-BB-141-EV87

Comment: *"The proposed water-quality parameters are not described. To be more complete, the full contingent of parameters available for continuous monitoring should be listing, which are: water temperature, specific conductance, pH, dissolved oxygen, and turbidity. Each parameter brings a specific scientific benefit to the monitoring plan, as well as complements each other with diagnostic troubleshooting of equipment failure."*

Response: Concur. The list of water quality parameters which will be monitored has been added to the Monitoring and Adaptive Management Plan [page 8].

637-BB-141-EV88

Comment: *"This figure needs to be updated to reflect current (2011) real-time network."*

Response: Figure 3 [page 9] of the Monitoring and Adaptive Management Plan has been replaced to reflect the 2011 real-time network.

637-BB-141-EV89, 637-BB-141-EV90

Comment: *"The USGS Georgia Water Science Center currently performs all of the monitoring in the SHEP The funding figures are 5-years old and need to be revisited."*

Response: Savannah District will be responsible for performing all monitoring for the proposed harbor deepening project. The Corps plans to use multiple organizations to perform the various types of monitoring that would be conducted. It expects to seek assistance of the GaWSC for some aspects of the work -- the continuous water quality monitors.

The District will review the cost figures for the continuous water quality monitoring and revise as appropriate.

637-BB-141-EV91

Comment: *"The goals of the Intense Monitoring are not clear. "This sampling would address those constituents that…cannot be monitored by continuous recorders." The parameters and constituents*

listed; river discharge, flow volumes, flow velocity, flow direction, water surface elevation, depth, salinity, dissolved oxygen, water temperature, turbidity, pH, and specific conductance, can be monitored continuously. The remaining constituents are a short list: suspended solids, 5-day biochemical oxygen demand (BOD), and chlorides. Other parameters, constituents, and rates to consider are nutrients, long-term BOD, nitrification rates, sediment oxygen demand rate, re-aeration rates and tidal marsh dissolved-oxygen production/depletion rates."

Response: The District has revised the EIS to clarify the goals of the intense water quality monitoring program.

637-BB-141-EV92

Comment: *"Based upon the results of the initial chloride monitoring performed by the GaWSC, the Department recommends that SHEP chloride monitoring include a real-time index velocity streamgage at Bear Creek, and full chloride monitoring stations at Abercorn Creek (near the intakes) and on the Savannah River at I-95. Much of the monitoring infrastructure is already in place at the last two stations. The Bear Creek streamgage and some of the water-quality instrumentation would need to be reinstalled."*

Response: The District will consider a real-time index velocity stream gage at Bear Creek and full chloride monitoring stations at Abercorn Creek and on the Savannah River at I-95.

637-BB-141-EV93

Comment: *"The Georgia Fish and Wildlife Cooperative Research Unit, not the South Carolina Fish and Wildlife Cooperative Research Unit, have the fisheries personnel available to monitor the movement of fish."*

Response: The District would decide which organization would conduct the Shortnose sturgeon distribution studies during development of the SOW for that effort. The work would only be performed by a qualified agency or contractor.

Page 16

637-BB-141-EV94

Comment: *"In the Cost Summary, Oversight and Contracting are listed under "Biological" but not under "Geomorphic." Should the there be a similar item under "Geomorphic"?"*

Response: The District reviewed its cost estimates and believes that the EIS identifies the funding needed to carry out the work.

637-BB-141-EV95, 637-BB-141-EV96

Comment: *""On a regular basis, the Corps would assess how well the … models predict…" What is the frequency of this assessment? Every 4 months? Were other locations for sampling chlorides concentrations considered, such as the mouth of Abercorn Creek and I-95?"*

Response: An assessment of the model's performance would be performed every four months by comparing its predictions to actual measurements taken by the continuous water quality meters. [see: Monitoring and Adaptive Management Plan, page 17]

The District considered numerous potential water quality monitoring locations. It believes that the stations identified in the Monitoring Plan will allow adequate identification of potential project impacts and assessment the performance of the mitigation plan.

637-BB-141-EV97

Comment: *"Were other locations for sampling chlorides concentrations considered, such as the mouth of Abercorn Creek and I-95?"*

Response: See previous response.

637-BB-141-EV98

Comment: *"What is the reporting interval between the end of the 4-month data- collection periods and the release of the model evaluation reports?"*

Response: The hydrodynamic and water quality model assessments would be conducted every four months. It is reasonable to assume that a brief technical report summarizing the work and results could be prepared within 60 days.

637-BB-138-EV99

Comment: *"In the Cost Summary, Oversight and Contracting are listed under "Biological" but not under "Geomorphic." Should the there be a similar item under "Geomorphic"?"*

Response: See previous response to this question.

637-BB-141-EV100

Comment: *"Are there details for the Transfer Efficiency Study of the dissolved-oxygen system? The data collection for the demonstration project was inadequate to show any conclusive effect of the injection system on the receiving waters."*

Response: The overall objective of the Transfer Efficiency Study [Monitoring and Adaptive Management Plan -page 20] would be to determine the efficiency by which the selected injection systems add oxygen to the water column. Once there is a quantitative determination of oxygen availability, a comparison can be made as to how this amount relates to that needed to mitigate project related impacts. A scope of work has not yet been developed.

637-BB-141-EV101

Comment: *"The Corps commits to biological monitoring when soil cadmium concentration is greater than or equal to 4 ppm, but does not define biological monitoring. The Department understood the Corps had agreed to tissue cadmium sampling independent of soil cadmium sampling. Tissue sampling should occur: 1) prior to sediment placement to collect baseline data; 2) during sediment placement; and 3) post placement until 3 consecutive years of samples contain cadmium concentrations that are less than the potential adverse effect level, which is to be determined."*

Response: See previous response to this question.

637-BB-141-EV102

Comment: *"The Department accepts the Corps' use of 4 ppm cadmium concentration in capping material as a trigger for remedial action in DMCAs. The Department understands that the Corps will move a DMCA to higher priority in the rotation for O&M sediment placement and vegetation monitoring if 25 cumulative acres are found to have a cadmium concentration greater than or equal to 4 ppm. Sampling and placement will continue until the DMCA has less than 25 cumulative acres with a cadmium concentration greater than or equal to 4 ppm."*

Response: See previous response to this question.

637-BB-141-EV103, 637-BB-141-EV104

Comment: *"This section states that the Corps will sample the top 15 cm of the cap material. The Department recommends sampling the top 30 cm of the cap material. This section also states that the Corps will conduct biological monitoring when soil cadmium concentrations exceed 4 ppm if the area "cannot be covered by O&M sediments within 6 months." This approach would risk a failure to conduct biological monitoring in an area that the Corps intends to cover within 6 months, but for whatever reason, may not. The Department recommends biological monitoring when concentrations exceed 4 ppm without regard to when the Corps intends to cover the area with O&M sediments."*

Response: See previous response to this question.

Page 17

637-BB-141-EV105

Comment: *"The Department requests that the Corps continue to coordinate with the FWS prior to completion of the final EIS to finalize plans for biological monitoring within DMCAs, including tissue sampling."*

Response: The Corps has coordinated with the USFWS concerning this issue during development of the FEIS.

637-BB-141-EV106

Comment: *"No monitoring is proposed for striped bass, but should be. We recommend a post-project assessment of striped bass habitat using the water quality monitoring data and updated water quality simulations. Model updates are already planned that would facilitate a low-cost assessment using the established striped bass habitat criteria. The Department recommends comparing conditions during the fourth year of post-project monitoring with pre-construction predicted habitat impacts, and formulating corrective actions as necessary based on the results."*

Response: Concur. The District agrees that a post-project assessment of Striped bass habitat impacts using the most recent water quality monitoring data and updated water simulations would be appropriate. This would be conducted during the fourth year of the post-construction monitoring. Appropriate sections of the document including the Monitoring and Adaptive Management Plan have been revised to indicate the inclusion of this work.

637-BB-141-EV107

Comment: *"The Department supports the sampling protocol (species and timing) described in this section, with one exception (or clarification). Sampling when the CDFs are wet is proposed for April and September. However, the next sentence says three individuals of two species (six total) "will be collected* ***each year"*** *(emphasis added). We recommend revising this to state that these six individuals will be collected twice a year (April and September) when the CDFs are wet."*

Response: Concur. The Monitoring and Adaptive Management Plan [page 23] has been revised to indicate that six individuals will be collected twice a year (April and September) when the CDFs are wet.

637-BB-138-EV108

Comment: *"The DEIS shows various post construction monitoring ranging from 2 to 5 years. It is not unlikely that a drought or high-flow period lasting several years would occur during the post-construction monitoring period, which would complicate comparisons with pre-construction monitoring data. In addition, tidal freshwater wetlands respond slowly to salinity change. Therefore, the Department recommends increasing wetland and continuous water quality monitoring from 5 years post-construction to 10 years."*

Response: The District believes that five years of post-construction monitoring is sufficient to capture a range of flows over which to identify the project's impacts and evaluate the performance of the mitigation features.

637-BB-141-EV109, 637-BB-141-EV110

Comment: *"We recommend developing a detailed data analysis plan for the post-construction water quality monitoring. The mitigation features will significantly alter the system, which will complicate the comparisons of pre- and post-construction conditions to determine the efficacy of the mitigation measures. A recent example of the need for such as plan was the re-oxygenation demonstration*

performed for the Savannah Harbor Expansion project. Monitoring data was collected, but the analysis of that data failed to conclusively quantify the effect of the demonstration project in the highly variable DO dynamics of the system."

Response: A detailed data analysis plan is not warranted in a feasibility study. That more detailed work would typically be performed after decisions are made to implement a project. The District believes the level of detail in the EIS describing the monitoring that would be performed is sufficient.

The initial reports of that limited demonstration project were supplemented and revised by GPA's contractors and the revised reports containing additional information quantifying the effects on D.O. were provided to the natural resource agencies.

637-BB-141-EV111, 637-BB-141-EV112

Comment: *"Concerning the revegetation of Area 1S, grading the site and its feeder creeks to the proper elevations is essential to avoid establishing invasive vegetation (e.g., Chinese tallow tree) that have little or no wildlife value. The discussion and table in this section should specify criteria for successful establishment of native wetland plants. Monitoring the success of the re-vegetation for 5 years should include control measures for exotic and invasive species, if detected."*

Response: The table on page 29 of the Monitoring and Adaptive Management Plan specifies 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 to be a problem.

637-BB-141-EV113, 637-BB-141-EV115

Comment: *"This section describes an informal inter-agency review process for monitoring data and reports during the 5-year post-construction monitoring period. Within 1 year after the 5-year post-construction monitoring period, the Corps would prepare a consolidated report of the various monitoring programs, followed by 30 days of agency review, an unspecified time period for further report revision, public review, and a potential elevation process. This time-line for making decisions on adaptive management actions would likely require a minimum of 1.5 years after the 5-year post-construction monitoring period, and could take much longer. The Department recommends compressing this process so that final decisions on corrective actions are reached within 1 year after the monitoring period. In addition, because we have recommended extending the duration of post-construction monitoring from 5 years to 10 years, we also recommend preparing and reviewing a consolidated report of the various monitoring programs at the end of 5 years, and again at the end of 10 years following project construction, to ensure that adaptive management decisions can be made when it becomes apparent that a problem exists, and in a timely manner."*

Response: The District believes the timelines discussed in the Monitoring and Adaptive Management Plan [page 30] regarding data compilation, draft report preparation, and agency/public review are reasonable.

As stated in previous responses, the District believes that five years of post-construction monitoring is sufficient. It should be stressed that the opportunity for Cooperating Agencies to make recommendations about changes in project and/or mitigation measures will not be limited to the immediate period after completion of the post-construction monitoring. The Monitoring and Adaptive Management Plan includes a meeting between the District and the natural resource agencies at the end of each monitoring year to discuss any changes to the monitoring requirements, the project, or the mitigation features. This type of meeting could be held on a more frequent basis if circumstances require.

Page 18

637-BB-141-EV114

Comment: *"Appendix D contains two sections "9.B" – the second one should be "9.C." "*

Response: Concur. Correction has been made.

637-BB-138-EV116

Comment: *"The Federal modeling performance goals in the plan are those provided by review agencies in 2001 during hydrodynamic model development. Because the agencies were aware of the complexity of the system and model limitations, we allowed considerable latitude in the performance of the models. We are concerned that adopting the same tolerances for the performance of the constructed project is inappropriate, because actual impacts could differ substantially from the predicted impacts without triggering remedial action. Based on earlier coordination, the Corps modified the tolerances for achieving a goal of <1 ppt salinity to +/- 0.1 ppt, and we support this change. The goal for salinity in the range of 1-5 ppt has not been modified, and would allow considerable impact without triggering action. As proposed, a range of 0.5 to 1.5 ppt is acceptable for a salinity goal of 1 ppt (+/- 50%), while a range of 0.89 to 1.09 ppt is acceptable for a salinity goal of 0.99 ppt (+/- 10%). We recommend modifying the goal for salinity in the range 1-5 ppt to +/- 10 % (not +/- 0.5 ppt as currently stated) to make it more consistent with other goals and triggers for adaptive management."*

Response: The District revised Appendix D to include the suggested goal for salinity predictions (+/- 10% in the 1-5 ppt range). While this goal may not be achievable, modelers would strive to reach this objective.

637-BB-141-EV117

Comment: *"This section states that the "Corps would seek and obtain its funds for this phase each year through the normal budget process," which concerns the Department. It is relatively certain that impacts to trust resources of the Department will occur following construction, but the effectiveness of the mitigation features is much less certain. Therefore, the Department cannot agree that the proposed*

mitigation plan adequately addresses project impacts unless contingency funding for monitoring/adaptive management activities is assured."

Response: See previous response to this question.

637-BB-141-EV118

Comment: *"This section should also discuss an implementation schedule for needed corrective actions. The Department recommends initiating construction, or other appropriate remedial actions, within 1 year of a decision to modify a mitigation feature."*

Response: The District concurs with the goal of initiating construction within one year of a decision to implement an adaptive management feature. However, it a one-year time limitation on implementing a remedial action may not be achievable in all circumstances. If the action were identified in the EIS and contingency funds available, a one-year duration would be reasonable. However, if the remedial action was outside the identified scope of the EIS, additional NEPA documentation [and time] would be required. Significant modifications to the project or its mitigation features could exceed available funding, requiring a request for additional money. Those steps could easily take more than one year to complete.

637-BB-141-EV119

Comment: *"The Corps proposes to monitor the performance of corrective actions under the adaptive management program. It is unlikely that 1 year of post-construction monitoring is sufficient to determine the outcome of the action in a system as dynamic as the Savannah estuary. The Department recommends 3 years of post-construction monitoring of adaptive management actions."*

Response: This section has been revised to provide for two years of monitoring after implementation of an adaptive management feature.

637-BB-141-EV120

Comment: *"The Corps proposes to fund four water monitoring stations to determine whether the mitigation features are functioning as intended. A fifth station, Station 021989784, is located at the intake of the freshwater supply system for the 3,000 acres of managed wetlands on Savannah NWR and is therefore especially important for monitoring project impacts to the Refuge. The Department recommends adding it to the Corps' list of supported stations."*

Response: The continuous water quality monitoring station at the intake to the Savannah National Wildlife Refuge is already funded by the Georgia Ports Authority.

Page 19

637-BB-141-EV121

Comment: *"This appendix does not include a section header to separate Section B, Tidal Freshwater Marsh, from Section A, Savannah NWR Freshwater Waterfowl Management Operations. We believe page 16 is the appropriate location for this."*

Response: Concur. The District has revised the EIS as suggested.

637-BB-141-EV122

Comment: *"Figure 5 and the associated text do not provide an accurate representation of marshes in 1854. Most of the salt marsh shown on Figure 5 is in the Wright River system, not the Savannah system. The demarcation between freshwater marsh, brackish marsh, and salt marsh is not supported by historical information. As stated on page 20, Appendix L, tidal forest in the mid-1700's extended to the junction of Back River and the Savannah River, and brackish marshes extended to near the mouth of the river. Appendix Q, page 22, mentions that Hutchinson Island was used extensively for rice culture, which requires freshwater. Between the mid-1700's and mid-1800's, only minor modifications were made to the Savannah River. This information indicates that the depiction of marsh type extent in Figure 5 and the resulting areal estimates are mistaken, and that the freshwater limit extended to about river mile 7 in the mid-1850's. Figure 5 shows the interface at about river mile 19. The Department recommends correcting these errors."*

Response: Figure 5 was originally developed by EPA during its analyses for the dissolved oxygen TMDL for the harbor. The District included it in the EIS to show that different natural resource agencies have different understandings of the historic conditions in the estuary. Since man has made many changes in this estuary over time, some of the differences are the result of analyzing conditions at different points in time.

637-BB-141-EV123

Comment: *"Figure 6 and the associated text do not provide an accurate representation of marshes in 1999. USGS estimates based on detailed field studies and Corps estimates based on the hydrodynamic model are generally consistent, but are substantially different from the estimates shown in Figure 6. The Department recommends corrections for clarity."*

Response: Figure 6 was originally developed by EPA during its analyses for the dissolved oxygen TMDL for the harbor. The District included it in the EIS to show that different natural resource agencies have different understandings of the historic conditions in the estuary. Since man has made many changes in this estuary over time, some of the differences are the result of analyzing conditions at different points in time.

637-BB-141-EV124

Comment: *"This section states that the primary stress to tidal freshwater marsh is prolonged drought, which is not supported by evidence. In 1875, when the controlling depth of the navigation channel was 12-15 feet, the Savannah estuary supported an estimated 12,000 acres of tidal freshwater marsh. In 2005, when the controlling depth was 42 feet, the estuary supported only 3,269 or 4,072 acres*

(depending on study method used). This section should instead state that the inland intrusion of salt water resulting from channel deepening is a constant stress on tidal freshwater marsh, and that prolonged drought exacerbates this stress."

Response: The Present and Future Stresses Sections of this discussion have been revised to indicate that salinity levels are and will continue to be a stress on tidal freshwater marsh.

637-BB-141-EV125

Comment: *"This section also states that the Corps evaluated the effects of sea level rise on tidal freshwater marsh. The Department maintains that sea level rise would have a negligible impact within the Savannah NWR if not for the cumulative impact of previous harbor deepening."*

Response: This section has been revised to show the relationship between sea level rise/past harbor deepening projects and their cumulative adverse effect on tidal freshwater wetlands.

637-BB-141-EV126

Comment: *"The discussion of the mitigation for the loss of non-freshwater tidal marshes is confusing. Previous sections – Appendix C, Section V, and elsewhere – speak of impacts to 14.08 acres of salt and brackish marsh with 42 (or 45) acres listed as mitigation for the 44-foot alternative. Appendix C lists 15.68 acres of brackish marsh loss for all the proposed harbor deepening alternatives. This Appendix lists the loss of 3.0 acres of brackish marsh and 12.68 acres of saltmarsh, which equals the 15.68 acres of brackish marsh mentioned in Appendix C. This is confusing because both 14.08 acres and 15.68 acres are listed as marsh loss for either the 44–foot alternative or all alternatives. Also, the acreage proposed for restoration is not clear. The Department recommends revisions for clarity."*

Response: Appropriate sections of the document have been revised to indicate that the amount of direct marsh loss associated with harbor deepening is 15.68 acres. Revisions to the text were also made to describe the marsh restoration feature at Disposal Site 1-S, viz., a roughly 42-acre portion would be topographically sculpted to create a suitable marsh habitat. This parcel also includes a 1.7-acre area previously graded down by the Georgia Ports Authority for similar mitigation purposes. Of the 42-acre total, only 25.8 acres would be necessary to mitigate for the subject harbor deepening. The remaining roughly 16 acres would serve as mitigation for future impacts from O&M of the Savannah Harbor Navigation Project.

Page 20

637-BB-141-EV127

Comment: *"Most of the salt marsh in the estimate provided in the "Present Condition" section is in the Wright River system, and not in the Savannah River system. The Department recommends corrections for clarity."*

Response: The information included in the EIS was originally developed by EPA during its analyses for the dissolved oxygen TMDL for the harbor. The District included it in the EIS to show that different natural resource agencies have different understandings of the historic conditions in the estuary. Since man has made many changes in this estuary over time, some of the differences are the result of analyzing conditions at different points in time.

637-BB-141-EV128

Comment: *"The Department recommends taking samples of the cap material to a depth of 30 cm instead of the 15 cm depth proposed. This section also cites 7 ppm cadmium concentration as the trigger for remedial action: we recommend this section be revised to be consistent with Appendix D (Section 7.B) which identifies 4 ppm as the trigger."*

Response: See previous responses to this question.

637-BB-141-EV129

Comment: *"We recommend biological monitoring when cadmium exceeds 4 ppm regardless whether the Corps plans to cover the area with O&M sediments within 6 months. This section, and others, should define biological monitoring in the context of cadmium in disposal areas. The Department recommends a program of monitoring wildlife activity in disposal areas and cadmium levels in bird tissues that is independent of the Dredge Material Containment Area (DMCA) capping criteria. Wildlife monitoring should begin with sediment placement and continue as long as all other monitoring of the DMCA. Tissue monitoring should occur: 1) prior to sediment placement to collect baseline data; 2) during sediment placement; and 3) post placement until 3 consecutive years of samples contain cadmium concentrations that are less than the potential adverse effect level, which is to be determined. The Department supports the sampling protocol (species and timing) described in Appendix D, page 23, and requests that the Corps continue to coordinate with the FWS prior to completion of the final EIS to finalize plans for biological monitoring within DMCAs, including tissue sampling."*

Response: There are two basic components of the monitoring plan in regard to the disposal of cadmium-laden sediments in the CDFs. The first involves sampling of the initial cover/cap material to be placed over the cadmium sediments. This material would be other new work sediments that contain lower cadmium levels. After this cover has been placed, sediment samples would be collected and analyzed. If cadmium levels in the cover are equal to or exceed 4 mg/kg in a cumulative area of 25 acres or greater, an additional cover of maintenance dredging sediments would be applied. If the concentration of cadmium in these samples is below 4 mg/kg, no further action would be required. If the samples exceed 4 mg/kg, then an additional cap of O&M material would be placed over the sediments and additional soil sampling conducted. This process would be repeated until cadmium concentrations in sediments in the CDF cover are 4 mg/kg or less.

637-BB-141-EV130

Comment: *"Our recommendations necessitate revisions to the "Decision Matrix for Cadmium Sampling" on page 86, including: remove references to 7 ppm cadmium concentrations; remove "if necessary" in*

reference to tissue sampling; do not differentiate between areas slated for covering before or after 6 months; and continue wildlife use studies until tissue monitoring is completed."

Response: The Decision Matrix will be revised as suggested.

637-BB-138-EV131

Comment: *"Based on an analysis prepared by Kinetic Analysis Corporation (KAC), this section concludes that the hydrodynamic model probably over-predicts salinity and under-predicts dissolved oxygen, i.e., the model errs towards the side of simulating conditions worse than would actually occur. We believe this analysis may seriously misrepresent the risk and uncertainty associated with the water quality predictions. With the exception of the new channel depth, the KAC analysis relied upon the existing geometry of the Savannah River estuary. Several mitigation measures would significantly modify the system geometry, including significant flow diversion at McCoys Cut, closing Rifle Cut, filling the Back River sediment basin, and removing the tide gate. Flow routing and flow volume in the three main river channels would become significantly different from the current system. Therefore, we believe the degree of risk and uncertainty regarding expected water quality impacts, and the resulting wetland impacts, is considerably higher than the KAC analysis suggests, which is one of the reasons why the Department recommends extending the proposed post-construction monitoring from 5 years to 10 years."*

Response: See previous responses to this question.

Page 21

637-BB-141-EV132

Comment: *"This portion of the DEIS discusses risk and uncertainty in relation to sea level rise and the modeling of impacts to freshwater marsh. This section argues for predicating mitigation on the "base year" impacts (the year construction is complete) instead of average annual impacts over the life of the project (consistent with Corps policy), because "impacts that would occur soon after the base year are those most likely to occur and least subject to uncertainty from more distant projections of future conditions." Average annual impacts are less than base year impacts because sea level rise over 50 years will cause wetland losses without the project. The Department agrees with predicating mitigation on the base year impacts, but for a different reason. The Department maintains that sea level rise would have a negligible impact on Savannah NWR if not for the cumulative impact of previous harbor deepening."*

Response: The USDI's comments concerning the effects of past harbor deepening on sea level rise and the SNWR are acknowledged.

637-BB-141-EV133, 637-BB-141-EV134

Comment: *"Wetland impacts are inferred from salinity changes predicted by the hydrodynamic model. This section states: "…the hydrodynamic model has roughly an 80 percent chance of over-predicting salinity levels at low salinity levels, thus leading to an over-prediction of salinity-induced impacts to*

wetlands. Therefore, the model is considered to present little risk for decision-makers evaluating salinity impacts to wetlands." The Department disagrees with this characterization, which was based on analysis by KAC that, with the exception of the new channel depth, relied upon the existing geometry of the Savannah River estuary. Several mitigation measures would significantly modify the system geometry, including significant flow diversion at McCoys Cut, closing Rifle Cut, filling the Back River sediment basin, and removing the tide gate. Flow routing and flow volume in the three main river channels would become significantly different from the current system. Therefore, we believe the degree of risk and uncertainty regarding expected water quality impacts is considerably higher than the KAC analysis suggests, and is a reason we recommend extending the proposed post-construction monitoring from 5 years to 10 years."

Response: The District acknowledges the USDI's disagreement with the basic conclusion in the Risk and Uncertainty Analysis [page 8] that states "the hydrodynamic model has roughly an 80 percent chance of over-predicting salinity levels at low salinity levels, thus leading to an over-prediction of salinity-induced impacts to wetlands. Therefore, the model is considered to present little risk for decision- makers evaluating salinity impacts to wetlands". The Risk and Uncertainty Analysis was performed by an independent contractor. The USFWS reviewed those findings before it agreed that the model was sufficient for impact evaluation purposes on this project. The post-construction monitoring plan is designed to provide data to refine and improve the accuracy of the hydrodynamic and water quality models.

See previous responses to this question

637-BB-141-EV136, 637-BB-141-EV135

Comment: *"This section states that the model slightly under-predicts DO levels and is therefore a good predictor of DO-related impacts. Because the project and the various mitigation features will substantially alter channel geometry of the lower river, and the hydrodynamic models are based on the current geometry, the Department attributes a relatively high degree of uncertainty with the model predictions of water quality impacts, including DO impacts. We recommend that the final EIS recognize and acknowledge this uncertainty. The risk to fish and other resources of underestimating DO impacts is further justification for expanding the monitoring effort beyond the currently proposed 5 years to 10 years."*

Response: The risks and uncertainties of the proposed dissolved oxygen system for Savannah Harbor are fully discussed in the Risk and Uncertainty Analysis [page 9-11]. The post-construction monitoring plan is designed to provide data to refine and improve the accuracy of the hydrodynamic and water quality models, and quantify impacts from a harbor deepening.

Please see previous responses concerning extending the five-year post-construction monitoring plan to ten-years.

637-BB-141-EV137

Comment: *The Draft EIS references a USGS report, by the Cooperative Research Unit, titled "Simulation of Water Levels and Salinity in the Rivers and Tidal Marshes in the Vicinity of the Savannah National Wildlife Refuge, Coastal South Carolina and Georgia" but does not provide the reference. Suggest the Final EIS include the reference (Conrads et al, 2006) as follows:*
Conrads PA, Roehl EA, Daamen RC, and Kitchens WM. 2006. Simulation of Water Levels and Salinity in the Rivers and Tidal Marshes in the Vicinity of the Savannah National Wildlife Refuge, Coastal South Carolina and Georgia. US Geological Survey, Scientific Investigations Report 2006–5187, 134 p. Available online at:
http://pubs.usgs.gov/sir/2006/5187/pdf/sir20065187.pdf "

Response: Concur. This reference has been added to the references section.

Page 21

637-BB-141-EV138

Comment: *"Based on an analysis prepared by Kinetic Analysis Corporation (KAC), this section concludes that the hydrodynamic model probably over-predicts salinity and under-predicts dissolved oxygen, i.e., the model errs towards the side of simulating conditions worse than would actually occur. We believe this analysis may seriously misrepresent the risk and uncertainty associated with the water quality predictions. With the exception of the new channel depth, the KAC analysis relied upon the existing geometry of the Savannah River estuary. Several mitigation measures would significantly modify the system geometry, including significant flow diversion at McCoys Cut, closing Rifle Cut, filling the Back River sediment basin, and removing the tide gate. Flow routing and flow volume in the three main river channels would become significantly different from the current system. Therefore, we believe the degree of risk and uncertainty regarding expected water quality impacts is considerably higher than the KAC analysis suggests, and is a reason we recommend extending the proposed post-construction monitoring from 5 years to 10 years."*

Response: Please see previous responses on this concern.

637-BB-141-EV139

Comment: *"This section states that the model slightly under-predicts DO levels and is therefore a good predictor of DO-related impacts. Because the project and the various mitigation features will substantially alter channel geometry of the lower river, and the hydrodynamic models are based on the current geometry, the Department attributes a relatively high degree of uncertainty with the model predictions of water quality impacts, including DO impacts. We recommend that the final EIS recognize and acknowledge this uncertainty. The risk to fish and other resources of underestimating DO impacts is further justification for expanding the monitoring effort beyond the currently proposed 5 years to 10 years."*

Response: Please see previous responses on this concern**.**

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

JAN 24 2011

Executive Office

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

Dear Ms. Boltin-Kelly:

In your letter, dated January 21, 2011, you inquired as to whether the time allowed under the Clean Water Act for water quality certification review also applies to your office's review for consistency with the South Carolina Coastal Zone Management Program. If it does not, you requested an extension of the National Environmental Policy Act (NEPA) public comment period that ends on January 25, 2011.

The Coastal Zone Management Act (CZMA) (16 U.S.C. 1451 et seq) is the Federal statute that governs Federal activities that affect land, water, or natural resource uses within the coastal zone. The CZMA requires that we provide a consistency determination to affected states at the earliest practicable time. Consistent with this requirement we provided SC DHEC with our consistency determination for the SHEP project through the November 15, 2010, Joint Public Notice (JPN) for the Savannah Harbor Expansion Project (SHEP).

Under the Corps coastal zone consistency regulations (33 C.F.R. 336.1 et seq), if SC DHEC requested an extension of time within 45 days, then I am required to approve one 15-day extension. On December 3, 2010, Mr. Earl Hunter (Commissioner, SC DHEC) did ask for additional time for coastal zone consistency review. Accordingly, 60 days for SC DHEC's coastal zone management review would have ended on January 14, 2011. However, I extended the NEPA public comment period and agreed to accept all comments until January 25, 2011.

Based on the information we provided in support of our coastal zone consistency determination, and the facts of this situation, no further time will be provided. I look forward to receiving your comments and appreciate and look forward to our continued collaboration on this project.

A copy of this letter will be furnished to Mr. Earl Hunter, Commissioner, SC Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201 and Mr. David Wilson, Bureau of Water Chief, SC Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201

Sincerely,

Jeffrey M. Hall
Colonel, US Army
Commanding

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.

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 <u>does not</u> 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

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

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

D H E C
PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment

March 3, 2011

William Bailey
US Army Corps of Engineers, Savannah District
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Re: P/N 2010 SHEP; Savannah Harbor Expansion Project (SHEP); Water Quality Certification

Dear Mr. Bailey:

The South Carolina Department of Health and Environmental Control (Department) received your application on November 15, 2010, for a 401 Water Quality Certification to deepen the navigation channel in the Savannah River. After reviewing the General Re-Evaluation Report (GRR) and the draft Tier II Environmental Impact Statement (EIS) submitted with the permit application, the Department is concerned that the project, as proposed, does not meet the requirements for issuance of a Water Quality Certification pursuant to Section 401 of the Clean Water Act and the requirements of State Regulation 61-101, Water Quality Certification.

In assessing the water quality impacts of this project, Regulation 61-101 requires that the Department address and consider whether there are feasible alternatives to the activity. Section F.(5)(b) of this regulation states that certification will be denied if there is a feasible alternative to the activity which reduces adverse consequences on water quality and classified water uses. The GRR and the EIS mentioned several alternatives that would alter the project impacts. Some of these alternatives include dredging to various project depths, various mitigation plans, and several alternative sites. Although the documents consider some alternatives, the analysis does not thoroughly evaluate all feasible alternatives for a project of this magnitude. For example, it seems reasonable to consider alternatives on a regional basis for such a large-scale project involving significant environmental impacts. The GRR and EIS do not consider whether or not other southeastern ports could be expanded with less cost or environmental impacts.

The Savannah River Maritime Commission, the South Carolina Department of Natural Resources, and the Southern Environmental Law Center each submitted comments on the GRR and EIS. These letters suggest that the Jasper Port Terminal alternative is viable and may have less environmental impacts than the proposed deepening. For these reasons, the establishment of a Jasper Port Terminal should be given detailed consideration as an option to the extensive cost and environmental impacts associated with the proposed expansion of the Garden City Terminal. The Department cannot meet its obligation under Regulation 61-101 by issuing a certification without a thorough investigation of all feasible alternatives. It is recommended that the

alternatives analysis for the project be amended to include the evaluation of all feasible alternatives to the proposed project.

In evaluating any project pursuant to Regulation 61-101, the Department must certify that there is reasonable assurance that the activity will be conducted in a manner that will not violate applicable water quality standards. The Water Classifications and Standards listed in Regulation 61-68 were promulgated in accordance with Section 303 of the Clean Water Act. This regulation also contains antidegradation rules that were established to ensure the protection of existing uses and water quality regardless of the water classification.

Existing conditions in the Savannah River have resulted in contraventions of the dissolved oxygen (DO) standard, particularly in the river estuaries during the warm summer months. The studies conducted for the SHEP indicate that the project will cause additional impacts to DO levels in the river system. Adding DO impacts to a waterbody that is currently experiencing low DO at certain times of the year is not consistent with the antidegration rules of Regulation 61-68. The Corps plans to use Speece Cones to inject oxygen into the river to mitigate for the DO impacts resulting from the proposed deepening.

After evaluating the DO modeling data, and the mitigation proposal outlined in the GRR and EIS, the Department is concerned with the uncertainty relating to the use of mechanical injection as mitigation for the DO impacts, especially in the shallow water areas of the Back River. The Corps is relying entirely on modeling data to support the conclusion that the Speece Cones will adequately restore DO in the river system to pre-project conditions. Furthermore, the oxygen injection system is a very costly method to mitigate for the projected impacts, and the funding for the long-term operational costs depends on unpredictable annual appropriations. Until the uncertainty from the DO impacts and mitigation has been thoroughly investigated, and reasonable assurance is provided that the project will protect existing uses and water quality standards for the life of the project, the Department cannot find the project consistent with the requirements of Regulation 61-101.

In addition to the impacts from DO, the ecosystem will also sustain significant wetland impacts. The project will impact 14.08 acres of salt marsh wetlands from excavation and indirectly impact 1,212 acres of freshwater wetlands due to increased salinity at the maximum project depth. The Corps has proposed a mitigation plan to offset these impacts. This plan includes the preservation of various properties that will become part of the Savannah National Wildlife Refuge (SNWR), the restoration of wetlands through flow altering structures, and the creation of salt marsh by grading down an area of high ground that was previously used as a dredge disposal area.

Section F.(5)(a) of Regulation 61-101 states that certification will be denied if the proposed activity alters the ecosystem in the vicinity of the project such that its functions and values are eliminated or impaired. The mitigation proposal submitted in the GRR and EIS fails to give reasonable assurance that the ecosystem will not be permanently impaired by the extensive wetland impacts from salinity intrusion. The preservation component of the mitigation plan lists several properties that would be acquired and subsequently placed under control of the SNWR. Although the EIS states that these properties contain desirable ecological resources, the

amount of wetland acreage or type of wetlands contained in these properties was not included in the EIS. In addition, the mitigation credit taken by the Corps for restoration includes the creation of 1,068 acres of brackish marsh for the 48 ft depth alternative. The flow altering structures will reduce salinity in some of the marsh areas; however, these structures will cause the conversion of salt and freshwater marsh to brackish marsh. The loss of any type of marsh should be considered an impact. Given the extensive loss of existing freshwater marsh within the ecosystem and the lack of an appropriate mitigation plan, the Department cannot certify that this project complies with the mandates in Regulations 61-101 and 61-68.

Much of the marsh areas that will be impacted by this project are located in the SNWR. Much of these impacts are to freshwater tidally influenced wetlands. These areas have been in decline for many years due to salinity intrusion from natural causes and from past harbor deepening activities. The proposed project poses a significant threat to these unique areas. The mitigation plan includes preservation of land that will be acquired by the refuge. As stated previously, the Department is concerned that the out-of-kind preservation of land does not adequately offset the significant loss of ecological resources due to this project. Regulation 61-101 states that certification will be denied if the proposed activity impacts special or unique habitats. The SNWR is considered a unique area, as such, the Department cannot issue a certification for the proposed activity unless the United States Fish and Wildlife Service (USFWS) gives concurrence that this project will not cause adverse impacts to the SNWR.

The proposed deepening will occur in waters containing Federally recognized threatened or endangered species. Species such as Shortnosed sturgeon, Atlantic sturgeon, various sea turtles, and West Indian manatees may all be impacted by the project. The loss of a significant portion of Shortnose sturgeon habitat due to lower DO levels and salinity intrusion is of particular concern. Regulation 61-101 states in Section 5(c) that certification will be denied if the project adversely impacts waters containing State or Federally recognized rare, threatened, or endangered species. Although the Corps proposes to mitigate for the loss of Shortnose sturgeon habitat by installing fish passage at the Savannah Bluff Lock and Dam, it is not known if this measure will adequately mitigate for the impacts to sturgeon. Endangered species impacts are typically evaluated by resource agencies such as the USFWS and the National Marine Fisheries Service (NMFS). Without concurrence from these agencies that the project will not cause adverse impacts to threatened or endangered species, the Department cannot certify this project.

In addition to the above list of concerns about the proposed project, the Department has not received a complete response to our previous request for information. On November 23, 2010, the Department sent a letter requesting an affidavit of public notice for the project, a list of adjacent property owners, and the application fee of $1,000. We received the affidavit and list of property owners, but we have not received the requested fee. Pursuant to Regulation 61-30, Environmental Protection Fees, the Department is authorized to collect application fees for Water Quality Certification.

In conclusion, the Department has several concerns about issuing a certification for this project. As currently proposed, this project does not meet the requirements for issuance of a Water Quality Certification pursuant to Section 401 of the Clean Water Act, 33 U.S.C. Section 1341, and the requirements of State Regulation 61-101, Water Quality Certification. It is

strongly recommended that the Corps withdraw the current application and address the issues outlined in this letter before continuing the 401 Certification process. If the Corps determines that it is necessary to move forward with a certification decision at this time, the fee should be submitted as soon as possible. Pursuant to Regulation 61-30, and Regulation 61-101, the Department has 180 days to complete action on an application for 401 Water Quality Certification or the assessed fee must be returned. These 180 days include only those days in which the Department is actively reviewing the application; the clock stops when information is requested and the Department is waiting on a response. Accordingly, the 180-day clock for this project will not start until the Department receives the requested fee and subsequent information. Should you have any questions, you may call me at (803) 898-4261 or you may e-mail beckhajc@dhec.sc.gov.

Sincerely,

Chris Beckham, Project Manager
Water Quality Certification & Wetlands Section

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

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

Enclosure 1

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.

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

RESPONSES TO SOUTH CAROLINA

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT

JANUARY 25, 2011

Page 1

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.

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: The public notice announcing the availability of the Draft Environmental Impact Statement (EIS) and the General Reevaluation Report (GRR) for the Savannah Harbor Expansion Project (SHEP) was published on November 17, 2010. As required by the National Environmental Policy Act, a 45-day review period was provided with the comment-due date set at December 30, 2010. However, the District received numerous requests for a time extension. Most requests were based on the amount/complexity of material involved together with scheduling conflicts with reviewing the EIS over the Christmas and New Year's holidays. As a result, the District Commander extended the public comment period until January 25, 2011. The District received some comments after the end of the extended comment period, but they were accepted and considered in the Final EIS preparation.

Page 2

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: Concur. The SHEP must be fully consistent with South Carolina's approved Coastal Zone Management Program unless another statutory authority prohibits the project [or element[s] thereof] from being fully consistent. Further review of the District's initial consistency determination reveals that the project is consistent with the enforceable provisions of South Carolina's approved Coastal Zone Management Plan. Based on the comments and guidance in your January 25, 2011 response, the SHEP is fully consistent with the State of South Carolina's Coastal Zone Management Plan. This determination is based on implementing the proposed mitigation features [Mitigation- and Monitoring and Adaptive Management Plans] which would protect the resources of the State of South Carolina's coastal zone as mandated by regulation.

Page 3

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: Disagree. The SHEP will not restore/enhance all of the environmental resources of the State's coastal zone. It is doubtful that many of the landscape development projects that your office reviews and approves meet that criteria. However, the SHEP does meet the primary criterion of protecting the State's coastal resources. As stated in your letter regarding the guidelines for evaluating all projects: "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 (underlined for emphasis) 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 [to the maximum extent practicable] as well as include features to mitigate for unavoidable 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 features in the lower end of both Middle and Back River to reduce the amount of saltwater that would move up those tidal streams.

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 to expand Shortnose sturgeon spawning habitat would be appropriate mitigation for their loss of habitat. The SHEP is fully consistent with this part of the South Carolina Coastal Zone Management Plan because the project provides adequate mitigation to offset its adverse effects. Additionally, implementation of the Monitoring and Adaptive Management Plan would ensure that the "critical areas" (coastal waters, tidelands) of South Carolina are protected 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 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.

Admittedly, 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 NOAA Fisheries, US Fish and Wildlife Service, and SC DNR.

Since the proposed dissolved oxygen system would restore [and marginally 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 (up to 337 acres with the 48-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 337 acres)	Saltmarsh to Brackish Marsh (Approximately 730 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	Negligible

Likewise, the 48-foot depth would have a similar effect on 730 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 48-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 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 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 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 2,683 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 2,683 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 337 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 District 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 District 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 District 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 District relinquish its sediment disposal rights for Disposal Areas 14A and 14B, the sites presently being considered for a container terminal in Jasper County. The District 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 District 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 District 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 provide 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."*

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.

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 District 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 District 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 District 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, local newspapers report the Joint Project Office agreeing 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.

Page 6

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.

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: Disagree. 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 improve dissolved oxygen conditions in over 90 percent of the estuary compared to existing conditions.

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, the sill in Middle River, 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 SC. 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 area.

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: 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.

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: Disagree. 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: Disagree 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 1,212 acres of freshwater marsh would be converted to brackish marsh by the 48-feet SHEP project. By implementing flow-routing measure 6A, only 337 acres of freshwater marsh would be similarly converted. Thus, flow routing measure 6A satisfies both avoidance and minimization elements by maintaining 875 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: Disagree. 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.

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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 was initiated based on a known problem -- the larger vessels that use Savannah Harbor are constrained by draft because of the existing controlling depth of -42 feet mlw. Those vessels must either light load and/or wait for high tide to safely navigate the harbor. This situation will become even more of an issue once the larger Post-Panamax ships begin replacing older, smaller vessels. The screening of potential management measures to address the identified navigation needs is contained in Appendix O of the EIS. Based on problem identification, the SHEP looked at the benefits and associated environmental impacts of constructing a deeper harbor to either 44, 45, 46, 47, or 48 feet mlw. Increasing the controlling depth in Savannah Harbor is the best alternative to solve the identified problems.

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: As with any water resource development project having a landscape 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 Mitigation- and 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.

The screening of potential management measures and development of alternatives to address Savannah's identified navigation needs are contained in Appendix O of the EIS. A port facility in Jasper County was one of the early alternative terminal locations that the District evaluated. The District found that deepening to the presently-proposed site and its subsequent development into a port facility was less cost effective than deepening up to the existing Garden City Terminal.

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.

Enclosure 2

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

RESPONSES TO SOUTH CAROLINA

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT

JANUARY 31, 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: Based on the District's recent coordination (February 2011) with the South Carolina State Historic Preservation Office, it is satisfied with the Programmatic Agreement and has no outstanding concerns regarding the proposed SHEP.

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: Based on the District's recent coordination (February 2011) with the South Carolina State Historic Preservation Office, it is satisfied with the Programmatic Agreement and has no outstanding concerns regarding the proposed SHEP. The SHPO has indicated that the proposed mitigation presented in the report is acceptable.

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

Planning Division

MAR 30 2011

Mr. J. Christopher Beckham
Water Quality Certification
and Wetlands Section
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Dear Mr. Beckham:

I refer to the March 3, 2011 letter from South Carolina Department of Health and Environmental Control (SC DHEC) concerning the Savannah Harbor Expansion Project (SHEP) and our November 15, 2010 application for Water Quality Certification pursuant to Section 401 of the Clean Water Act. In the letter, you strongly recommended the US Army Corps of Engineers (Corps) withdraw its application and address issues outlined in the letter.

Enclosed, you will find a comment/response document that addresses the issues you raised and provides the information requested. Based on the contents of your letter, it is our understanding that upon receiving concurrence of the project from US Fish and Wildlife Service and National Marine Fisheries Service, SC DHEC would be satisfied with the proposed project's mitigation for impacts to fish, wildlife, and the Savannah National Wildlife Refuge.

With regard to payment of application fees and completion date of the requested action, SC DHEC has not traditionally charged the Corps for water quality certifications and we look forward to receiving the same courtesy on this request.

The Corps believes that the issues and concerns outlined in your March 3, 2011 letter were adequately addressed in the draft reports provided in November 2010. Construction of the SHEP and its proposed mitigation features would not adversely affect the dissolved oxygen regime in South Carolina waters, nor would it adversely affect tidal freshwater wetlands or endangered species habitat in South Carolina waters. Consequently, the Corps looks forward to South Carolina issuing its Section 401 Water Certification for the Savannah Harbor Expansion Project.

We appreciate your continued support of the Corps' efforts to establish and maintain navigable waterways for the benefit of national commerce.

If you have any questions or concerns regarding the contents of this letter, please do not hesitate to contact me at (912) 652-5781.

Sincerely,

William G Bailey

William G. Bailey
Chief, Planning Division

Enclosure

US ARMY CORPS OF ENGINEERS, SAVANNAH DISTRICT

RESPONSES TO SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

LETTER DATED 3 MARCH 2011

Comment. *Although the document considers some alternatives, this analysis does not thoroughly evaluate all feasible alternatives for a project of this magnitude. For example, it seems reasonable to consider alternatives on a regional basis for such a large-scale project involving significant environmental impacts. The GRR and EIS do not consider whether or not other southeastern ports could be expanded with less cost or environmental impacts.*

Response. The Corps conducted a Regional Port Analysis and a Multiport Analysis as discussed on Page 3-3 of the DEIS and Pages 117-119 of the GRR, respectively. The full reports are included as attachments to the Economic Appendix of the GRR. The regional port analysis indicated that (1) the volume of Twenty-foot Equivalent Units (TEUs) expected to move through the southeastern US ports in the future exceeds the total capacity of any US east coast port; (2) USACE participation in planning and construction of a regional port would require Congressional authorization and a non-Federal sponsor; (3) there is no centralized planning jurisdiction that would encourage development of a regional port hub and discourage competitive development of local ports; and (4) local port planning and development is already underway (Savannah, Charleston, Jacksonville, Norfolk, Cape Fear) which would make a regional port redundant. For the foregoing reasons, the District determined that further evaluation of a single regional port is not warranted for the Savannah Harbor Expansion Project.

Comment. *For these reasons, the establishment of a Jasper Port Terminal should be given detailed consideration as an option to the extensive cost and environmental impacts associated with the proposed expansion of the Garden City Terminal. The Department cannot meet its obligation under Regulation 61-101 by issuing a certification without a thorough investigation of all feasible alternatives. It is recommended that the alternatives analysis be amended to include the evaluation of all feasible alternatives to the proposed project.*

Response. The SHEP EIS and GRR do not evaluate the environmental aspects of the expected future expansion of the Garden City Terminal. The District expects GPA to increase the throughput capability of that terminal in response to future demand independent of a harbor deepening. The SHEP EIS and GRR were prepared as directed by the US Congress to address the identified inefficiencies of the current operation of ***Savannah Harbor***. In Section 3.1 of the GRR, the Corps identified the present navigation inefficiencies:

1. Increased/ inflated operations costs due to light loading and tidal delays;
2. Light loading and tidal delays will increase as present harbor users increase their annual tonnage and as larger, more efficient ships replace older, smaller ones;

3. Existing ships are experiencing problems associated with turning capabilities and overall maneuverability in certain reaches of the inner harbor;
4. The severity of problems associated with turning capabilities and overall maneuverability in certain reaches of the inner harbor will increase as vessel size increases.

Some of these situations are expected to worsen in the near future as larger, Post-Panamax Generation 2 vessels begin to replace older, smaller vessels.

Alternative container terminal locations were thoroughly evaluated in the EIS and GRR (Chapter 3 and Appendix O (Formulation of Alternatives) of the EIS). This analysis considered methods in which the harbor's navigation problems could be reduced, including structural and non-structural methods. The structural methods included providing a deep-water channel to alternate terminal locations, four of which were in South Carolina. This analysis included a new marine container terminal at the harbor's present confined dredged material disposal facilities (CDFs) 12A, 14A, 14B, and at Jones/Oysterbed Island. The CDF 14A and 14B sites are the ones presently under consideration for a Jasper Ocean Terminal. The analysis concluded that the Garden City Terminal of the Georgia Ports Authority best met the criteria of Completeness, Effectiveness, Efficiency, and Acceptability. Consequently, the Corps concluded that the detailed studies would concentrate on evaluating the feasibility of various channel depth alternatives (42 feet to 48 feet) to the Garden City Terminal. The project's Cooperating Agencies (US Environmental Protection Agency (EPA), US Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries), and the Georgia Ports Authority) concurred in this finding. The Corps provided that analysis to your agency and the public in 2005; you provided no comments.

The Corps' analysis concluded that construction of a container terminal in Jasper County and deepening to that facility is not the best alternative to solve the existing navigation problems in Savannah Harbor. A series of sensitivity analyses (Pages 224-229 of the GRR) were conducted to identify the potential impact that a new terminal in Jasper County might have on the justification to deepen Savannah Harbor to the Garden City Terminal. This analysis showed that economic justification for deepening the channel between a Jasper County terminal and the Garden City Terminal is not particularly sensitive to the development of a container terminal in Jasper County. Rather, the proposed harbor deepening has independent utility apart from the potential Jasper County terminal. In other words, even if a container terminal in Jasper County was already constructed and operational, deepening the channel to the Garden City Terminal would still be economically justified.

Capital improvements at the Garden City Terminal have occurred in the past and the Corps expects GPA to continue to take similar actions in the future in response to increases in container traffic volumes through that facility. The Corps expects those increases in container volumes to occur with or without SHEP.

Comment. *After evaluating the DO modeling data and the mitigation proposal outlined in the GRR and EIS, the Department is concerned with the uncertainty relating to the use of mechanical injection as mitigation for the DO impacts, especially in the shallow areas of the Back River. The Corps is relying entirely on modeling data to support the conclusion that the Speece cones will adequately restore DO in the river system to pre-project conditions. Furthermore, the oxygen injection system is a costly method to mitigate for the projected impacts, and the funding for the long-term operational costs depends on unpredictable annual appropriations. Until the uncertainty from the DO impacts and mitigation has been thoroughly investigated, and reasonable assurance is provided that the project will protect existing uses and water quality standards for the life of the project, the Department cannot find the project consistent with the requirements of 61-101.*

Response. The models employed in the analysis of the impacts of the SHEP on the dissolved oxygen regime in Savannah Harbor were developed over a number of years by subject matter experts with integrated input from the Cooperating Agencies and the state resource agencies (including SC DHEC) to ensure the results are meaningful and accurate. While all models have uncertainty, the SHEP hydrodynamic and water quality models are the best prediction tool available to understand future conditions in the harbor under various scenarios. In 2006, your agency approved the use of those models on this project. In 2010, your agency concurred in use of these basic models in EPA's Revised Draft Total Maximum Daily Load (TMDL) for Dissolved Oxygen in Savannah Harbor.

The Corps used the same models to design the oxygen injection systems as it did to identify the impacts expected from the proposed project. There should be no difference in uncertainty about the effectiveness of the proposed mitigation from that for the impacts from the harbor deepening alternatives. The Corps remains confident that the flow diversion measures and the dissolved oxygen injection system would remove the incremental effects of SHEP on the dissolved oxygen regime in Savannah Harbor. In fact, when the dissolved oxygen injection system is operational, the dissolved oxygen regime is expected to improve in over 90 percent of the estuary over the without project condition.

Comment. *Section F.(5)(a) of Regulation 61-101 states that certification will be denied if the proposed activity alters the ecosystem in the vicinity of the project such that its functions and values are eliminated or impaired. The mitigation proposal submitted in the GRR and EIS fails to give reasonable assurance that the ecosystem will not be permanently impaired by the extensive wetland impacts from salinity intrusion. The preservation component of the mitigation plan lists several properties that would be acquired and subsequently placed under control of the SNWR. Although the EIS states these properties contain desirable ecological resources, the amount of wetland acreage or type of wetlands contained in these properties was not included in the EIS. In addition, the mitigation credit taken by the Corps for restoration includes the creation of 1,068 acres of brackish marsh for the 48 ft depth alternative. The flow altering structures will reduce salinities in some of the marsh areas; however, these structures will cause the conversion of salt and freshwater marsh to brackish marsh. The loss of any type of marsh should be considered an impact. Given the extensive loss of existing freshwater marsh within the*

ecosystem and the lack of an appropriate mitigation plan, the Department cannot certify that this project complies with the mandates in Regulations 61-101 and 61-68.

Response. It is important to note that installation of the flow diversion structures would not result in the conversion of any freshwater marsh to brackish marsh in South Carolina. On the contrary, the diversion of flow would reduce the upstream movement of salinity in Middle River and Little Back River from harbor deepening, thereby minimizing impacts to tidal freshwater marsh in South Carolina. On the other hand, flow diversion would result in the conversion of some saltmarsh located in the lower ends of these two streams to more brackish species, which the USFWS identified as being more ecologically valuable.

Upstream salinity increases resulting from construction of the SHEP would not eliminate the functions of any wetland. Construction of the 48-foot channel (with flow diversion) would result in the conversion of the dominant vegetative species typically observed in approximately 337 acres (net) of freshwater marsh to more brackish species. It is important to note that many of the emergent plant species associated with this freshwater marsh system would still be readily observed in the brackish environment (Latham et. al., 1994). Likewise, the 48-foot depth (with flow diversion) would result in a conversion of the dominant vegetative species typically observed in 730 acres (net) of saltmarsh to more brackish species. However, dominant saltmarsh species like *Spartina alterniflora* are still expected to be observed in those areas. While the SHEP would result in changes to the dominant wetland vegetation, the overall basic wetland functions typically associated with these systems would not change.

A review of the changes that occur to the elements of wetland functions (water purification, groundwater recharge, streamflow maintenance, fish and wildlife habitat, etc.) when freshwater marsh is converted to more a brackish marsh indicates that there are only negligible changes to these functions with the exception of fish and wildlife habitat. The wetland conversion is classified as a minor effect when considering the total function of the wetland and the continued existence of some freshwater vegetation in the areas that would become brackish marsh.

The proposed preservation lands consist of 2,683 acres (for the 48-foot channel) characterized by bottomland hardwoods, maritime forest and dispersed uplands dominated by deciduous forest and regrowth. These 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. The USFWS had previously identified those tracts as potentially being valuable additions to the Savannah National Wildlife Refuge (SNWR). Those 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 emergent wetlands within the Refuge. Thus, the acquisition and preservation of 2,683 acres of wetland and upland buffer would provide a functional replacement for the reduction in the only wetland function (i.e., fish and wildlife habitat) that would be expected to be impacted from the 337 acre freshwater to brackish marsh conversion. Consequently, the Corps believes the proposed mitigation satisfies the no-net loss of wetland function criterion.

Modeling indicates that the expected conversion of tidal freshwater marsh to brackish marsh would occur within the waters of the State of Georgia. That conversion would be confined to areas of Middle River and Front River from just below the Georgia Highway 25 crossing to just upstream of the confluence of Front River and Steamboat River. Those model studies indicate that there would be an increase in tidal freshwater marshes in the State of South Carolina in marshes associated with Little Back River in the vicinity of the SNWR intake on Little Back River.

Comment. *Regulation 61-101 states that certification will be denied if the proposed activity impacts special or unique habitat. The SNWR is considered a unique area, as such, the Department cannot issue a certification for the proposed activity unless the United States Fish and Wildlife Service (USFWS) gives concurrence that this project will not cause adverse impacts to the SNWR.*

Response. The adverse impacts of the SHEP on the SNWR are readily acknowledged and addressed in the DEIS and the GRR. Specifically, there will be direct impacts to marsh caused by excavation to expand the Kings Island Turning Basin and indirect impacts to tidal freshwater marsh caused by an increase in upstream salinity levels. Plans to minimize and mitigate those adverse impacts are also addressed. Mitigation includes restoring 28 acres of saltwater marsh, constructing flow diversion measures to reduce salinity levels in upstream areas where tidal freshwater marsh would be impacted, and purchasing and preserving lands that would be beneficial to the SNWR. The Corps believes that the SHEP Mitigation Plan adequately addresses adverse impacts to the SNWR. Also, all of the described adverse impacts to the SNWR occur in the State of Georgia. Construction of the SHEP would not adversely affect any unique areas in the State of South Carolina.

Comment. *The proposed deepening will occur in waters containing Federally recognized threatened or endangered species. Species such as Shortnose sturgeon, Atlantic sturgeon various sea turtles and West Indian manatees may all be impacted by the project. The loss of a significant portion of Shortnose sturgeon habitat due to lower DO levels and salinity intrusion is of particular concern. Regulation 61-101 states in Section 5(c) that certification will be denied if the project adversely impacts waters containing state or Federally recognized rare, threatened, or endangered species. Although the Corps proposes to mitigate for the loss of Shortnose sturgeon habitat by installing fish passage at the Savannah Bluff Lock and Dam, it is not known if this measure will adequately mitigate for the impacts to sturgeon. Endangered species impacts are typically evaluated by resource agencies such as the USFWS and the National Marine Fisheries Service (NMFS). Without concurrence from these agencies that the project will not cause adverse impacts to threatened or endangered species, the Department cannot certify this project.*

Response. The modeling studies presented in the DEIS indicate that approximately 11.0% (439 acres) of Shortnose sturgeon adult winter habitat, 8.2% (113.0 acres) of adult summer habitat, and 1.6% (21.6 acres) of juvenile winter habitat would be adversely affected by the 48-foot alternative. There would be no loss of Shortnose sturgeon habitat in South Carolina waters for any of the alternative harbor depths

analyzed. Loss of Shortnose sturgeon habitat due to SHEP would mainly occur in portions of Front River just above the Georgia Highway 25 crossing and in a small portion of Middle River near its confluence with Front River. Modeling results indicate that implementation of the SHEP with its mitigation features would result in a slight increase in Shortnose sturgeon habitat in South Carolina waters.

The proposed fishway at the New Savannah Bluff Lock and Dam was included in the mitigation plan for the project to ameliorate the remaining effects of Shortnose sturgeon habitat after the Corps and the natural resource agencies were unable to identify any measures that could be implemented in the estuary to restore sturgeon habitat or enhance existing habitat. The horseshoe rock ramp design is the current state-of-the-art measure that could be constructed at the New Savannah Bluff Lock and Dam to allow Shortnose sturgeon and other species of anadramous fish an opportunity to bypass the dam and gain access to traditional upstream spawning areas.

As required, the Corps prepared a Biological Assessment of Threatened and Endangered Species (BATES) which was included in the DEIS as Appendix B. The BATES concluded that the project may affect but is not likely to adversely affect the wood stork, Piping plover, manatee, North Atlantic right whales, humpback or sperm whales, leatherback turtles, loggerhead turtles, kemp's ridley turtles, hawksbill turtles, and green sea turtles or their critical habitats. The BATES concluded that the SHEP may affect but is not likely to adversely affect Shortnose or Atlantic sturgeon or their critical habitat.

The BATES has been furnished to the USFWS and the NMFS for their review and Biological Opinion. NMFS is the agency that oversees compliance with the Endangered Species Act for Shortnose sturgeon.

Comment: *In addition to the above list of concerns about the proposed project, the Department has not received a complete response to our previous request for information. On November 23, 2010, the Department sent a letter requesting an affidavit of public notice for the project, a list of adjacent property owners, and the application fee of $1,000.00. We received the affidavit and list of property owners, but we have not received the requested fee.*

Response. South Carolina DHEC has not traditionally charged the Corps for water quality certifications and we look forward to receiving the same courtesy with this request.

Comment. *As currently proposed, this project does not meet the requirements for issuance of a Water Quality Certification pursuant to Section 401 of the Clean Water Act, 33 U.S.C. Section 1341, and the requirements of State Regulation 61-101, Water Quality Certification. It is strongly recommended that the Corps withdraw the current application and address the issues outlined in this letter before continuing the 401 Certification process. If the Corps determines that it is necessary to move forward with a certification decision at this time, the fee should be submitted as soon as possible.*

Response. The Corps believes that the issues and concerns outlined in your March 3, 2011 letter were adequately addressed in the draft reports provided in November 2010. Construction of the SHEP and its proposed mitigation features would not adversely affect the dissolved oxygen regime in South Carolina waters nor would it adversely affect tidal freshwater wetlands or endangered species habitat in South Carolina waters. Consequently, the Corps looks forward to South Carolina issuing its Section 401 Water Certification for the Savannah Harbor Expansion Project.

Bailey, William G SAS

From: Bailey, William G SAS
Sent: Thursday, April 21, 2011 5:56 PM
To: 'Rheta Geddings DiNovo'
Cc: 'boltincr@dhec.sc.gov'; 'pontifmj@dhec.sc.gov'; 'Barbara Neale'; 'Blair N. Williams'; 'churdabd@dhec.sc.gov'; 'whitficd@dhec.sc.gov'; Hall, Jeffrey M COL SAS; Oddi, Peter A SAS; Sloan, G Rogers SAS; Saltalamachea, Michael H SAS; King, Jeffrey K. SAS; McIntosh, Margarett (Mackie) SAS; Okane, Jason D SAS
Subject: Savannah Harbor Expansion (UNCLASSIFIED)
Attachments: EPA Agency Letter and Responses.pdf; NOAA Agency Letter and Responses.pdf; NMFS Agency Letter and Responses.pdf; DOI Agency Letter and Responses.pdf; Direct Impacts to Marsh.docx; SC SHPO Comments.pdf

Classification: UNCLASSIFIED
Caveats: NONE

We appreciate the time that you and the rest of the OCRM management took to meet with us today. We trust we were able to better explain some items that we had tried to describe in our DEIS.

You asked for some additional pieces of information. I've attached the following items:

- Draft responses to EPA comments
- Draft responses to Department of Commence comments
- Draft responses to Department of Interior comments
- Comments from SC SHPO
- Updated table of wetland impacts

It will take us a little time to prepare the figures you requested:

- Salinity under various conditions (existing, with deepening, with deepening and mitigation (flow rerouting))
- Wetland areas with direct and indirect impacts
- Wetland areas benefitting from flow rerouting

We will send these as soon as we complete them.

We will also soon send along (1) our expanded description of how the project complies with the Mitigation Rule, and (2) figures showing the sites we propose to acquire and preserve.

Please feel free to email me if you have additional questions.

Bill Bailey
Chief, Planning Division
Savannah District
US Army Corps of Engineers

Classification: UNCLASSIFIED
Caveats: NONE

Bailey, William G SAS

From: Bailey, William G SAS
Sent: Friday, May 13, 2011 2:29 PM
To: 'Blair N. Williams'; 'J. Christopher Beckham'
Cc: 'Rheta Geddings DiNovo'; 'pontifmj@dhec.sc.gov'; 'Barbara Neale'; 'Heather Preston'; 'hightocw@dhec.sc.gov'; Okane, Jason D SAS; McIntosh, Margarett (Mackie) SAS; Hall, Jeffrey M COL SAS; Oddi, Peter A SAS; Sloan, G Rogers SAS; Saltalamachea, Michael H SAS
Subject: Savannah Harbor Expansion Project -- additional information (UNCLASSIFIED)
Attachments: SHEP direct wetland impacts.pdf; SHEP indirect wetland impacts.pdf; SHEP VII Consideration of Final Mitigation Rule.pdf

Classification: UNCLASSIFIED
Caveats: NONE

At our 25 April meeting, you requested we provide specific additional information. We have completed our write-up (attached) that describes how the wetland mitigation plan complies with the Mitigation Rule. We intend to include this information in one of the appendices of the Final EIS. This information may still be revised as our documents are reviewed by higher headquarters. We consider this information to be Pre-Decisional. It will become public information when we release the General Re-evaluation report and Environmental Impact Statement to the public for comment.

You requested some additional figures on wetlands, which we now have available. The figures use the same modeling information that was in the November 2010 Draft GRR and Draft EIS, but displays it in a different way, which we trust will be more useful to you. I have attached figures that show the direct and indirect impacts to wetlands. The figures also show the wetland areas that would benefit from the flow rerouting.

You also requested figures showing salinity under various conditions (existing, with deepening, with deepening and mitigation (flow rerouting)). Those figures result in a file that is too large to send by email, so we are putting a CD with them in the mail today; you should receive it next week. These figures also use the same modeling information that was in the November 2010 Draft GRR and Draft EIS.

We met with members of the DHEC staff in Columbia yesterday to discuss water quality certification issues and they had some of the same questions that you did, so I am including them on this email. We will also send them a copy of the CD, as well.

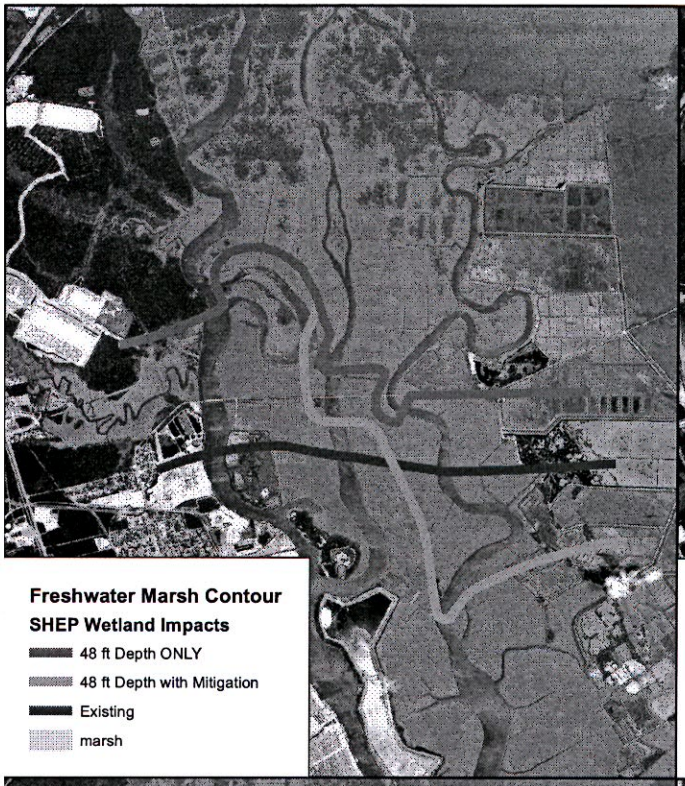
We believe this is all the information that OCRM requested at our 25 April meeting. After you receive the CD and have a chance to look it over, please let me know by 25 May if you need any other information before your agency can reach its decisions on this project.

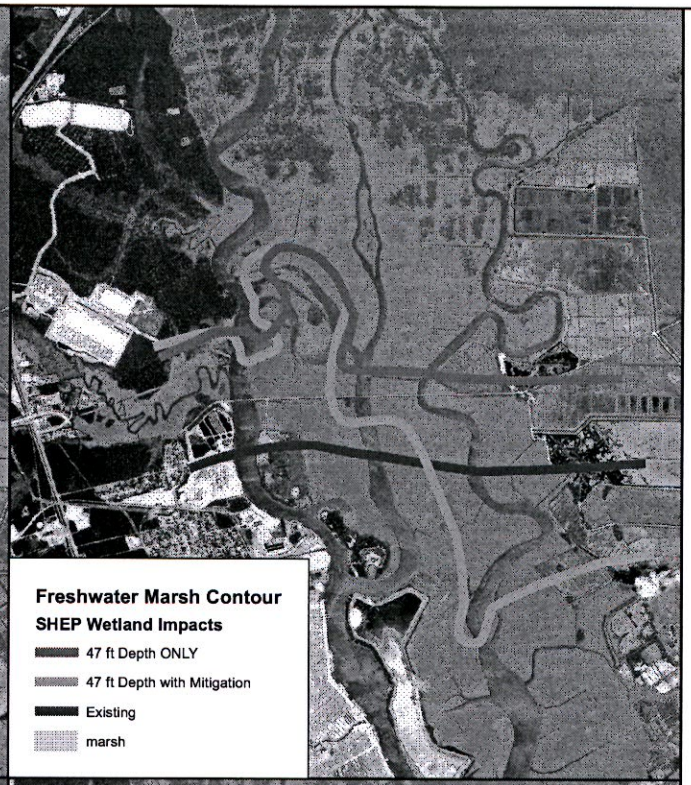
William Bailey
Chief, Planning Division

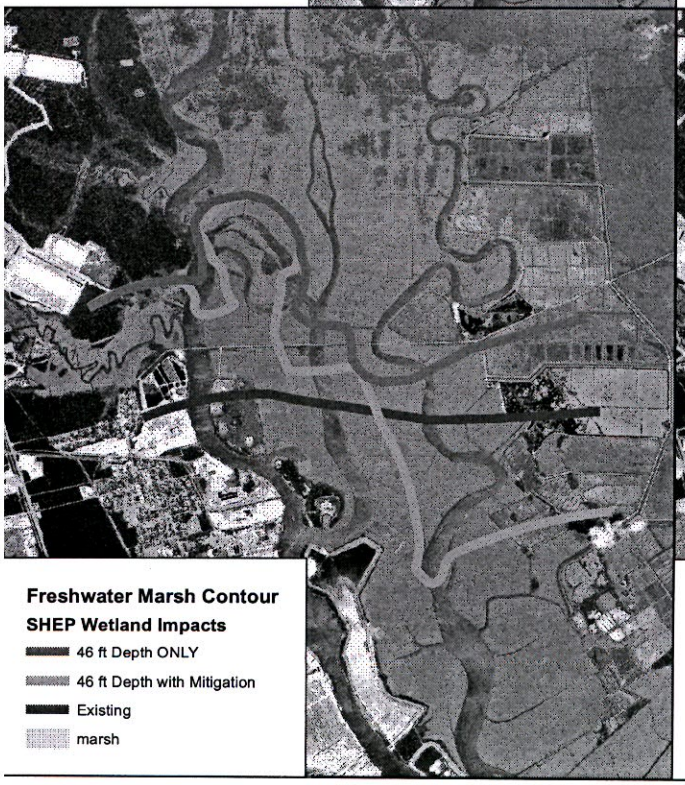
Classification: UNCLASSIFIED
Caveats: NONE

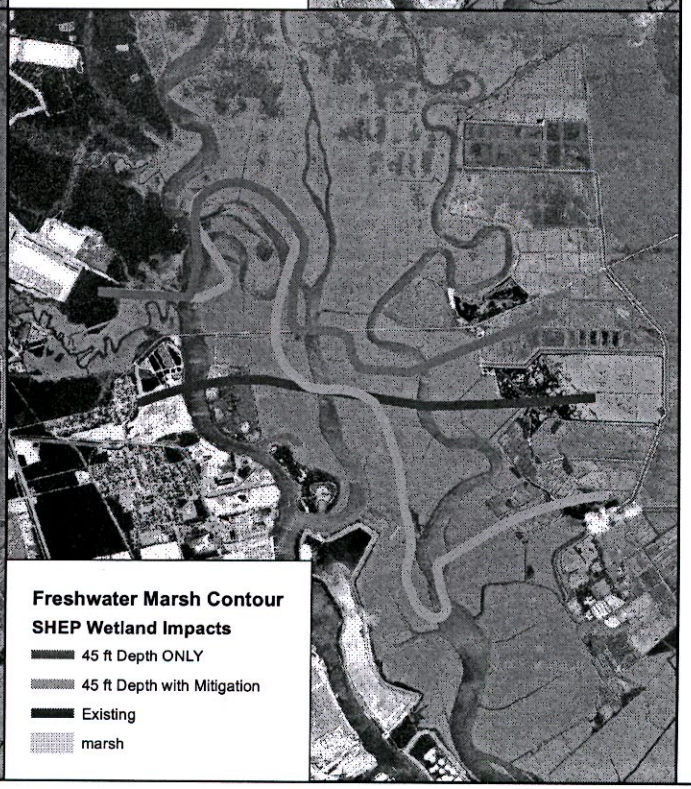
Savannah Harbor Expansion Project

Freshwater Tidal Wetland Impacts









Marsh contours are generalized and are based on model predictions using average freshwater river flows and tidal conditions.

In all figures, the blue line represents Existing Conditions (ie, existing location of freshwater marsh contour). Marsh located north of the blue line are considered freshwater tidal marsh and areas south, or closer to the ocean, are considered to be brackish with adjacent river salinities greater than 0.5 ppt.

For greater detail and more information on model simulations and wetland impact determination see the SHEP Draft EIS and GRR.

May 2011

Bailey, William G SAS

From: Bailey, William G SAS
Sent: Friday, May 13, 2011 3:30 PM
To: 'J. Christopher Beckham'
Cc: 'hightocw@dhec.sc.gov'; 'Heather Preston'; Hall, Jeffrey M COL SAS; Oddi, Peter A SAS; Okane, Jason D SAS; Sloan, G Rogers SAS
Subject: Savannah Harbor Expansion Project -- SC Water Quality Certification Processing Fee (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Regarding the Water Quality Certification processing fee, we have confirmed with Charleston District that they do not pay this fee for a Federal navigation project. Since the Savannah Harbor Expansion Project (SHEP) is also a Federal navigation project, it would be consistent for you to treat SHEP in the same manner.

We are working to get you the remaining information you requested and look forward to assisting you as you need.

Bill Bailey
Chief, Planning Division

Classification: UNCLASSIFIED
Caveats: NONE

Bailey, William G SAS

From: Wade Cantrell [cantrewm@dhec.sc.gov]
Sent: Tuesday, May 17, 2011 11:09 AM
To: Bailey, William G SAS
Cc: J. Christopher Beckham; David Graves; Heather Preston
Subject: Meeting Follow Up

Bill,

Good discussion at the meeting last week. I wanted to follow up on the additional information regarding the DO injection and wetland impact modeling. The question of who should do the work came up at the meeting. We have discussed it again here and have no issue if the Corps elects to use its original contractors (Tetra Tech and Eco2/Dr. Richard Speece) for the additional work.

On the DO injection modeling, we need additional assurance that the Speece cones will perform as designed at the Back River location. There are studies that suggest Speece cones are primarily a deep water technology not suitable for shallow waters (see for example Final Aeration Technology Feasibility Report for the San Joaquin River Deep Water Ship Channel, Jones and Stokes, October 2004) and that sufficient water depth at the injection point is a critical design consideration. Plume model results in the design report for Savannah show extremely high dissolved concentrations in close proximity to the water surface at the Back River location, and it is not clear that enough oxygen would stay in solution and remain in the river to mitigate predicted DO impacts on Back River.

The following information is requested:

1) Explanation of why this technology is suitable for the shallow Back River which addresses the apparent discrepancy with the San Joaquin River case and other studies.
2) Explanation of the physical factors controlling oxygen solution dynamics at Back River conditions, including DO concentration as a function of depth at which effervescence would occur.
3) Additional discussion that builds on the results presented in Figure 6-3 of the design report and explains how oxygen solution dynamics could affect the results of the existing plume model analysis, which treats DO as a conservative material.
4) Justification of the system-wide 80% transfer efficiency assumption specifically for the Back River location

On the wetland impact modeling, we need assurance that the Corps' wetland impact and mitigation projections are not affected by subsequent monitoring data and hydrodynamic and salinity model refinement, which is documented in EPA's 2010 draft TMDL for Savannah Harbor.

The following information is requested:

5) Comparison of wetland impacts and mitigation success for representative scenarios as predicted by the original Corps model and the refined EPA model.

Let me know if this is consistent or not with your recollection of the meeting discussion. Chris will be including the modeling questions in the Department's official response.

Thanks,
Wade

Bailey, William G SAS

From: Bailey, William G SAS
Sent: Tuesday, May 17, 2011 3:18 PM
To: 'beckhajc@dhec.sc.gov'; 'Wade Cantrell'; 'Blair N. Williams'; 'Kelie Moore'; 'Dale Caldwell'; 'Keith_Parsons@mail.dnr.state.ga.us'; 'Bob Lord (Lord.Bob@epa.gov)'; 'Bill Wikoff'; 'Chuck_Hayes@fws.gov'; 'wendtp@dnr.sc.gov'; 'Bob Perry'; 'kay.davy@noaa.gov'
Cc: 'hmoorer@gaports.com'; 'Jeff_Larson@dnr.state.ga.us'; 'Brad_Gane@dnr.state.ga.us'; 'Tim Barrett'; Okane, Jason D SAS; Bradley, Kenneth P SAM; McIntosh, Margarett (Mackie) SAS; King, Jeffrey K. SAS; Small, Daniel L SAD; Lampley, Vechere V SAD; 'Pace Wilber'; 'David Bernhart'; 'Jack_Arnold@fws.gov'; 'Mark_Musaus@fws.gov'; 'Sandy_Tucker@fws.gov'; 'Jane_Griess@fws.gov'; 'Mueller, Heinz J.'; 'Gagliano.Paul@epamail.epa.gov'; 'Godfrey.Annie@epamail.epa.gov'; 'Derby.Jennifer@epamail.epa.gov'; 'Melville.William@epamail.epa.gov'; 'Mancusi-Ungaro.Philip@epamail.epa.gov'; 'Gregory_Hogue@ios.doi.gov'; 'joyce_stanley@ios.doi.gov'; 'Rheta Geddings DiNovo'; 'Barbara Neale'; 'Heather Preston'
Subject: Savannah Harbor Expansion Project: Wetlands Interagency Coordination Team (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

In their review of the November 2010 Draft EIS, EPA had several questions about the procedures used to evaluate project impacts and the proposed wetland mitigation. They requested the Corps convene an interagency group to discuss these issues.

The Corps would like to hold another meeting of the Wetlands Interagency Coordination Team to review the Savannah Harbor Expansion Project's wetland impact evaluation procedures and proposed wetland mitigation. EPA has agreed to provide a room for us to meet. We will meet on 1 June at the Atlanta Federal Center (EPA building). The meeting will be in the 3rd floor Augusta Room (bridge building) from 10 AM to 4 PM.

The Corps will present the procedures that we used during our evaluations, the steps we followed in developing the wetland mitigation plan, and our recommended wetland mitigation. We will also summarize additional information that we intend to include in the Final EIS in response to comments that we received on the Draft EIS.

Please join us.

Bill Bailey

Classification: UNCLASSIFIED
Caveats: NONE

Bailey, William G SAS

From: Bailey, William G SAS
Sent: Wednesday, May 18, 2011 11:27 AM
To: 'Wade Cantrell'
Cc: 'beckhajc@dhec.sc.gov'; 'Heather Preston'; 'hightocw@dhec.sc.gov'; 'David Graves'; Okane, Jason D SAS; McIntosh, Margarett (Mackie) SAS; Hoke, Joseph T SAS
Subject: SHEP -- hydrodynamic and water quality models (UNCLASSIFIED)
Attachments: savannah_harbor_tmdl_draft_201056.pdf.pdf; Modeling Report - Savannah Harbor Z-Grid Model (April 2010).pdf

Classification: UNCLASSIFIED
Caveats: NONE

You asked how well the hydrodynamic and water quality models (EFDC and WASP) that the resource agencies had approved for the Corps to use for impact evaluation purposes on the Savannah Harbor Expansion Project compare with a later version that EPA used in their updated D.O. TMDL for the harbor.

The basis for both models is the same. The Corps (through Tetra Tech) enhanced models that EPA had developed and used for its Nov 2006 D.O. TMDL for the harbor. When EPA decided to update the TMDL, they also decided to revise the enhanced models. Section 3 of the attached Draft TMDL from EPA describes their modeling process, including the revisions they made to the earlier versions. Among other changes, they switched from a sigma-grid to a Z-grid, updated the hydrodynamics for the Middle and Back Rivers, and reduced the resolution in the Middle, Back, and upper Savannah Rivers by going to one grid layer in those locations. The primary purpose for revising the models was to reduce their computer run time.

When EPA summarizes the model development for the 2010 Draft D.O. TMDL (attached), they refer (page 2, end of top paragraph in attached) to the Corps' 2006 modeling report for the Savannah Harbor Expansion Project (Development of the Hydrodynamic and Water Quality Models for the Savannah Harbor Expansion Project, Final, January 2006) and a draft Z-grid Modeling Report (attached). You reviewed the Corps' model calibration report in 2006 as part of our interagency peer review and approval process. In 2010, Tetra Tech prepared a Water Quality Model Update Report to document the work they had performed to update the models for EPA. As far as I know, EPA did not send that calibration report out for specific interagency peer review and approval, although both SC and GA water quality modelers have reviewed the model. Section 2 of that report summarizes the revisions they made to the earlier versions. In the conclusions in Section 8, they state "The post-processor developed for the USACE on the enhanced EFDC and WASP models was modified to read the Z-grid results. The 1999 enhanced (sigma) and the Z-grid are approximately the same. Actually, the Z-grid provides a better calibration of the salinity in the navigation channel and the dissolved oxygen dynamics are captured better than the enhanced (sigma) grid. This exercise proved to the useful in developing a natural conditions model and making longterm model runs with the reduced run times." They did not provide a direct comparison of the USACE-enhanced EFDC and WASP models with the updated Z-grid version. They only provided data showing how the later version compared to observed data.

The following is the text from a 4/23/08 email from Jim Greenfield when he was at EPA in response to a question from me about EPA's use of an updated version of the models:

"These are the same models except with different grid configurations.

Both versions give similar results - not exactly the same because of the grid configuration but will give similar DO
delta projections for both TMDLs and deepening

EFDC sigma grid was never fully set up for natural conditions (SOD, reaeration, channel width, additional marshes,
etc) so nothing to compare. But in my opinion if we transfer Sav zgrid info to sigma grid results will be similar.
But I have no need to do that and if the USACE wants to be my guest.

Reasons we changed
- faster run times
- eliminated the thin layers in middle and back rivers and reaeration and sod issues
- able to include the appropriate bottom slope in upper river portion

Bottom line should not have compatibility issues as long as appropriate modeling assumptions and inputs
are used in both
sigma model may be better for harbor salinity alternative evaluation, zgrid model is better for water quality"

At that time I also asked Elizabeth Booth (GA DNR-EPD) about the updated models. She initially said that she and Steven Davie (Tetra Tech) completely agreed with Jim Greenfield's 4/23/08 comments. I went on to ask: "So am I correct that you don't see a need for GA DNR-EPD or EPA to request the Corps rerun the impact or mitigation analyses for the Savannah Harbor Expansion Project using the Z-grid -- that you both are comfortable with the sigma grid for those purposes? She replied: "Yes". It is my understanding from recent emails that both Ms. Booth and Mr. Davie remain comfortable with the use and comparison of both models.

The Corps used the Z-grid model in its re-evaluation of potential impacts to chloride levels at the City of Savannah's water intake on Abercorn Creek. Tetra Tech modified the Z-grid model by adding a more detailed grid in the Abercorn Creek, Bear Creek, and Big Collis Creek area (upstream of I-95). Their December 2010 report titled "Chloride Modeling, Savannah Harbor Expansion Project" documents their work. Section 4.1 of Appendix A states "The SHEP EFDC model was revised to include more cells in the Abercorn Creek and Bear Creek region to better simulate the flow connections upstream of the City's intake. This modification to the grid was not expected to affect the other EFDC calculations and the impact predictions based on those calculations." In Section 4.4 of that appendix, they compare results from the sigma-grid model to results from the Z-grid model. Page 8 states "Tetra Tech validated the modified model, Z-grid and extended grid, to water surface elevation, flow, and salinity. Figures 4-3 to 4-8 present a comparison of measured and simulated water surface elevation at Fort Pulaski, Houlihan Bridge on the Front River and I-95 Bridge. These comparisons show that the model developed for the present study show the same degree of accuracy as the original model calibrated and validated in 2006. … Figures 4-11 and 4-12 present the salinity comparison at the stations USACE Docks and Houlihan Bridge on the Front River. These figures show that the model is able to reproduce the same trends and values of the previous calibrated version of the model." I will send that report separately because of its size.

I trust this information provides sufficient technical support on this issue. Modeling experts at other organizations (EPA, GA DNR-EPD, and Tetra Tech) have considered this issue and believe the Corps' enhanced EFDC and WASP models compare well with EPA's later Z-grid version.

If the Savannah Harbor Expansion Project is constructed, the Corps intends to use the most recent (Z-grid) version in the Monitoring and Adaptive Management phases of the project. The Corps' 2010 Draft EIS proposed three updates to the calibration of these models during those phases to further enhance their accuracy. The Corps would use those updated models during (1) the construction period to identify whether greater impacts occur than are expected, and (2) after construction to ensure the mitigation plan functions as intended.

Please let me know whether you need and additional information on this issue.

Bill Bailey

Classification: UNCLASSIFIED
Caveats: NONE

Bailey, William G SAS

From: Bailey, William G SAS
Sent: Wednesday, May 18, 2011 11:29 AM
To: 'Wade Cantrell'
Cc: 'beckhajc@dhec.sc.gov'; 'Heather Preston'; 'hightocw@dhec.sc.gov'; 'David Graves'; Okane, Jason D SAS; McIntosh, Margarett (Mackie) SAS; Hoke, Joseph T SAS
Subject: SHEP -- hydrodynamic and water quality models #2 (UNCLASSIFIED)
Attachments: SHEP Chloride Modeling Report (Rev 2 - Dec 31, 2010) with Appendices.pdf

Classification: UNCLASSIFIED
Caveats: NONE

Here is the other report.

BB

From: Bailey, William G SAS
Sent: Wednesday, May 18, 2011 11:27 AM
To: 'Wade Cantrell'
Cc: 'beckhajc@dhec.sc.gov'; 'Heather Preston'; 'hightocw@dhec.sc.gov'; 'David Graves'; Okane, Jason D SAS; McIntosh, Margarett (Mackie) SAS; Hoke, Joseph T SAS
Subject: SHEP -- hydrodynamic and water quality models (UNCLASSIFIED)

You asked how well the hydrodynamic and water quality models (EFDC and WASP) that the resource agencies had approved for the Corps to use for impact evaluation purposes on the Savannah Harbor Expansion Project compare with a later version that EPA used in their updated D.O. TMDL for the harbor.

The basis for both models is the same. The Corps (through Tetra Tech) enhanced models that EPA had developed and used for its Nov 2006 D.O. TMDL for the harbor. When EPA decided to update the TMDL, they also decided to revise the enhanced models. Section 3 of the attached Draft TMDL from EPA describes their modeling process, including the revisions they made to the earlier versions. Among other changes, they switched from a sigma-grid to a Z-grid, updated the hydrodynamics for the Middle and Back Rivers, and reduced the resolution in the Middle, Back, and upper Savannah Rivers by going to one grid layer in those locations. The primary purpose for revising the models was to reduce their computer run time.

When EPA summarizes the model development for the 2010 Draft D.O. TMDL (attached), they refer (page 2, end of top paragraph in attached) to the Corps' 2006 modeling report for the Savannah Harbor Expansion Project (Development of the Hydrodynamic and Water Quality Models for the Savannah Harbor Expansion Project, Final, January 2006) and a draft Z-grid Modeling Report (attached). You reviewed the Corps' model calibration report in 2006 as part of our interagency peer review and approval process. In 2010, Tetra Tech prepared a Water Quality Model Update Report to document the work they had performed to update the models for EPA. As far as I know, EPA did not send that calibration report out for specific interagency peer review and approval, although both SC and GA water quality modelers have reviewed the model. Section 2 of that report summarizes the revisions they made to the earlier versions. In the conclusions in Section 8, they state "The post-processor developed for the USACE on the enhanced EFDC and WASP models was modified to read the Z-grid results. The 1999 enhanced (sigma) and the Z-grid are approximately the same. Actually, the Z-grid provides a better calibration of the salinity in the

navigation channel and the dissolved oxygen dynamics are captured better than the enhanced (sigma) grid. This exercise proved to the useful in developing a natural conditions model and making longterm model runs with the reduced run times." They did not provide a direct comparison of the USACE-enhanced EFDC and WASP models with the updated Z-grid version. They only provided data showing how the later version compared to observed data.

The following is the text from a 4/23/08 email from Jim Greenfield when he was at EPA in response to a question from me about EPA's use of an updated version of the models:

"These are the same models except with different grid configurations.

Both versions give similar results - not exactly the same because of the grid configuration but will give similar DO
delta projections for both TMDLs and deepening

EFDC sigma grid was never fully set up for natural conditions (SOD, reaeration, channel width, additional marshes,
etc) so nothing to compare. But in my opinion if we transfer Sav zgrid info to sigma grid results will be similar.
But I have no need to do that and if the USACE wants to be my guest.

Reasons we changed
- faster run times
- eliminated the thin layers in middle and back rivers and reaeration and sod issues
- able to include the appropriate bottom slope in upper river portion

Bottom line should not have compatibility issues as long as appropriate modeling assumptions and inputs
are used in both
sigma model may be better for harbor salinity alternative evaluation, zgrid model is better for water quality"

At that time I also asked Elizabeth Booth (GA DNR-EPD) about the updated models. She initially said that she and Steven Davie (Tetra Tech) completely agreed with Jim Greenfield's 4/23/08 comments. I went on to ask: "So am I correct that you don't see a need for GA DNR-EPD or EPA to request the Corps rerun the impact or mitigation analyses for the Savannah Harbor Expansion Project using the Z-grid -- that you both are comfortable with the sigma grid for those purposes? She replied: "Yes". It is my understanding from recent emails that both Ms. Booth and Mr. Davie remain comfortable with the use and comparison of both models.

The Corps used the Z-grid model in its re-evaluation of potential impacts to chloride levels at the City of Savannah's water intake on Abercorn Creek. Tetra Tech modified the Z-grid model by adding a more detailed grid in the Abercorn Creek, Bear Creek, and Big Collis Creek area (upstream of I-95). Their December 2010 report titled "Chloride Modeling, Savannah Harbor Expansion Project" documents their work. Section 4.1 of Appendix A states "The SHEP EFDC model was revised to include more cells in the Abercorn Creek and Bear Creek region to better simulate the flow connections upstream of the City's intake. This modification to the grid was not expected to affect the other EFDC calculations and the impact predictions based on those calculations." In Section 4.4 of that appendix, they compare results from the sigma-grid model to results from the Z-grid model. Page 8 states "Tetra Tech validated the modified model, Z-grid and extended grid, to water surface elevation, flow, and salinity. Figures 4-3 to 4-8 present a comparison of measured and simulated water surface elevation at Fort Pulaski, Houlihan Bridge on the

Front River and I-95 Bridge. These comparisons show that the model developed for the present study show the same degree of accuracy as the original model calibrated and validated in 2006. … Figures 4-11 and 4-12 present the salinity comparison at the stations USACE Docks and Houlihan Bridge on the Front River. These figures show that the model is able to reproduce the same trends and values of the previous calibrated version of the model." I will send that report separately because of its size.

I trust this information provides sufficient technical support on this issue. Modeling experts at other organizations (EPA, GA DNR-EPD, and Tetra Tech) have considered this issue and believe the Corps' enhanced EFDC and WASP models compare well with EPA's later Z-grid version.

If the Savannah Harbor Expansion Project is constructed, the Corps intends to use the most recent (Z-grid) version in the Monitoring and Adaptive Management phases of the project. The Corps' 2010 Draft EIS proposed three updates to the calibration of these models during those phases to further enhance their accuracy. The Corps would use those updated models during (1) the construction period to identify whether greater impacts occur than are expected, and (2) after construction to ensure the mitigation plan functions as intended.

Please let me know whether you need and additional information on this issue.

Bill Bailey

Classification: UNCLASSIFIED
Caveats: NONE

D H E C

PROMOTE PROTECT PROSPER

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.

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.

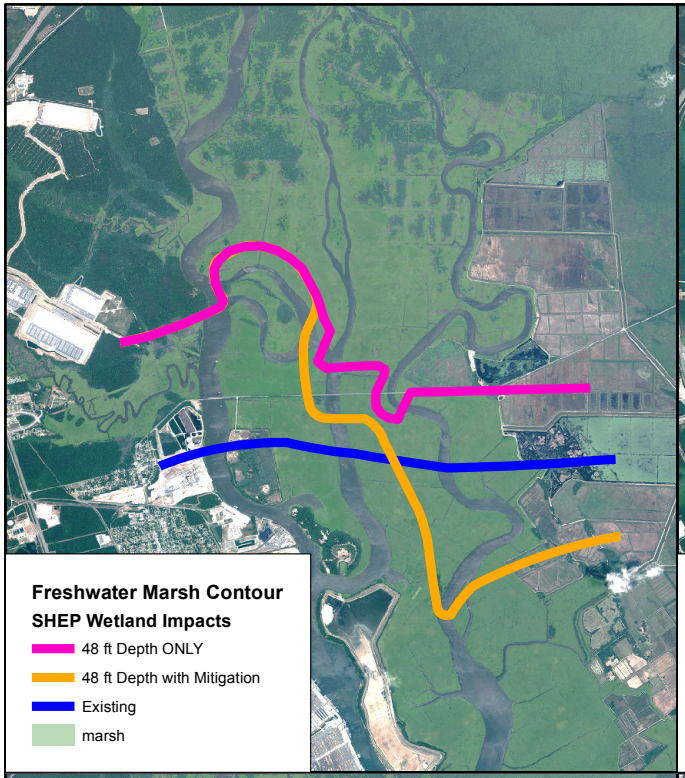
Finally, SCDHEC-OCRM clearly articulated our reasons for objecting to the Corps' consistency determination and provided supporting information in our letters of January 25 and 31, 2010. Specifically, the potential impacts to the resources under the proposed plan would be excessive and without adequate 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.

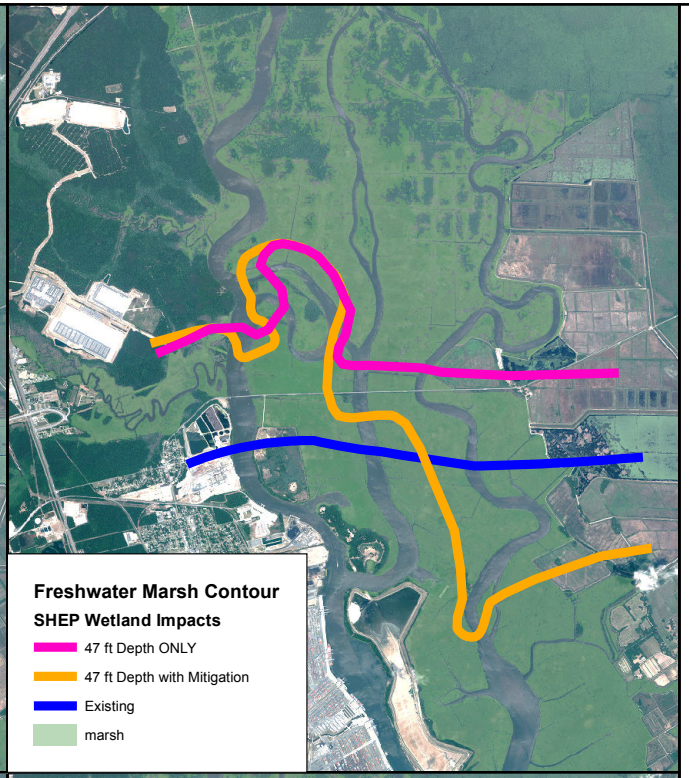
As mentioned previously, SCDHEC-OCRM would welcome continued discussions with the Corps regarding this project to discuss a potential outcome that reduces the impacts of the project as well as modifications to the proposed mitigation. If this is an option to which the Corps is agreeable, I will have 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.

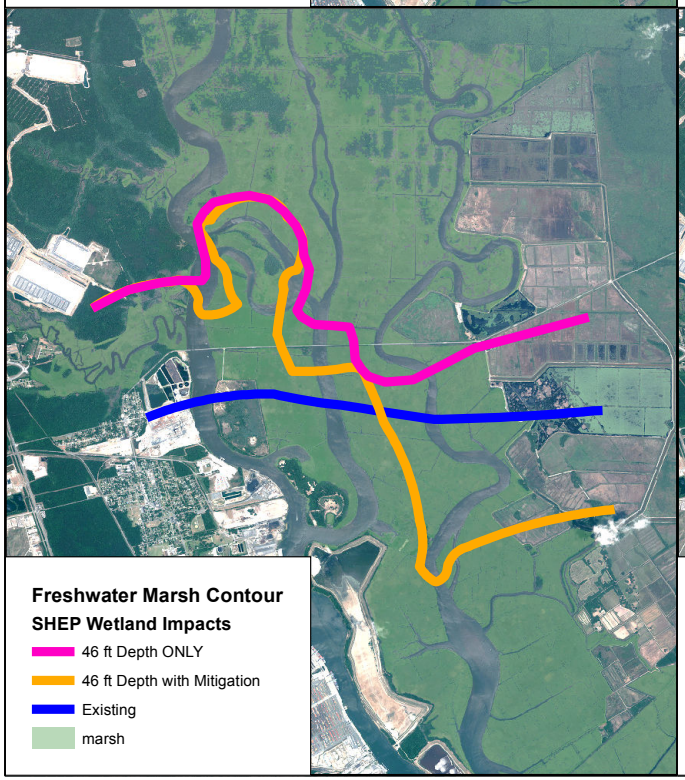
Sincerely,

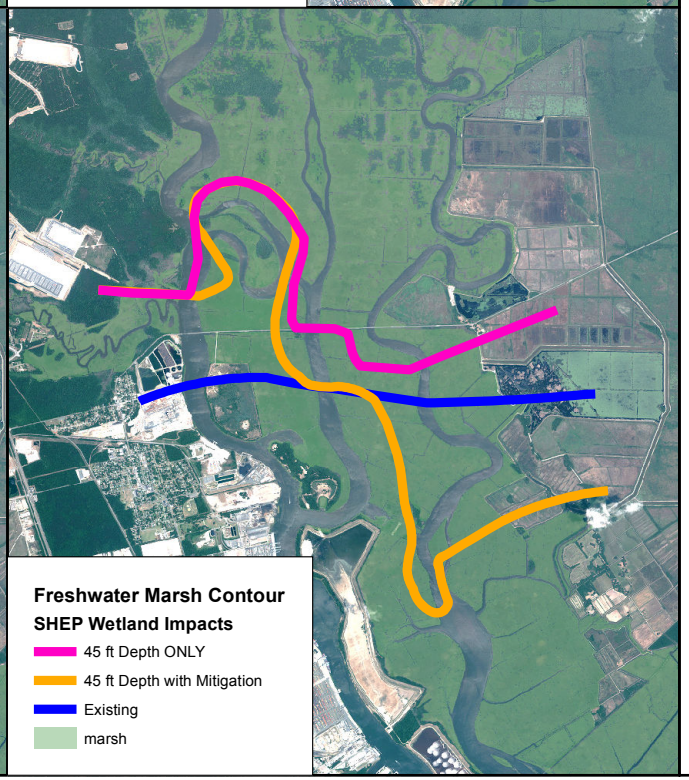
Carolyn Boltin-Kelly
Deputy Commissioner, SCDHEC-OCRM

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









Savannah Harbor Expansion Project

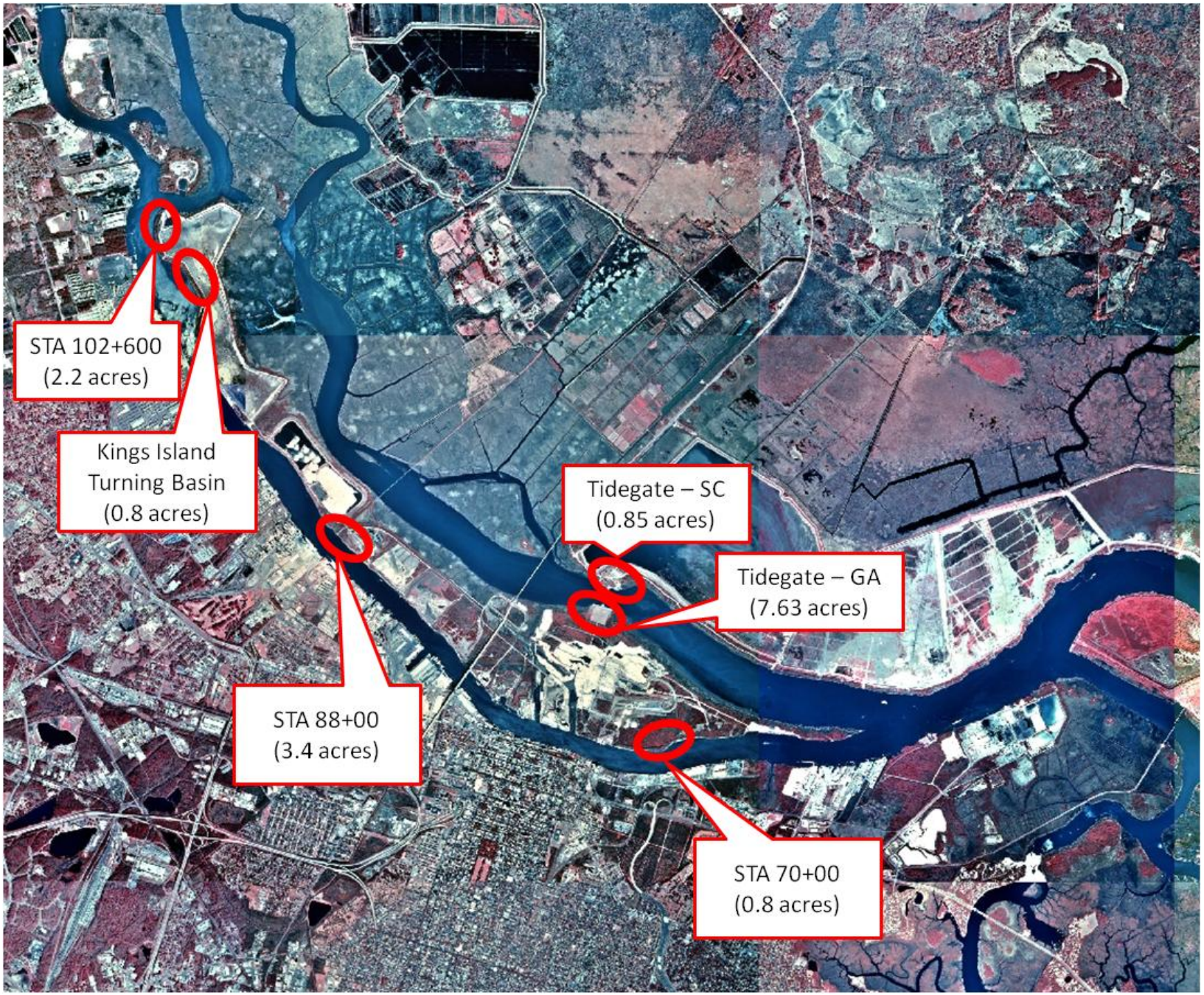
Freshwater Tidal Wetland Impacts

Marsh contours are generalized and are based on model predictions using average freshwater river flows and tidal conditions.

In all figures, the blue line represents Existing Conditions (ie, existing location of freshwater marsh contour). Marsh located north of the blue line are considered freshwater tidal marsh and areas south, or closer to the ocean, are considered to be brackish with adjacent river salinities greater than 0.5 ppt.

For greater detail and more information on model simulations and wetland impact determination see the SHEP Draft EIS and GRR.

May 2011


STA 102+600
(2.2 acres)
Kings Island
Turning Basin
(0.8 acres)
Tidegate – SC
(0.85 acres)
Tidegate – GA
(7.63 acres)
STA 88+00
(3.4 acres)
STA 70+00
(0.8 acres)

Bailey, William G SAS

From: Bailey, William G SAS
Sent: Friday, June 03, 2011 3:07 PM
To: 'beckhajc@dhec.sc.gov'; 'Blair N. Williams'; 'Kelie Moore'; 'Dale Caldwell'; 'Keith_Parsons@mail.dnr.state.ga.us'; 'Bob Lord (Lord.Bob@epa.gov)'; 'Mueller, Heinz J.'; 'Bill Wikoff'; 'wendtp@dnr.sc.gov'; 'Bob Perry'; 'kay.davy@noaa.gov'
Cc: 'Wade Cantrell'; 'Chuck_Hayes@fws.gov'; 'hmoorer@gaports.com'; 'Jeff_Larson@dnr.state.ga.us'; 'Brad_Gane@dnr.state.ga.us'; 'Tim Barrett'; Okane, Jason D SAS; Bradley, Kenneth P SAM; McIntosh, Margarett (Mackie) SAS; King, Jeffrey K. SAS; Small, Daniel L SAD; Lampley, Vechere V SAD; 'Pace Wilber'; 'David Bernhart'; 'Jack_Arnold@fws.gov'; 'Mark_Musaus@fws.gov'; 'Sandy_Tucker@fws.gov'; 'Jane_Griess@fws.gov'; 'Gagliano.Paul@epamail.epa.gov'; 'Godfrey.Annie@epamail.epa.gov'; 'Derby.Jennifer@epamail.epa.gov'; 'Melville.William@epamail.epa.gov'; 'Mancusi-Ungaro.Philip@epamail.epa.gov'; 'Gregory_Hogue@ios.doi.gov'; 'joyce_stanley@ios.doi.gov'; 'Rheta Geddings DiNovo'; 'Barbara Neale'; 'Heather Preston'
Subject: Savannah Harbor Expansion Project: Wetlands Interagency Coordination Team meeting (UNCLASSIFIED)
Attachments: 2011-06-01 SHEP Wetland Presentation.pdf

Classification: UNCLASSIFIED
Caveats: NONE

I've attached the presentation we gave at this Wednesday's meeting and the sign-in sheet.

Thank you all for attending.

We are adding some of the figures that had in the presentation to our write-up for the FEIS. We expect to complete that and send it out to you by the end of next week.

Bill Bailey
Chief, Planning Division

Classification: UNCLASSIFIED
Caveats: NONE

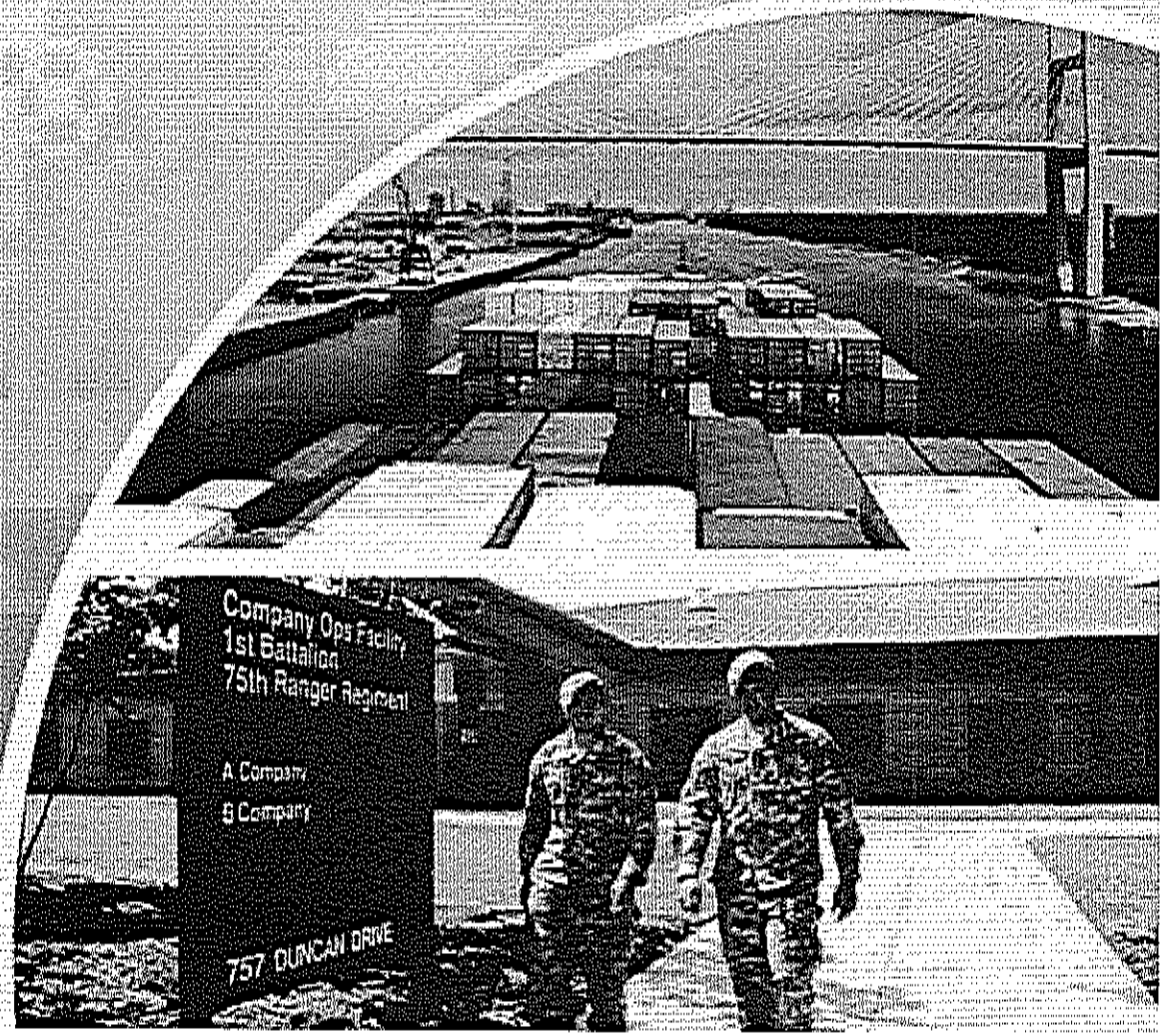
Savannah Harbor Expansion Project (SHEP) – Information Meeting Wetland Impacts and Mitigation

Bill Bailey and Jeffrey King

US Army Corps of Engineers, Savannah District

Atlanta, Georgia

June 1, 2011



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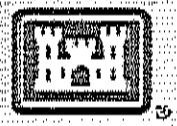
Outline

- Provide agencies with history of Wetland Interagency Coordination Team (ICT) discussions and recommendations concerning wetland impact evaluation and mitigation
- Review direct impacts to wetlands
- Review mitigation for direct impacts to wetlands
- Review indirect impacts to wetlands
- Review mitigation for indirect impacts to wetlands

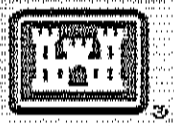
History of Wetland Interagency Coordination Team

- EPA, USFWS, NMFS, GA DNR-EPD, GA DNR-CRD, SC DNR, and SC DHEC
- Previous meetings
  - 01 July 2003
  - 31 May 2006
  - 15 Dec 2006
  - 20/21 June 2007
- Site visit to Disposal Area 1S on 10 August 2009



Guidance Provided By Wetland Interagency Coordination Team

- 01 July 2003 Meeting
  - Freshwater vegetative communities are more valuable in the Savannah River estuarine ecosystem
  - USFWS favors a community-based approach to assessing impacts to tidal wetlands
  - Possibly need a sensitivity analysis of alternate river flows

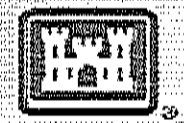


Guidance Provided By Wetland Interagency Coordination Team

- 31 May 2006 Meeting
  - Would use hydrodynamic model to identify changes in salinity
  - Would use Marsh Succession Model to identify changes in vegetation/community resulting from salinity changes
  - Would develop multiple methods of identifying changes in vegetation
    - Movement of 0.5 ppt contour
    - Would use ATM Marsh Succession Model
    - Would use USFWS/USGS Marsh Succession Model

Guidance Provided By Wetland Interagency Coordination Team

- 31 May 2006 Meeting (continued)
  - Conduct basic analysis using average river flows (1997)
  - Conduct drought sensitivity analysis using 2001 flows
  - Conduct sensitivity analysis on sea level rise
    - 25 and 50 cm over 50 years
  - Evaluate impacts over a 1 Mar – 30 Oct growing season
  - Evaluate sea level rise and drought (combined) on recommended plan



Guidance Provided By Wetland Interagency Coordination Team

- 31 May 2006 Meeting (continued)
  - Corps should provide salinity values predicted in root zone from Model-To-Marsh
  - Corps should provide changes in root zone salinity from Model-To-Marsh
  - USFWS maintains that freshwater tidal wetlands in Middle and Back Rivers are most ecologically valuable areas within the lower estuary
  - Areas along navigation channel have considerably less ecological value
  - USFWS reiterated that it can accept no further loss of tidal freshwater marsh

Guidance Provided By Wetland Interagency Coordination Team

- 31 May 2006 Meeting (continued)
  - Corps should evaluate acquiring Harrison property adjacent to SNWR as mitigation
  - Present surface, middle and bottom salinities
  - Use surface salinity for wetland evaluation because that is what floods the marshes
  - Display locations where the surface salinity would change
  - Provide acreage and % change for each vegetative type

Guidance Provided By Wetland Interagency Coordination Team

- 15 Dec 2006 Meeting
  - Evaluate not dredging the upper portions of Middle and Back Rivers
  - Evaluate blocking original mouth of McCoys Cut
  - Evaluate rerouting Middle River through Rifle Cut

Guidance Provided By Wetland Interagency Coordination Team

- 20/21 June 2007 Meeting
  - Use 50%-tile exceedence surface salinity values for wetland evaluations
  - Reaffirmed basic analysis should use average river flows
  - Manually extending salinity contours across the marsh is an acceptable procedure
  - Provide information on acreage of 5 salinity categories (<0.5; 0.5-1.0; 1-2; 2-4; >4 ppt)

Guidance Provided By Wetland Interagency Coordination Team

- 20/21 June 2007 Meeting (continued)
  - Drop consideration of flow rerouting plans 4,5 and 8 because they decrease flooding of marshes
  - Evaluate flow rerouting plans 6 and 7, using 3 as a base
  - USFWS would not consider any out-of-kind replacement for loss of tidal freshwater wetlands

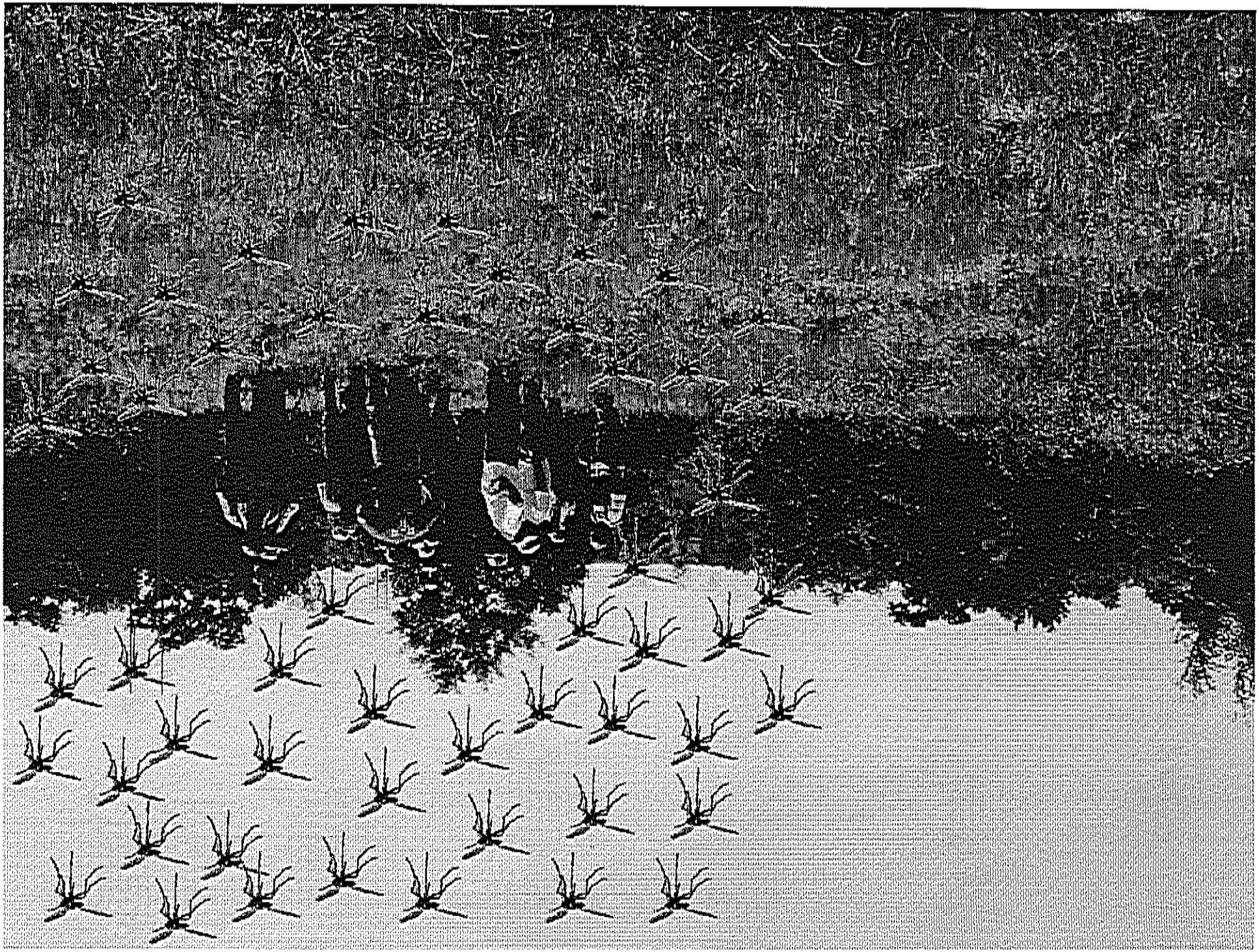
Guidance Provided By Wetland Interagency Coordination Team

- 20/21 June 2007 Meeting (continued)
  - All tidal freshwater marshes within the Refuge possess the same ecological value
  - USFWS preferred leaving slough at lower arm of McCoys Cut for fishing rather than filling to create tidal freshwater wetlands
  - Constructing an earthen sill at the lower end of the Sediment Basin could create water quality impacts, depending on material used and construction technique
  - Add "Restore wetlands at Disposal Area 1S" to list of potential mitigation features
  - Corps will consider grading down high ground to produce tidal freshwater wetlands

Interagency Site Visit

Disposal Area 1S

10 August 09



Wetland Impacts

Wetland Impacts Associated with SHEP

- DEIS Evaluated several alternative depths
- For simplicity, discussions on wetland impacts will use 48-foot depth alternative
  - Direct Impacts: 15.68 acres salt marsh
  - Indirect Impacts:
    - 337 acres of tidal freshwater conversion
    +1067 acres of brackish marsh conversion
    - 730 acres of salt marsh conversion

Final Compensatory Mitigation Rule and Wetland Impacts

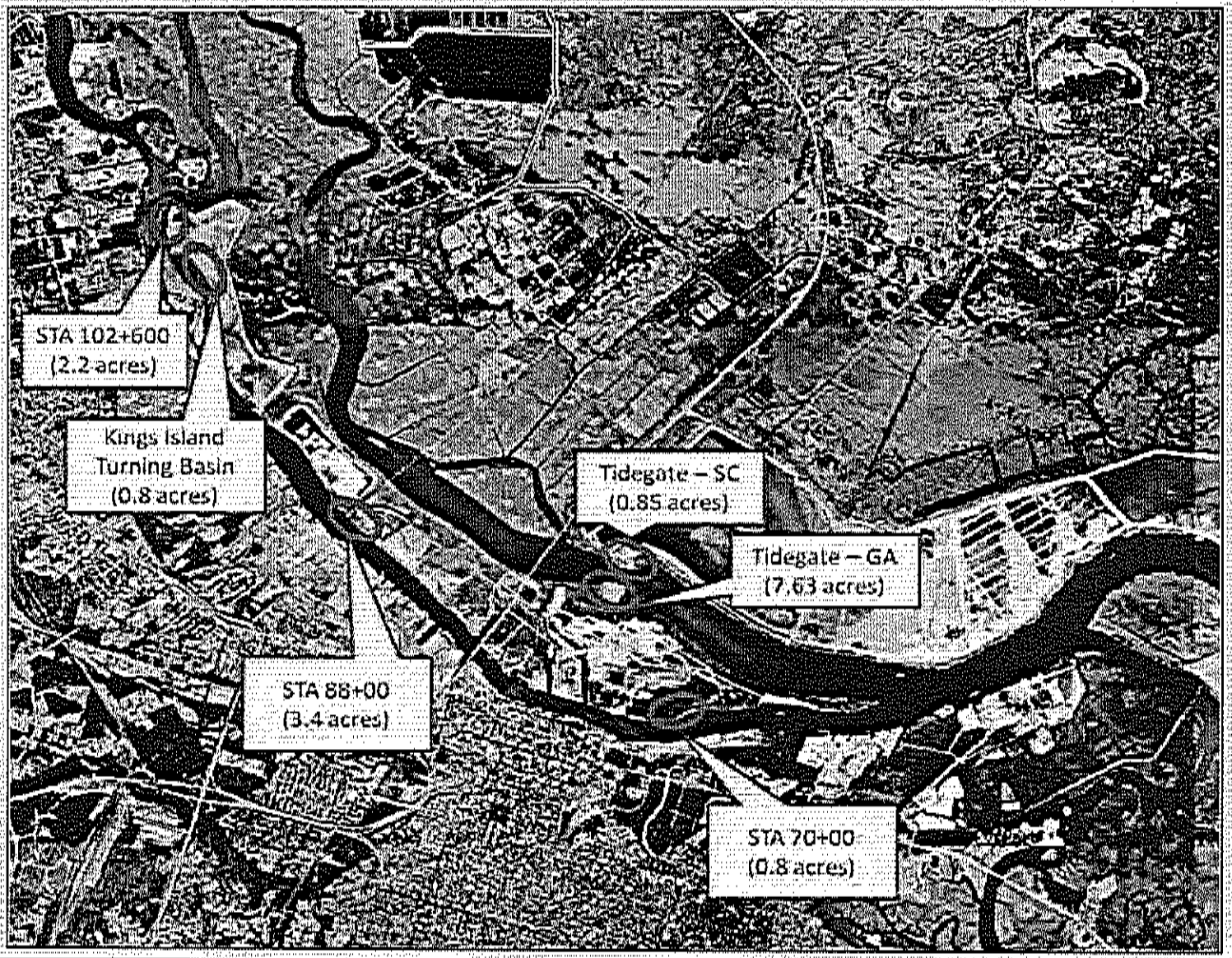
- Functional assessment of impact sites and mitigation areas
- Watershed approach (considerations, information, site selection)
- Type and location of mitigation
- Responsible parties
- Timing
- Ecological Performance Standards
- Monitoring
- Adaptive Management
- Long term Management
- Financial Assurances and Protection

Direct Impacts to Wetlands

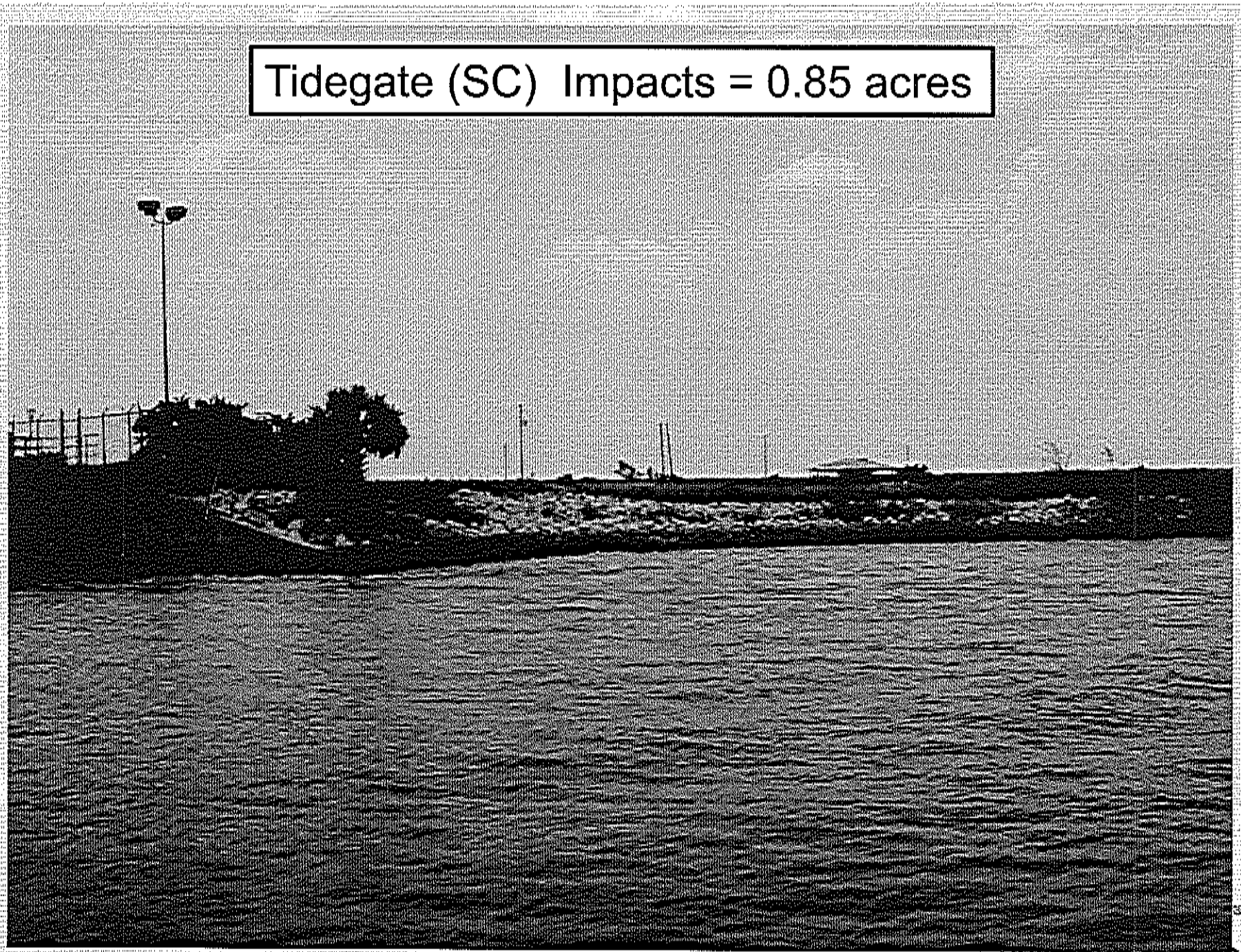
Direct Impacts to Wetlands

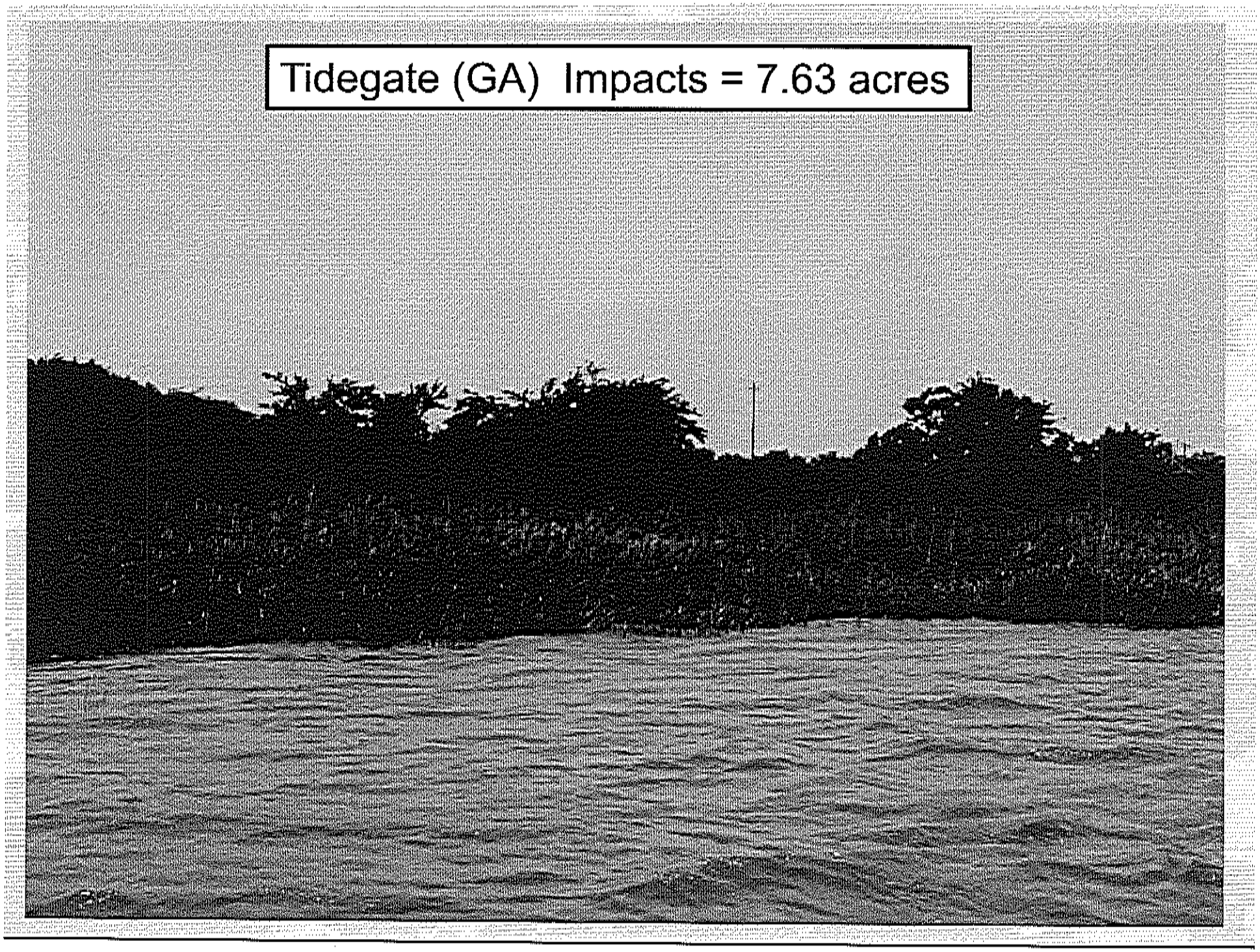
Location (Channel Station)	Wetland Acres Affected by Excavation
Refuge Lands	
102+600 – GA	2.2
Kings Island Turning Basin- GA	0.8
Non-Refuge Lands	
88+000 – GA	3.4
70+000 – GA	0.8
Tidegate – GA	7.63
Tidegate - SC	0.85
Total	15.68

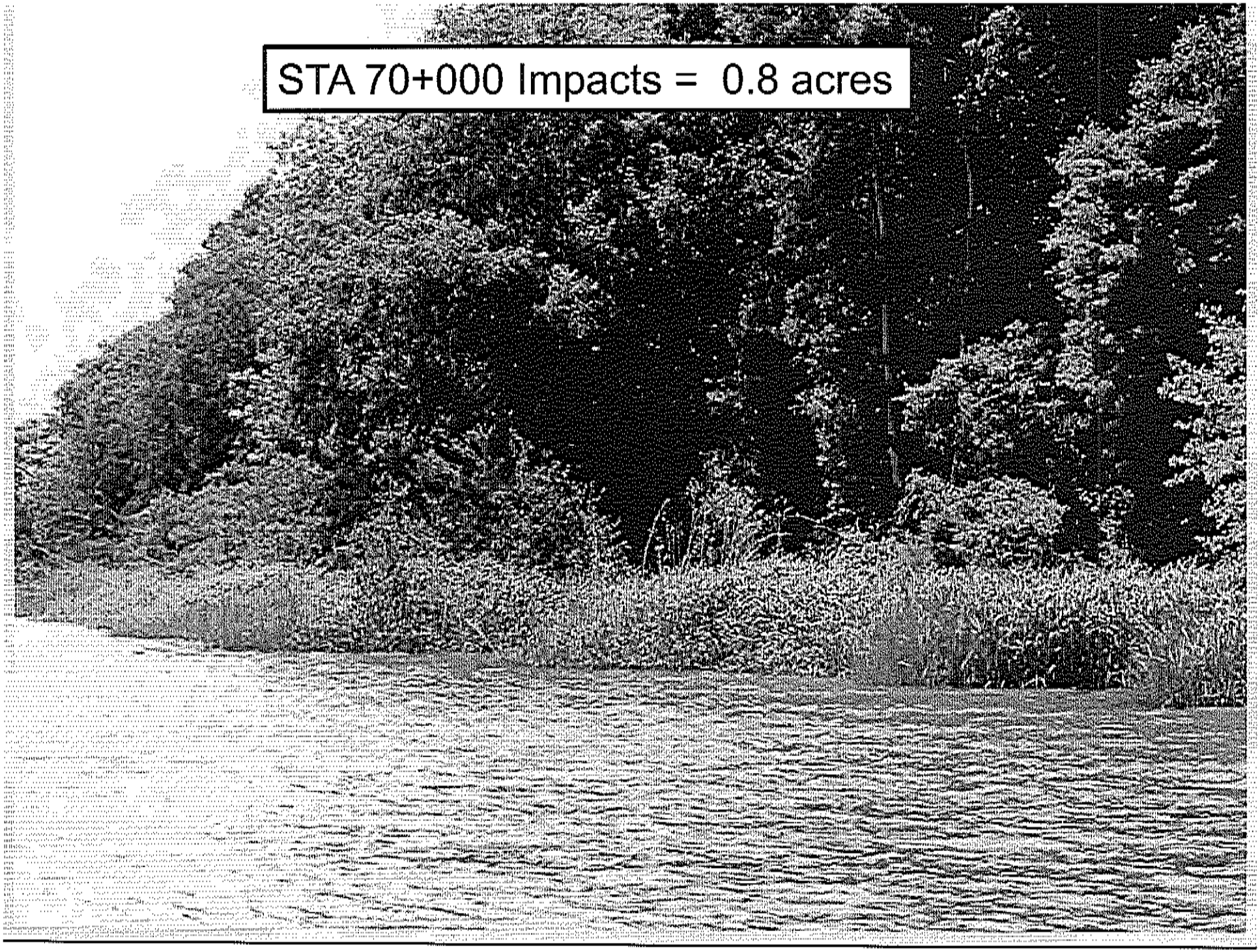
Location of Direct Impacts to Wetlands



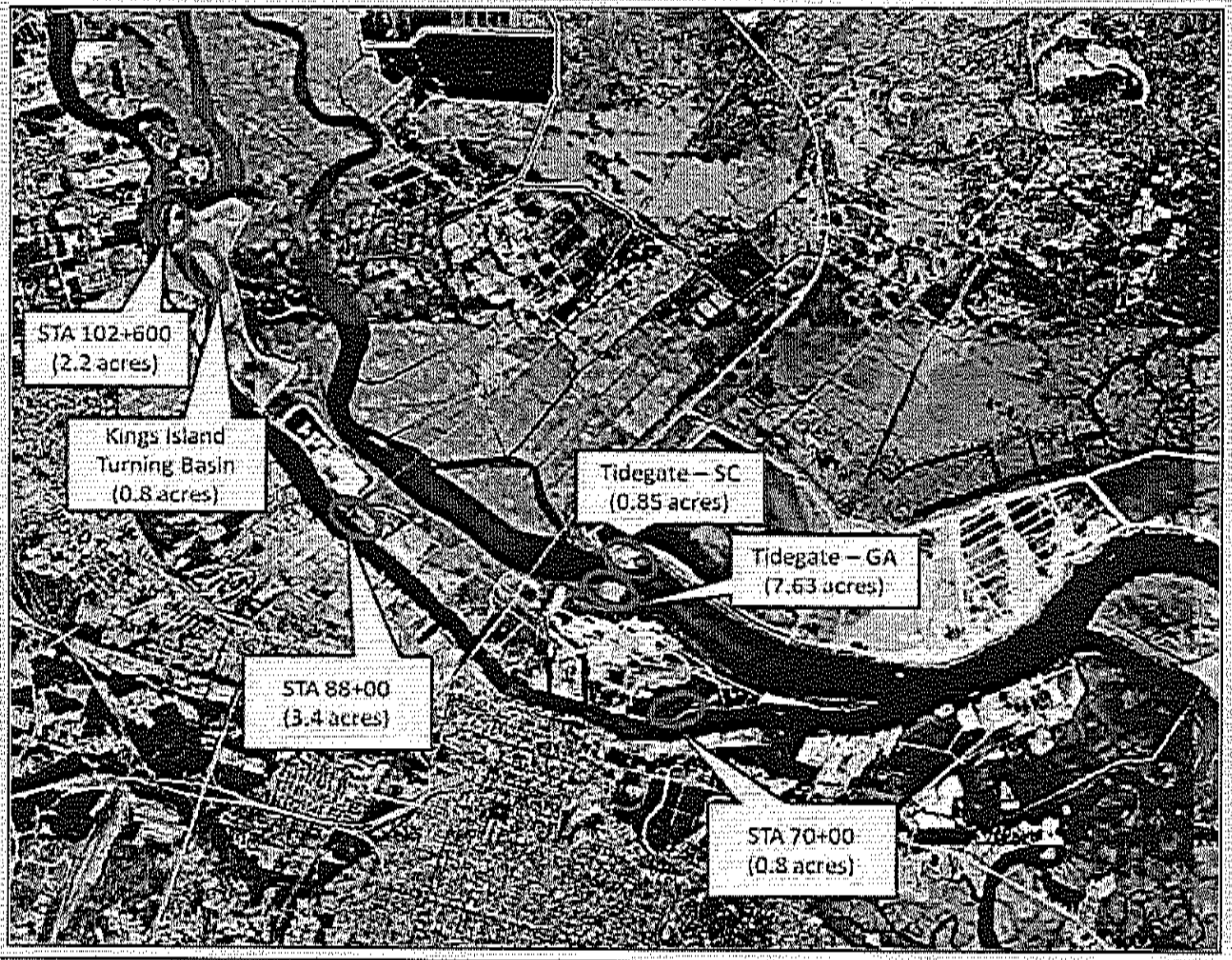
Tidegate (SC) Impacts = 0.85 acres




Tidegate (GA) Impacts = 7.63 acres


STA 70+000 Impacts = 0.8 acres

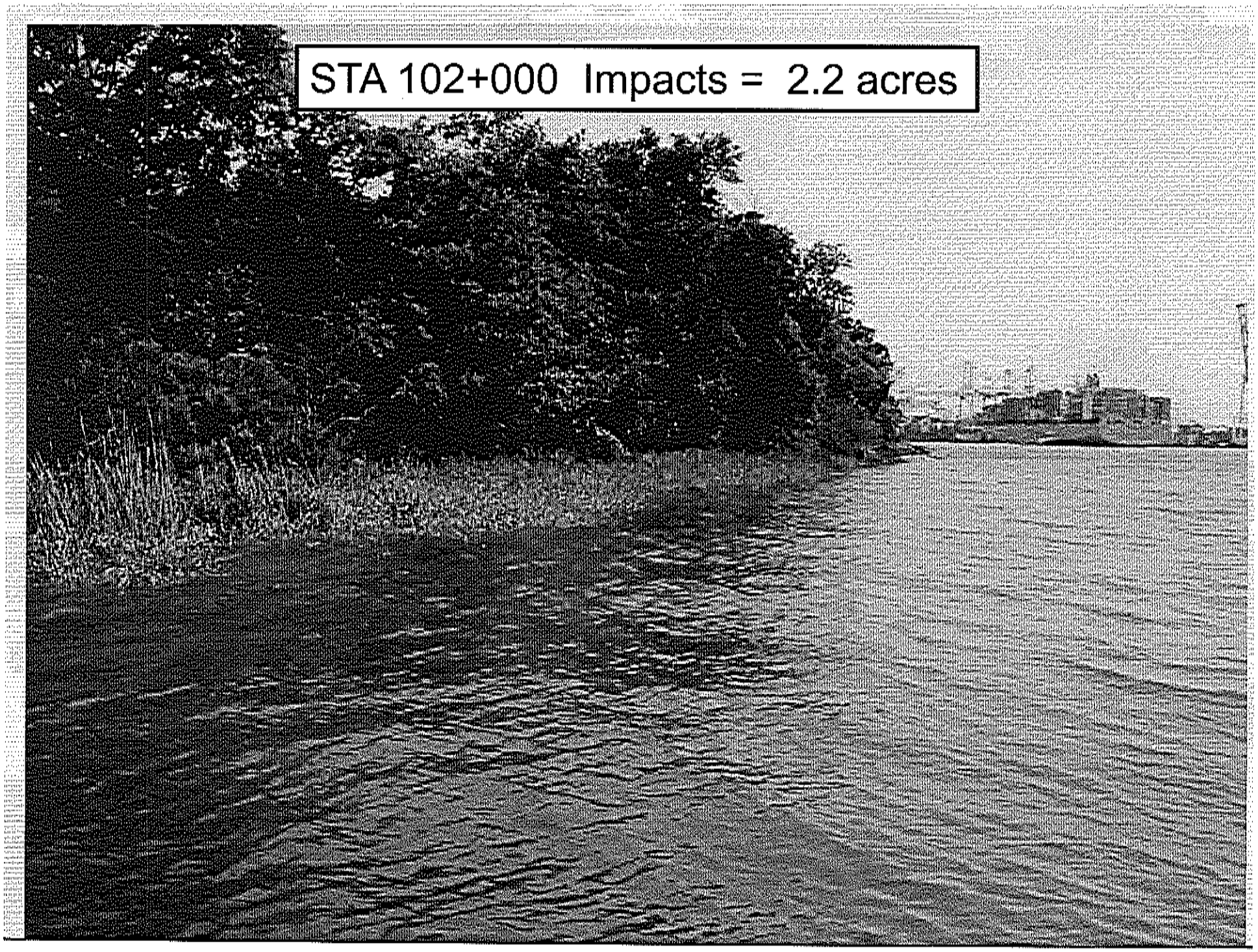
Location of Direct Impacts to Wetlands




STA 88+000 Impacts = 3.4 acres


STA 88+000 Impacts = 3.4 acres


KITB Impacts = 0.8 acres


STA 102+000 Impacts = 2.2 acres

Changes in Wetland Function as a Result of Brackish Marsh Excavation

Elements of Wetland Function	Effect of Excavation on Wetland Function (15.68 acres)
Water Purification	Major Adverse (lost)
Flood Protection	Major Adverse (lost)
Shoreline Stabilization	Major Adverse (lost)
Groundwater Recharge	Major Adverse (lost)
Streamflow Maintenance	Major Adverse (lost)
Retention of Particles	Major Adverse (lost)
Surface Water Storage	Major Adverse (lost)
Subsurface Storage	Major Adverse (lost)
Nutrient Cycling	Major Adverse (lost)
Values to Society	Major Adverse (lost)
Fish and Wildlife Habitat	Major Adverse (lost)

Mitigation for Direct Impacts

- Conducted watershed assessment
- Evaluated use of mitigation banks

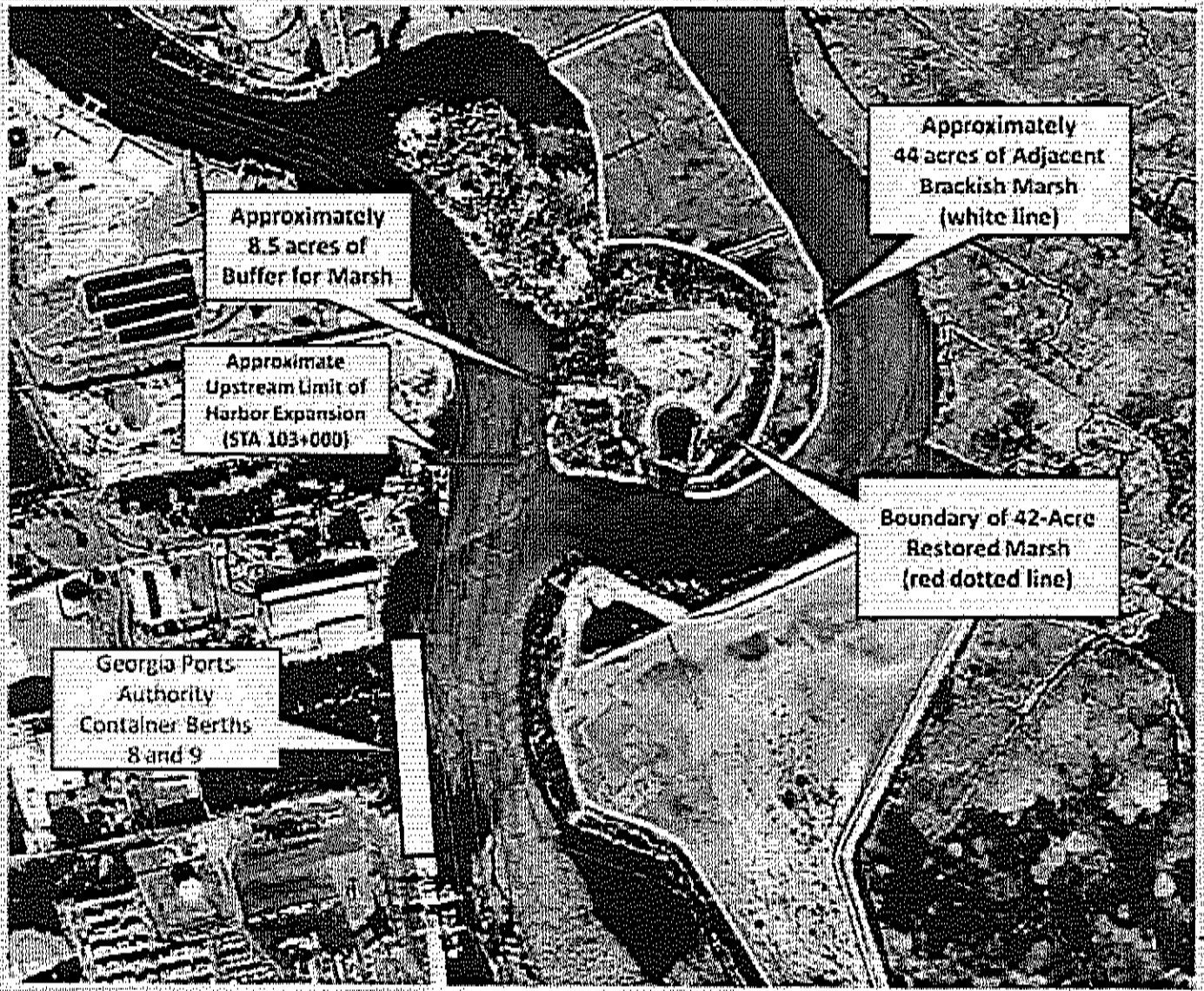
Bank Name	Watershed	Acreage of Bank*	Status	USACE District
Salt Creek	Ogeechee-Coastal	98.9	Pending	Savannah
Tronox	Lower Savannah	88	Pending	Savannah
Vallambrosa	Ogeechee-Coastal	1,513	Pending	Savannah
Clydesdale Club	Lower Savannah	693	Pending	Charleston

* Acreage reflects total size of bank and may include additional habitat other than saltmarsh.

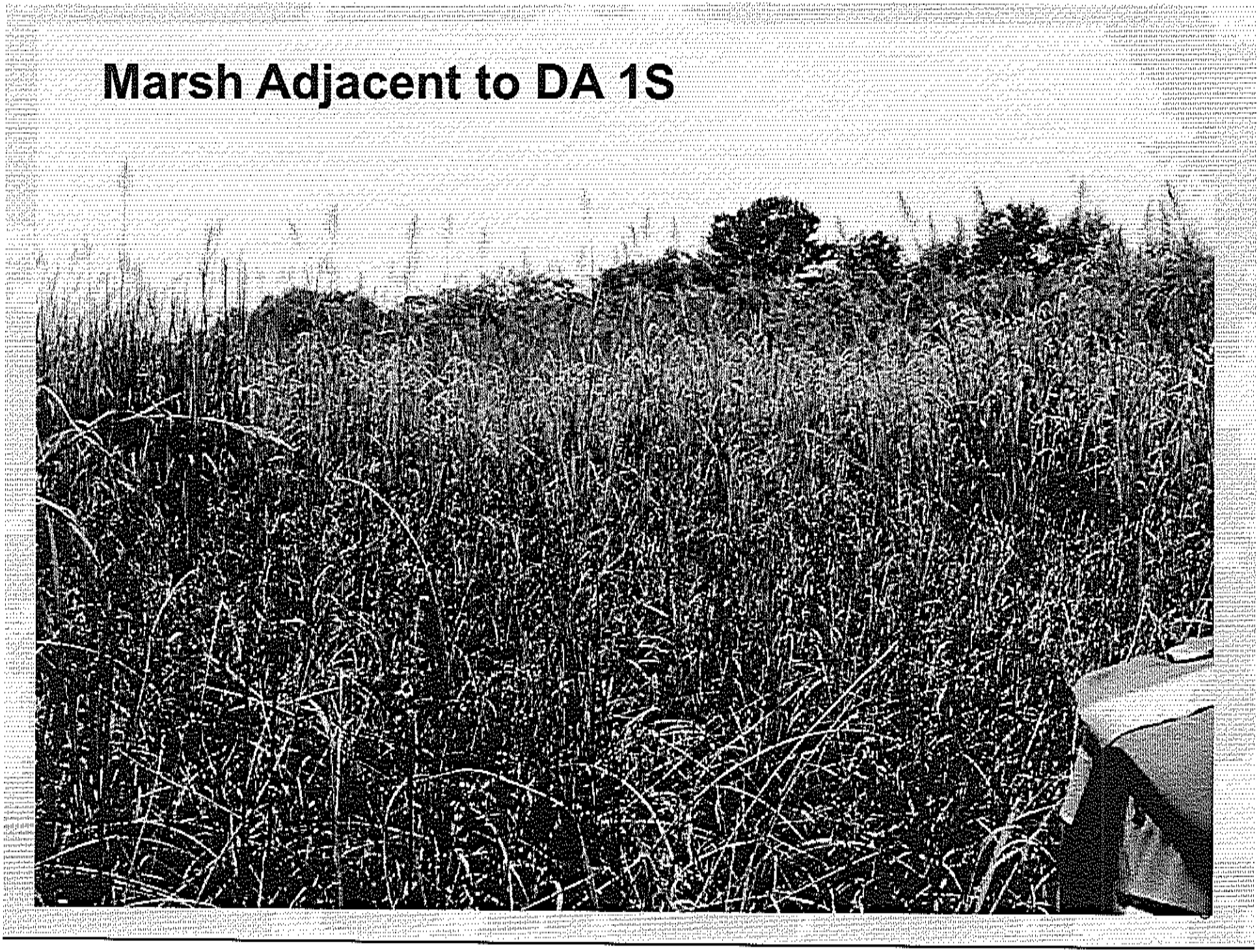
- Reviewed possible in-lieu fee option

Mitigation for Direct Impacts

- "In Kind / In Basin" Restoration Opportunity



Marsh Adjacent to DA 1S



Amount of Compensatory Mitigation

- ICT participation and use of Savannah District SOP
- Restoration of 28.75 acres for the 15.68 acres of impact (1.8 to 1 mitigation ratio)
- Mitigation ratio consistent with RD requirements
- Restoration would encompass 1.7 acre marsh site previously restored by GPA
- Remaining 11.55 acres would be used for future harbor improvements and/or adaptive management

Example Regulatory Division Authorized Projects

Project Name	USACE File Number	Brackish Marsh Impacts (Acres)	Brackish Marsh Creation (Acres)	Mitigation Ratio (mitigation: Impact)
Slip One-Hutchinson Island	20050145 3	0.28	0.56	2:1
Hardin Canal Drainage	20060039 3	0.27	0.54	2:1
Skidaway Narrows Emergency Access	20060090 9	0.56	0.56	1:1
Skidaway Road Drainage Improvements	20060124 9	0.52	0.75	1.4 :1
SLNG-Slip Construction	20020064 0	3.24	7.5	2.3 :1

Site Selection for "In Kind / In Basin" Restoration

- USFWS required "In Basin" mitigation for impacts
  - Site located in close proximity to impacts
  - Previously existed as brackish marsh with continuity to adjacent marsh
  - One large contiguous marsh vs. multiple sites
  - Site in area of Lower Savannah River Watershed that supports a brackish marsh ecosystem
  - Site is upriver of major Port of Savannah activities
  - Located within designated boundaries of SNWR (compatible with adjacent land use)

Responsible Parties and Timing

- Savannah District will be responsible for implementation, performance, and long-term management of the brackish marsh site.
- The Wetland ICT (USEPA, USFWS, NOAA, GADNR-CRD, SCDNR, SCDHEC-OCRM) will receive annual reports on the status of the mitigation project. Also, Savannah District will work with ICT to implement any Adaptive Management plans.
- Savannah District has committed to construction of the restored marsh concurrently with dredging in the Inner Harbor.

Ecological Performance Standards

- Developed so that mitigation project can be objectively evaluated to determine if it is developing into the desired resource type.
- Grade down Disposal Area 1S; allow *in situ* Spartina seed stock to vegetate site.
- Successful restoration will be determined based on following table.

Revegetation Rate for Restored Marsh	
Time Period	Percent Vegetative Cover
Construction	0
Year 1	15
Year 2	25
Year 3	40
Year 4	60
Year 5	80

Monitoring Restored Marsh Site

- Restored Marsh will be monitored for a period of five years.
- Ten, 30-foot transects established on site and one in adjacent reference marsh; Vegetative counts and density measurements.
- Success based on meeting or exceeding the percent vegetative cover on previous slide.
- ICT will be provided with annual reports documenting the success of the restored marsh site.

Site Protection

- Corps and GDOT will relinquish sediment disposal easement on Disposal Area 1S.
- Restored brackish marsh ecosystem will be permanently protected through the State of Georgia's Coastal Marshlands Protection Act.
- Restored marsh is within boundaries of SNWR. Thus, permanently integrated into SNWR's conservation and management plan.

Adaptive Management

- Site inspected twice annually. If it does not naturally revegetate as indicated in performance standards, then site will be planted with *Spartina*.
- If invasive species are identified, then they will be removed from the site.
- If percent colonization not achieved, site would be sprigged or then purchase salt marsh mitigation credits from approved bank.
- Wetland ICT will be provided annual monitoring reports and consulted annually to provide input and recommendations.

Long Term Management

- Plan includes description of long-term needs, annual cost estimates and management responsibility.
- After revegetation, brackish marsh would be self-sustaining.
- Restoration area already within boundaries of SNWR and contiguous with existing marsh. As such, restored site would be managed by USFWS and integrated into the same long-term management plan that currently protects the SNWR as defined in the National Wildlife Refuge System Improvement Act of 1997.

Indirect Impacts to Wetlands

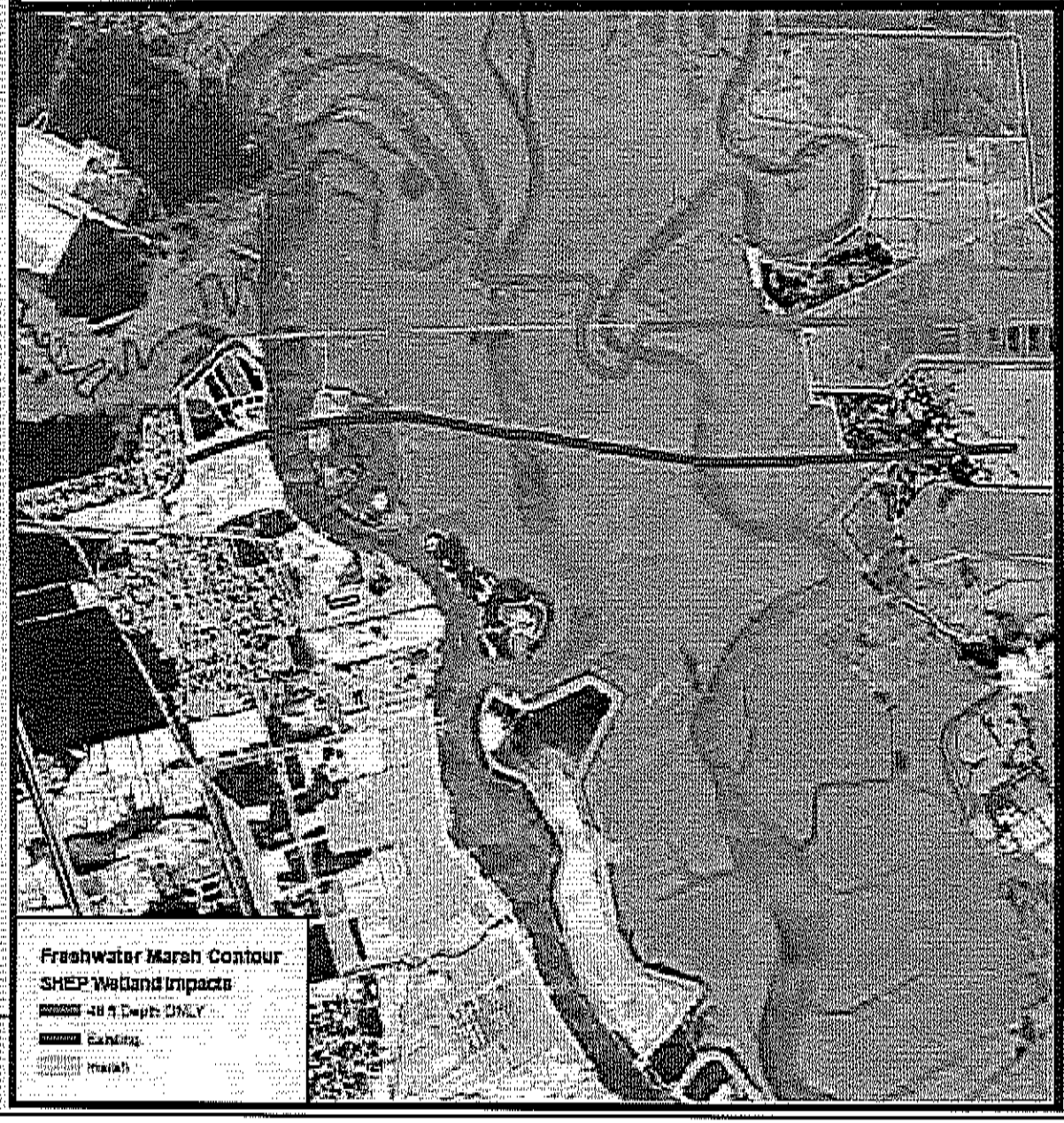
Model Used to Evaluate Vegetative Shifts Associated Changes in Salinity

- **EFDC Model used to determine changes in salinity and associated influence over marsh areas**
  - **0.0 – 0.5 ppt Tidal Freshwater Wetland**
  - **> 0.5 – 4 ppt Brackish Marsh**
  - **> 4 ppt Salt Marsh**
- **Model Used to Analyze all Depth Alternatives**
- **Use 48' Depth Alternative as Example**

Indirect Impacts Without Flow Diversion

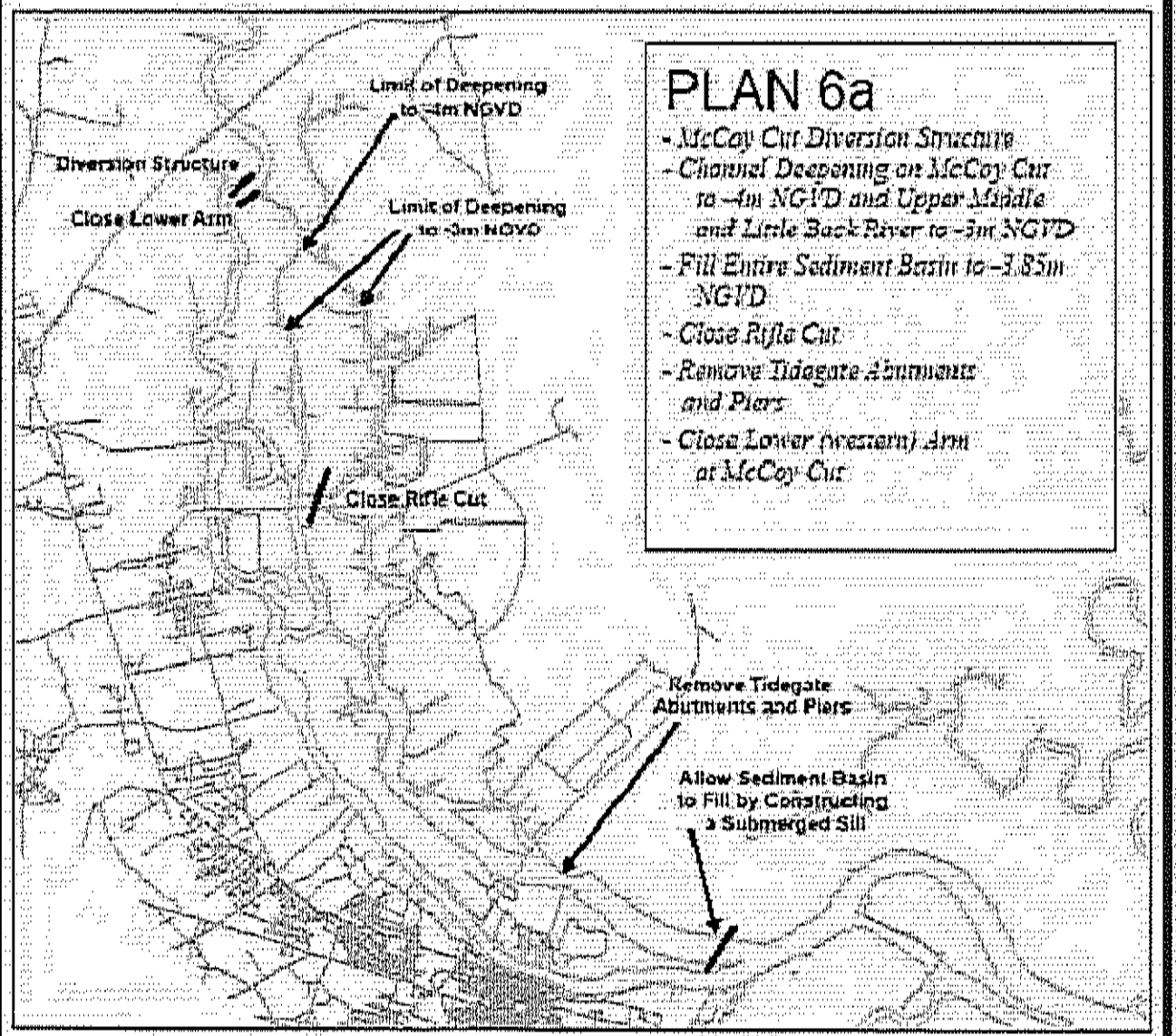
Wetland Type	48-Foot Depth (Wetland Conversion)
Freshwater Wetlands (< 0.5 ppt salinity)	1,212 acres
Salt Marsh (> 4 ppt salinity)	0 acres

Salinity: Existing Conditions and Post- Deepening



Lines indicate limits of 0.5 ppt salinity

Flow Diversion Plan 6A



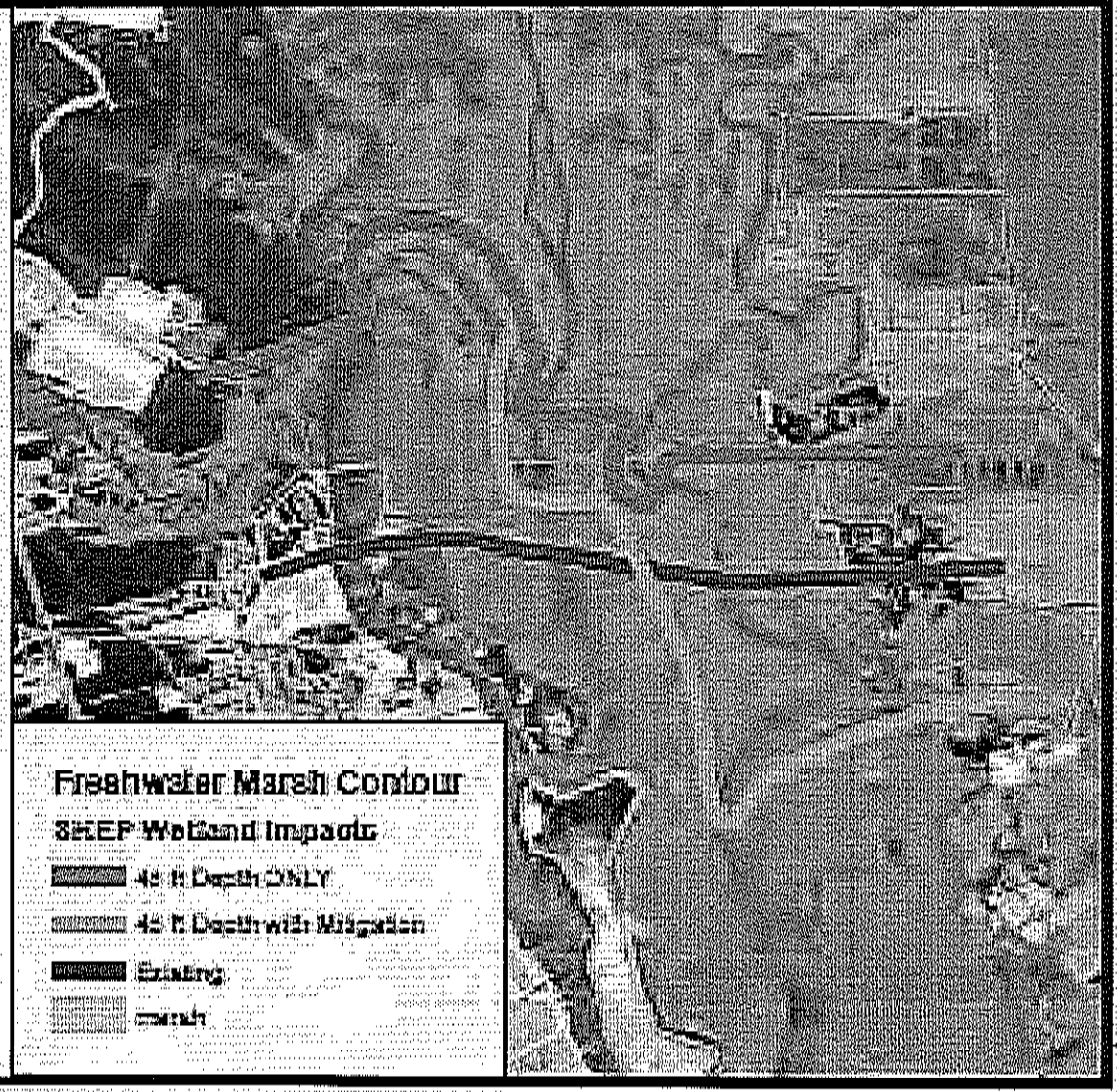
PLAN 6a

- *McCoy Cut Diversion Structure*
- *Channel Deepening on McCoy Cut to –4m NGVD and Upper Middle and Little Back River to –3m NGVD*
- *Fill Entire Sediment Basin to –3.85m NGVD*
- *Close Rifle Cut*
- *Remove Tidegate Abutments and Piers*
- *Close Lower (western) Arm at McCoy Cut*

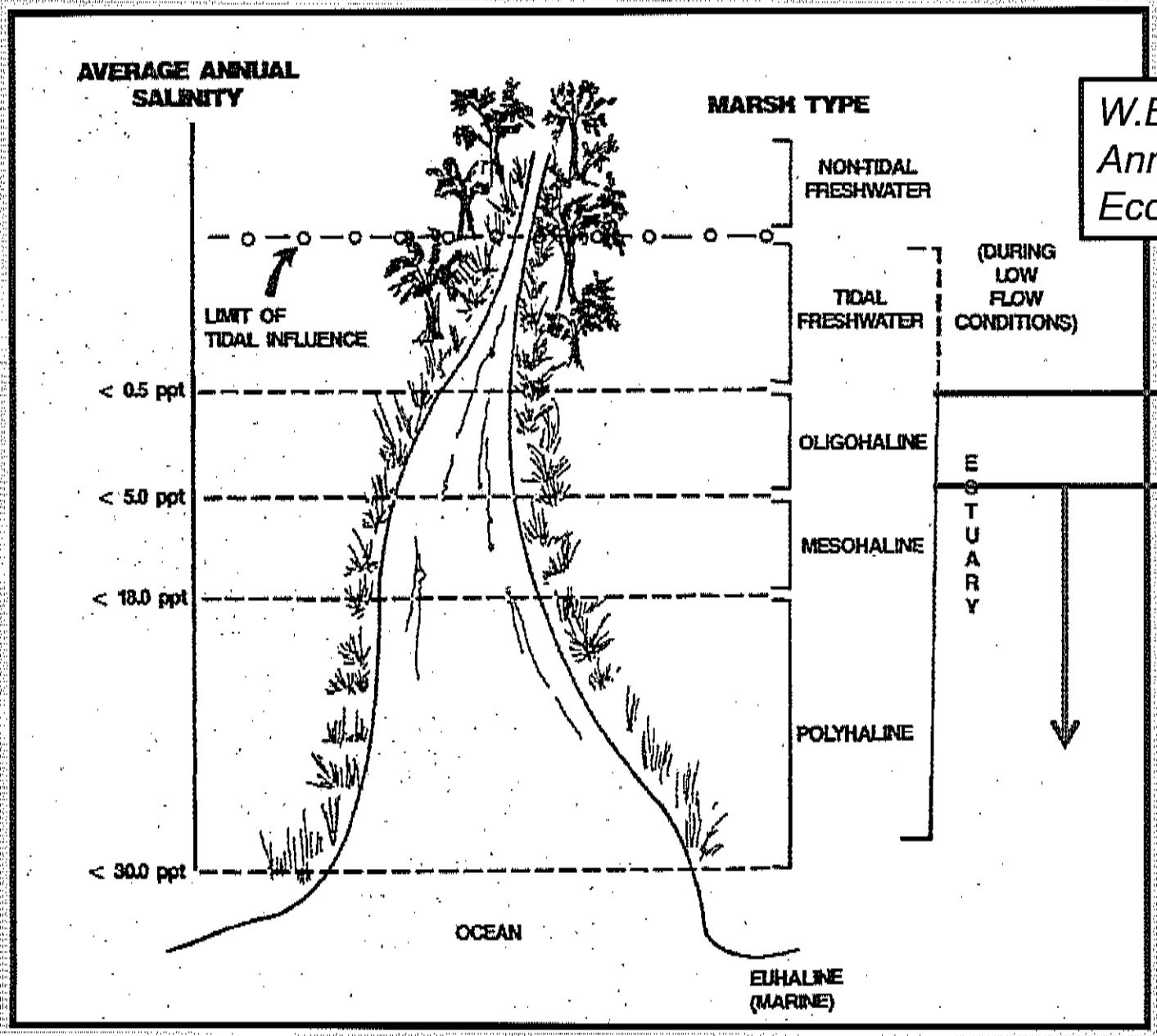
Indirect Impacts With Flow Diversion 6A

Wetland Type	48-Foot Depth (Wetland Conversion)
Freshwater Wetlands (< 0.5 ppt salinity)	337 acres
Salt Marsh (> 4 ppt salinity)	730 acres

Salinity: Existing Conditions and Post- Deepening with Flow Diversion Plan 6A



Lines indicate limits of 0.5 ppt salinity



W.E Odum (1988) Annual Review of Ecological Systems

Freshwater

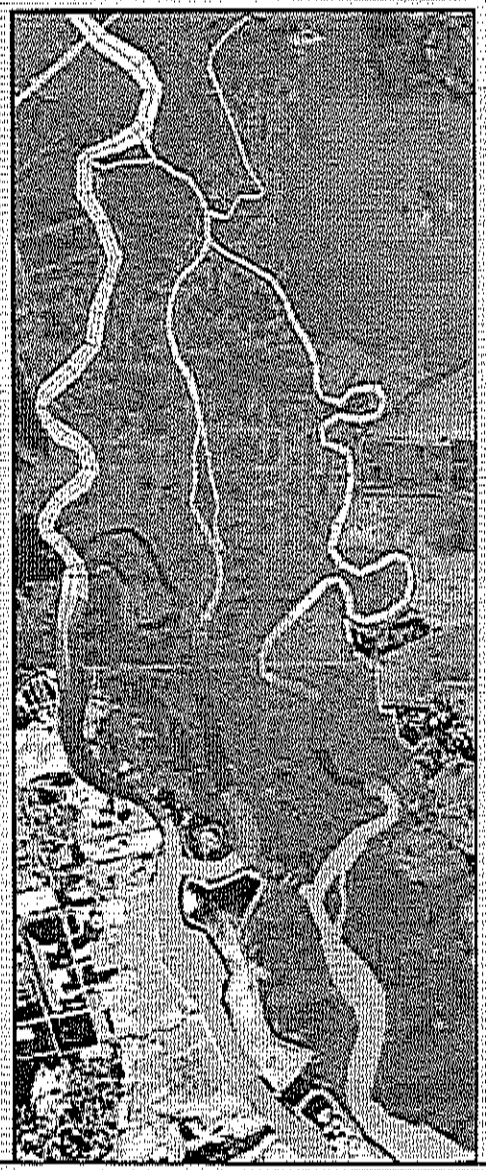
0.5 ppt

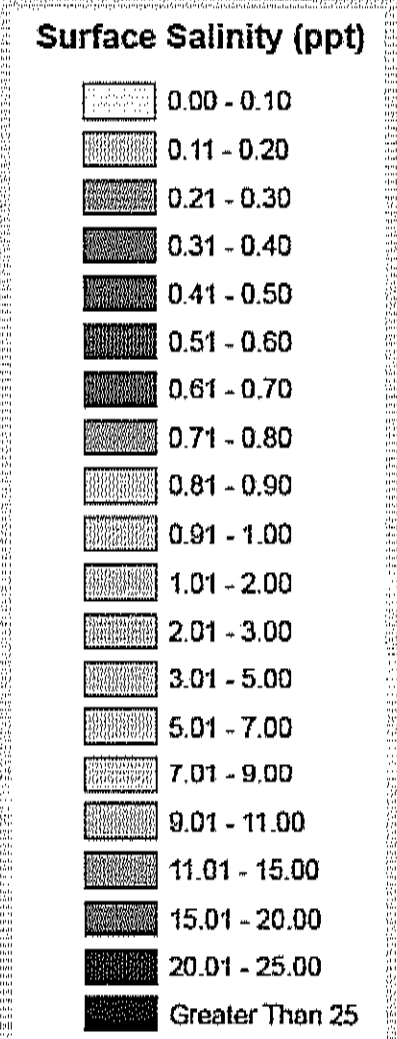
Brackish

4.0 ppt

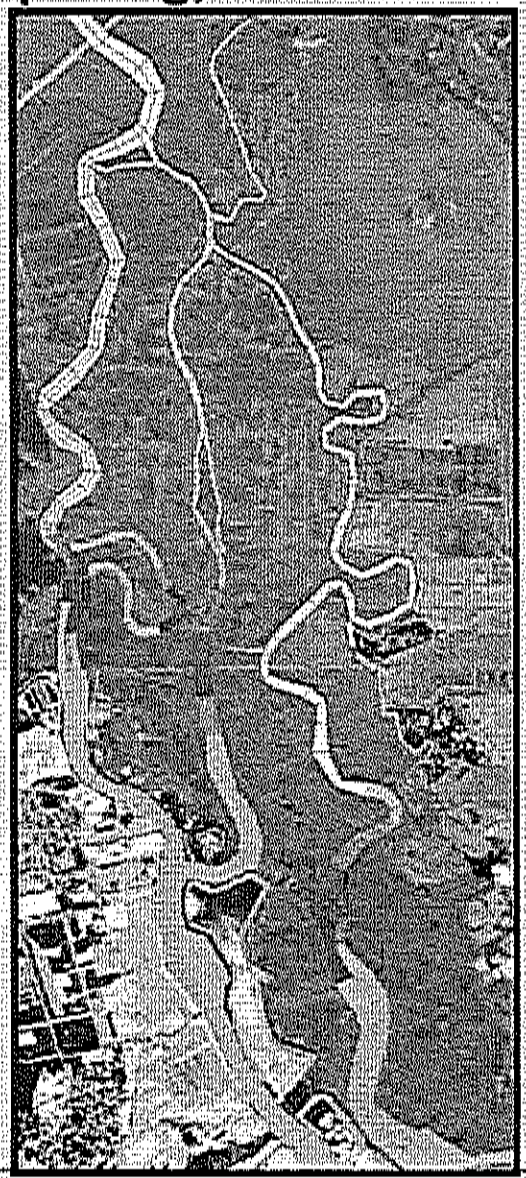
Saltmarsh

Existing 42 ft Depth
No Deepening, No Mitigation

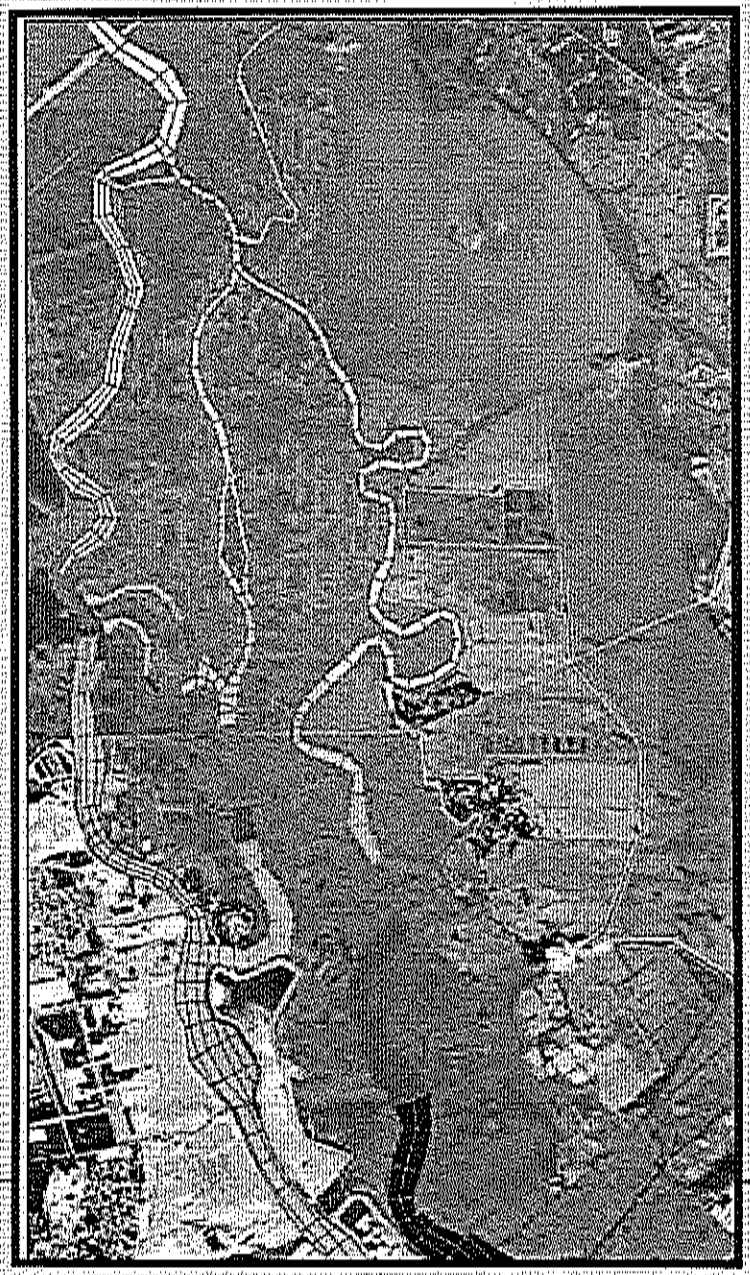




48 ft Depth
6 ft Deepening, Flow Diversion 6A



Change in Salinity Following Harbor Deepening



48 ft Channel Depth
6 ft Deepening, Mitigation 6A

Surface Salinity Difference (ppt)

-3.25 - -2.00
-1.99 - -1.00
-0.99 - -0.50
-0.49 - -0.30
-0.29 - -0.10
-0.09 - 0.00
0.01 - 0.10
0.11 - 0.20
0.21 - 0.30
0.31 - 0.40
0.41 - 0.50
0.51 - 0.60
0.61 - 0.70
0.71 - 0.80
0.81 - 0.90
0.91 - 1.00
1.01 - 2.00
2.01 - 2.18

Negative values indicate a reduction in river salinity.

Comparison of Physical Characteristics in Tidal Freshwater Marsh and Salt Marsh

Table 1 Comparison of physical characteristics between tidal freshwater marshes and salt marshes

	Tidal freshwater marsh	Salt marsh
Location	Head of the estuary (above the oligohaline zone)	Mid and lower estuary
Geographical distribution	Worldwide, usually associated with rivers	Worldwide, not always associated with rivers
Salinity	Annual average below 0.5 ppt	Annual average between 18.0 and 35.0 ppt
Tidal range	Ocean-derived lunar tide, often greater amplitude than nearby salt marshes	Ocean-derived lunar tide
Sediments	Silt-clay, high organic content, low-moderate root and peat content	More sand, lower organic content, higher peat and root content
Sediment erodability	High erodability (particularly in the low marsh)	Generally lower erodability
Streambank morphology	Low gradient, little undercutting	Steeper gradient, more undercutting
Stream channel morphology	Low sinuosity	Moderate to high sinuosity
Dissolved sulfur	Trace (approximately 1 ppm)	Very high (approximately 2500 ppm)
Sediment redox potential	Moderate to strongly reducing (multiple redox pairs)	Strongly reducing (sulfur redox pairs most important)
Reduced iron-sulfur compounds	Rare or absent	Plentiful
Dissolved and particulate organic carbon	High concentrations	Moderate to low concentrations

W.E Odum (1988) Annual Review of Ecological Systems

Percent of Vegetation Correctly Classified by Environmental Variables

Latham et. al. Wetlands 1994

Table 2. Discriminant analysis results of vegetation classes from freshwater, oligohaline, strongly oligohaline, and mesohaline sites on the lower Savannah River. Wilk's-Lambda = 0.18; F = 1743.28; DF = 3/1144; P = 0.0001.

A. Classification matrix.

	Percent Cases Correctly Classified by Site			
Class	Fresh	Oligo-haline	Strongly Oligohaline	Meso-haline
0.54 ppt +/- 0.63 Fresh	87	13	0	0
2.10 ppt +/- 1.04 Oligohaline	37	47	17	0
4.67 ppt +/- 1.49 Strongly oligohaline	9	13	68	9
9.27 ppt +/- 1.97 Mesohaline	0	2	19	79

Proportion of correct classifications between sites = 70%

"Overlap between adjacent classes was high, non-neighboring classes did not seem to overlap; Percent of vegetation correctly classified by environmental variables was 87%, 47%, 68%, and 79% for freshwater, oligohaline, strongly oligohaline and mesohaline, respectively."

Percent Organics at Different Marsh Sites

Table 3-3. Mean percent organics of marsh sediments in relation to distance from primary canals, using repeated measures analysis of variance. H_o: Mean percent organics are equal for each site between dates. (Designations "A" = 20 m, "B" = 70m, "C"= 120m.).

			Mean Percent Organic			
Site	N	A	B	C	p	*Significance*
0.5 ppt +/- 0.2	B1M	90	0.47	0.59	0.62	0.0390	Reject, lower at "A" points
1.3 ppt +/- 1.1	B2M	87	0.44	0.50	0.52	0.1181	ns
2.0 ppt +/- 1.2	B3M	90	0.29	0.42	0.45	0.0044	Reject, lower at "A" points
7.5 ppt +/- 1.7	B4M	90	0.31	0.34	0.33	0.8042	ns
	F1M	72	0.57	0.65	0.67	0.0091	ns
	M1M	72	0.33	0.59	0.67	< 0.0001	Reject, lower at "A" points
	M2M	72	0.47	0.68	0.57	0.1176	ns

Dusek and Kitchens
Technical Report (2002)

Spatial Patterns in Fish Distribution

Jennings and Weyers (2003)

Polyhaline (>15 ppt)				Mesohaline (5-15 ppt)				Oligohaline (1-5 ppt)				Tidal Freshwater (<1 ppt)			
F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su
141	324	724	3731	1297	1165	9582	14147	2953	4616	5448	6264	1627	3401	7967	4071
TOTAL: 4,920				TOTAL: 26,191				TOTAL: 19,281				TOTAL: 17,066			

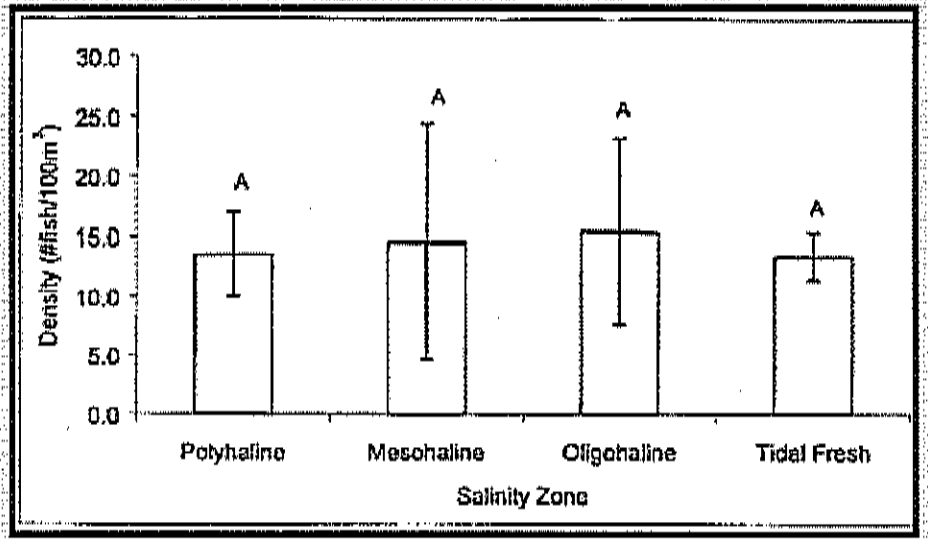
Temporal and Spatial Distribution of Estuarine-Dependent Species in the Savannah River Estuary July 2000-December 2002.

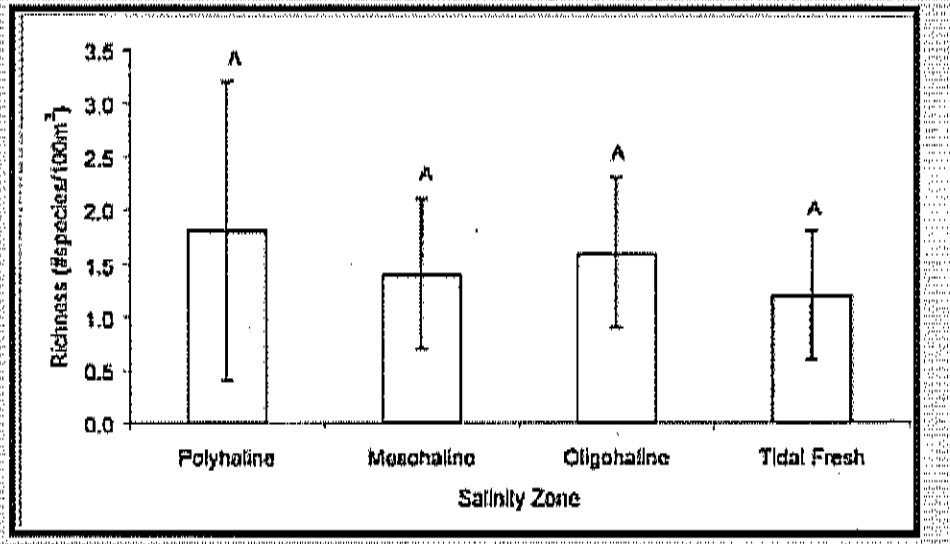
90% of catch were estuarine generalist fish species: Bay Anchovy, Atlantic menhaden, Atlantic croaker, spot, other drum species, gobies, blueback herring, Southern flounder, and striped mullet.

91 fish species identified throughout most habitat types

Fish Density and Species Richness in Tidal Creeks

Jennings and Weyers (Feb 2002) Annual Report
Temporal and Spatial Distribution of Estuarine-Dependant Species



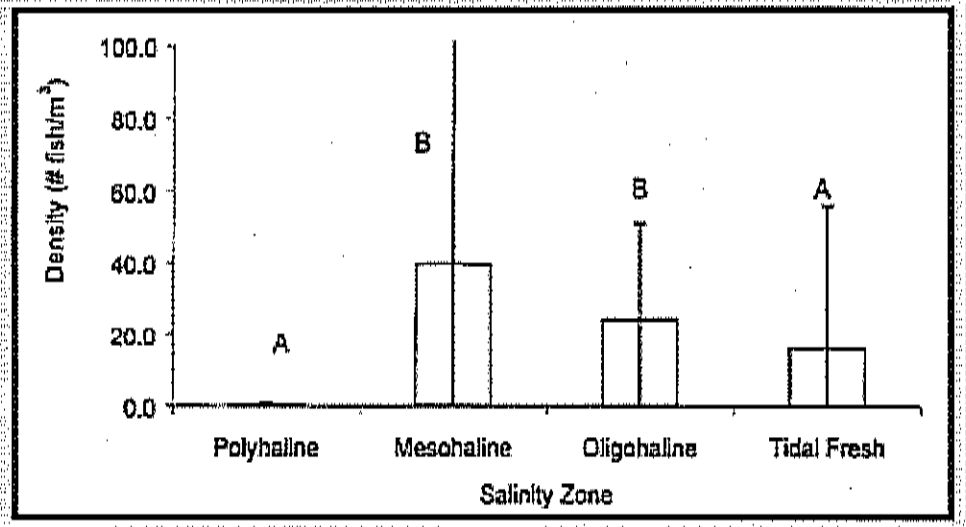


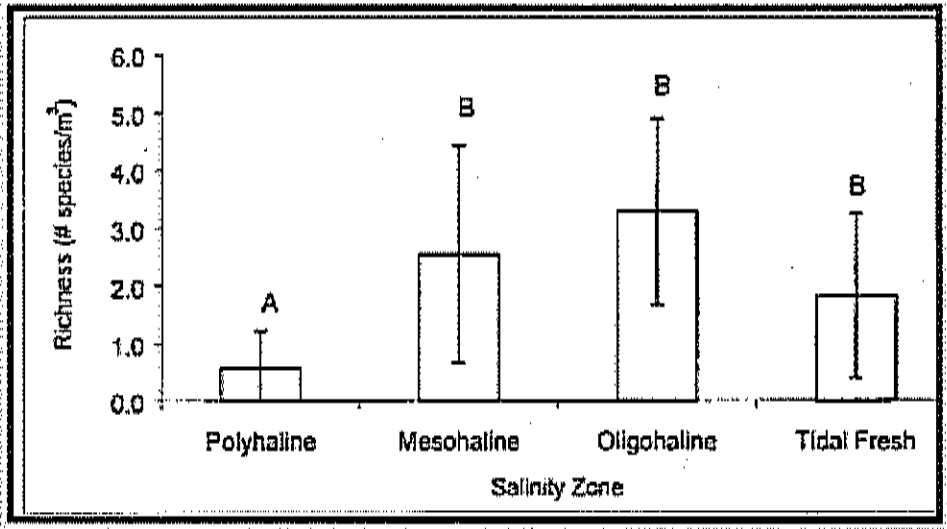
Tidal Freshwater (0-1 ppt); Oligohaline (1-5 ppt); Mesohaline (5-15 ppt); Polyhaline (> 15 ppt)

Figure 5. Mean fish density (± st. dev.) and species richness(± st. dev.) for ichthyoplankton surveys conducted in the four salinity zones from September 2000 to August 2001. Different letters denote means that were significantly different.

Fish Density and Species Richness Along Marsh Edge

Jennings and Weyers (Feb 2002) Annual Report
Temporal and Spatial Distribution of Estuarine-Dependant Species





Tidal Freshwater (0-1 ppt); Oligohaline (1-5 ppt); Mesohaline (5-15 ppt); Polyhaline (> 15 ppt)

Figure 9. Mean fish density (± st. dev.) and species richness (± st. dev.) for marsh-edge drop surveys conducted in the four salinity zones from October 2000 to September 2001. Different letters denote means that were significantly different.

Changes in Wetland Function as A Result of Marsh Conversion

(Wetland ICT Procedures: Greater Vegetative Diversity is Beneficial)

Elements of Wetland Function	Freshwater to Brackish Marsh (337 acres)	Saltmarsh to Brackish Marsh (730 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	Minor Beneficial

Changes in Wetland Function as A Result of Marsh Conversion

(Recent Corps Analysis: Salinity Shifts + Data and Literature Review)

Elements of Wetland Function	Freshwater to Brackish Marsh (337 acres)	Saltmarsh to Brackish Marsh (730 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

Indirect Impacts: Watershed Assessment to Identify Appropriate Mitigation Options

- Evaluated use of Mitigation Banks:
  - No mitigation banks with credits derived from tidal freshwater wetlands.
- Evaluated use of In Lieu Fee Program
- A perceived high risk of failure for created tidal freshwater wetland systems. USFWS determined not sustainable, and therefore, not viable alternative.

Watershed Approach to Identify Appropriate Mitigation: *Existing Watershed Plan*

- GA DNR-EPD's (2001) Savannah River Basin Management Plan

- Long-term priorities for Lower Savannah River Basin
  - ➢ *Preserving habitat suitable for the support of healthy aquatic and riparian ecosystems*

Watershed Approach: *Considerations*

- Identified 20+ considerations in revised EIS
  - Functional Assessment
  - Landscape position, resource type, location, inventory of resources
  - Growth/Land Use Conversion in Lower Savannah River Watershed
  - In SRE, Savannah National Wildlife Refuge (SNWR) is conservation area of national importance
  - Development adjacent to SNWR boundaries could directly/indirectly impact fish/wildlife habitat, wetlands, and water quality

Watershed Approach: *Information Needs*

- Evaluated Watershed Condition and Needs
  - Wetland ICT Coordination and identification of properties in F&W Coordination Act Report
  - Functional Assessment
  - Trends in habitat loss, cumulative impacts, development trends
    - ✓ Development within 5 miles of SNWR
    - ✓ Impaired Waters in Lower Savannah River Watershed and SNWR
  - Presence and needs of sensitive species

Watershed Approach: *Site Selection*

- Site must be suitable for providing the desired aquatic resource function
  - Comparative wetland analysis: wetland threats, fish and wildlife function, opportunities for mitigation, and long-term sustainability
  - Watershed scale features (aquatic habitat diversity and connectivity)
  - Size and location of compensatory mitigation relative to hydrologic resources.
  - Reasonably foreseeable effects the project will have on aquatic and terrestrial resources

SNWR

Existing Boundary and Acquisition Boundary and Proposed Mitigation Areas

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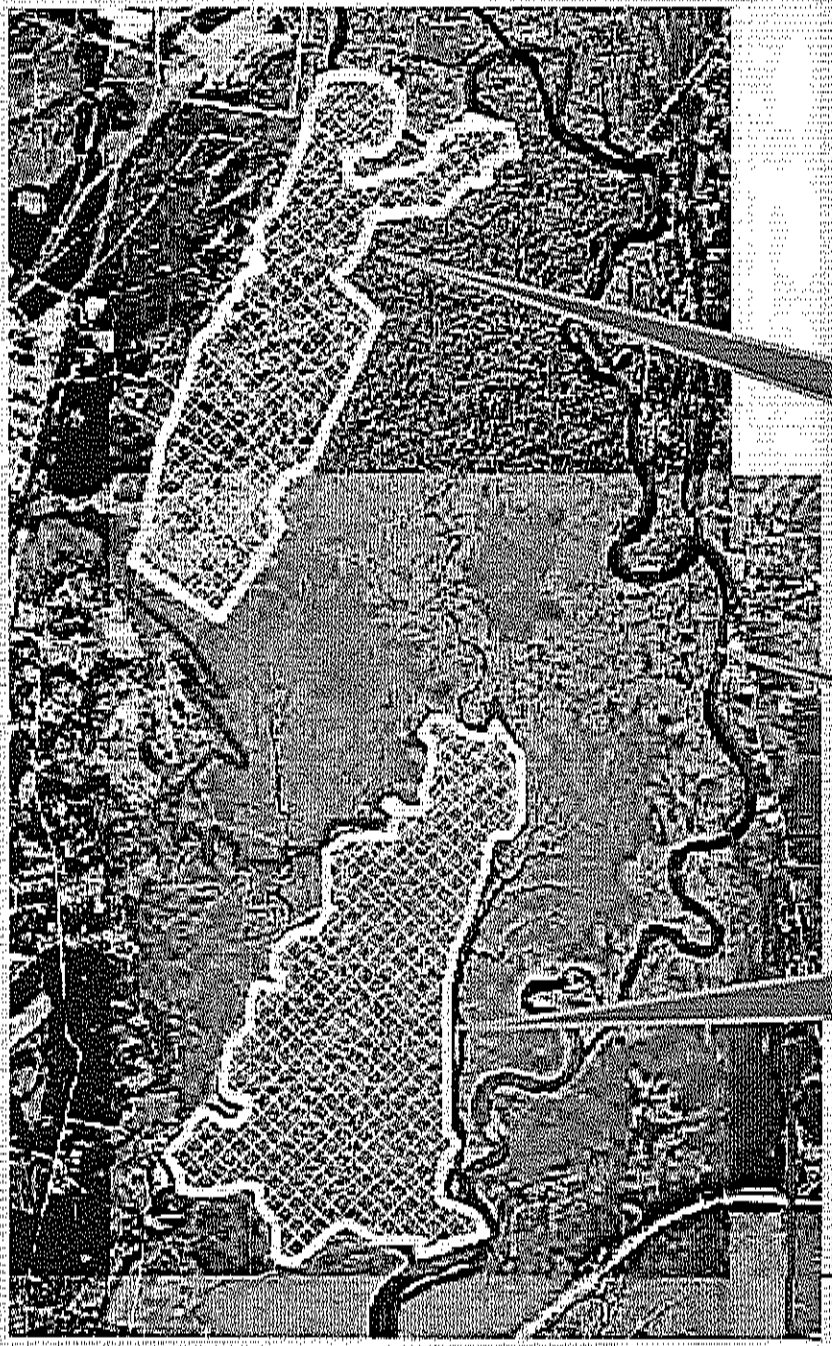
Preservation Sites

(Mitigation for Indirect Impacts)

2,683 acres for Preservation



Mill Creek Area
Tracts 36 a-d
(1,122 total acres)

Existing SNWR
Boundary
(Red Line)

Abercorn Island Area
Tract 40
(1,989 total acres)

Abercorn Island Area

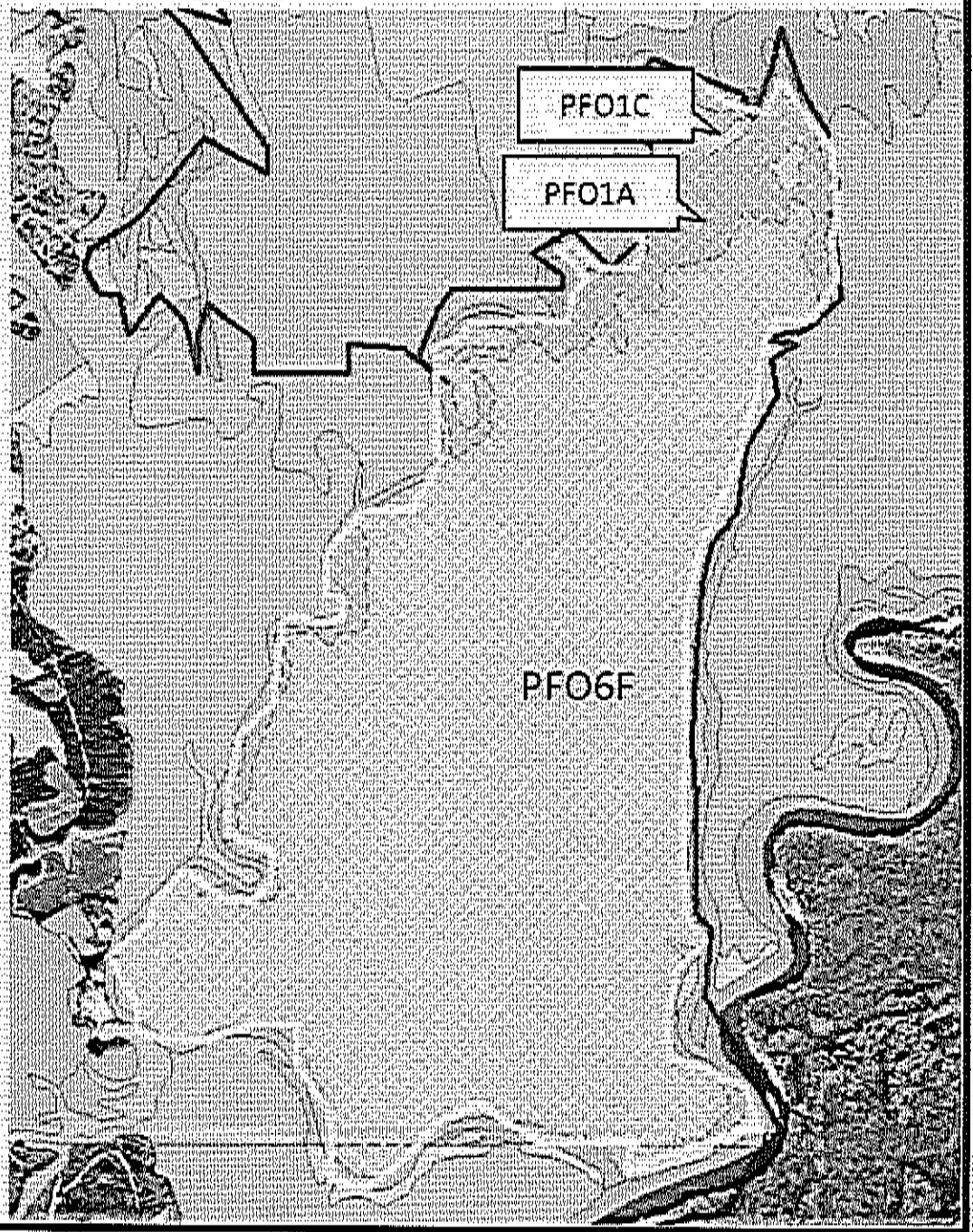
1,989 Acres of Wetland
0 acres of Upland

National Wetland Inventory GIS Layer –

Wetland Classifications For Abercorn Island Area:

PFO1A
PFO6F
PFO1C

Functional assessment of wetland preservation areas and detailed characterization of wetland types/habitats is located in Appendix C



Mill Creek Area

877 acres of Wetland
135 acres of Upland

National Wetland Inventory GIS Layer –

Wetland Classifications For Mill Creek Area:

- PFO1A
- PSS1A
- PFO1

Functional assessment of wetland preservation areas and detailed assessment of wetland types/habitats is located in Appendix C.

Watershed Approach: Mitigation Type and Amount

- Corps recent watershed evaluation and functional assessment confirmed that out-of-kind compensatory mitigation will serve aquatic resource needs of the watershed
- Wetland ICT agreed to use Savannah District SOP as a tool (i.e., suitable metric) to determine how much compensatory mitigation would be required
- Preservation of 2,683 acres is sufficient to replace the impacts to aquatic function that were previously discussed

SOP Worksheets

ADVERSE IMPACT WORKSHEET

		FRESHWATER MARSH	BRACKISH MARSH	SALT MARSH	
		---------- SALINITY ZONE ----------			
	RANGE	0 to 0.5	0.6 to 4.0	> 4.0	
Dominant Effect	2.0 to 0.5	0.5		0	
Duration of Effects	2.0 to 0.1	2		2	
Existing Condition	2.0 to 0.1	2		1.8	
Lost Kind	2.0 to 0.1	2		2	
Preventability	2.0 to 0	0.5		0.5	
Rarity	2.0 to 0.1	2		0.1	
Sum		9		6.4	
Impacted Acreage		337		730	
Impact Total		3033		4672	
TOTAL					7705

RESTORATION WORKSHEET

		FRESHWATER MARSH	BRACKISH MARSH	SALTMARSH	
		---------- SALINITY ZONE ----------			
	RANGE	0 to 0.5	0.6 to 4.0	> 4.0	
Net Improvement - Vegetation	0.1 to 1.4		1.4		
Net Improvement - Hydrology	0.1 to 1.4		0.9		
Credit Schedule	0 to 0.4		0.4		
Kind	0.2 to 0.6		0.6		
Maintenance	0 to 0.3		0.2		
Monitoring	0 to 0.4		0.2		
Control	0.1 to 0.5		0.5		
Sum			4.2		
Restored Acreage			1068		
Salinity Zone			0.6 to 4.0		
Restoration Total			4485.6		
TOTAL					4485.6

PRESERVATION WORKSHEET

	RANGE		
Threat	0 to 0.5	0.3	
Kind	0.2 to 0.6	0.4	
Control	0.1 to 0.5	0.5	
Sum		1.2	
Preservation Acreage		2683	Calculated to fulfill total credit need
Preservation Total		3219.4	From Restoration worksheet

SUMMARY WORKSHEET

Project Depth	48			
		Credits	Percent	Acres
Required Mitigation		7705		
Amount Provided by Restoration		4485.6	58	1068
Amount Provided by Preservation		3219.4	42	2683
	Total	7705		3751

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Responsible Parties and Timing

- The Corps would acquire 2,683 acres of land identified in the SNWR's Comprehensive Conservation Plan
- Provide the land to USFWS to manage as additions to the SNWR
- Properties would be acquired prior to or concurrent with the activity that results in conversion of wetland

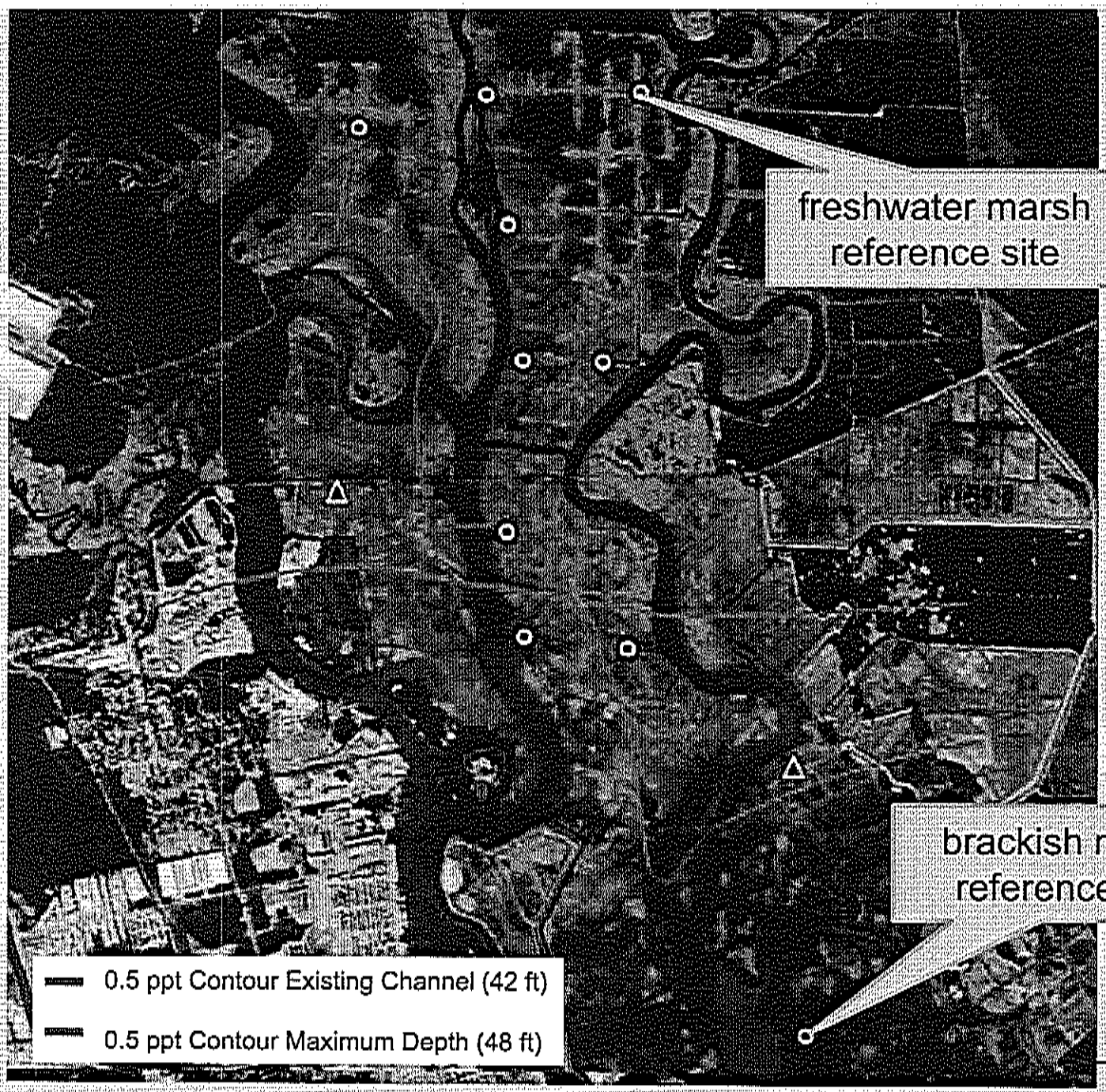
Protection and Long Term Management of Preservation Sites

- The 2,683 acres of Abercorn Island and Mill Creek become part of SNWR
- Managed by USFWS
- Lands would be subject to same protections and use requirements as defined in the National Wildlife Refuge System Improvement Act of 1977 and the SNWR's Comprehensive Conservation Plan

Monitoring Marsh Conversion Areas

- Establish 10 monitoring sites in areas subject to vegetative conversion.
- An upriver freshwater site and downriver brackish marsh site will be selected as reference sites
- Sample stations: record water surface elevation, specific conductance of surface waters and interstitial waters, and depth every 30 minutes (downloaded monthly).
- Twice annual vegetation counts - six transects per site (species and stem density)
- Monitor: 1 year pre-construction, 3-4 years during construction, and an additional 5 years post construction
- Wetland ICT provided with annual reports that document findings

Location of Monitoring Sites



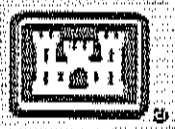
BUILDING STRONG®

Adaptive Management

- Monitoring of marsh sites:
  - Wetland ICT will be provided annual monitoring reports and consulted frequently for input and recommendations
  - If vegetative conversion extends beyond limits of monitoring, then will establish more sampling sites to determine margins of conversion
  - Additional wetland preservation will be acquired if model results are under predicted.

Summary for Direct Impacts

- Direct impacts to 15.68 acres of brackish marsh result in major adverse impact to all wetland functions
- Restoration of 28.75 acres of brackish marsh at DA 1S is appropriate mitigation and ratio is similar to regulatory projects requiring brackish/salt marsh mitigation
- Monitoring and adaptive management plans are sufficient to ensure "no net loss of aquatic resources"
- Wetland ICT will be active participants in all phases of site development, monitoring, adaptive management, etc.



Summary for Indirect Impacts

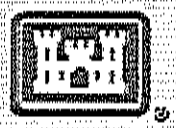
- Small changes in salinity relative to dynamics of freshwater, oligohaline and mesohaline systems in SRE
- A majority of the areas that experience vegetative shifts will still retain a percentage of pre-project vegetation
- Functional assessment for conversion of freshwater to brackish marsh resulted in negligible impacts to wetland functions with a minor adverse impact to fish and wildlife habitat.
- Functional assessment for conversion of salt marsh to brackish marsh resulted in negligible impacts to all wetland functions
- Mitigation options were considered using a watershed approach with consideration of impacts to wetland function

Summary for Indirect Impacts (Continued)

- Preservation of 2,683 acres of bottomland hardwood and emergent wetland adjacent to SNWR is adequate mitigation for impacts to fish and wildlife habitat
- Proposed monitoring of marsh areas susceptible to vegetative conversion is a long term commitment by Corps to ascertain effects associated with changes in salinity.
- Adaptive management plan Includes the purchase of additional properties to further benefit fish and wildlife habitat adjacent to SNWR.
- Wetland ICT will be active participants in all phases of plan review, monitoring, adaptive management, etc.

Final Compensatory Mitigation Rule and Wetland Impacts

- ✓ Functional assessment of impact sites and mitigation areas
- ✓ Watershed approach (considerations, information, site selection)
- ✓ Type and location of mitigation
- ✓ Responsible parties
- ✓ Timing
- ✓ Ecological Performance Standards
- ✓ Monitoring
- ✓ Adaptive Management
- ✓ Long term Management
- ✓ Financial Assurances and Protection



Next Steps

- Corps will respond to agency comments in Final EIS
- New information will be included in Final EIS
- Final EIS will receive agency and public review at end of 2011

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Susan N. Williams	SCDHEC	843-953-0232	Williasn@dhec.sc.gov

Bailey, William G SAS

From: Bailey, William G SAS
Sent: Friday, June 03, 2011 3:23 PM
To: 'Heather Preston'
Subject: Savannah Harbor Expansion Project: Wetland Interagency Coordination Team (UNCLASSIFIED)
Attachments: Appendix N Agency Coord.pdf

Classification: UNCLASSIFIED
Caveats: NONE

At Wednesday's meeting, you asked about records from previous meetings.

Here is the section of the DEIS that contained the records of those meetings. It includes the meetings of the Wetland Interagency Coordination Team.

You asked about how the recommendations and decisions were made, the Corps called and hosted the meetings, prepared the records, sent them to the participants who attended, and revised them to address the suggested revisions. We then sent the revised documents out as the final Memorandum For Record of the meeting.

For the various Interagency Coordination Teams, the Corps asked each agency to designate a representative who would speak for them and represent them on the team. We invited all the designated members to the meetings. Not everyone was able to attend every meeting. With retirements and staff turnover, the membership changed over time. It appears that information was not passed along well within each agency. (Our record-keeping here is certainly not the best.) That worked against us as we encountered problems and the study duration extended.

BB

Classification: UNCLASSIFIED
Caveats: NONE

Bailey, William G SAS

From: Bailey, William G SAS
Sent: Tuesday, June 07, 2011 4:42 PM
To: 'beckhajc@dhec.sc.gov'; 'Heather Preston'; 'Blair N. Williams'; 'Barbara Neale'; 'Kelie Moore'; 'Dale Caldwell'; 'Keith_Parsons@mail.dnr.state.ga.us'; 'Elizabeth Booth'; 'Bob Lord (Lord.Bob@epa.gov)'; 'Mueller, Heinz J.'; 'Gagliano.Paul@epamail.epa.gov'; 'Godfrey.Annie@epamail.epa.gov'; 'Derby.Jennifer@epamail.epa.gov'; 'Melville.William@epamail.epa.gov'; 'joyce_stanley@ios.doi.gov'; 'Chuck_Hayes@fws.gov'; 'Bill Wikoff'; 'Jane_Griess@fws.gov'; 'wendtp@dnr.sc.gov'; 'Bob Perry'; 'kay.davy@noaa.gov'
Cc: 'Wade Cantrell'; 'hmoorer@gaports.com'; 'Jeff_Larson@dnr.state.ga.us'; 'Brad_Gane@dnr.state.ga.us'; 'Tim Barrett'; Okane, Jason D SAS; Bradley, Kenneth P SAM; McIntosh, Margarett (Mackie) SAS; King, Jeffrey K. SAS; Small, Daniel L SAD; Lampley, Vechere V SAD; 'Pace Wilber'; 'David Bernhart'; 'Jack_Arnold@fws.gov'; 'Mark_Musaus@fws.gov'; 'Sandy_Tucker@fws.gov'; 'Mancusi-Ungaro.Philip@epamail.epa.gov'; 'Gregory_Hogue@ios.doi.gov'; 'Rheta Geddings DiNovo'
Subject: Savannah Harbor Expansion Project: Draft MFR of 1 June Wetlands Interagency Coordination Team meeting (UNCLASSIFIED)
Attachments: 2011-06-07 Wetlands ICT Meeting MFR.DOCX

Classification: UNCLASSIFIED
Caveats: NONE

I've attached our draft Memorandum For Record of last week's meeting.

Please send Mackie McIntosh any suggested revisions or corrections by COB 17 June.

Bill Bailey

-----Original Message-----
From: Bailey, William G SAS
Sent: Friday, June 03, 2011 3:07 PM
To: 'beckhajc@dhec.sc.gov'; 'Blair N. Williams'; 'Kelie Moore'; 'Dale Caldwell'; 'Keith_Parsons@mail.dnr.state.ga.us'; 'Bob Lord (Lord.Bob@epa.gov)'; 'Mueller, Heinz J.'; 'Bill Wikoff'; 'wendtp@dnr.sc.gov'; 'Bob Perry'; 'kay.davy@noaa.gov'
Cc: 'Wade Cantrell'; 'Chuck_Hayes@fws.gov'; 'hmoorer@gaports.com'; 'Jeff_Larson@dnr.state.ga.us'; 'Brad_Gane@dnr.state.ga.us'; 'Tim Barrett'; Okane, Jason D SAS; Bradley, Kenneth P SAM; McIntosh, Margarett (Mackie) SAS; King, Jeffrey K. SAS; Small, Daniel L SAD; Lampley, Vechere V SAD; 'Pace Wilber'; 'David Bernhart'; 'Jack_Arnold@fws.gov'; 'Mark_Musaus@fws.gov'; 'Sandy_Tucker@fws.gov'; 'Jane_Griess@fws.gov'; 'Gagliano.Paul@epamail.epa.gov'; 'Godfrey.Annie@epamail.epa.gov'; 'Derby.Jennifer@epamail.epa.gov'; 'Melville.William@epamail.epa.gov'; 'Mancusi-Ungaro.Philip@epamail.epa.gov'; 'Gregory_Hogue@ios.doi.gov'; 'joyce_stanley@ios.doi.gov'; 'Rheta Geddings DiNovo'; 'Barbara Neale'; 'Heather Preston'
Subject: Savannah Harbor Expansion Project: Wetlands Interagency Coordination Team meeting (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

I've attached the presentation we gave at this Wednesday's meeting and the sign-in sheet.

Thank you all for attending.

We are adding some of the figures that had in the presentation to our write-up for the FEIS. We expect to complete that and send it out to you by the end of next week.

Bill Bailey
Chief, Planning Division

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

CESAS-PD **7 June 2011**

MEMORANDUM FOR RECORD

SUBJECT: Savannah Harbor Expansion Project (SHEP) Wetlands Interagency Coordination Team (ICT) Meeting Summary

1. In response to a request from the Environmental Protection Agency (EPA) in their comments on the SHEP Draft Environmental Impact Statement (EIS), the US Army Corps of Engineers, Savannah District (USACE) called a meeting of the SHEP Wetlands Interagency Coordination Team. The meeting was held on 1 June 2011 in Atlanta, Georgia at the EPA Region 4 office and attended by representatives from the following agencies: USACE; EPA; US Fish and Wildlife Service (USFWS); US Department of the Interior; Georgia Department of Natural Resources, Environmental Protection Division (GA DNR-EPD); Georgia Department of Natural Resources, Coastal Resources Division (GA DNR-CRD); South Carolina Department of Health and Environmental Control (SC DHEC); and SC DHEC Office of Coastal Resource Management (SC DHEC-OCRM).

2. The meeting began with Mr. William Bailey (USACE) and Mr. Heinz Mueller (EPA) welcoming the group, introductions of meeting attendees, and a brief overview of the meeting objectives. Mr. Bailey then presented an overview of the project history and summaries of past meetings of the Wetlands ICT. The review included the 2003 determination that tidal freshwater vegetative communities are the most critical wetland community in the Savannah River estuarine ecosystem. He reviewed the development of the salinity criteria that the Corps used to predict and evaluate impacts from harbor deepening and summarized attempts to develop and use Marsh Succession Models to predict marsh impacts, rather than using in-river salinity predictions. Mr. Bailey concluded his presentation with a summary of the most recent Wetlands ICT meeting in August 2009, a site visit to a proposed restoration site at Disposal Area 1S.

3. Dr. Jeff King continued the presentation with technical information on the project's wetland analyses and both the direct and indirect impacts to wetlands that are expected to occur as a result of harbor deepening. Dr. King indicated that the Final EIS would include a more rigorous discussion of the functional assessment analysis the Corps conducted to address EPA's concerns regarding consistency with the 2008 EPA/US Army Corps of Engineers Mitigation Rule. He began his presentation with a discussion of the direct impacts, where wetlands would be lost through excavation during harbor deepening. He showed pictures of vegetation at the various impact sites. He also presented the mitigation plan proposed for those impacts – grading down most of Disposal Area 1S to allow the site to restore to brackish marsh.

4. Dr. King then presented technical information on the project's indirect impacts to wetlands. This included information from wetland studies within the harbor and scientific journal articles that discussed the relationship between observed salinities and vegetative species occurrence, diversity, and function. He compared the nomenclature used in scientific literature to distinguish between the vegetative communities with that previously recommended by the Wetlands ICT and used by the Corps for the SHEP analyses. Based on the expected project change in marsh

salinities of +/– 2 parts per thousand, Dr. King summarized that the vegetative conversion would not be a major one and would have a negligible or minor adverse effect on overall wetland function. He identified fish and wildlife habitat as the single wetland function that could change as a result of the expected changes in salinity.

5. After summarizing the expected indirect impacts to wetlands, Dr. King then presented the mitigation plan presented in the Draft EIS to compensate for the expected impacts. He included the District's watershed assessment to identify appropriate mitigation options and all its associated considerations. He showed maps identifying the potential sites for habitat preservation (the chosen mitigation alternative) and the Standard Operating Procedure (SOP) Worksheets that were used as a tool to help assess the preservation acreage requirements for the proposed action. He concluded the presentation with a brief overview of the proposed monitoring network, the adaptive management process that could be implemented should the vegetative conversion exceed that which is expected, and a summary of all the information presented.

6. The group discussion focused on the application of the SOP worksheets to the harbor deepening and the values of certain parameters used in the calculations. The group did not agree that the values applied were consistent, namely the Dominant Effect, Control, and Threat. The group discussed the impacts of the expected vegetative conversion and if there were better tools that could be used to quantify the level of acceptable mitigation for that expected wetland conversion. No other tools or methods were suggested. Mr. Bailey stated that members of the Wetlands ICT had previously recommended using the Savannah SOP as a quantification tool. The worksheets were included in the Draft EIS and the Draft Fish and Wildlife Coordination Act Report (FWCAR). Mr. Bailey also noted that the resource agencies had not expressed concern with the SOP values in their official comments on the Draft EIS or the FWCAR. A portion of the discussion focused on the historical landscape and its value in determining the appropriate mitigation strategy. SC DHEC stated that saltmarsh is ecologically valuable and losses of that community need to be mitigated. The USFWS indicated that while saltmarsh is a valuable vegetative community, the Savannah National Wildlife Refuge (SWNR) was historically tidal freshwater marsh, a unique habitat that had been adversely impacted by higher salinity levels and replaced over time, and is therefore a priority in this estuary because of the historic adverse cumulative impacts. USFWS also indicated that the parcels proposed by the Corps for habitat preservation are not necessarily their present top priority for parcels to add to the SNWR. Ms. Jane Griess (USFWS) indicated that the SNWR prioritizes acquisition of the "Exley" and "Del-a-Rae" parcels over the proposed "Mill Creek" parcel. The Corps said it was open to substituting parcels that provided similar of better habitats then those identified in the Draft EIS.

7. The group discussed the desire of some agencies to re-designate their official member of the Wetlands ICT, as a number of the original members have retired or are no longer involved with the project. The group agreed that the Wetlands ICT should be actively involved with the monitoring (particularly the post-construction monitoring), to identify the need for adaptive

management, and enact any agreed measures in a timely fashion. The group also discussed the proposed length of the post-construction monitoring period. Mr. Bailey acknowledged that the natural resource agencies had requested a longer monitoring period and that USACE was internally discussing extending the period beyond the five years stated in the Draft EIS.

8. At the conclusion of the meeting, Mr. Mueller thanked the USACE personnel for presenting the information. Mr. Bailey and Mr. Mueller thanked everyone for attending, and the meeting was adjourned.

Encl

MARGARETT G. McINTOSH
Planning Division

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CESAS-PD **4 August 2011**

MEMORANDUM FOR RECORD

SUBJECT: Savannah Harbor Expansion Project (SHEP) Wetlands Interagency Coordination Team (ICT) Meeting Summary

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6. The group discussion focused on the application of the SOP worksheets to the harbor deepening and the values of certain parameters used in the calculations. The group did not agree that the values applied were consistent, namely the Dominant Effect, Control, and Threat. A dominant effect level of 0 was used in the SOP calculation sheets to determine the required credits for the salinity change in the saltmarsh. It was discussed that this is not consistent with using the highest net improvement value of 1.4 to calculate the restoration credits. The group also discussed whether or not it is appropriate to apply a high threat level value of 0.3 to the preservation areas. In addition, there was also disagreement concerning the highest control value of 0.5 for the restoration areas, and whether or not the lack of a preservation mechanism is consistent with the new mitigation rule. The group also discussed the impacts of the expected vegetative conversion and if there were better tools that could be used to quantify the level of acceptable mitigation for that expected wetland conversion. No other tools or methods were suggested. Mr. Bailey stated that members of the Wetlands ICT had previously recommended using the Savannah SOP as a quantification tool. The worksheets were included in the Draft EIS and the Draft Fish and Wildlife Coordination Act Report (FWCAR). A portion of the discussion focused on the historical landscape and its value in determining the appropriate mitigation strategy. SC DHEC stated that saltmarsh is ecologically valuable and losses of that community need to be mitigated. The USFWS indicated that while saltmarsh is a valuable vegetative community, the Savannah National Wildlife Refuge (SWNR) was historically tidal freshwater marsh, a unique habitat that had been adversely impacted by higher salinity levels and replaced over time, and is therefore a priority in this estuary because of the historic adverse cumulative impacts. USFWS also indicated that the parcels proposed by the Corps for habitat preservation are not necessarily their present top priority for parcels to add to the SNWR. Ms. Jane Griess (USFWS) indicated that the SNWR prioritizes acquisition of the "Exley" and "Del-a-Rae" parcels over the proposed "Mill Creek" parcel. The Corps said it was open to substituting parcels that provided similar of better habitats then those identified in the Draft EIS.

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Planning Division

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~~BLAIR~~ N. Williams	SCDHEC	843-953-0232	williahn@dhec.sc.gov

Bailey, William G SAS

From: Bailey, William G SAS
Sent: Wednesday, June 08, 2011 4:00 PM
To: 'beckhajc@dhec.sc.gov'; 'Heather Preston'; 'Blair N. Williams'; 'Barbara Neale'; 'Kelie Moore'; 'Dale Caldwell'; 'Keith_Parsons@mail.dnr.state.ga.us'; 'Elizabeth Booth'; 'Bob Lord (Lord.Bob@epa.gov)'; 'Mueller, Heinz J.'; 'Gagliano.Paul@epamail.epa.gov'; 'Godfrey.Annie@epamail.epa.gov'; 'Derby.Jennifer@epamail.epa.gov'; 'Melville.William@epamail.epa.gov'; 'joyce_stanley@ios.doi.gov'; 'Chuck_Hayes@fws.gov'; 'Bill Wikoff'; 'Jane_Griess@fws.gov'; 'wendtp@dnr.sc.gov'; 'Bob Perry'; 'kay.davy@noaa.gov'
Cc: 'Wade Cantrell'; 'hmoorer@gaports.com'; 'Jeff_Larson@dnr.state.ga.us'; 'Brad_Gane@dnr.state.ga.us'; 'Tim Barrett'; 'Jennifer Welte'; Okane, Jason D SAS; Bradley, Kenneth P SAM; McIntosh, Margarett (Mackie) SAS; King, Jeffrey K. SAS; Small, Daniel L SAD; Lampley, Vechere V SAD; 'Pace Wilber'; 'David Bernhart'; 'Jack_Arnold@fws.gov'; 'Mark_Musaus@fws.gov'; 'Sandy_Tucker@fws.gov'; 'Mancusi-Ungaro.Philip@epamail.epa.gov'; 'Gregory_Hogue@ios.doi.gov'; 'Rheta Geddings DiNovo'
Subject: Savannah Harbor Expansion Project: 1 June Wetlands Interagency Coordination Team meeting (UNCLASSIFIED)
Attachments: VII Consideration of Final Mitigation Rule.docx

Classification: UNCLASSIFIED
Caveats: NONE

We added some of the figures we used in the presentation to the write-up that we are developing for the FEIS.

This write-up is still subject to revision, but it is our most recent version of how the mitigation plan complies with the Mitigation Rule.

Bill Bailey

-----Original Message-----
From: Bailey, William G SAS
Sent: Tuesday, June 07, 2011 4:42 PM
To: 'beckhajc@dhec.sc.gov'; 'Heather Preston'; 'Blair N. Williams'; 'Barbara Neale'; 'Kelie Moore'; 'Dale Caldwell'; 'Keith_Parsons@mail.dnr.state.ga.us'; 'Elizabeth Booth'; 'Bob Lord (Lord.Bob@epa.gov)'; 'Mueller, Heinz J.'; 'Gagliano.Paul@epamail.epa.gov'; 'Godfrey.Annie@epamail.epa.gov'; 'Derby.Jennifer@epamail.epa.gov'; 'Melville.William@epamail.epa.gov'; 'joyce_stanley@ios.doi.gov'; 'Chuck_Hayes@fws.gov'; 'Bill Wikoff'; 'Jane_Griess@fws.gov'; 'wendtp@dnr.sc.gov'; 'Bob Perry'; 'kay.davy@noaa.gov'
Cc: 'Wade Cantrell'; 'hmoorer@gaports.com'; 'Jeff_Larson@dnr.state.ga.us'; 'Brad_Gane@dnr.state.ga.us'; 'Tim Barrett'; Okane, Jason D SAS; Bradley, Kenneth P SAM; McIntosh, Margarett (Mackie) SAS; King, Jeffrey K. SAS; Small, Daniel L SAD; Lampley, Vechere V SAD; 'Pace Wilber'; 'David Bernhart'; 'Jack_Arnold@fws.gov'; 'Mark_Musaus@fws.gov'; 'Sandy_Tucker@fws.gov'; 'Mancusi-Ungaro.Philip@epamail.epa.gov'; 'Gregory_Hogue@ios.doi.gov'; 'Rheta Geddings DiNovo'
Subject: Savannah Harbor Expansion Project: Draft MFR of 1 June Wetlands Interagency Coordination Team meeting (UNCLASSIFIED)

I've attached our draft Memorandum For Record of last week's meeting.

Please send Mackie McIntosh any suggested revisions or corrections by COB 17 June.

Bill Bailey

-----Original Message-----
From: Bailey, William G SAS
Sent: Friday, June 03, 2011 3:07 PM
To: 'beckhajc@dhec.sc.gov'; 'Blair N. Williams'; 'Kelie Moore'; 'Dale Caldwell'; 'Keith_Parsons@mail.dnr.state.ga.us'; 'Bob Lord (Lord.Bob@epa.gov)'; 'Mueller, Heinz J.'; 'Bill Wikoff'; 'wendtp@dnr.sc.gov'; 'Bob Perry'; 'kay.davy@noaa.gov'
Cc: 'Wade Cantrell'; 'Chuck_Hayes@fws.gov'; 'hmoorer@gaports.com'; 'Jeff_Larson@dnr.state.ga.us'; 'Brad_Gane@dnr.state.ga.us'; 'Tim Barrett'; Okane, Jason D SAS; Bradley, Kenneth P SAM; McIntosh, Margarett (Mackie) SAS; King, Jeffrey K. SAS; Small, Daniel L SAD; Lampley, Vechere V SAD; 'Pace Wilber'; 'David Bernhart'; 'Jack_Arnold@fws.gov'; 'Mark_Musaus@fws.gov'; 'Sandy_Tucker@fws.gov'; 'Jane_Griess@fws.gov'; 'Gagliano.Paul@epamail.epa.gov'; 'Godfrey.Annie@epamail.epa.gov'; 'Derby.Jennifer@epamail.epa.gov'; 'Melville.William@epamail.epa.gov'; 'Mancusi-Ungaro.Philip@epamail.epa.gov'; 'Gregory_Hogue@ios.doi.gov'; 'joyce_stanley@ios.doi.gov'; 'Rheta Geddings DiNovo'; 'Barbara Neale'; 'Heather Preston'
Subject: Savannah Harbor Expansion Project: Wetlands Interagency Coordination Team meeting (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

I've attached the presentation we gave at this Wednesday's meeting and the sign-in sheet.

Thank you all for attending.

We are adding some of the figures that had in the presentation to our write-up for the FEIS. We expect to complete that and send it out to you by the end of next week.

Bill Bailey
Chief, Planning Division

Classification: UNCLASSIFIED
Caveats: NONE

D H E C
PROMOTE PROTECT PROSPER

Promoting and protecting the health of the public and the environment

June 16, 2011

William Bailey
US Army Corps of Engineers, Savannah District
100 West Oglethorpe Avenue
Savannah, Georgia 31401

Re: P/N 2010 SHEP; Savannah Harbor Expansion Project (SHEP); Water Quality Certification

Dear Mr. Bailey:

The South Carolina Department of Health and Environmental Control (Department) sent a letter on March 3, 2011, outlining our concerns about the above referenced project. This letter also requested additional information that must be received to complete the water quality certification process. Subsequent to this letter, the Department received your response dated April 1, 2011, and attended several meetings to discuss the proposed project. After reviewing the additional information obtained in your response letter and at the meetings, the Department continues to have concerns about the project.

As discussed in the meeting held on May 12, 2011, the Department is concerned about the ability of the Speece Cones to adequately oxygenate the shallow water areas of the Back River. The Department is also concerned that the models used by the Corps do not adequately simulate flows in the Back and Middle Rivers. The Department has been working with the Corps to determine what information will be needed to address these concerns. The Corps is currently working with a contractor to develop a report to evaluate the applicability of the oxygen injection system in the shallow water areas of the Back River. The Corps is also working with the contractor to acquire updated modeling data to compare the Corps' hydrodynamic and water quality model with the Environmental Protection Agency's (EPA) revised TMDL model. The Department will require that these reports be submitted with adequate time for review prior to any decision on the Water Quality Certification.

The wetland impacts from the project and the proposed mitigation continue to be a concern of the Department. The project will substantially alter the wetlands located in the lower Savannah River estuary. Section F.(5)(a) of Regulation 61-101, Water Quality Certification, states that certification will be denied if the proposed activity alters the ecosystem in the vicinity of the project such that its functions and values are eliminated or impaired. In order to comply with the provisions in Section F of Regulation 61-101, the Department must require appropriate mitigation to ensure that functions and values in the ecosystem will be protected. Early in the development phase of this project, an Interagency Coordination Team (ICT) was established to assist in evaluating the wetland impacts and mitigation. The results of this interagency coordination lead to the mitigation proposal included in the permit application. The plan places an emphasis on minimizing the loss of freshwater tidally influenced wetlands, because these wetlands have historically been altered by past projects.

A meeting to discuss the wetland impacts and mitigation was held on June 1, 2011, in Atlanta Georgia. The exhibits presented during the meeting show significant areas of salt marsh impacts in South Carolina waters. The Corps used the Savannah District Standard Operating Procedures (SOP) as a tool to quantify the impacts and determine appropriate compensation for the salinity conversion. The reduction

in salinity will cause a vegetative shift by converting the dominant salt marsh plant species to a vegetative community dominated by more brackish species. While the Department has no objection to using the SOP to quantify the impacts from the change in salinity, the Department is concerned about the way some of the factors in the SOP were applied.

During the June 1st meeting, the Corps presented a substantial amount of scientific research to show that the reduced salinity in the salt marsh areas would have a minor effect on the vegetative community in the ecosystem. Since this change will be minimal, a dominant effect level of 0 was used in the SOP calculation sheets to determine the required credits for the salinity change in the salt marsh. Then the Corps used the highest level (1.4) for the net improvement factor to determine that 4,485.6 credits will generated by the restoration of 1,068 acres of brackish marsh. The high net improvement value is not consistent with the low dominant effect level. Furthermore, the area proposed for restoration is comprised of the same wetlands where the impacts will occur. The Corps agrees that the vegetative shift from the salinity conversion is an impact and is proposing to take restoration credit for these impacts. The Department is concerned about the precedent set by allowing the Corps to take restoration credit for wetlands that are included in the project impacts.

Another concern about the restoration component of the mitigation plan is the level of control for 1,068 acres of brackish marsh. The Corps has acknowledged that the restoration area will be preserved as wetlands included as part of the public trust. This level of control is not appropriate because many of the wetlands impacted by this project currently exist as part of the public trust. There is no mechanism to preclude impacts to these wetlands from any future harbor deepening. In order to generate mitigation credits, the restored wetlands must be preserved with a mechanism to ensure that these wetlands will be protected in perpetuity.

The approach to mitigation used by the Corps does not offset all of the project impacts since no mitigation is provided for the impacts to 730 acres of salt marsh for the 48' deepening. This plan diminishes the ecological value of salt marsh, while placing an arbitrarily elevated value to the creation of brackish marsh. Even though the vegetative shift that will occur from the change in salinity is minimal, there will be some loss to the habitat functions within the large area of converted salt marsh. This plan may have been acceptable when discussed in the early meetings of the ICT, but it is not consistent with the state's regulatory obligation to protect existing uses in the ecosystem. The plan does not meet the requirements of Regulation 61-101, since no reasonable assurance is given that the project will not eliminate or impair functions within the ecosystem.

Another regulatory obligation of the Department is to receive and acknowledge comments in response to a public notice for a water quality certification. Several comment letters were received during the public comment period. The Department received letters from resource agencies, such as the South Carolina Department of Natural Resources, and from non-governmental organizations including the Southern Environmental Law Center. These letters identified a variety of concerns about the project. The Department is requesting a response to these comment letters. The letters were addressed to the Corps and you should have received copies. If not, please let the Department know and we will forward you a copy each letter.

In our March 3rd letter the Department discussed our concern about the project's potential impacts to endangered and threatened species. Since that time, we received a copy of a letter dated April 28, 2011, from the United States Fish and Wildlife Service (USFWS). This letter gave concurrence on the Biological Assessment of Threatened and Endangered Species (BATES) included as Appendix B in the draft EIS. Some of the endangered species that might be affected by this project fall under the responsibility of the National Marine Fisheries Service (NMFS). It is our understanding that the Corps is

currently in consultation with NMFS. Regulation 61-101 states in Section 5(c) that certification will be denied if the project adversely impacts waters containing State or Federally recognized rare, threatened, or endangered species. To assure that the project complies with the Section 5(c) of the regulation, the Department will need to get concurrence from NMFS prior to making a certification decision.

As stated previously, the Department has several remaining concerns that need to be addressed before we can render a decision on the 401 Water Quality Certification. We appreciate the Corps' continued effort to resolve these concerns and we will continue to work with you through the certification process. Pursuant to Regulation 61-30, and Regulation 61-101, the Department has 180 days to complete action on an application for 401 Water Quality Certification. These 180 days include only those days in which the Department is actively reviewing the application; the clock stops when information is requested and the Department is waiting on a response. Since the Department has agreed to waive the fee for this project, the 180-day clock pursuant to Regulation 61-30 is not applicable. The 180-day clock pursuant to Regulation 61-101 will not start until all of the subsequent information is received. It should be noted that the Department must issue, waive, or deny a decision on a federal permit within one of acceptance of a complete application, so we would appreciate a timely response to this information request. Should you have any questions, you may call me at (803) 898-4261 or you may e-mail beckhajc@dhec.sc.gov.

Sincerely,

Chris Beckham, Project Manager
Water Quality Certification & Wetlands Section

Cc: Blair Williams, OCRM

Bailey, William G SAS

From: Bailey, William G SAS
Sent: Wednesday, July 13, 2011 11:23 AM
To: 'Beckham, J. Christopher'
Subject: RE: Savannah Harbor Expansion Project: draft responses to comments 3 of 3 (UNCLASSIFIED)
Attachments: 2011-07-13 SELC Comments for DHEC.PDF

Classification: UNCLASSIFIED
Caveats: NONE

From: Bailey, William G SAS
Sent: Wednesday, July 13, 2011 11:21 AM
To: 'Beckham, J. Christopher'
Subject: RE: Savannah Harbor Expansion Project: draft responses to comments 2 of 3 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

From: Bailey, William G SAS
Sent: Wednesday, July 13, 2011 11:20 AM
To: 'Beckham, J. Christopher'
Subject: Savannah Harbor Expansion Project: draft responses to comments 1 of 3 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

We've completed our draft responses to these letters. I'll send each in separate emails because of their size.

We are still coordinating these responses within our agency, so please treat them as being pre-decisional and not public information at this time.

Bill Bailey

From: Beckham, J. Christopher [mailto:beckhajc@dhec.sc.gov]
Sent: Wednesday, June 29, 2011 1:40 PM
To: Bailey, William G SAS
Subject: Re: Savannah Harbor Expansion Project: SCDHEC 16 June letter on water quality certification (UNCLASSIFIED)

Bill,

The comment letters for which we would like a response are:

The Southern Environmental Law Center, January 25, 2011

SC Dept. of Natural Resources, January 25, 2011

US EPA, January 28, 2011

Those three are the only comment letters that I received. If you need anything else, let me know.

Chris

On Mon, Jun 27, 2011 at 7:40 AM, Beckham, J. Christopher <beckhajc@dhec.sc.gov> wrote:
Bill,

That won't be a problem. I will be out of the office all day today, but I will send you a list when I come in tomorrow.

Chris

On Fri, Jun 24, 2011 at 10:46 AM, Bailey, William G SAS <William.G.Bailey@usace.army.mil> wrote:

Classification: UNCLASSIFIED

Caveats: NONE

We received your recent letter (attached). In it, you mention wanting our responses for letters that you received during the public comment period concerning water quality.

To be certain we provide the information you are looking for, could you send me a list with the commentor name and date of the letter for which you would like our response?

Thank you.

BB

From: Moore, Monica R SAS
Sent: Friday, June 24, 2011 9:22 AM
To: Bailey, William G SAS
Subject: SHEP SCDHEC 16 June Letter on water quality cert

Classification: UNCLASSIFIED

Caveats: NONE

<<Letter PN 2010 SHEP Water Quality cert>>

Classification: UNCLASSIFIED

Caveats: NONE

Classification: UNCLASSIFIED

Caveats: NONE

--
Chris Beckham, Project Manager
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--
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Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Bailey, William G SAS

From: Bailey, William G SAS
nt: Wednesday, July 27, 2011 1:56 PM
: 'Beckham, J. Christopher'
Cc: 'Wade Cantrell'; Okane, Jason D SAS; McIntosh, Margarett (Mackie) SAS; Hoke, Joseph T SAS
Subject: Savannah Harbor Expansion Project -- Re-evaluation of Back River D.O. system (UNCLASSIFIED)
Attachments: FINAL Report - Back River Oxygen Injection July 26, 2011.pdf

Classification: UNCLASSIFIED
Caveats: NONE

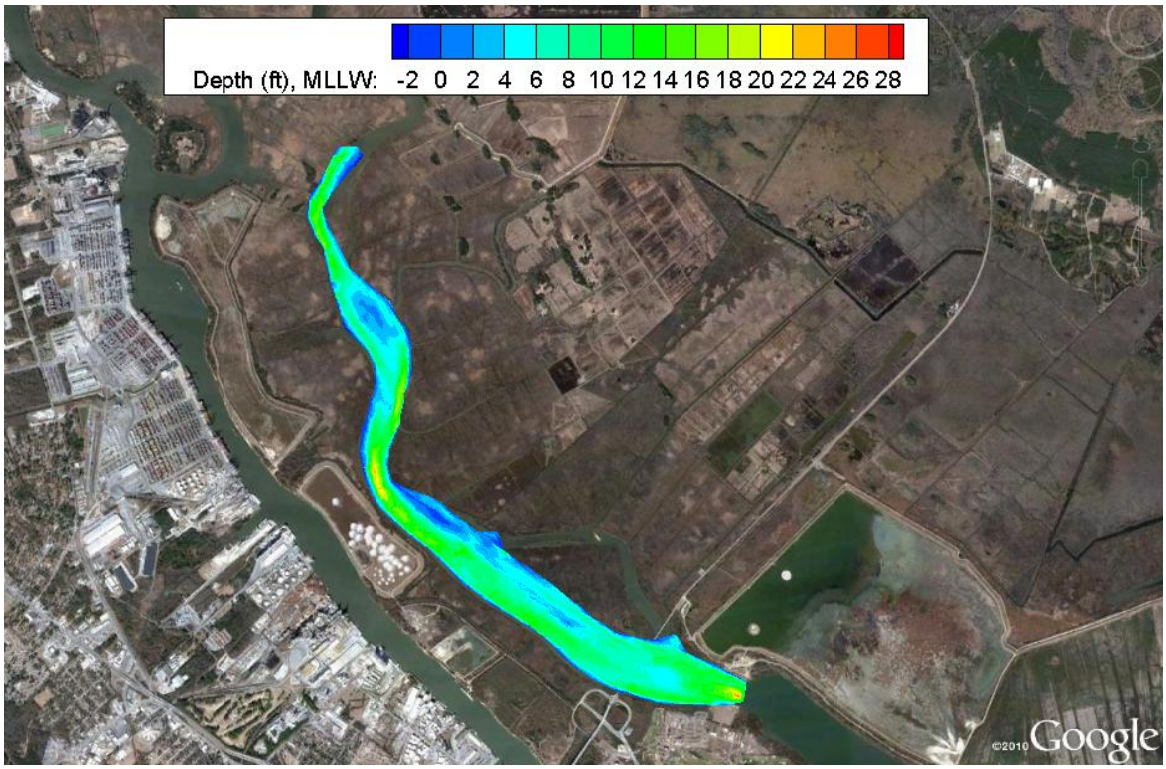
You had requested we re-evaluate the effectiveness of the oxygen injection system that the Corps proposes for Back River. We consulted with Wade to better understand the Department's concerns prior to initiating the work.

Our contractor has completed the work and we provide the attached report for your review. We believe it fully addresses your concerns about this issue.

Bill Bailey

Classification: UNCLASSIFIED
Caveats: NONE

Analysis of Oxygen Injection in the Back River in Support of the Savannah Harbor Expansion Project



PREPARED BY:

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PREPARED FOR:

US Army Corps of Engineers

USACE Savannah District
100 West Oglethorpe Ave
Savannah, Georgia 31401
Contract No: W912HN-09-R-0081
Work Order DQ02 (SEPI Contract)

July 26, 2011

Acknowledgements

Mr. Joe Hoke contributed to this report and coordinated efforts with the contractor team and the Savannah District. The District surveying team collected the bathymetric data through a hydrographic survey in June 2011. Mr. Wade Cantrell from the South Carolina Department of Health and Environmental Control (DHEC) assisted in the scope of this work. Mr. David Clidence and Dr. Richard Speece from ECO2 developed the first parts of this report by describing the physical nature of the oxygen injection system. Mr. Steven Davie was the project manager from Tetra Tech and was supported by Dr. Hugo Rodriguez, Dr. Yuri Plis, Mr. Jim Greenfield, and Mr. Christian Maiocco from Tetra Tech. Mr. Phillip Todd was the project manager for SEPI.

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Appendix A – Diffuser Options

1. Background

This report will answer specific questions from the South Carolina Department of Health and Environmental Control (DHEC) about the oxygen injection systems in the Savannah Harbor, specifically the shallower Back River. The USACE Savannah District met with South Carolina DHEC on 12 May 2011 to discuss the Savannah Harbor Expansion Project and South Carolina DHEC expressed concerns about how well the proposed Dissolved Oxygen (D.O.) systems would function in the shallower Back River. Tetra Tech developed the design of the systems that would inject oxygen at three locations (near International Paper on the Front and Back Rivers and Georgia Pacific on the Savannah River) and had conducted mixing zone modeling (Tetra Tech 2010). South Carolina DHEC requested additional information that would provide greater assurance that the Speece cones would perform as designed at the Back River location. There was a previous study that suggested Speece cones are primarily a deep water technology not suitable for shallow waters (Final Aeration Technology Feasibility Report for the San Joaquin River Deep Water Ship Channel, Jones and Stokes, October 2004) and that sufficient water depth at the injection point is a critical design consideration.

2. Physical Factors Controlling Oxygen Dynamics

South Carolina DHEC requested an explanation of the physical factors controlling oxygen injection dynamics on the shallow Back River, including DO concentration as a function of the depth at which effervescence would occur. This section was prepared by ECO2 and describes the physics of oxygen injection as it relates to water depth (injection depth). This section will also address differences between the proposed design and the San Joaquin River case where water depth was identified as a factor in eliminating this general design.

The efficacy of using the Speece cone oxygenation system to supplement 20,000 lbs D.O. per day to the deep navigation channel was successfully demonstrated in August 2008. Modeling studies have shown the need to supplement D.O. to the Back River region, which is shallower than the navigation channel. A report written by Jones for supplementation of D.O. to the San Joaquin shipping channel (San Joaquin Oxygen Aeration Study, 2004) included a statement that the Speece cone system was not suitable for "shallow" bodies of water. Therefore, it was requested that ECO2 justify the efficacy of using the Speece cone for supplementing the D.O. in the Back River section of Savannah Harbor. In addition, it was requested that the physics of O_2 transfer in the Speece cone be more completely explained.

2.1 Approach

The final design of the Speece cone oxygenation system for supplementing D.O. into the Savannah River has been optimized incorporating discharge location characteristics and observations made during the 2008 demonstration. It is important to note that although the Speece cone system is similar to what was used in the demonstration, the operating parameters will be materially different.

In the Speece cone design, there is a balance between ambient D.O. saturation level of the surface water being treated and the D.O. level in the Speece cone discharge. While the ambient D.O. saturation

level is a function of site characteristic, the Speece cone discharge saturation level can be manipulated to generate D.O. levels higher than saturation, if desired. This was seen in 2008 demonstration when the Speece cone D.O. discharge was 150 mg/L (i.e. 208% saturation at the discharge depth of 34 feet) on the Front River.

When the Speece cone is operated near the ambient D.O. saturation level, there is no potential for D.O. to come out of solution by effervescence. The higher the differential in cone discharge D.O. level to the ambient saturation D.O. level, the higher the potential for effervescence. It is under these operating conditions, that the diffuser design is critical to ensure quick depressurization/dilution/mixing of the highly oxygenated water to prevent the potential for effervescence. This report will show that it takes at a minimum 170% saturation before effervescence is possible.

ECO2 has proposed implementation of a Speece cone to add 4,000 lbs D.O./day to the Back River which has a cross section of about 2,000 ft by 30 ft (MLLW) depth at the deepest point. To accomplish this, a side stream flow of 10,200 gpm would be pumped through a Speece cone and the D.O. raised to 40 mg/L in the discharge and sent to a diffuser located just above the bottom of this cross section. Surface D.O. saturation level of the Back river is 36 mg/L. Therefore, 40 mg/L in the discharge of the cone represents 111% saturation (40/36) at the river surface. If this 40 mg/L D.O. water was discharged from a diffuser located 15 feet below the surface it would be at only 77% of saturation. This is much below the 170% to 240% saturation effervescence potential documented in this report. (Effervescence potential is defined as the % saturation level below which no effervescence can occur.) The Back River system would have to have a D.O. of 122 to 173 mg/L to reach the 170% to 240% saturation threshold for potential effervescence. This does not take into consideration the fact that it would be diluted to about 1/10 of this concentration in a fraction of a second in a properly designed diffuser/depressurization system. The ECO2 design of 40 mg/L D.O. discharged at 15 feet below the surface is only at 77% saturation and incapable of manifesting effervescent loss of D.O. mass from the receiving water. Even though the ECO2 design precludes any effervescence of D.O., one of the charges of this project is to clarify the physics of O_2 transfer in a Speece cone and to quantify the conditions required for effervescent loss of D.O. from highly superoxygenated water. The remainder of this report summarizes the experimental results that document the effervescence phenomena in water that contains a range of D.O. concentrations from 50 to >400 mg/L produced using pressurized pure O_2.

2.2 O_2 Transfer

O_2 is considered to be a relatively insoluble gas in water. The saturation concentration of O_2 in fresh water in contact with air (21% O_2) at 20°C and sea level is approximately 9 mg/L. The D. O. saturation concentration for pure O_2 is approximately 43 mg/L under these conditions. Physical factors which affect the saturation concentration of O_2 in water are as follows:

- Salinity
- Altitude
- Temperature

As the salinity increases, the solubility of O_2 decreases. As the altitude increases, the partial pressure of O_2 in air decreases and the saturation concentration decreases. As the temperature increases, the solubility of O_2 decreases. For instance, at 28°C and 5,000 mg/L salinity, the saturation concentration of water in contact with pure O_2 is 36 mg/L D.O.

Gas transfer equation:

$$dC = K_L A/V (C_{SAT} - C_{ACT})dT$$

where: dC is the change in D.O.

K_L is related to the turbulence at the gas-water interface

A is the gas interfacial area

V is the volume of water

C_{SAT} is the D.O. saturation concentration

C_{ACT} is the actual D.O. in the water

dT is the time over which the gas transfer occurs

All O_2 transfer systems work according to this equation.

2.3 Speece Cone Design

There are two critical design components when designing a Speece cone oxygenation system. The first is the design of the Speece cone itself, and the second is the design of the diffuser. Each is critical and will be discussed in detail.

2.3.1 Oxygen Transfer in a Speece Cone

The Speece cone is designed to achieve high O_2 absorption efficiency. Low O_2 absorption efficiency results in undissolved O_2 gas bubbles in water which present two problems. First, low O_2 absorption efficiency increases operational costs and second, the undissolved O_2 gas bubbles can cause operational and safety problems. Therefore, it is most important to preclude loss of O_2 bubbles in the discharge of the O_2 transfer system for both economics and practicality.

Since pure O_2 is a commercial commodity, absorption efficiency drives the economics. To achieve high O_2 absorption efficiency, the pure O_2 must be kept in contact with the water for approximately 100 seconds. Since the rise velocity of bubbles is nominally about 1 ft/sec it would require a 100 foot deep column of water to achieve efficient absorption if O_2 bubbles were injected at the base. This is the basis of the oxygenation system Prof. Speece designed, tested and installed in the late 1970's to add 100 tons/day of D.O. to the hypolimnion of Clark Hill Reservoir on the Savannah River above Augusta (for development of the design to be used in the future Richard Russell Reservoir). The fine bubble diffusers located at a depth of 140 ft achieved 90% O_2 absorption efficiency. (Injection of pure O_2 into a bubble

diffuser at the bottom of a 15 feet deep aeration tank would result in unacceptably low O_2 absorption efficiency even if it was a fine bubble diffuser.)

The Speece cone oxygenation system is designed to address the crucial need to maintain large bubble swarms with their very high gas surface areas for O_2 transfer. The Speece cone maintains the O_2 gas in contact with the water for well over the required 100 seconds and thus achieves the prolonged O_2 gas detention times needed for highly efficient absorption of pure O_2. The system combines the capability to efficiently dissolve pure O_2 as well as produce a highly superoxygenated discharge of 50 to >400 mg/L D.O. The water detention time within the cone is uncoupled from the O_2 bubble detention time and is much shorter. The turbulence within the cone caused by the high inlet velocity determines the hydraulic shear regime in the cone and maintains a large swarm of bubbles having relatively small bubble sizes with their high gas surfaces. The tendency for the bubbles to coalesce and collapse is countered by the continual hydraulic shear provided within the cone. Thus the large gas surface for O_2 transfer is continually maintained. The conical configuration of the Speece cone results in a progressively decreasing downward water velocity. The inlet velocity at the top of the column is designed to exceed the buoyant velocity of the bubbles as well as to counter the tendency of the bubble swarm to collapse and the large gas surface area of the bubble swarm is maintained. Thus, the O_2 bubbles cannot escape out the top. As the cone cross-section increases as the water moves through it, the downward velocity of the water toward the base of the cone becomes less than the buoyant velocity of the O_2 bubbles and consequently the bubbles are not lost in the discharge. Therefore, the detention time of the bubbles is prolonged to achieve highly efficient O_2 absorption.

The saturation concentration of D.O. and the O_2 transfer capacity of the cone are determined by the O_2 composition of the gas and the hydrostatic pressure. The D.O. concentration in the discharge of the Speece cone is related to the hydrostatic pressure within the cone. With pure O_2 and hydrostatic pressurization, it is easily possible to develop C_{sat} concentrations in the cone of 50 to > 400 mg/L and thus achieve high discharge D.O. of nearly comparable concentrations.

A system which efficiently dissolves pure O_2 and produces a highly superoxygenated discharge opens up a whole new realm of possibilities in water quality management not possible with conventional aeration techniques. Using pure O_2 the D.O. in the discharge is nominally 1 mg/L per 1 foot of absolute pressure of hydrostatic head in the cone. This, of course, varies with temperature and salinity. The hydrostatic pressure within the cone can be increased by placing the cone in an excavated caisson to achieve energy-free pressurization or the cone can be pressurized by pumping against a throttling valve on the discharge. Placing the Speece cone in a caisson for energy-free pressurization results in a unit energy consumption of about 300 kWhr per ton of D.O. dissolved. Whereas pressurization by pumping against a discharge valve results in a unit energy consumption of a little more than 1000 kWhr per ton of D. O.

When the Speece cone is pressurized by pumping against a throttling valve on the discharge in order to produce D.O. of 50 to >400 mg/L in the discharge, special attention to prevent effervescent loss of the high D.O. is required in the diffuser design to dilute the superoxygenated water quickly in the receiving water as will be addressed below. With proper design, D.O. concentrations in the 100's of mg/L range can be depressurized and diluted without significant effervescent loss of D.O.

Figure 1 shows the operating characteristics as the O_2 injection rate increases. The discharge D.O. concentration increases linearly with the O_2 injection rate up to the design point when pressure is held constant. The physics of gas transfer within the Speece cone are such that over 90% of O_2 absorption efficiency occurs up to the design O_2 injection load. In this range the cone is able to maintain the bubble swarm with insignificant loss of bubbles in the discharge. Below the O_2 design load of the cone, the bubble swarm is smaller and does not occupy the entire cone.

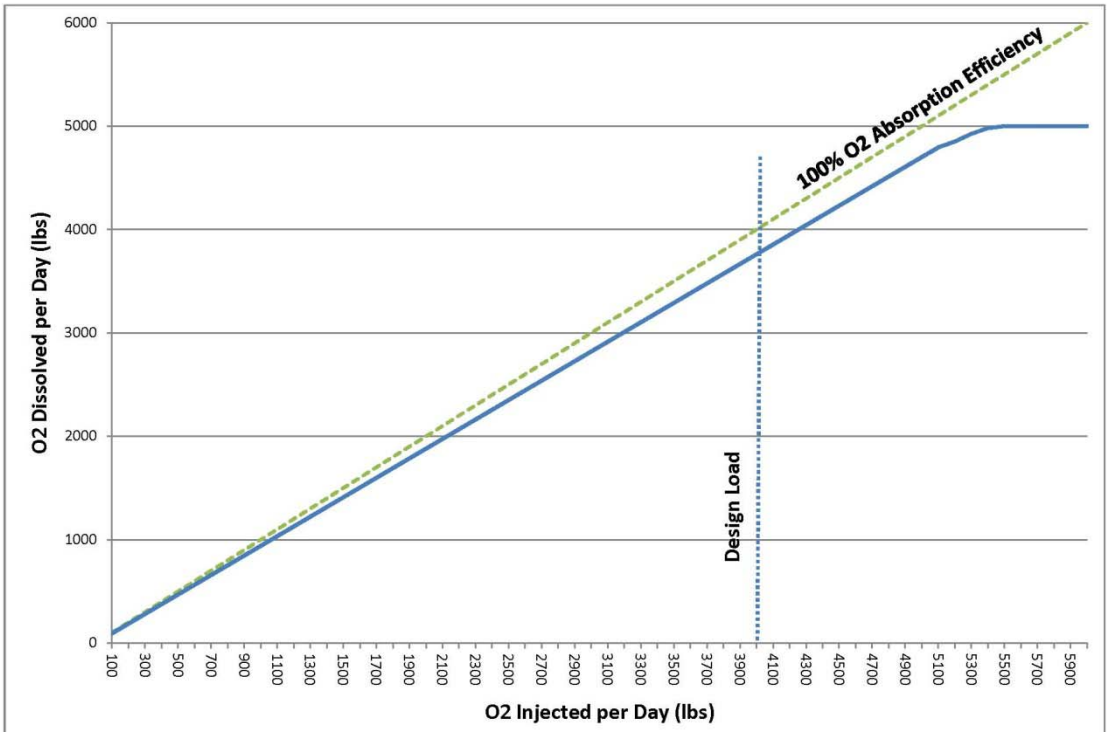


Fig. 1 O2 Dissolved vs O2 Injected

As the O_2 injection rate increases, a greater bubble swarm must develop to provide the increased bubble surface necessary to accommodate the demand for more O_2 absorption. However, there is a maximum bubble swarm which can be maintained in any given size of cone. When more O_2 is injected than is being dissolved, the bubble swarm grows beyond the capacity of the Speece cone to retain it and the excess O_2 bubbles are crowded out the bottom of the cone and lost in the discharge. Thus, the O_2 absorption efficiency is relatively constant at over 90% up to the maximum bubble swarm size. Any O_2 injected above this critical design rate is essentially all lost in the discharge.

It is to be noted that there is a fundamental difference between effervescent loss of highly supersaturated D.O. from the depressurized discharge and loss of O_2 bubbles that never were dissolved in the first place. The latter bubbles are physically crowded from the bubble swarm at an O_2 injection rate that exceeds the design load corresponding to a maximum bubble swarm volume that can be retained in the specific cone size. Effervescent loss of D.O. is characterized by tiny bubbles (<0.1 mm diameter) which barely disturb the surface when they emerge and O_2 bubbles that were never dissolved

in the first place and which are about 10 to 20 times larger in diameter and are readily observed breaking at the water surface. Even though the 2008 study discharge D.O. was 150 mg/L at 34 feet below the surface (i.e.) 208% saturation at that depth (150/2x36=208%), the discharge was diluted in less than a second by the ambient low D.O. water. Thus negligible effervescent loss from the very high D.O. occurred.

In the pilot demonstration project in Savannah Harbor, there were occasions when considerable loss of larger bubbles was noted in the discharge to the harbor. Examination of the data revealed that during these times the O_2 injection rate was considerably above the design loading, resulting in massive loss of undissolved O_2 gas in the discharge. In summary, when the O_2 injection rate is below the design load, over 90% O_2 absorption occurs. When the O_2 injection rate exceeds the design load, there is essentially 0% O_2 absorption efficiency of that portion of O_2 which exceeds the design loading.

Figure 2 shows the O_2 absorption efficiency at constant cone pressure as a function of the O_2 injection rate. This plot demonstrates that the O_2 absorption efficiency exceeds 90% all the way up to the design load. As mentioned above, at this point, the bubble swarm volume that can be maintained within a given cone cannot further increase due to physical limitations and any O_2 injected above the design load is not absorbed.

Figure 3 indicates that O_2 absorption efficiency is maintained constant at approximately 94% efficiency at design O_2 loading over a pressure range of 0 to 100 foot of head and above i.e. pure O_2 absorption efficiency is independent of the hydrostatic pressure in the cone. The discharge D.O. increases linearly with hydrostatic pressure within the cone at design O_2 loading over this range up to 100 feet of head and above.

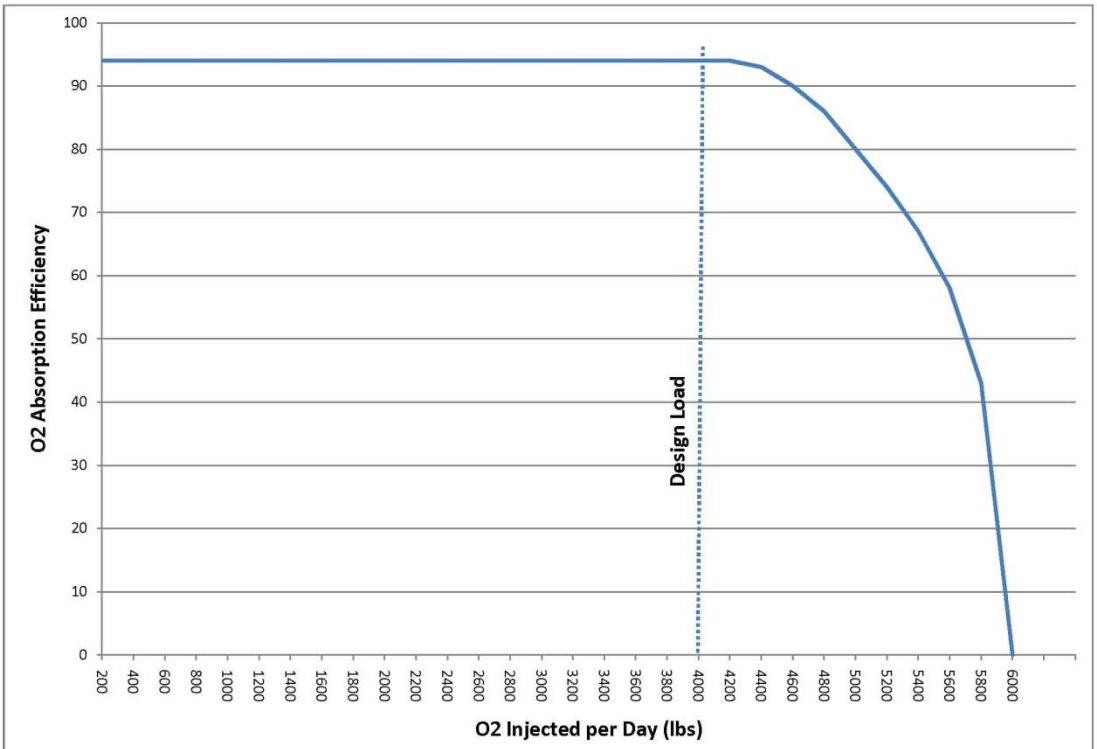


Fig. 2 O2 Absorption Efficiency vs O2 Injected per Day

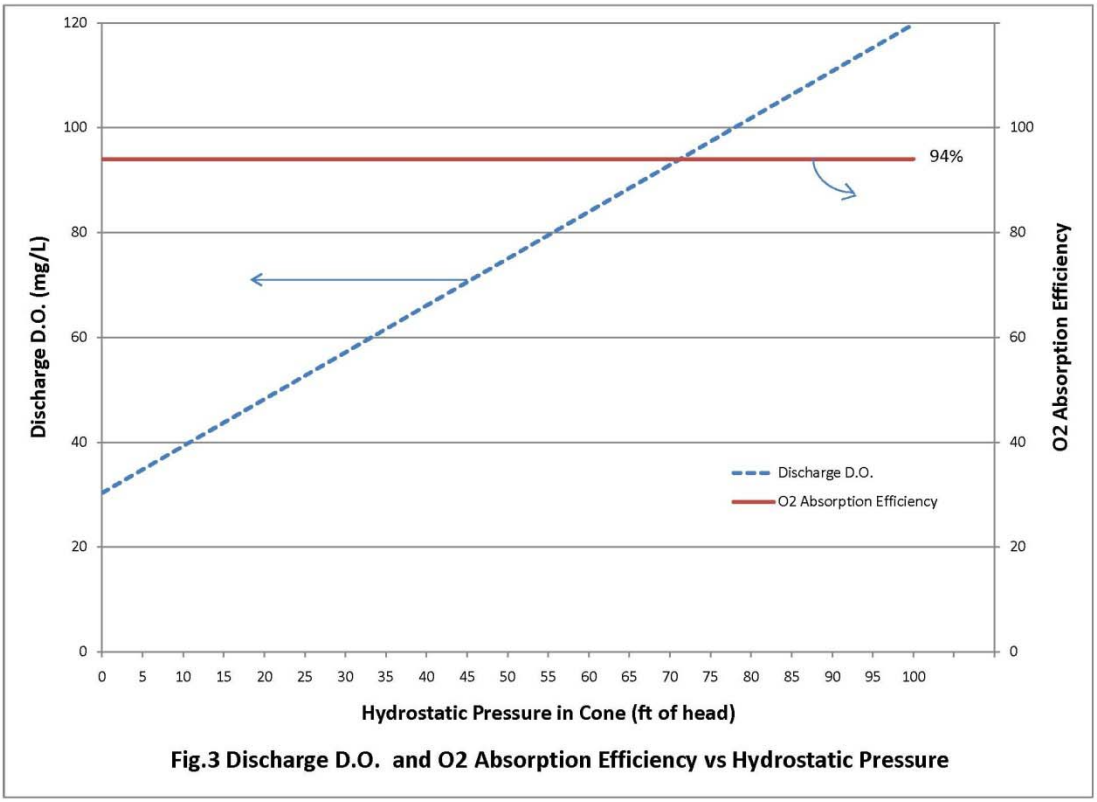


Fig.3 Discharge D.O. and O2 Absorption Efficiency vs Hydrostatic Pressure

2.3.2 Conditions Required for Precluding Effervescence to Achieve Retention of High D.O. (>400 mg/L) Conditions in the Discharge

Effervescence is a phenomena whereby a dissolved gas comes out of solution in water as tiny bubbles (<0.1 mm diameter) from a liquid having a highly supersaturated concentration of D.O. There is a common misconception that when dissolved gas concentrations exceed 100% saturation that effervescence results with the dissolved gas level quickly dropping to 100%. This is commonly based on the visual observation of vigorously shaking a champagne bottle and popping its cork or of pouring a can of Coke into a glass. Indeed effervescence is a critical phenomena which must be addressed when dealing with supersaturated D.O. concentrations in water . However, with proper diffuser/depressurization design, effervescence is successfully precluded.

Effervescence is generally controlled by the following parameters:

- Supersaturation concentration
- Time
- Turbulence
- Temperature
- Presence of colloids

By manipulation of these parameters, effervescence can be either maximized or prevented, whichever is the design objective. The most common example of effervescence, dissolved air flotation, effervescence is designed to be maximized. Therefore, a very high supersaturation level is achieved by operating the gas transfer vessel pressure at ~75 psig. This results in a saturation level that approaches 600%. In order to enhance turbulence in the discharge from the saturator, a pressure letdown nozzle is directed at a flat plate for maximum turbulence. This combination of exceptionally high supersaturation concentrations and exceptionally high turbulence in the discharge results in rapidly reducing the supersaturation concentration down to some level above 100%. It is of note that very high supersaturation levels are required to achieve efficient effervescence of the dissolved gas. As will be documented later in this report there is an effervescence threshold level of nominally between 170 to 240% supersaturation, below which effervescence cannot be induced even with high turbulence levels.

As a point of reference, the pressure in a Coca Cola can at room temperature exceeds 45 psig due to pressurization with CO_2, which corresponds to about 400% CO_2 saturation for taste appeal (this also allows the cans to be stacked on top of each other without crushing). This corresponds to dissolving about 3.7 volumes of CO_2 per volume of Coke. Thus a 355 ml can of Coke contains over 1300 mL of CO_2. If a Coke can is allowed to sit for about 10 min. so that any tiny bubbles rise to the surface, and the can is opened, less than 50 mL of CO_2 escapes in the first minute. Thus, over 96% of the dissolved CO_2 remains in solution during this period, even though it is at a highly supersaturated condition. Coca-Cola personnel estimate that it takes about two hours for all of the dissolved CO_2 to escape if the can is opened under quiescent conditions. On the other hand, if a Coke can is vigorously shaken, so that a

multitude of tiny bubbles is entrained, creating a very high gas bubble surface area, and the can is subsequently opened, it immediately foams over due to the loss of a high amount of dissolved CO_2.

Water in the Columbia River normally is passed through electricity turbine generators and discharged below the downstream surface with none flowing over the spillway. However during flood flows the turbine generators cannot accommodate the entire flow and spillway discharge is required during these times. Supersaturation of the water flowing over Columbia River dams, which suck in air at the plunge point and drag the air bubbles deep into the stilling basin, results in total dissolved gas levels exceeding 130% saturation downstream. Due to the very low surface gas exchange coefficient of the deep, slow moving Columbia River, it has been observed that after flowing 80 miles, more than two days, there is an insignificant reduction in the 130% saturation level of the water.

It has also been observed that in farm ponds which are highly eutrophic, with resulting high algal activity, the D.O. rises to as high as 30 mg/L in the middle of the afternoon and persists for hours. These examples prove that a D.O. concentration considerably above 100% saturation is required to cause effervescence.

2.3.3 Discharge Diffuser Design Criteria

The Speece cone designed for the Back River will have a discharge D.O. of 40 mg/L (111% saturation at the surface but only 77% at the discharge point 15 ft below the surface). This is dramatically lower than the 2008 demonstration system in which the D.O. was raised to 150 mg/L (208% saturation at discharge depth of 34 feet). Effervescence in the Back River location is precluded because the discharge D.O is not 100% saturated at the discharge depth.

The Speece cone can be designed to raise the D.O. in the discharge to >400 mg/L. In these cases, careful attention must be paid in the design of the discharge diffusers which mix these very high D.O. levels with the receiving waters and quickly dilutes the D.O. to below the effervescent potential concentration of 170 to 240 % saturation (as described below).

If it is desired to retain highly supersaturated D.O. in solution after discharge from the Speece cone, special measures can be taken to avoid effervescent loss of highly super oxygenated water. Since effervescence requires a finite period of time for the D.O. to come out of solution, if the highly supersaturated water is quickly diluted with water containing only a few mg/L of D.O., there is insufficient time for the effervescent bubbles to form before the D.O. concentration is diluted below its effervescence potential.

The higher the D.O. supersaturation, the quicker the discharge must be diluted below the effervescence potential to preclude effervescent loss of D.O. Thus the proper design of the discharge diffuser to minimize the time before dilution to below the effervescence potential level is paramount. At very high supersaturation D.O. concentrations in the Speece cone discharge, the discharge must be depressurized, diluted and distributed in the receiving water quickly in order to minimize the time at which the superoxygenated discharge is at reduced pressure.

The jet from a diffuser is rapidly mixed/diluted with the receiving water. The dimensions of the undiluted core of superoxygenated water exiting from the port of a diffuser are a function of:

- Superoxyenation concentration in jet
- Port diameter
- Jet velocity (pressure drop across discharge port)
- Port spacing
- D.O. in receiving water

The impact of a diffuser design can be easily modeled to show the mixing and dilution effects.

It has been shown that water containing >100 mg/L of D.O. (>200 % saturation) can be effectively diluted into D.O. free water in a BOD bottle with no effervescent loss of the D.O. This has been a demonstrated laboratory technique for measuring D.O. concentrations much above that possible with electronic D.O. meters.

Figure 4 is a cross section of a diffuser header with multiple discharge ports. The shaded area represents superoxygenated water that is undiluted. As the undiluted water is forced through the discharge ports, its high velocity generates considerable shear/entrainment in the surrounding water containing low D.O. Consequently, the plume is eroded and diluted by the surrounding water, which contains low D.O. The duration of time for which the discharge jet is undiluted is very short and thus rapidly diluted down below the effervescence potential.

Figure 5 shows the cross-section through the diffuser jet versus the D.O. concentration. The cross-section AA initially contains ambient water with the ambient D.O. concentration. The D.O, then abruptly increases to the concentration coming out of the port and then abruptly decreases to the ambient D.O. concentration. Cross-section BB, which is located farther from the face of the diffuser nozzle still contains some undiluted discharge water and is characterized by an increasing concentration next to the jet because of entrainment of the ambient water with the superoxygenated water. Then the concentration in the undiluted core equals the discharge from the header and then subsequently tails off on the other side. Cross-section CC is taken beyond the distance where the undiluted jet exists and shows an elevated concentration that rises and peaks at the centerline of the jet at some level, much less than the superoxygenated water in the diffuser and tails off symmetrically on the other side. The object of the diffuser design is to dilute the superoxygenated water quickly below its effervescence potential. This is done by mixing it with the ambient water in the high turbulence jet.

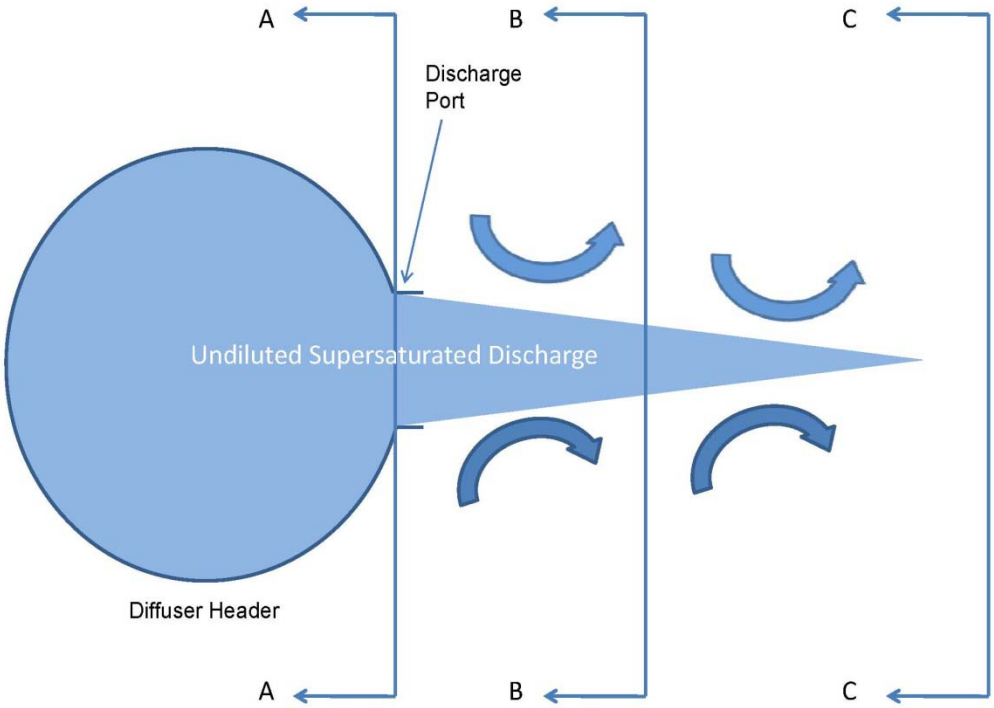


Fig. 4 Schematic of Mixing in Diffuser Jet

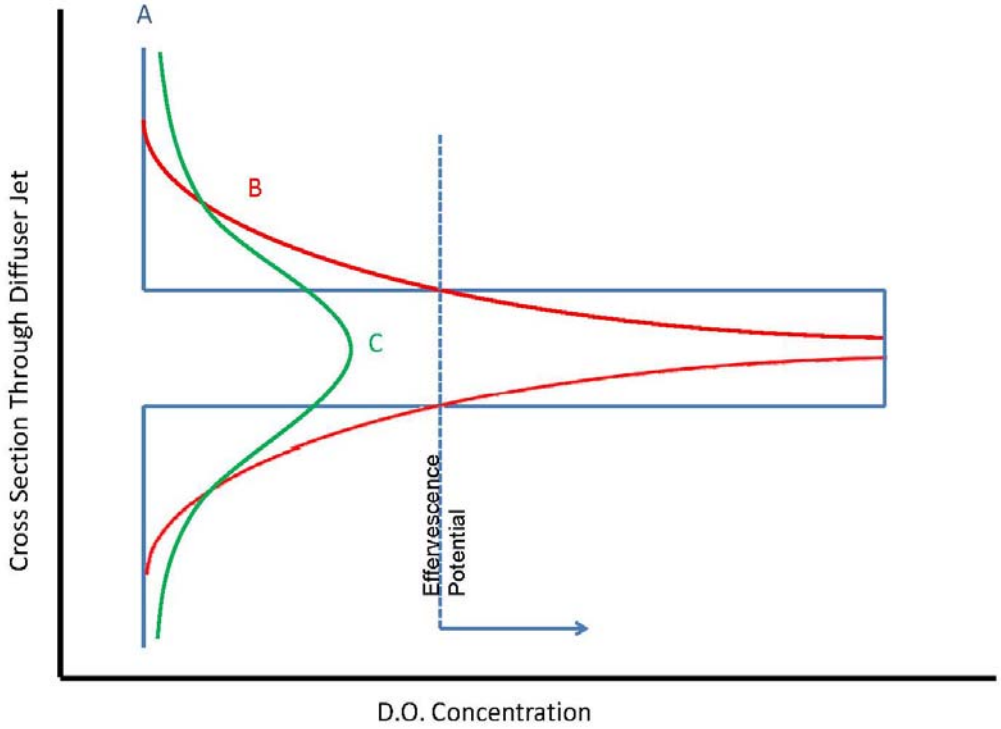


Fig 5. D.O. Profile in Diffuser Jet

In summary all of the pressure drop must occur at the discharge port to minimize the time at which discharges are highly superoxygenated and thus capable of supporting effervescent loss of D.O.. In such a case, the jets coming from the discharge port will be rapidly diluted with the ambient water in less than a fraction of a second. There is a cone shaped volume of undiluted water coming out of a discharge port and it is crucial to minimize the time before its dilution to below the effervescence potential level. The undiluted core of superoxygenated water exiting the discharge port will be rapidly mixed with the ambient water within a distance of nominally less than 10 diameters of the discharge port (depending on the parameters listed above). If the pressure within the cone was 34 feet of hydraulic head, the discharge velocity through the port would be approximately 50 ft/sec (V^2 / 2g= H_L). And if the ports were 2 inches in diameter, then 10 diameters would be 20 inches and at 50 ft/sec, then the duration of time that the undiluted water would exist in the jet core would be 0.03 seconds. The high velocity jet also results in more than a 10 fold dilution of the jet with the receiving water in a fraction of a second. This rapid dilution in the high velocity of the discharge/depressurization port is crucial for rapid dilution of highly superoxygenated water to below its effervescence potential.

Even though the Speece cone's capacity to dissolve oxygen does not change in shallow water, the diffuser design becomes more critical in shallow water installations. However the Speece cone design for the Back River system only raises the D.O. to 56% of saturation at the discharge depth and is thus incapable of effervescent loss of D.O. Therefore the diffuser design only needs to insure distribution of the superoxygenated discharge across the Back River.

2.4 Superoxygenation Discharge into "Shallow" Waters

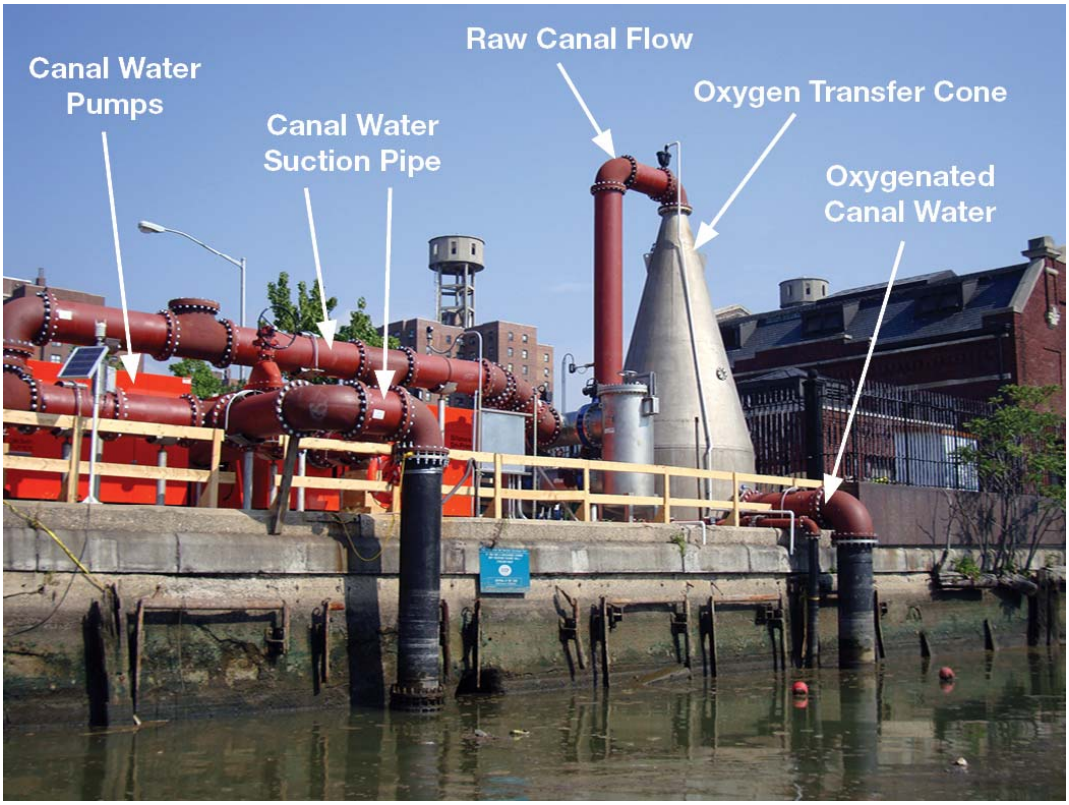
It has been reported by Jones in a publication describing pure O_2 supplementation to the San Joaquin ship channel in Stockton, California, that the Speece cone was inappropriate for applications when discharging into shallow waters. Unfortunately, this is an unsubstantiated conclusion. The Speece cone can be successfully operated to discharge into shallow waters. The Speece cone can be operated to discharge a D.O. level which is at the D.O. saturation level of the shallow water whereby precluding the potential for effervescence. Secondly, highly superoxygenated water can be discharged into a depth of water of 1 foot with nil effervescent loss of D.O. if the diffuser is properly designed to quickly dilute the superoxygenated water with ambient D.O. water and there is transport/movement to carry away the D.O. dissolved therein.

In California, Farrelldean reports that the aquaculture industry uses superoxygenation of a side stream for maintenance of the D.O. at >8 mg/L in the fish rearing tanks. In one preliminary study, the superoxygenated side stream coming into the fish tank had 117 mg/L of D.O. The superoxygenated side stream is quickly mixed with the 29^{o}C water in an 8 ft deep tank and no effervescence was observed.

2.5 Example Speece Cone Installations

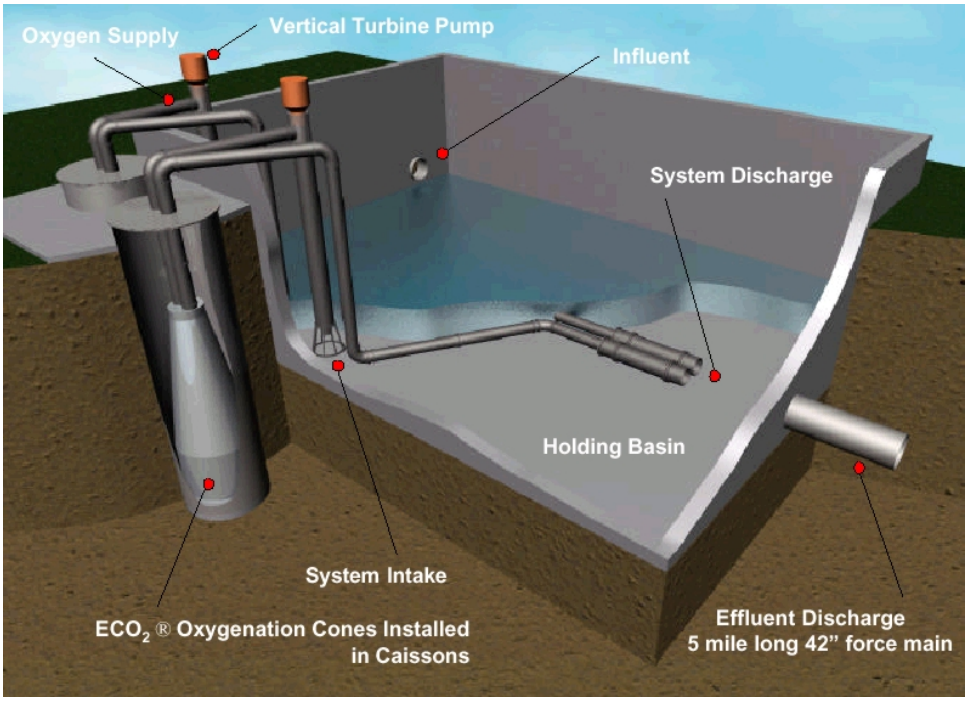
2.5.1 Gowanus Canal

The Gowanus Canal is a sea level, dead end canal constructed in Brooklyn N.Y. in the 1800's. It is about 9 feet deep at the head end and less than 2 miles long and has very little replacement of the stagnant water at the head end. Consequently it was a major odor source. Many years ago a tunnel and pump station were constructed to bring in fresh sea water to flush the canal and eliminate the odor source. Recently rehabilitation of the pump station was required and a means for maintaining oxic conditions within the canal during this 2 year period of construction was needed. A Speece cone oxygenation system was installed and pumps about 5,000 gpm of water from the canal, superoxygenates it to about 50 mg/L D.O. and discharges it into a half mile long, submerged, distribution header/diffuser system. This distribution header/diffuser is attached on one side of the canal. It maintains the head end of the canal at about 14 mg/L D.O. under summer conditions.



2.5.2 Paper Mill Wastewater Oxygenation

A Speece cone superoxygenation system was installed at a paper mill to superoxygenate the treated discharge to an elevated D.O. level which was sufficient to maintain oxic conditions throughout the length of a five-mile long force main (five hours detention time). A basin with 9 ft water depth received the treated discharge. Water from this basin was pumped as a sidestream through a Speece cone located in a 65 foot deep caisson at a flow rate of 14 ft^3 per second and a temperature of 27.8°C. The discharge D.O. was 81 to 83 mg/L (230% saturation). The O_2 absorption efficiency exceeded 90% in the Speece cone. The Speece cone discharge having a D.O. of 81 to 83 mg/L was discharged back into the 9 foot deep basin and diluted to 32 mg/L with less than 3% of the initial D.O. lost due to effervescence.



2.5.3 Logan Martin Dam

Logan Martin Dam on the Coosa River in Alabama is operated for peaking power production. During off peak periods of electricity demand, no flow occurs. Due to the fact that the foundation of the dam is channeled karst that was not 100% grouted, leakage of 700 CFS occurs underneath the dam. This large volume of leakage water is deficient in D.O. and causes stress to the aquatic life in the 35 foot deep tail water.

In order to rectify the unacceptably low D.O. during the night and over the weekend when water is not discharged through the turbines, a Speece cone oxygenation system was installed. Water is taken through a siphon over the dam and conducted through the Speece cone located at the base of the dam. The water is raised to approximately 50 mg/L D.O. in the Speece cone and then immediately diluted by discharge 15 feet below the surface. A relatively high D.O. is added to the small side stream without effervescent loss when it is discharged into the tail water. This system adds approximately 6000 pounds of D.O. per day to the tail water and effectively relieves the stress on the resident fishery. This cone is 9 foot in diameter and 20 feet high. It handles a flow of 24 cfs of water at 86°F. The system achieves 94% of the theoretical saturation concentration of D.O. within a residence time of 30 seconds due to the exceptionally high gas transfer surface area provided in the bubble swarm.

2.5.4 Tombigbee River

In the 1980's Prof. Speece designed a U-Tube oxygenation system for the Tombigbee River between Alabama and Mississippi for supplementing D.O. near an industrial complex. The Tombigbee River was less than 35 ft deep at this location. The U-Tube oxygenation system pumped 120 MGD of water from the Tombigbee down through the 175 ft deep U-Tube and raised the D.O. to ~50 mg/L in the discharge which was then sent to a diffuser installed across the bottom of the river for dilution with the main flow of the river. This system could add ~40,000 lbs D.O./day to the river and no effervescent loss occurred after discharge to the river. This system operates on an as needed basis at low flow conditions in the river.

2.5.5 Laboratory Studies to Define Effervescent Loss of Highly Superoxygenated Water

Laboratory studies were conducted by Prof. Speece to determine the residual D.O. in superoxygenated water after depressurization occurs and all effervescence has ceased. This was used to determine the D.O. below which effervescence did not occur i.e. the effervescence threshold. Various methods of depressurization were evaluated and the dilution requirements to preclude effervescent loss of the D.O. were determined.

A. Quiescent Depressurization of Superoxygenated Water

Water was saturated with pressurized pure O_2, then progressively depressurized until the occurrence of effervescence was noted. Water was placed in a pressure vessel with a pure O_2 headspace that was connected to an O_2 pressure cylinder. The pressure inside the water pressure vessel was maintained by a pressure regulator on the discharge from the O_2 cylinder. Then the vessel was agitated for a prolonged period of time until the water reached saturation equilibrium with the pressurized O_2 headspace. The various pressure levels were over a range of 4 to 10 atm of pressure achieving 150 to 400 mg/L D.O. After the water reached equilibrium at the study pressure, the system was slowly depressurized until effervescence was noted to commence. Over this entire pressure range of 4 to 10 atm of pressure it was observed that whenever the D.O. concentration exceeded 170% saturation, that effervescence would commence. Below 170%, D.O. saturation, effervescence was not observed upon depressurization.

Figure 6 shows the results of supersaturating water with D.O. in a pure O_2 headspace at pressures up to 125 psig. The system was abruptly depressurized to ambient conditions and allowed to effervesce. After all effervescence has ceased, the D.O. concentration was in the range of 100 to 160 mg/L. This indicates that the effervescence threshold was above 200 to 300% saturation.

Figure 7 shows another study tap water was placed in a pressure vessel with a pure O_2 headspace and the pressure was raised from 4 to 10 atm. Subsequently, the pressure was gradually reduced and it was observed that whenever the D.O. concentration exceeded 200 to 300% saturation, effervescence would occur. No effervescence was noted below these levels.

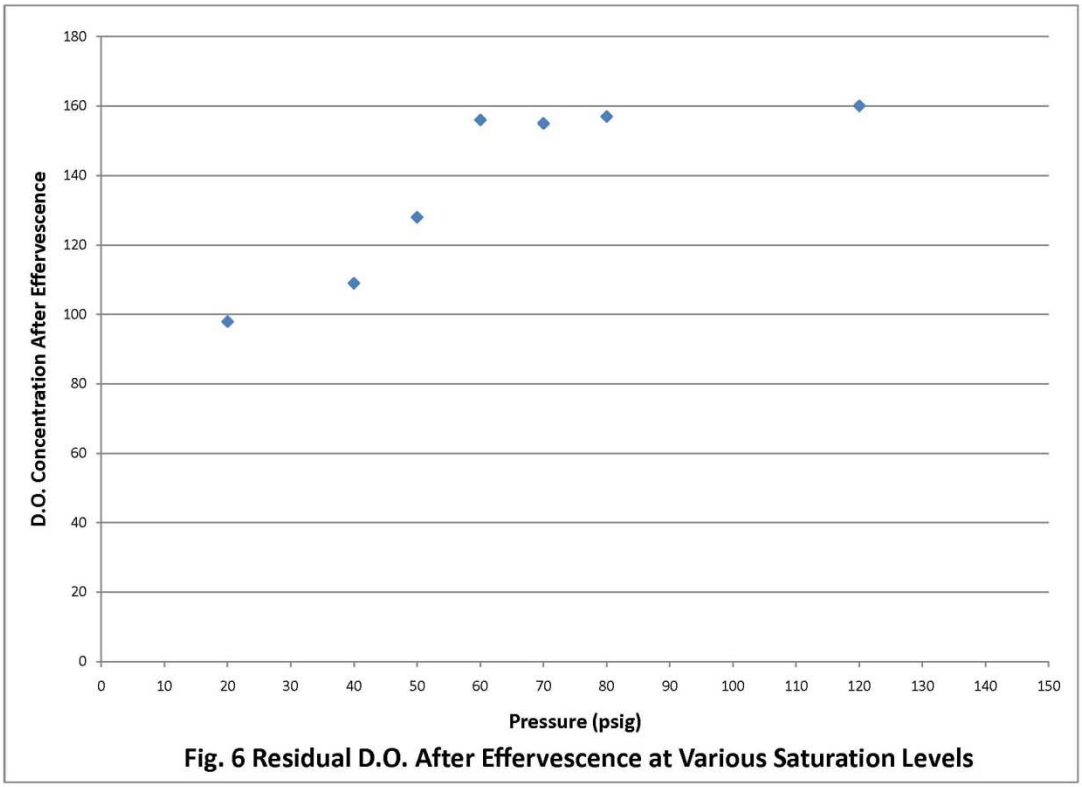


Fig. 6 Residual D.O. After Effervescence at Various Saturation Levels

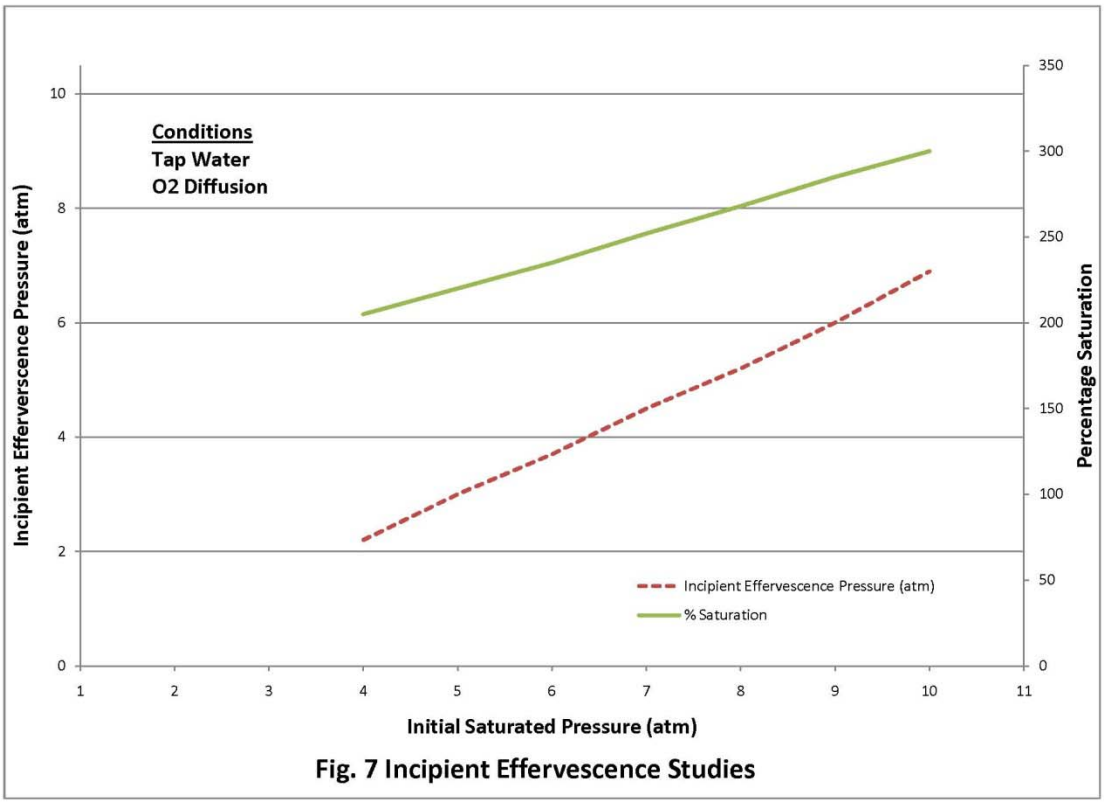


Fig. 7 Incipient Effervescence Studies

Figure 8 shows the residual D.O. in a system that was pressurized with pure O_2 in the headspace at a temperature of 29° C to 185 mg/L D.O., The system was abruptly depressurized and the D.O. was measured after all effervescence ceased. This experiment was conducted over a range of bentonite concentrations from 0 to 400 mg/L. Bentonite serves as a colloidal nucleation agent to enhance effervescence. Above a concentration of approximately 60 mg/L of bentonite, the residual D.O. was constant at approximately 150 mg/L (~400% saturation).

Figure 9 shows that the residual D.O. after all effervescence had stopped are approximately 150 mg/L with tap water saturated with pure O_2 at pressures of 45 to 120 psig.

Figure 10 shows that as long as D.O. was less than 170% saturation no effervescence will occur. Thus, 170% D.O. saturation was the effervescence potential threshold.

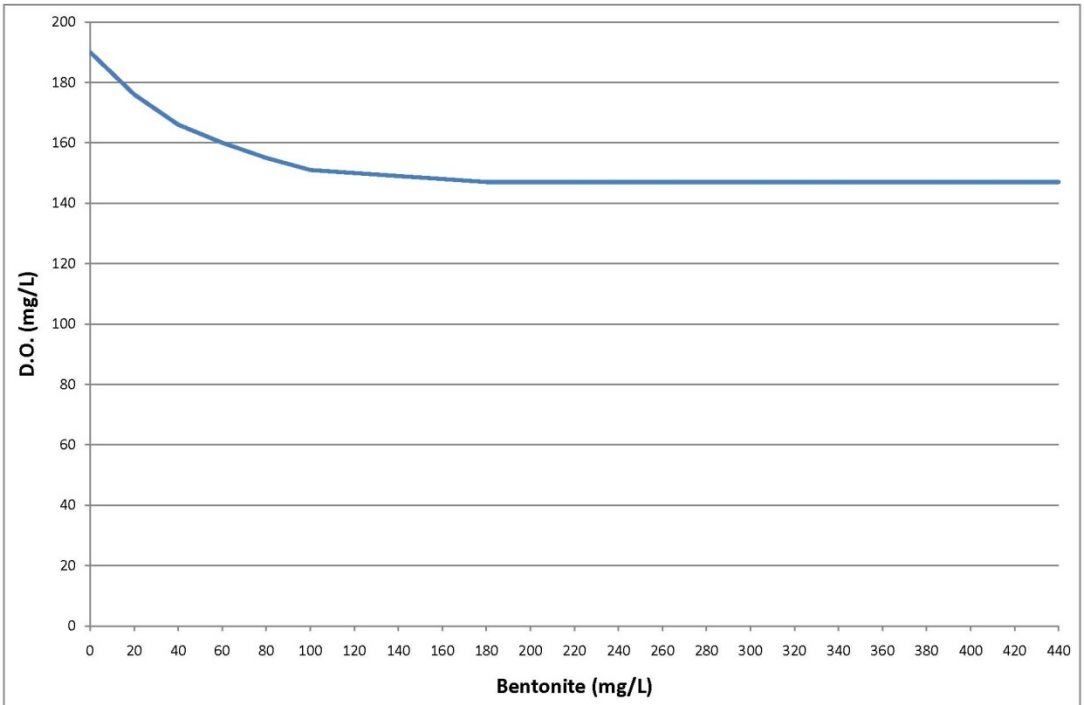


Fig. 8 Residual D.O. After Depressurization in Presence of Bentonite Colloids

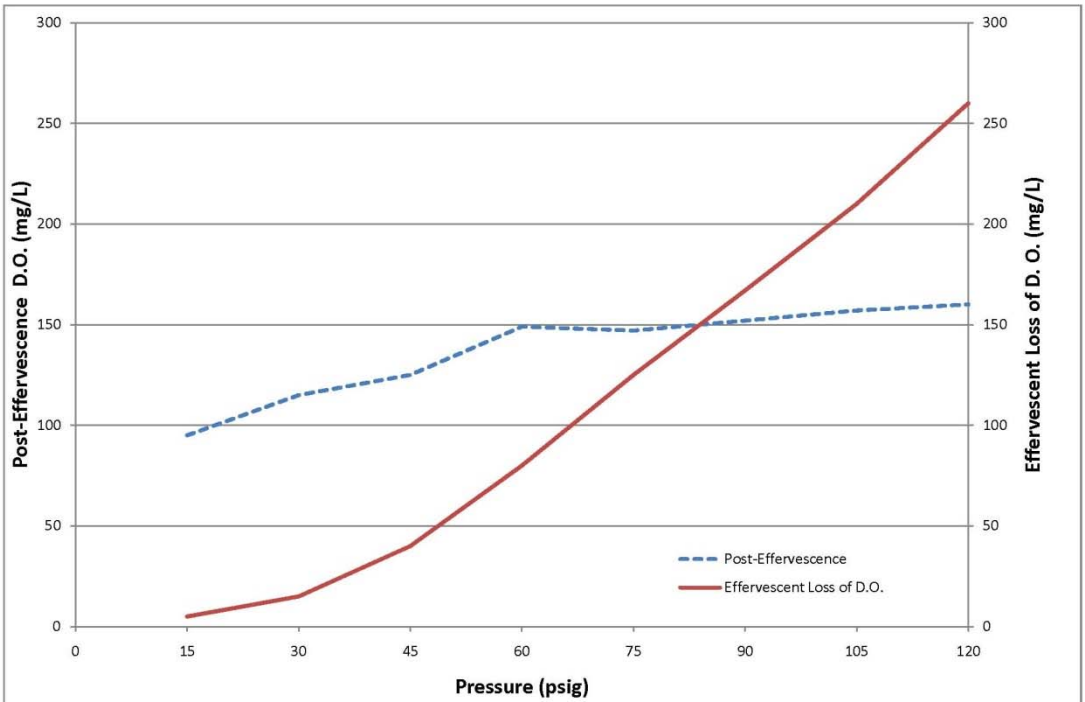


Fig. 9 D.O. After Effervenscence and Oxygen Lost Due to Effervescence (No Sulfite)

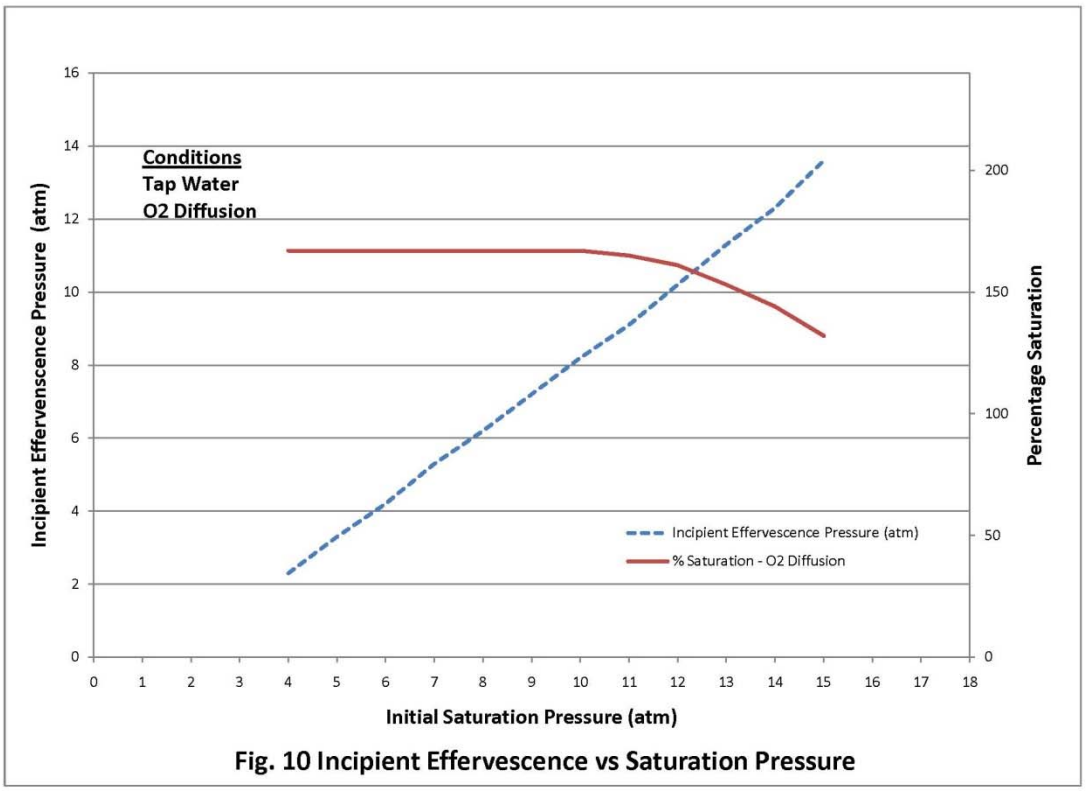


Fig. 10 Incipient Effervescence vs Saturation Pressure

B. Turbulent Depressurization of Superoxygenated Water

Figure 11 shows tap water was saturated at a pressure of 9 atm with pure O_2, and the vessel was depressurized while being stirred and the D.O. was recorded for various stirring times. The D.O. deficit initially was approximately 280 mg/L (320 mg/L D.O.). Upon depressurization while being mixed, the D.O. deficit dropped to approximately 60 mg/L, (which would correspond to 100 mg/L D.O.) within 3 min. No further effervescence was noted after 3 min. The D.O. deficit then decreased in a linear manner up to 10 min. when the D.O. deficit was 35 mg/L (the actual D.O., was 75 mg/L). The purpose of this curve is to show that no effervescence potential was noted below a D.O. deficit of 80 mg/L, (corresponding to 120 mg/L D.O.). It is also noteworthy that it took about 60 seconds for the D.O. deficit to drop from 280 to 95 mg/L., The curve shows that if D.O. can be diluted below its effervescence potential within a fraction of a second, no loss of highly superoxygenated D.O. will occur. Thus, rapid dilution is a means of retaining the highly superoxygenated D.O in solution.

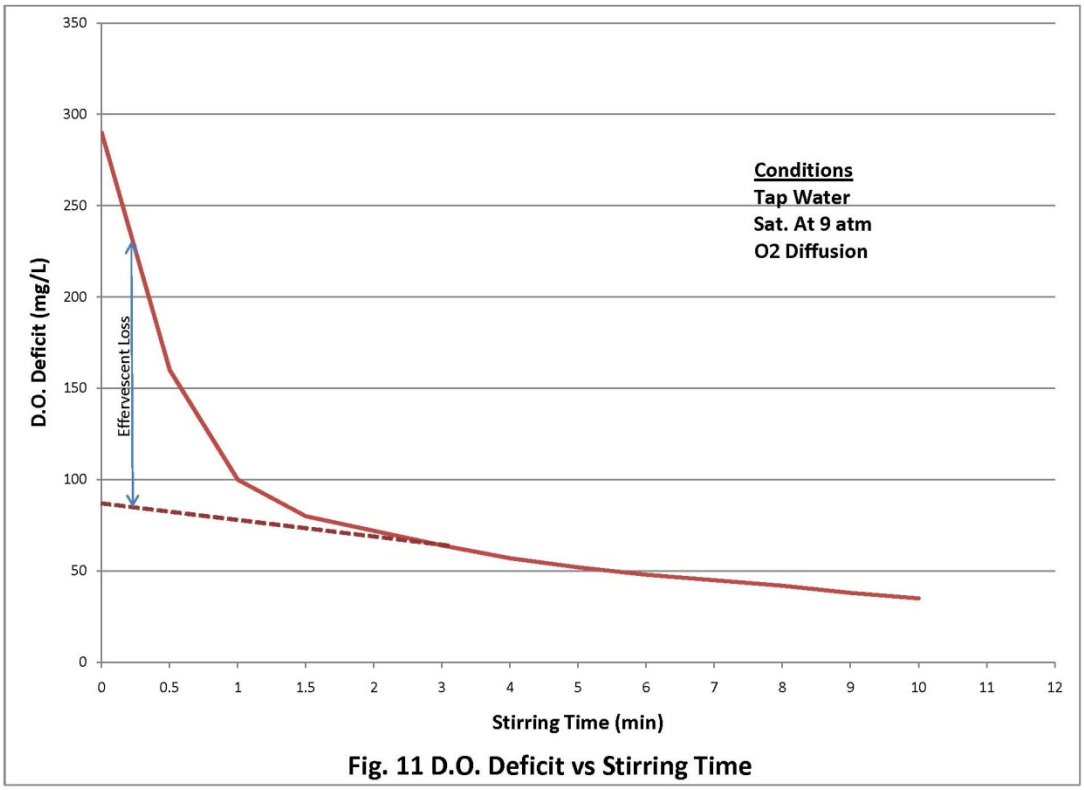


Fig. 11 D.O. Deficit vs Stirring Time

In another study, using a pressurized pure O_2 headspace at 45 psig, tap water was brought to 165 mg/L D.O. in equilibrium with the pressurized headspace and then passed through a throttling valve with the following pressure drops across the throttling valve:

45, 30, 15, and 0 psig.

After all effervescence had ceased, the residual D.O. was measured and found to be:

87, 83, 87, and 89 mg/L of D.O. (~230% saturation).

In another study, water was brought into equilibrium with a pure O_2 atmosphere at 100 psig, corresponding to a saturation concentration of 328 mg/L, D.O. It was then passed through a throttling valve with the following pressure differential across the valve of 100, 30, 15 psig. The residual D.O. was then measured after all effervescence had ceased and found to be respectively:

65, 77, and 89 mg/L of D.O. corresponding to:

176, 208 and 240% saturation.

In another study, tap water at 27.4°C was used to evaluate a 15 psig pressure drop after equilibrium at the following pressures:

15, 30, 45, 60, 100, 150, and 200 psig.

The D.O., after equilibrium with the pure O_2 pressurized headspace was correspondingly:

81, 122, 163, 203, 312, 447, and 584 mg/L.

After passing water with these respective concentrations of D.O. across a 15 psig throttling valve, the D.O. was measured in the discharge after all effervescence had ceased and found to be respectively:

65, 90, 76, 77, 85, 89, and 89 mg/L D.O..

These values correspond to:

173, 240, 206, 205, 230, 237 and 237% saturation after all effervescence ceased.

C. Dilution Requirements to Prevent Effervescent Loss of High D.O.

Figure 12 shows water at 28°C was brought to equilibrium with pure O_2 at a pressure of 60 psig. (185 mg/L D.O). The discharge of this highly superoxygenated water was immediately diluted with ambient D.O. (8 mg/L D.O.) tap water . Increasing dilution flow resulted in increasing retention of the D.O. mass in solution. At approximately 2 volumes of dilution flow with the ambient D.O. (8 mg/L) water per volume of superoxygenated water with 185 mg/L D.O., 95% of this original D.O. mass was retained in solution. The D.O. at this dilution would be 62 mg/L i.e. 170% saturation.

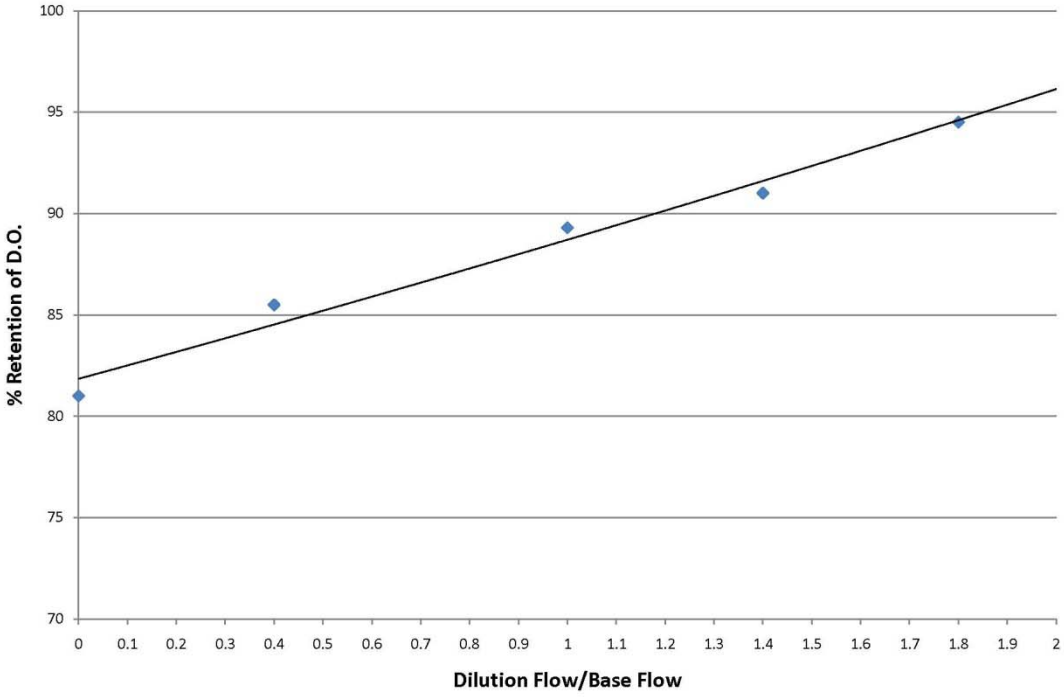


Fig. 12 Percentage Retention of D.O. vs Dilution Flow/Base Flow (Pressure = 60 psig)

Figure 13 shows water at 28°C was brought to equilibrium with pure O_2 at a pressure of 90 psig. i.e. 250 mg/L D.O. The discharge from this pressure vessel was immediately diluted with a range of flows with ambient air saturated water containing 8 mg/L D.O. The percent retention of D.O. mass in solution reached approximately 95% when the dilution flow was three times the base flow. Again the diluted concentration was 62 mg/L D.O. and 170% saturation.

Figure 14 show a series of studies was conducted in which water was brought to equilibrium with a pressurized pure O_2 headspace over a pressure range of 45 to 90 psig. The superoxygenated water from this pressurized reactor was then immediately diluted into a cobalt catalyzed sulfite (for scavenging the D.O. and thus maintaining 0 mg/L D.O. in the water) reservoir of water and the volume of effervescent O_2 was measured. At a pressure of 45 psig, corresponding to 148 mg/L D.O., there was no detectable loss due to effervescence because of the immediate dilution. Even at 90 psig, corresponding to 259 mg/L D.O., only 10% loss of the D.O. was noted after depressurization into a cobalt catalyzed sulfite reservoir of water.

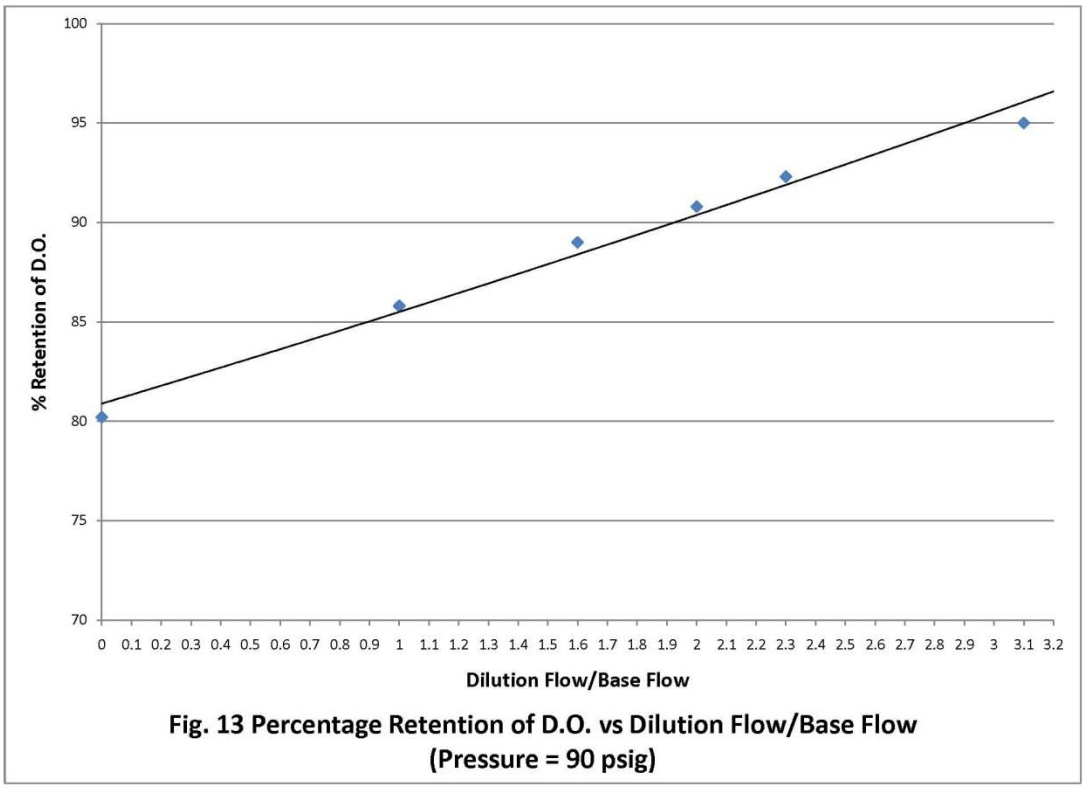


Fig. 13 Percentage Retention of D.O. vs Dilution Flow/Base Flow (Pressure = 90 psig)

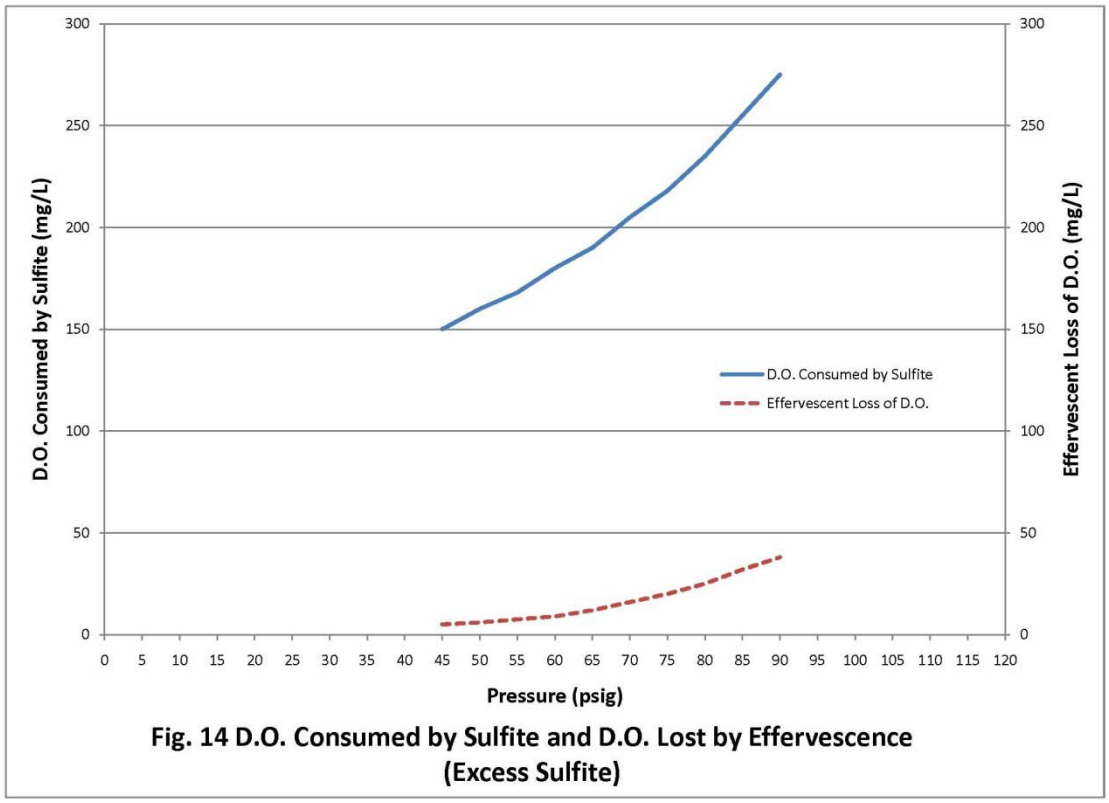


Fig. 14 D.O. Consumed by Sulfite and D.O. Lost by Effervescence (Excess Sulfite)

Figure 15 graph shows the D.O. and the pressurized discharge versus the pressure maintained at equilibrium in the pressure vessel. There is a linear increase in D.O., in the discharge versus pressure that corresponds to about 90% of theoretical saturation. The retention of D.O. after discharge directly into tap water containing cobalt catalyzed sulfite was 100% at 45 psig and about 90% D.O. retention at 90 psig.

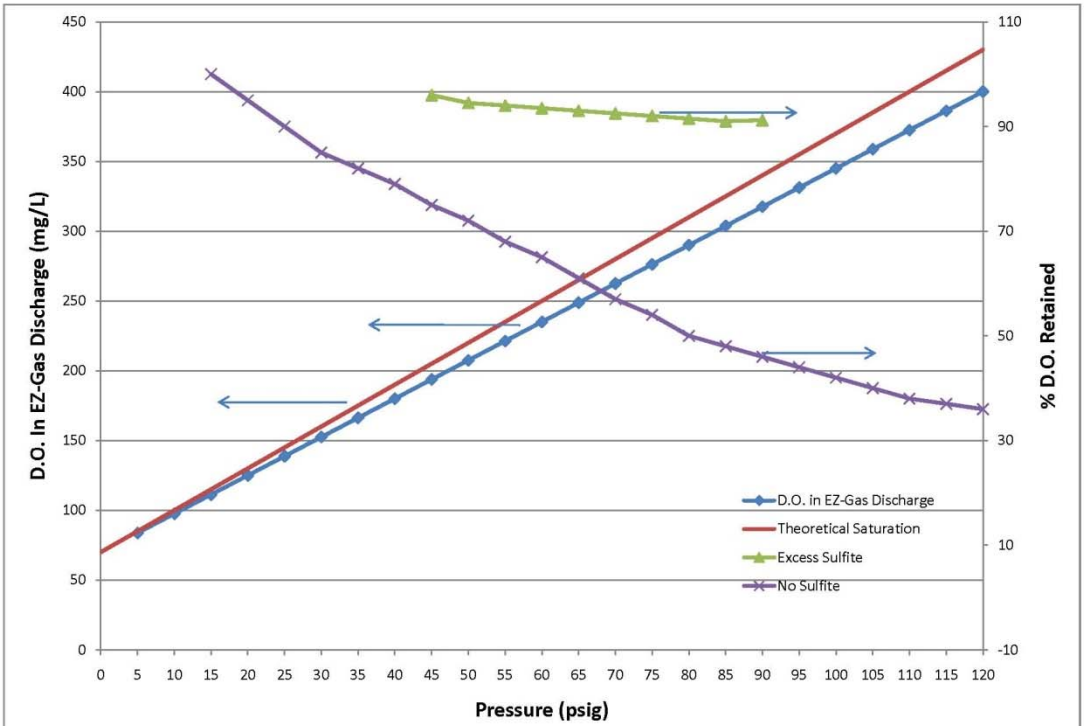


Fig. 15 D. O. in EZ-Gas Discharge and Percentage D.O. Retained

Back pressure studies were conducted in which superoxygenated water was raised to180 mg/L of D.O. and discharged into a reservoir at the equivalent of 50 feet below the surface and no effervescence loss of D.O. was observed. When water was raised to 140 mg/L of D.O., it could be injected 20 feet below the surface with no effervescent loss of D.O.

2.6 Tidal Mixing and Slack Tide

The two key requirements for supplemental oxygenation of a surface water body are:

- Means of supplementing the D.O.
- Means of transporting the oxygenated water away from the location where it is added.

There is significant tidal mixing to transport the oxygenated water away from the point where it is being injected in Savannah Harbor except at the very head of the estuary. The locations where the Speece cones are to be located have significant tidal transport mixing. However at slack tide, mixing transport of the water ceases for a period of less than an hour. During this period, the D.O. will accumulate in the vicinity of the O_2 injection station. At the rate which D.O. is being supplemented to the Back River

region ~4,000 lbs D.O./day, into a cross section of 1,500 ft wide by 15 ft deep by an assumed length of 100 ft for the diffuser influence (a volume of 2,250,000 ft^3), it would take about 52 hours of slack tide for the D.O. to accumulate to 13 mg/L. Thus in the relatively short slack tide interval of less than an hour, the D.O. in the vicinity of the D.O. supplementation station will only increase less than ~ 0.5 mg/L above steady state, not impacting the fishery with an unacceptably high D.O. environment. Thus slack tide will not significantly impact the performance of this oxygenation station.

2.7 Recommendations

The ECO2 oxygenation design for Back River will only result in 77% saturation of D.O. at the 15 ft depth at which it will be depressurized and discharged. Therefore effervescent loss of D.O. is not even possible. Aquaculture installations successfully discharge superoxygenated water at 29^oC and having a D.O. of 117 mg/L into 8 ft deep tanks and observe no effervescent loss of D.O. because of the rapid dilution achieved with the ambient D.O. water in the tank. Three examples are given of operating ECO2 Speece cone systems which superoxygenate a side stream of water and discharge it into “shallow” water with negligible loss of D.O. due to effervescence e.g. Logan Martin Dam on the Coosa River in Alabama (50 mg/L), Gowanus Canal in Brooklyn (50 mg/L) and a paper mill discharge (81 mg/L). For highly superoxygenation concentrations of 100 to >400 mg/L D.O. proper design of the depressurization/dilution diffuser is important to efficiently retain the D.O. mass in solution by minimizing effervescent loss of D.O. Results of laboratory studies to determine effervescent loss of D.O. from highly superoxygenated water reveals an effervescence threshold of nominally 170% to 240% saturation below which effervescence does not occur, regardless of the turbulence or nucleation sites involved. Studies have demonstrated that with proper depressurization/diffuser design, D.O. concentrations of >250 mg/L can be retained in solution with 95% mass efficiency. Lower D.O. concentrations can be 100% retained in solution.

3. Bathymetry of Back River

The Savannah District recently completed a hydrographic survey of the Back River in June 2011. The downstream extent of the survey was at the Tide Gate structure and the upstream was at New Cut closure. The hydrographic survey was provided to Tetra Tech in xyz format on June 21, 2011.

Figure 16 shows the bathymetric data plotted and the variations in the Back River. Figure 17 is a close-up view of the discharge point.

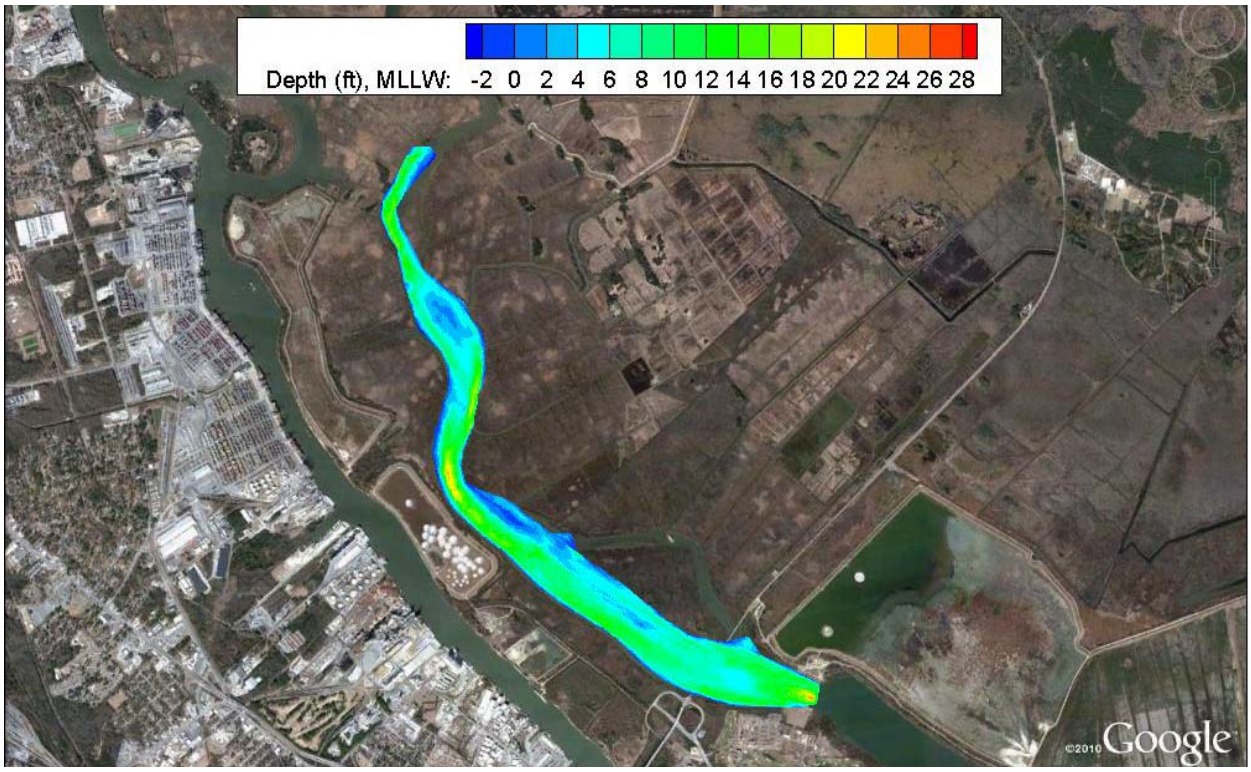


Figure 16 Bathymetry on the Back River (Data collected June 2011, USACE Savannah District)

The 2011 bathymetric data assisted in locating the water depth that would be appropriate for the oxygen injection discharge. The proposed discharge will be located on the Back River just downstream of the aeration lagoon on Hutchinson Island. Discharge point shown with an arrow in Figure 17 with a depth of approximately 15 feet of water.

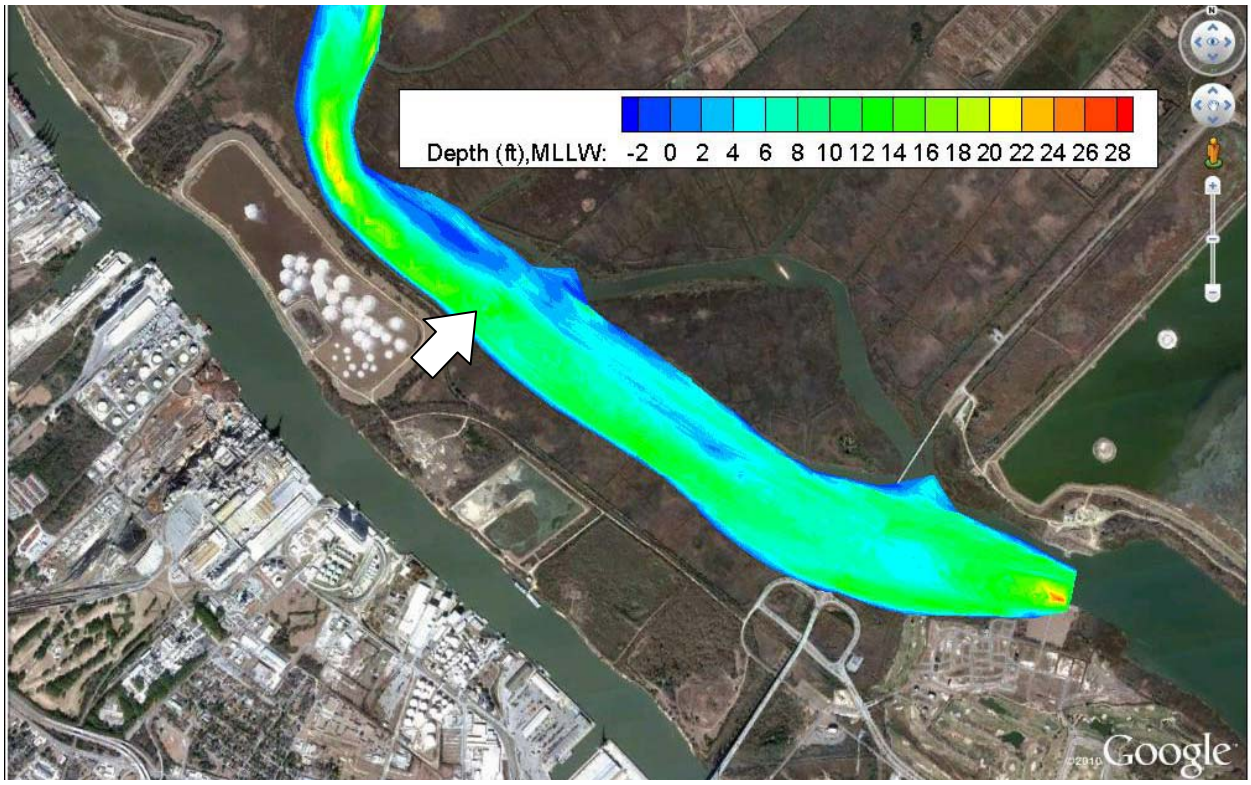


Figure 17 **Close-up Bathymetry of Discharge Location (Data collected June 2011, USACE Savannah District)**

4. Diffuser Design Calculations

Tetra Tech reviewed and identified pertinent sections of previous analyses performed on the Savannah Harbor hydrodynamic and water quality models and oxygen injection systems, with a focus on the depths and dynamics of Back River. A diffuser design spreadsheet was developed to calculate the head loss at the effluent pipe and minimum velocity required for the diffuser.

In order to accurately demonstrate how a Speece cone would perform in shallow water, Tetra Tech created multiple designs for the Back River location to compensate for the shallowness of the river. The design that created the most head losses was chosen so that effluent flow would dilute before approaching the water surface. This design was broken into three parts: influent, Pump to Speece cone, and effluent. A description of each part is given below.

- Influent – The influent entrance will be 3.5 feet from the river bottom. There will be a 90-degree turn piece installed. From here, 25 feet of 24-inch diameter ductile pipe is laid at a depth of 15 feet into the Savannah River. Once the pipe reaches the river's edge, a 45-degree angle will be installed and the pipe will travel 21 feet along the river's edge. Another 45-degree angle will be placed at the top of this pipe so that the pipe can now travel parallel with the ground. The pipe will travel 75 feet parallel with the ground. The pump will be located at the end of the 75 foot pipe. For the influent design, a total of 121 feet of 24-inch diameter ductile pipe will be used.

- Pump to Speece cone – From the pump, 600 feet of 18-inch diameter ductile pipe will be laid. At the end of the 600 feet, a 90-degree turn will be installed so that the water will flow up. From here 27 feet of pipe will be installed. At the end of this, another 90-degree turn will be installed, pointing downstream and parallel with the ground. From there, 6 feet of pipe will be installed with a 90-degree turn at the end of that, pointing towards the ground. This 90-degree turn will enter into the Speece cone. The total amount of 18-inch piped used in this section is 633 feet.

- Effluent – As the water exits the Speece cone, it will enter a 14-inch diameter ductile pipe. This pipe will be 73.25 feet long, aiming perpendicular to the river. This pipe will reach the river's edge. From here, a 45 degree angle pipe will be placed so that the water can travel parallel with the river's edge. A pipe 21 feet long will extend into the river. At the end of this, there will be a 45-degree angled turn will be installed so that the water can travel parallel with the river bottom. The 866.75-foot long pipe will lay parallel to the river bottom. Diffusers will be attached to this pipe, with the outflow at the same height as the inflow. The first diffuser will be located 145.75 feet from the beginning of the pipe, then each diffuser will be installed after every 100 feet. This will allow the dissolved oxygen to be more evenly distributed throughout the Back River. The total amount of 14-inch diameter ductile pipe used for this part of the design is 940 feet.

The total amount of pipe used for the entire design is roughly 1,694 feet. Using this value as well as the total amount of turns used in the design, the total head loss for the entire system could be determined. After finding the total head loss, the ideal pump could be determined. Tetra Tech determined that the Godwin CD500M C15 460 Horsepower pump would be the best for this project. This is the same pump used in the initial testing by MACTEC. It was determined that this pump would not cause cavitation under these conditions. It was also determined that the Speece cone would pump 40 mg/L of dissolved

oxygen (17.34 psi) into the river. Once all of these factors were considered, Bernoulli's equation was used, which showed that the effluent velocity would be 38.61 fps. Using this value, it was calculated that 8 diffuser ports, each with a diameter of 4 inches, would be required for this design.

The spreadsheet calculates the head loss through cone and pipe system. It calculates the effluent velocity which is critical in the mixing zone calculation. The following calculations are included in the spreadsheet.

Pipe Head Loss $= 0.002083 \bullet L \bullet \left(\frac{100}{c}\right)^{1.85} \bullet \left(\frac{gpm^{1.85}}{D^{4.8655}}\right)$

Minor Loss $= \sum k \bullet \frac{v^2}{2g}$

Pump Head Loss $= \frac{HP \bullet 550 \bullet E}{Q \bullet \gamma}$

Then based on the Bernoulli equation, the total pressure loss and velocity head can be computed with the following equation:

$$\frac{p_1}{\gamma} + z_1 + \frac{v_1}{2g} - h_f - h_m + h_p = \frac{p_2}{\gamma} + z_2 + \frac{v_2}{2g}$$

Table 1 shows the results of several scenarios based on pump sizing (horsepower, HP) and flowrate.

Table 1 Table of Exit Velocity Based on Flow Rate

Scenario	Flowrate (gpm)	Pump (HP)	Pump Name	Pipe Length (ft)	Pipe Diameter (in)	Effluent Velocity (ft/s)
1	11,600	460	CD500M C15	121.00	24	38.61
				633.00	18	
				940.00	14	
2	8,000	275	CD400M	209.50	18	75.77
				816.00	18	
3	4,800	275	CD300M	209.50	12	96.45
				816.00	12	
4	2,880	147	CD250M	209.50	10	91.65
				816.00	10	
5	2,880	300	HL225M	209.50	10	49.09
				816.00	8	
6	4,560	440	HL250M	209.50	12	121.67
				816.00	10	
7	4,000	151	DPC300	209.50	12	78.68
				816.00	12	

5. Mixing Zone Model

Tetra Tech revisited the mixing zone analysis performed previously (Tetra Tech 2010) based on new information such as the 2011 bathymetry and diffuser recommendations from Dr. Speece and ECO2.

5.1 MACTEC Summary

The MACTEC ReOx report was reviewed and summarized for use in the Back River design. The demonstration project consisted of two custom-built, 12-foot diameter ECO2 Speece cones with river water supplied by four 400-horsepower water intake pumps mounted on a 110-foot barge. The barge was temporarily moored at The Industrial Company (TIC) waterfront property on Hutchinson Island (river mile 14.1). The nominal water-flow capacity for the pump configuration was about 15,000 gallons per minute (gpm) at a hydraulic head of 150 feet (in the center of the cones). The overall transfer efficiency was 85 percent for the temporary demonstration system with some loss during tank filling. The average amount of oxygen added to the river was about 27,000 pounds per day (ppd). The oxygen concentration delivered from the cones to the river ranged from about 120 to 180 milligrams per liter (mg/L).

The Speece cones that were used were each capable of injecting up to 15,000 ppd of oxygen. This superoxygenated flow from the Speece cones was piped directly back to the river and discharged at a depth of about 30 feet where it was dispersed in the river by tidal action without benefit of a diffuser. Some effervescence of oxygen was evidenced at the water surface in the form of rising fine bubbles.

Maintenance was performed on the pumps approximately every 250 hours of operation. The pumps were manufactured by Godwin Pumps and were electrical.

5.2 Mixing Zone Results

The Visual Plumes model was used again based on information from ECO2 and the head loss calculations described in the previous section. The ambient data were received from EFDC simulation results on the Back River at the discharge location during the summer of 1997.

For the design information, the following were used:

- Diffuser = 4 in. diameter
- Quantity = 8 diffusers
- Spacing = 1 port every 100 feet = 700 feet of pipe
- DO Input from cone = 40 mg/L
- Pump = 460HP Godwin CD500M C15
- 80% Efficiency output = 11,600 gpm (approx.)

After determining the effluent flow and velocity, the pipe diameter and depth, the DO concentration, and the number of ports, the mixing zone analysis could begin. The ports are spaced 100 feet apart along the 845.75 foot pipe starting at the 145.75 foot mark, each pointed 90 degrees up toward the river's surface. After producing multiple runs through Visual Plumes, the scenario with the best dilution rate was chosen. Once the water exits the diffuser, the concentration dilutes to around 7 mg/L before reaching the surface. Using data from Visual Plumes, an image could be generated through Tecplot to give a small demonstration as to what the effluent would look like in the river. Figure 18 shows the results from the Visual Plumes model.

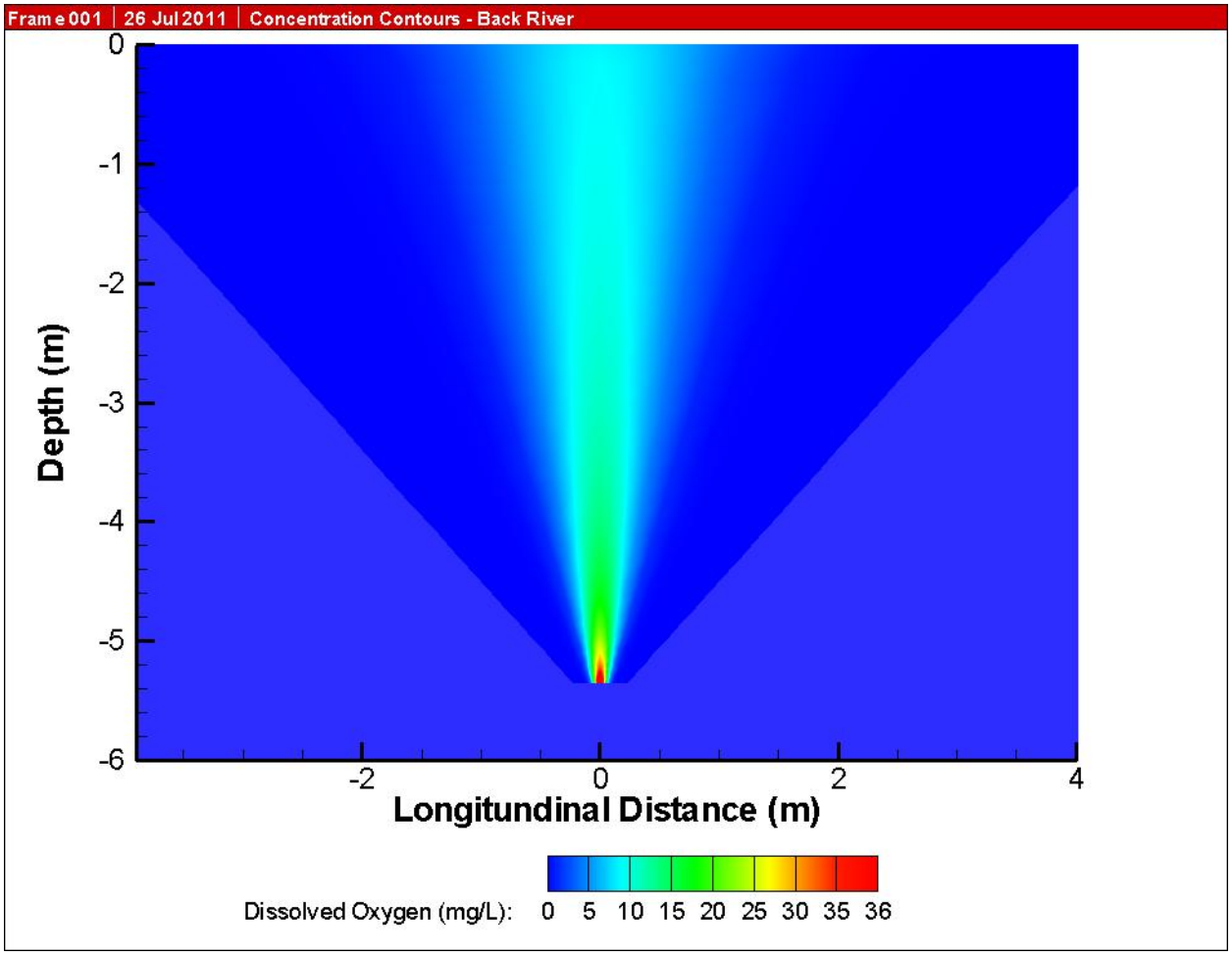


Figure 18 Mixing Zone results from Visual Plumes

6. Summary and Conclusions

The technology of the Speece cones will work at the Back River location. ECO2 performed an analysis based on percent saturation, discharge depth, and effluent pressure. The analysis proved that discharging 40 mg/L at a depth of 15 feet results in 77% saturation of D.O. This is under 100% and much lower than the minimum of 170% saturation needed for effervescence. The Speece cone can be successfully operated to discharge into shallow waters. Multiple examples were provided of successful Speece cone technology applications in waters that are 8 to 9 feet in depth. The Speece cone can be operated to discharge a D.O. level which is at the D.O. saturation level of the shallow water whereby precluding the potential for effervescence. Effervescent loss of D.O. is not even possible. An explanation of why effervescence occurred in the 2007 demonstration project was provided based on operation of the cones.

Aquaculture installations successfully discharge superoxygenated water at 29^{o}C and having a D.O. of 117 mg/L into 8 ft deep tanks and observe no effervescent loss of D.O. because of the rapid dilution achieved with the ambient D.O. water in the tank. Also, this analysis demonstrated the D.O. concentrations do not accumulate to unhealthy (toxic) levels during high or low slack tides in the Back River.

A detailed bathymetry of the Back River was conducted by the Savannah District and shown in this report. The discharge depth in the vicinity of the Back River injection is approximately 15 feet. The Tetra Tech mixing zone analysis showed the pressure head calculations and mixing zone determination was sufficient to discharge the poundage required. With a reasonable number of ports and the exit velocity, the oxygen plume is readily mixed due to advection and dispersion in the Back River.

7. References

Jones and Stokes, 2004: "Final Aeration Technology Feasibility Report for the San Joaquin River Deep Water Ship Channel" Final Report, October 2004.

MACTEC, 2008: Savannah Harbor Reoxygenation Demonstration Project, Savannah, Georgia. Prepared for the Georgia Ports Authority, January 8, 2008.

Speece, R.E., 2004: The Role Of Superoxygenation In Achieving TMDL Requirements, R. E. Speece, Ph.D., Centennial Professor Emeritus of Civil and Environmental Engineering Vanderbilt University, Nashville, TN and Board Member of ECO2. Indianapolis, Indiana.

Tetra Tech, 2010 "Oxygen Injection Design Report, Savannah Harbor Expansion Project, Savannah, Georgia" Final Report, October 15, 2010.

Tetra Tech, 2008: Final Report, Design of Dissolved Oxygen Improvement Systems in Savannah Harbor. Atlanta, Georgia.

Tetra Tech, 2009: Modeling of GPA's Oxygen Injection Demonstration Project Savannah Harbor, Georgia. Atlanta, Georgia.

Appendix A – Diffuser Options

Type: Tide Flex Diffuser (TFD's)

Company: Tide Flex Technologies (http://www.tideflex.com/tf/index.php/)

Analysis

- Extremely versatile – easily retrofitted to fit any pipe size you give
- Prevents backflow into the system
- **More even flow distribution among mutli ports**
- **Significantly improved salt water purging characteristics**
- **Lower headloss at peak flow increases flow capacity**
- **Higher jet velocity at low flows improves initial dilution**
- **Less variability in jet velocity and headloss thru range of flows**
- **30 year operation life**

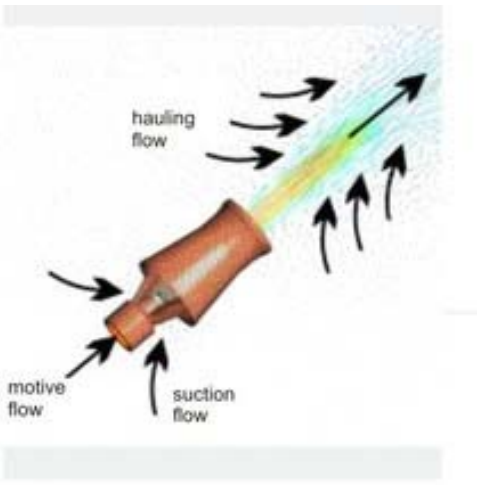
Disadvantages

- Data and calculations are produced directly by the company
- Unkown cost

Other info

http://www.scribd.com/doc/30924376/MeasurIT-Tideflex-Effluent-Diffuser-Systems-0910
http://www.aeiltda.com.co/descargas/Red%20Valve/Tideflex-Check-Valve-brochure.pdf

http://www.sgm-inc.com/fileadmin/sgm/home/happenings/2009_Effluent_Diffusers.pdf



Type: SBR-Plants (Sequenced Batch Reactor) Körting Ejectors

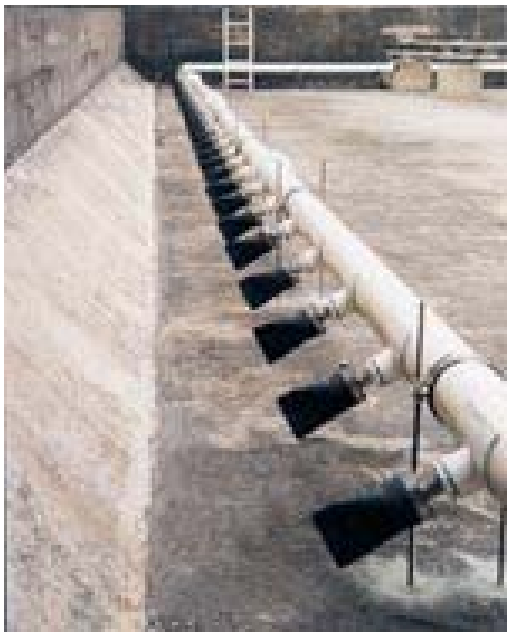
Company: KörtingHannover AG (http://www.koerting.de/index_html_en?set_language=en&cl=en)

Analysis:

- Creates a more direct stream of flow
- Mutiple nozels can be attached to one fitting
- Low cost
- Water jet
- No sealing problems
- This nozel provides pre-mixing before the DO would even enter the channel

Other info

http://www.koerting.de/dateien/strahlpumpen/watertreatment.pdf



Bailey, William G SAS

From: Bailey, William G SAS
nt: Monday, August 01, 2011 11:34 AM
: 'Beckham, J. Christopher'
Cc: 'Wade Cantrell'; Okane, Jason D SAS; McIntosh, Margarett (Mackie) SAS; Hoke, Joseph T SAS
Subject: Savannah Harbor Expansion Project -- Comparison of Sigma and Z-grid EFDC models (UNCLASSIFIED)
Attachments: FINAL Report - SHEP Model Comparison July 29, 2011.pdf

Classification: UNCLASSIFIED
Caveats: NONE

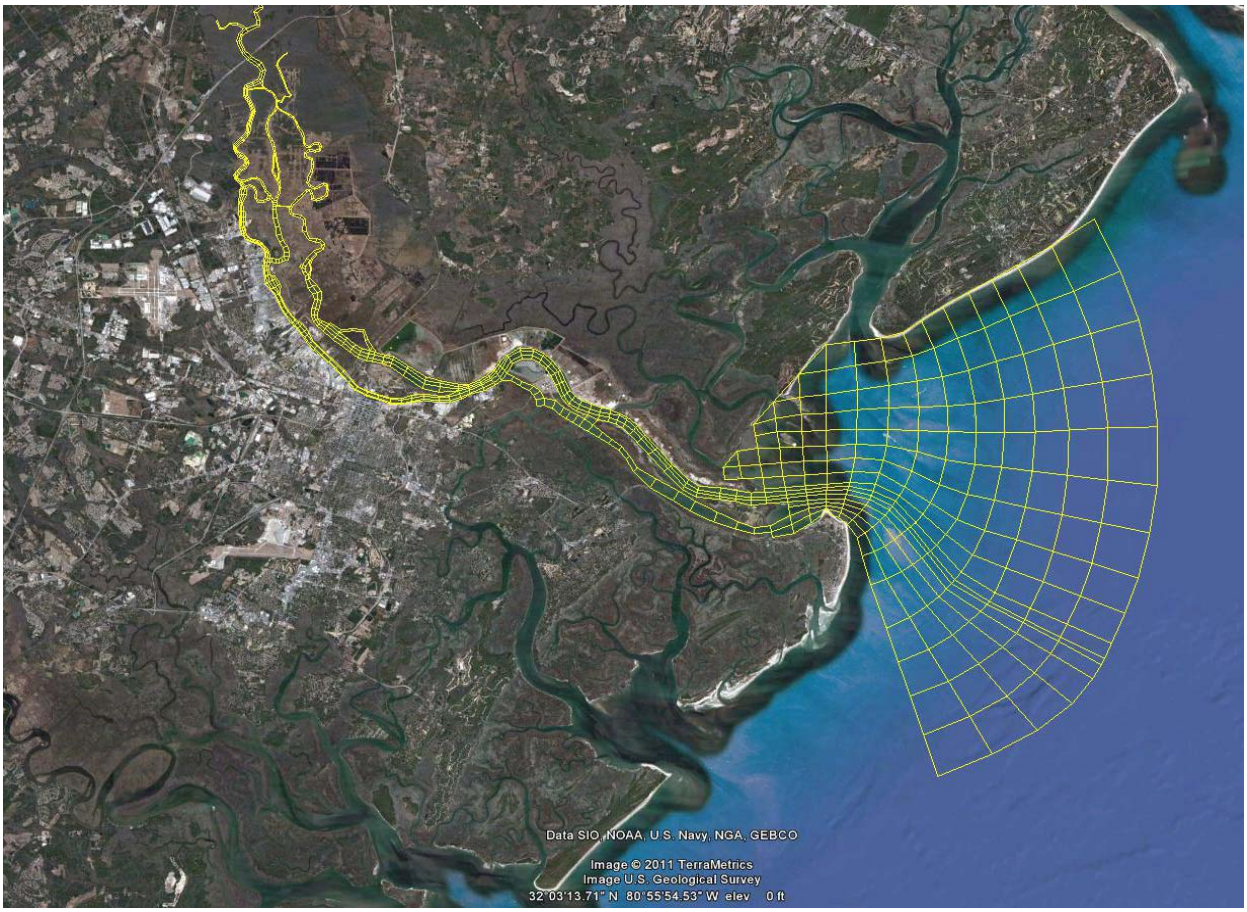
SC DHEC had requested we compare the hydrodynamic and water quality models that the Corps used in the impact evaluation for this project with a version of those models that EPA subsequently developed. We consulted with Wade to better understand the Department's concerns prior to initiating the work.

Our contractor has completed the work and we provide the attached report for your review. We believe it fully addresses your concerns about this issue.

Bill Bailey

`assification: UNCLASSIFIED
veats: NONE

Model Comparison Report
In Support of the
Savannah Harbor Expansion Project



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Contract No: W912HN-09-R-0081
Work Order DQ03 (SEPI Contract)

July 29, 2011

Acknowledgements

Mr. Joe Hoke contributed to this report and coordinated efforts with the contractor team and the Savannah District. Mr. Wade Cantrell from the South Carolina Department of Health and Environmental Control (DHEC) assisted in the scope of this work. Mr. Steven Davie was the project manager from Tetra Tech and was supported by Mr. Jim Greenfield, Dr. Hugo Rodriguez, and Dr. Yuri Plis. Mr. Phillip Todd was the project manager for SEPI.

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1.0 INTRODUCTION

The United States Army Corps of Engineers (USACE), Savannah District is working with the Georgia Ports Authority (GPA) to evaluate the deepening of the navigation channel in Savannah Harbor. This effort is called the Savannah Harbor Expansion Project (SHEP). The project is intended to identify the impacts and mitigation strategies of deepening the harbor from its presently authorized 42-foot depth Mean Lower Low Water (MLLW), up to a depth of 48-feet MLLW.

Hydrodynamic and water quality models were developed and determined to be acceptable in March 2006 by the United States Environmental Protection Agency (USEPA), United States Fish and Wildlife Services (USFWS), Georgia Environmental Protection Division (GAEPD), and South Carolina Department of Health and Environmental Control (SCDHEC) to identify dissolved oxygen levels throughout Savannah Harbor. This set of models are called the Sigma Model. During 2007, EPA Region 4 determined a need to convert the sigma grid of the enhanced model to a Z-Grid, which was later updated with new Middle River and Back River bathymetry and recalibrated to 2009 USGS velocity and flow data. The Z-Grid model was further enhanced to be used for the Savannah harbor Chloride analysis.

It should be noted that the Sigma and Zgrid models were calibrated for different purposes. The Sigma model was calibrated on 1997 and 1999 data and was designed for SHEP impact use in a way that state and federal agencies and peer reviews deemed appropriate. The Zgrid model was refined to better handle the EPA, Georgia and South Carolina TMDL development needs and the Corp's chlorides analysis for the Upper Savannah River portion of the model. The Z-Grid model was based on the Sigma Model and then updated with 2009 USGS data. This report does not develop any conclusions about one model being better than the other but is just to illustrate the differences. However it should be noted that even though the models were developed about 10 years apart the results are remarkably similar.

The basic tasks included in this *Model Comparison Report* are as follows:

- Comparison of Z-Grid Model and Sigma Models' salinity and velocities at Houlihan Bridge
- Comparison of Z-Grid Model and Sigma Model Predictions of the Surface Salinities at the 0.5 ppt 50% Exceedance Levels
- Estimation of wetland impacts due to Harbor Deepening using the Z-Grid Model results

2.0 TECHNICAL APPROACH

This Scope is to compare the Corp's Savannah Harbor Hydrodynamic and Water Quality Models (Sigma Grid) with EPA's updated TMDL Hydrodynamic and Water Quality Models (Zgrid Grid) under baseline 1997 conditions. Both sets of models use the same hydrodynamic model linked to a water quality model. The hydrodynamic model used is the Environmental Fluid Dynamics Code (EFDC) developed and maintained by Tetra Tech (Hamrick 1992). The water quality model used is the Water Quality Analysis Simulation Program (WASP) maintained by EPA.

The Z-Grid model builds on the original harbor model. During 2007, EPA Region 4 determined a need to convert the sigma grid of the enhanced model to a Z-Grid. Hundreds of Savannah Harbor TMDL modeling runs were going to be necessary over a multiyear time period and the Sigma Grid WASP model took a day to run one year. So EPA changed to the Zgrid model which ran one year of water quality in a couple of hours. The initial grid model predictions were very similar to the Sigma model, the major changes in the Zgrid model occurred when EPA recalibrated the Middle and Back River based on new bathymetry, velocity and flow data collected by USGS in 2009.

The Z-Grid allows for varying number of vertical layers throughout the model domain. The Sigma Grid has six vertical layers with widely varying layer depths, the Z-Grid model was converted to five vertical layers in the navigation channel and one vertical layer in the Middle, Back, Little Back, and Upper Savannah Rivers allowed all the layers to be similar depths. The Z-Grid allowed for the invert of the river bottom elevation to be modified with one vertical layer going upstream from the I-95 Bridge to the Clyo USGS gage on the Savannah River. A more detailed description of the Z-Grid model is explained in a later section of this report.

The EPA Z-Grid model was updated by Tetra Tech in 2010 for use in the Corp's Chloride modeling analysis. The updates included expanding the Upper Savannah River portion of the model to include Abercorn Creek tributary. This is the Z-Grid model used for the following model comparisons.

The EFDC model is part of the USEPA TMDL Modeling Toolbox due to its application in many TMDL-type projects. As such, the code has been peer reviewed and tested and has been freely distributed for public use. EFDC was developed by Dr. John Hamrick and is currently supported by Tetra Tech for USEPA Office of Research and Development (ORD), USEPA Region 4, and USEPA Headquarters. EFDC has proven to capture the complex hydrodynamics in systems similar to that of Savannah Harbor. The EFDC hydrodynamic and sediment transport model linked with the WASP water quality model provides the most appropriate combination of features necessary for this study. EFDC is a multifunctional, surface-water modeling system, which includes hydrodynamic, sediment-contaminant, and eutrophication components. The EFDC model is capable of 1, 2, and 3-D spatial resolution. The model employs a curvilinear-orthogonal horizontal grid and a sigma, or terrain following, vertical grid. The EFDC model's hydrodynamic component employs a semi-implicit, conservative finite volume-finite difference solution scheme for the hydrostatic primitive equations with either two or three-level time stepping (Hamrick 1992).

The EFDC hydrodynamic model can run independently of a water quality model. For this Savannah Harbor application the EFDC model simulates the hydrodynamic and constituent (salinity and temperature) transport and then writes a hydrodynamic linkage file for the water quality model WASP7 code.

WASP7 is a version of WASP with many upgrades to the user's interface and the model's capabilities. The major upgrades to WASP have been the addition of multiple BOD components, addition of sediment diagenesis routines, and addition of periphyton routines. WASP is an enhanced Windows version of the USEPA Water Quality Analysis Simulation Program (WASP), nonetheless, uses the same algorithms to solve water quality problems as those used in the DOS version. WASP is a dynamic compartment-modeling program for aquatic systems, including both the water column and the underlying benthos. The time-varying processes of advection, dispersion, point and diffuse mass loading and boundary exchange are represented in the basic program.

2.1 Sigma Grid EFDC Application to the Savannah River Estuary

The Sigma Grid EFDC model was calibrated with seven years of data – from January 1, 1997 through December 31, 2003. The model grid, which includes 931 horizontal cells, extends upstream to Clyo, Georgia (~ 61 miles from Fort Pulaski) and downstream to the Atlantic Ocean (~17 miles offshore from Fort Pulaski). The model also includes marsh cells, to simulate the extensive intra-tidal marsh areas in the system, increasing the number of total cells to 947. The man-made connections affecting the system were included in the model. These included McCoy Cut, Rifle Cut, Drakie's Cut, New Cut as closed, and the sill of the Tide Gate.

Figure 2-1 shows the modeling grid. The Savannah Harbor EFDC model was calibrated with graphical time series comparisons (qualitative) and statistical calculations (quantitative). The statistical calculations

included percentiles at 5% intervals. It included: water surface elevation, currents, flow, temperature, and salinity.

The calibration objectives for the hydrodynamic model were to appropriately represent the transport processes by propagating momentum and energy through the system based upon freshwater inflow from the Savannah River and tidal energy from the Atlantic Ocean. Since vertical stratification plays a major role in the water quality of the lower harbor area, it was imperative to capture the effect of tides and fresh water flows on salinity and temperature over the appropriate spatial and temporal scales. The primary objective was to simulate the salinity and temperature stratification events and to demonstrate that the duration and magnitude of the events were appropriately represented in the model. The calibration period was the summer of 1999. The confirmation period was the summer of 1997. Long-term United States Geological Survey (USGS) data was also used for confirmation. The two summer periods were both low-flow conditions with several spring/neap tide events occurring throughout the period.

The model calibration and validation results are presented in the report "Development of the Hydrodynamic and Water Quality Models for the Savannah Harbor Expansion Project", of January of 2006, prepared by Tetra Tech, Inc. for the Savannah District of USACE.

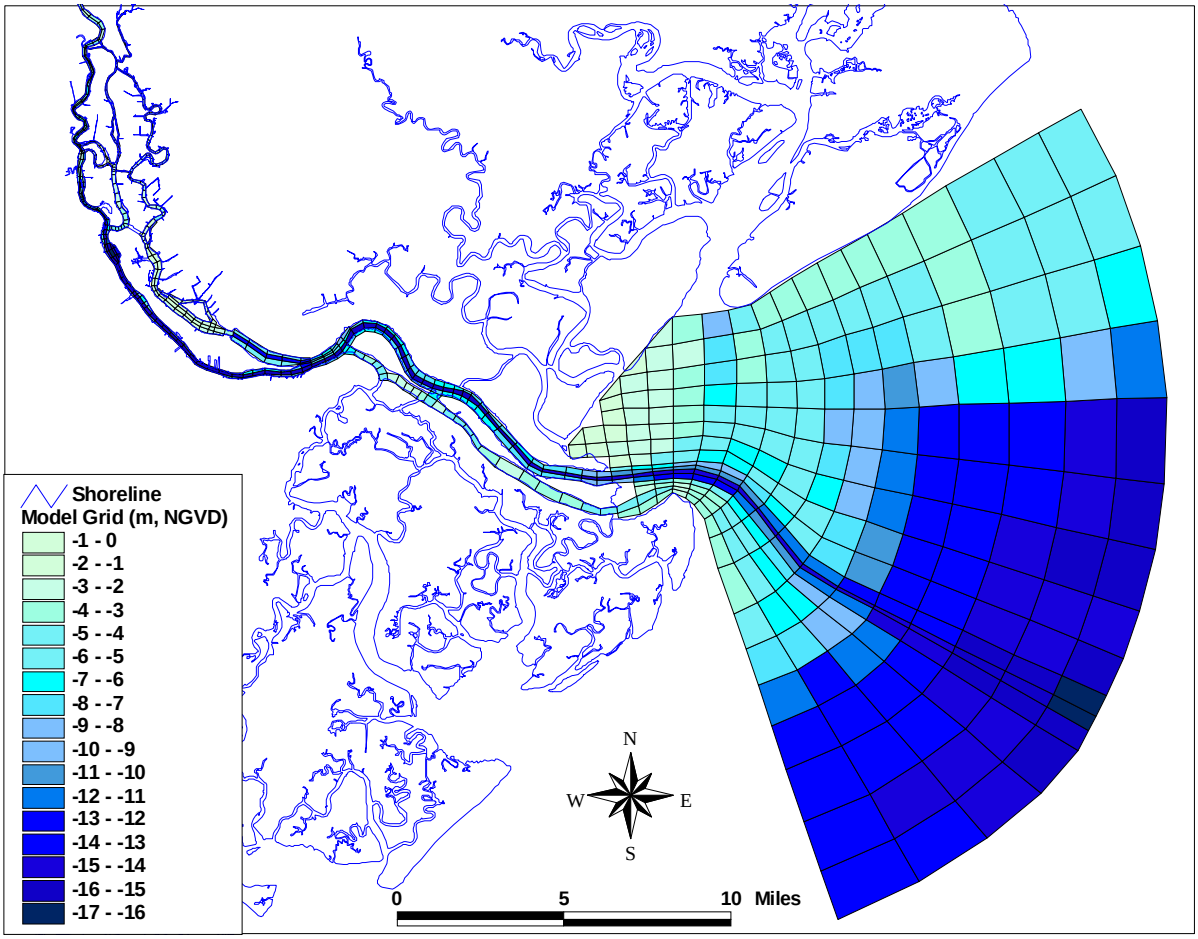

Figure 2-1 EFDC Sigma Grid

2.2 EPA Z-Grid Model Application to the Savannah River Estuary

The Z-Grid model builds on the original harbor model developed for EPA Region 4 during the development of the Total Maximum Daily Load in 2004-2005 and the enhanced model for the United States Army Corps of Engineers (USACE) finalized on January 30, 2006 (Tetra Tech 2006). During 2007, EPA Region 4 determined a need to convert the sigma grid of the enhanced model to a Z-Grid. The Z-Grid allows for varying number of vertical layers throughout the model domain. The sigma grid is six vertical layers with widely varying layer depths, while the Z-Grid has five vertical layers in the navigation channel and one vertical layer in the Middle, Back, Little Back, and Upper Savannah Rivers which allowed all the layers to be similar depths. The Z-Grid allowed for the invert of the river bottom elevation to be modified with one vertical layer going upstream from the I-95 Bridge to the Clyo USGS gage on the Savannah River. The longitudinal slope was evenly distributed from the headwater cell to above the I-95 Bridge by adjusting bottom elevations. The water surface elevation at the headwater boundary cell was raised to better match the gage height reported at the Clyo USGS gage. In addition to the Z-Grid conversion, the watershed tributary flows and marsh areas were revised.

The Z-Grid model, Figure 2-2, contains 608 horizontal cells and 1,778 total cells when including the vertical cells. The original flow, velocity, elevation and temperature predictions were calculated using the EFDC hydrodynamic model and calibrated to the extensive 1997 and 1999 data set (Tetra Tech 2006). The EFDC model inputs were updated to reflect more recent information. This information includes new flow gages by USGS in the harbor, long-term DO data at the USACE Dock, updates to the boundary conditions, connection to EPD's river model, and updates to water quality kinetics.

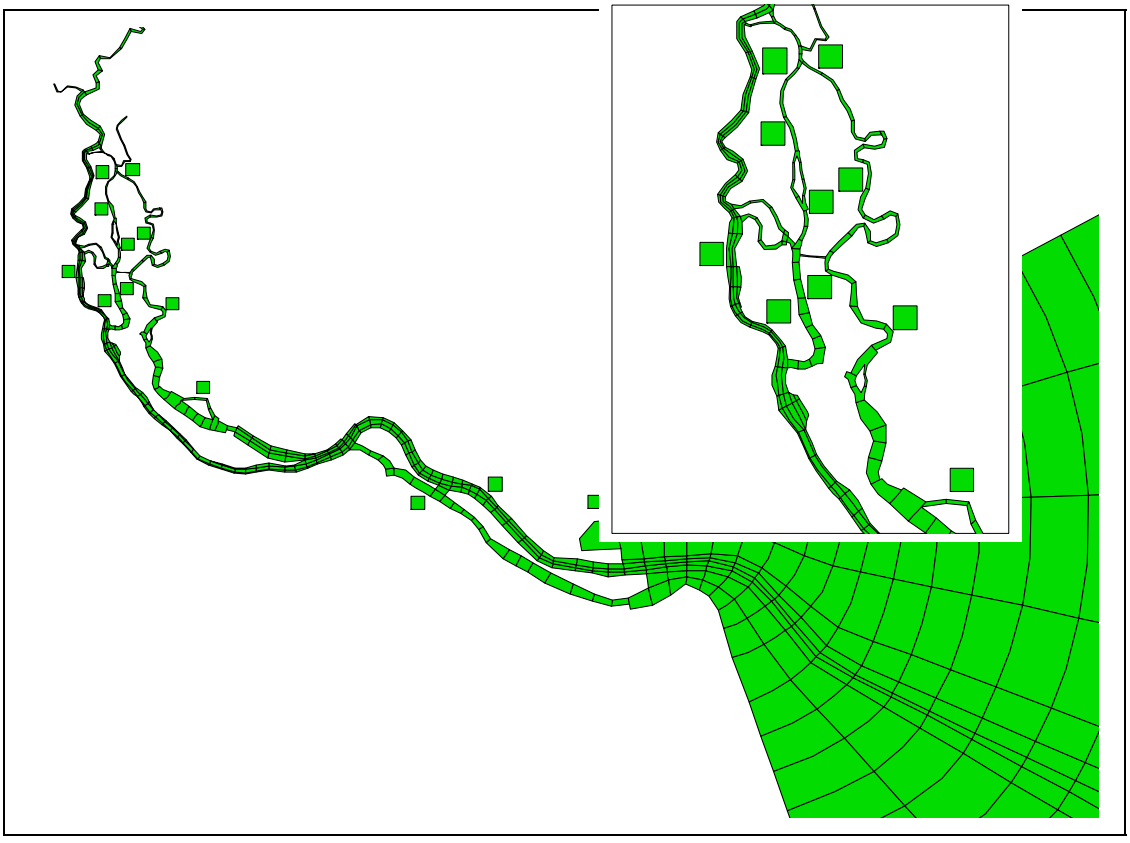

Figure 2-2 Savannah Harbor Z-Grid Model (marsh cells shown for representation)

The USGS collected detailed (15 minute) water surface elevation, velocity and flow data during the fall and winter of 2008 – 2009 at the Middle and Back Rivers near the Houlihan Bridge crossings at Stations MR-10 and LBR-15, respectively. These data were used to improve the hydrodynamic predictive ability of the model in the Middle and Back Rivers. The updates focused on improving the width and depths of the river channels in the model and changing the marsh storage areas to better reflect the movement of water through the channels so the model would better reflect the measured flows, velocities and elevations. (2010 EPA Region 4) Figure 2-3 and Figure 2-4 illustrate an example of the models predictive capabilities for gage height and flows for Little Back River at Houlihan Bridge.

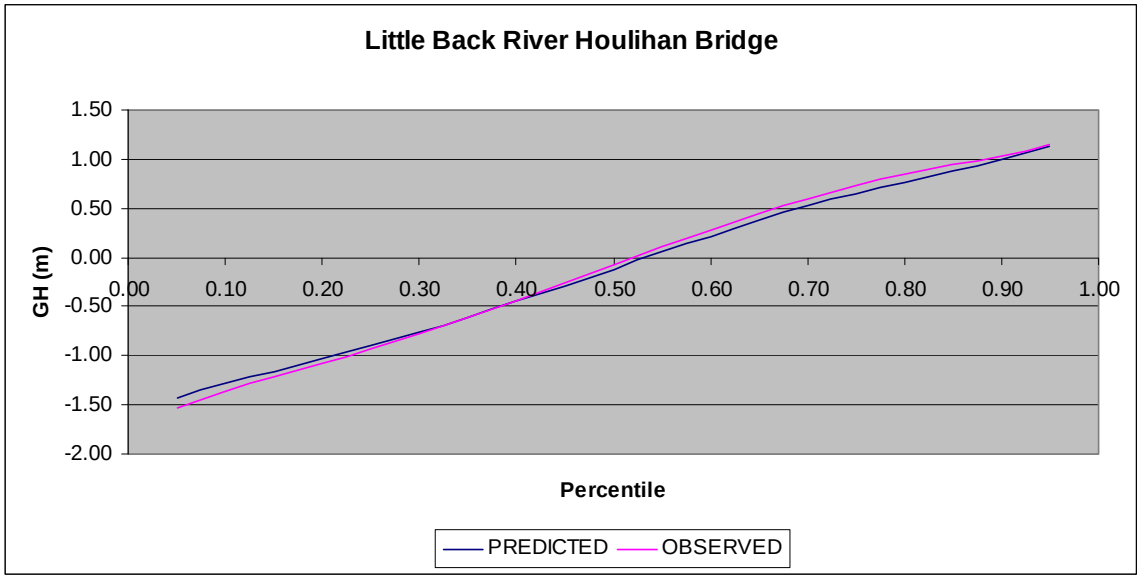

Figure 2-3 Percentile Comparison of Predicted and Measured Gage Heights

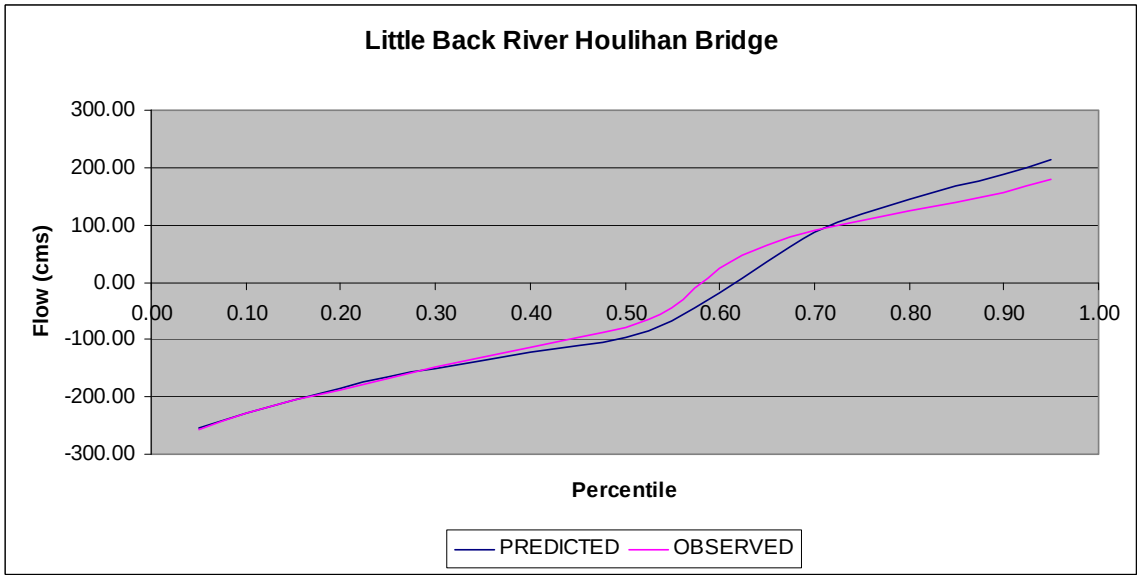

Figure 2-4 Percentile Comparison of Predicted and Measured Flows

Georgia EPD has developed a hydrodynamic and water quality model (EPDRiv1 Model) for the Savannah River from the Augusta Canal diversion dam to the USGS stage recorder (02198760) near

Hardeeville, South Carolina. This model was used to transport the oxygen demanding substances from the upper watershed to the Harbor Model. This provided a seamless connection between the Savannah River Model and the Savannah Harbor Model. The Sigma model and the original (pre 2009) Zgrid model used USGS Clyo gage flow and water quality data for the Savannah River input boundary.

The Z-Grid model, as used for TMDL development, was reviewed extensively by an EPA, States and Dischargers' Technical Advisory Group. . This group of technical experts w from or represented the Savannah Harbor Committee, Central Savannah River Area TMDL Group, USEPA, Georgia EPD and South Carolina DHEC. The Technical Advisory Groups conclusion was the River and Harbor Models as refined during 2009 subgroup work effort provide sufficient tools to develop a revised Savannah Harbor TMDL

Tetra Tech used the Z-Grid model for the 2010 chloride analysis in support of SHEP. The Z-Grid model was used because of the improved flow calibration in the upper part of the system. The Abercorn Creek, including Big Collis, Little Collis, and Bear Creeks, was added to the model domain by adding grid cells and measured depths for the bathymetry. The model was calibrated to a longterm chloride dataset at the City's intake and further validated with flow and salinity data in the harbor through 2009. The Z-Grid model was reviewed through Agency Technical Review (ATR) by Mr. John Hazelton (USACE Wilmington District) in November 2010 and Independent External Peer Review (IEPR) by Battelle Memorial Institute in February 2011.

3.0 MITIGATION PLANS FOR SALINITY AND WETLANDS

The USACE Savannah District used the EFDC (Sigma grid) to determine the appropriate measures to mitigate for salinity and wetland impacts. Plan 6A includes the following flow-altering mitigation features: McCoy Cut diversion structure; channel enlargement on McCoy Cut, and upper Middle and Little Back Rivers; submerged sill and broad berm at the mouth of Back River, closure at Rifle Cut and lower arm at McCoy Cut; and removal of the tide gate abutments and piers. These features act together to increase freshwater flows through Middle, Little Back and Back River while maintaining tidal flow access to mitigate for salinity intrusion from the deepened navigation channel.

Figure 3-1 was provided by the USACE Savannah District and depict the different features for Plan 6A.

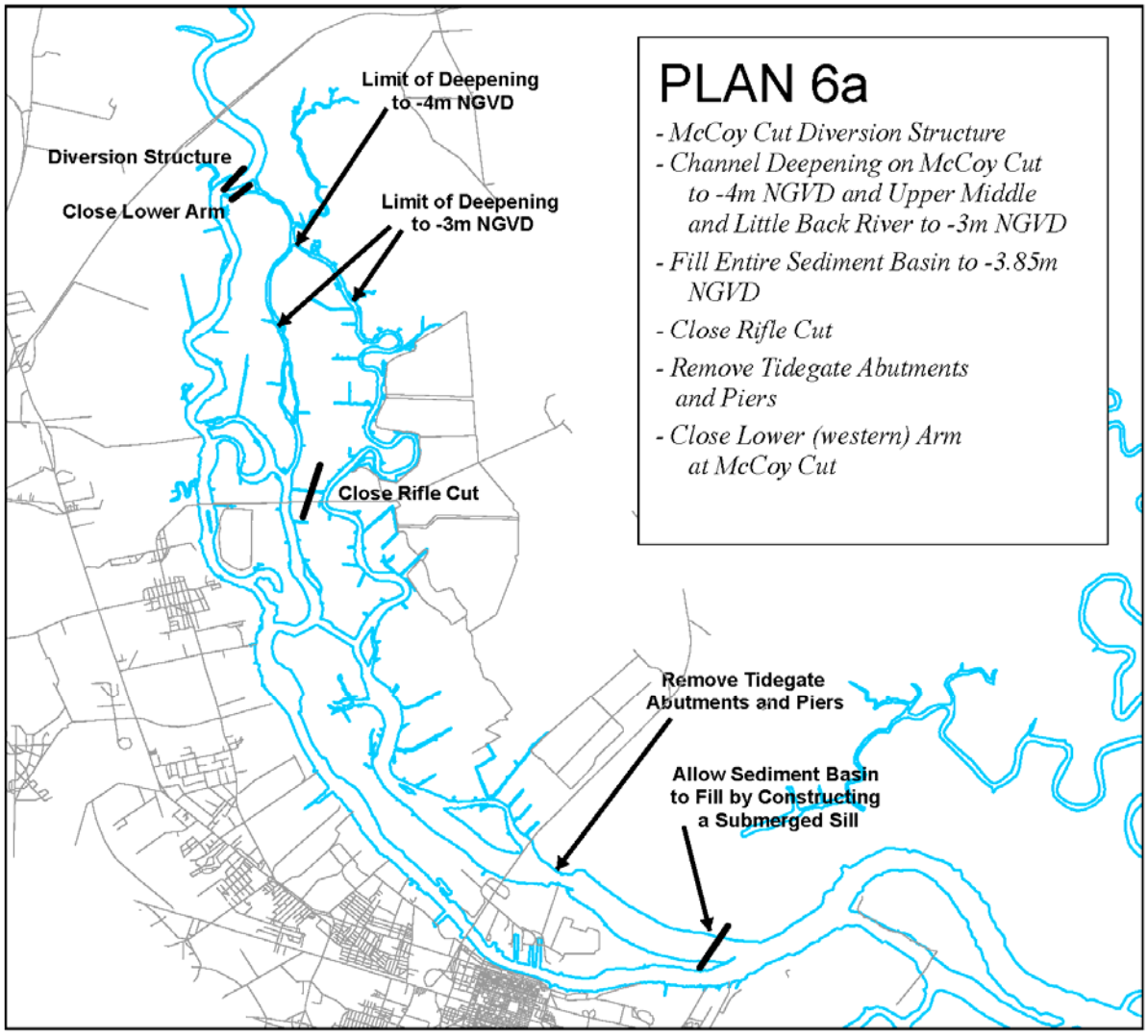

Figure 3-1 Mitigation Plan 6A (courtesy of the USACE Savannah District)

4.0 SALINITY COMPARISONS AT HOULIHAN BRIDGE FOR FRONT, MIDDLE AND BACK RIVERS.

The location where Houlihan Bridge crosses the Front, Middle and Back Rivers was selected for Salinity Comparisons between the Sigma Grid and Z-Grid Models.

4.1 Salinity Comparisons under Existing Conditions

Tables 4-1 to 4-3 and Figures 4-2 to 4-4 show the differences in salinity predictions for Front, Middle and Back Rivers. The Z-Grid model predicts salinity moving upstream slightly farther than the Sigma Grid model.

Table 4-1 Front River Salinity Comparisons

Front River Z-Grid - Sigma Grid 1997 Model Comparisons Salinity (ppt)			
Percentiles	10th	50th	90th
Sigma Grid	0.0	0.2	2.8
Z-Grid	0.03	0.78	4.0

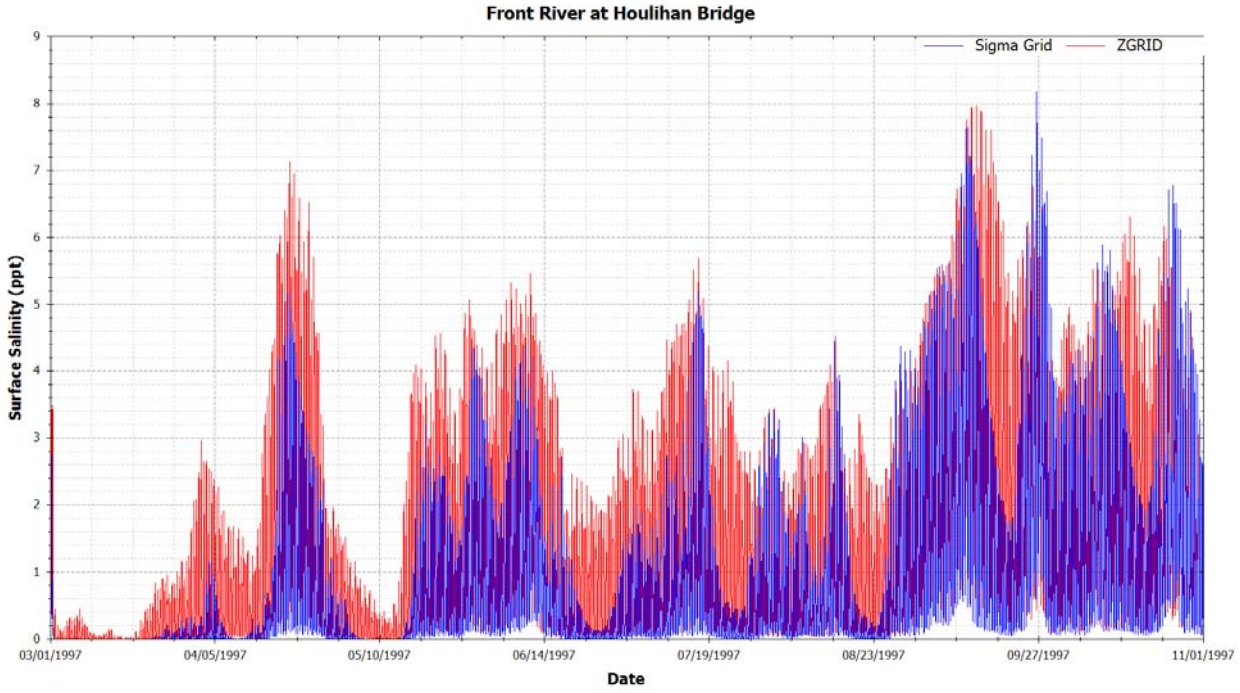

Figure 4-1 Front River Salinity Comparisons

Table 4-2 Middle River Salinity Comparisons

Middle River Z-Grid - Sigma Grid 1997 Model Comparisons Salinity (ppt)			
Percentiles	10th	50th	90th
Sigma Grid	0.0	0.37	1.9
Z-Grid	0.19	1.1	3.0

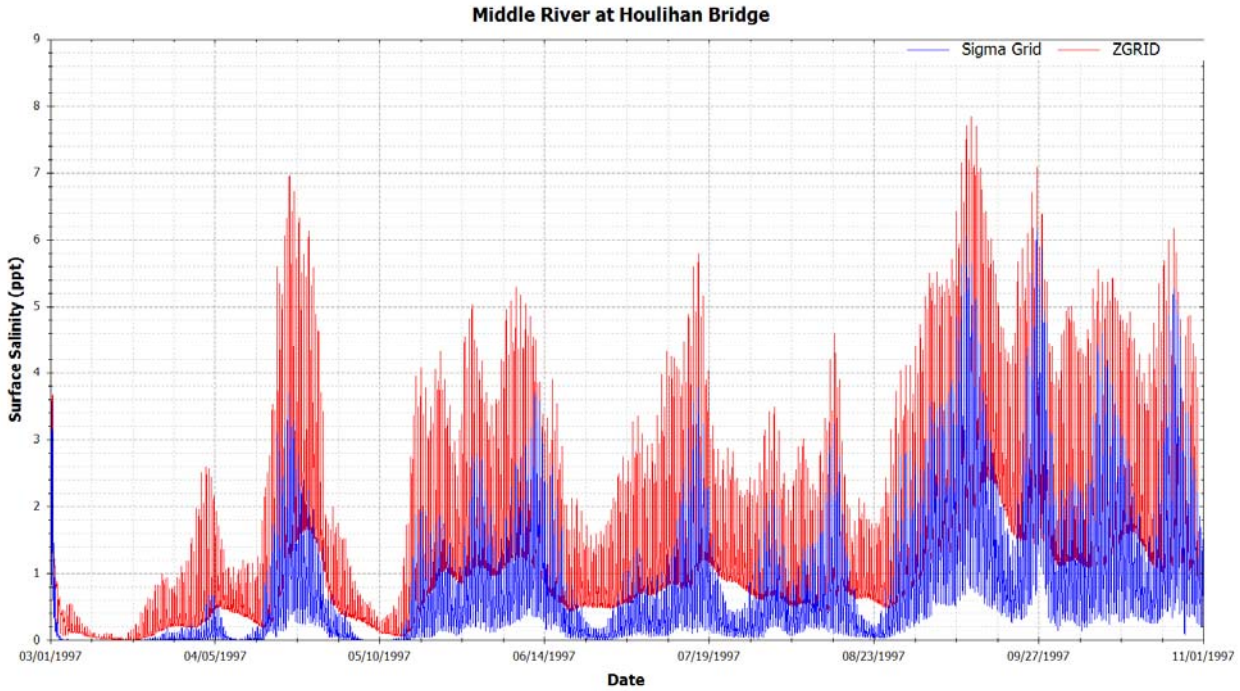

Figure 4-2 Middle River Salinity Comparisons

Table 4-3 Back River Salinity Comparisons

Back River Z-Grid - Sigma Grid 1997 Model Comparisons Salinity (ppt)			
Percentiles	10th	50th	90th
Sigma Grid	0.0	0.15	1.0
Z-Grid	0.02	0.33	1.79

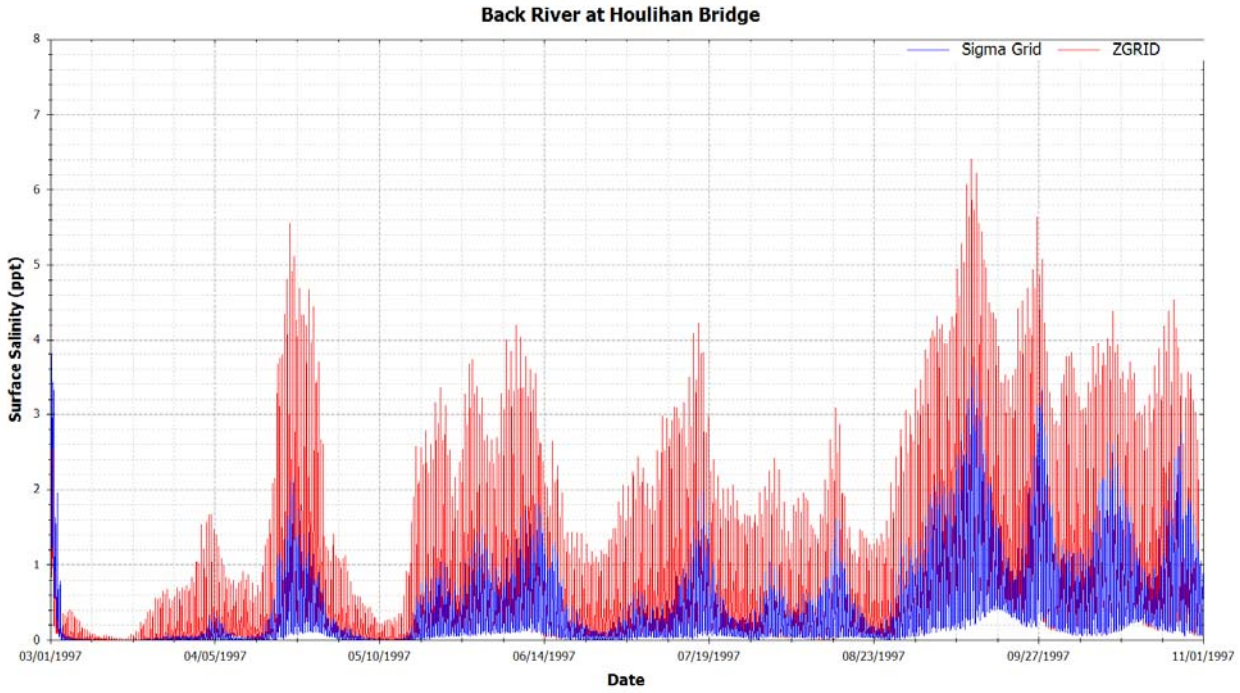

Figure 4-3 Back River Salinity Comparisons

4.2 Velocity Comparisons at Houlihan Bridge for Front, Middle and Back Rivers.

Houlihan Bridge crossings at Front, Middle and Back Rivers are used for Velocity Comparisons between the Sigma Grid and Z-Grid Models. Tables 4-4 to 4-6 and Figures 4-6 to 4-8 illustrate the differences in velocity for Front, Middle and Back Rivers. Overall the Z-Grid Model predicts higher surface velocities both in the upstream (+) and downstream (-) directions with an increase in the average surface velocity in the upstream direction. This corresponds with the increased salinity movement upstream.

Table 4-4 Front River Velocity Comparisons

Front River Z-Grid - Sigma Grid 1997 Model Comparisons Average Velocity (cm/sec)			
Percentiles	10th	50th	90th
Sigma Grid	-73	-28	+47
Z-Grid	-99	-40	+97

Figure 4-4 Front River Velocity Comparison

Table 4-5 Middle River Model Velocity Comparisons

Middle River Z-Grid - Sigma Grid 1997 Model Comparisons Velocity (cm/sec)			
Percentiles	10th	50th	90th
Sigma Grid	-34	-11	+27
Z-Grid	-48	-22	+46

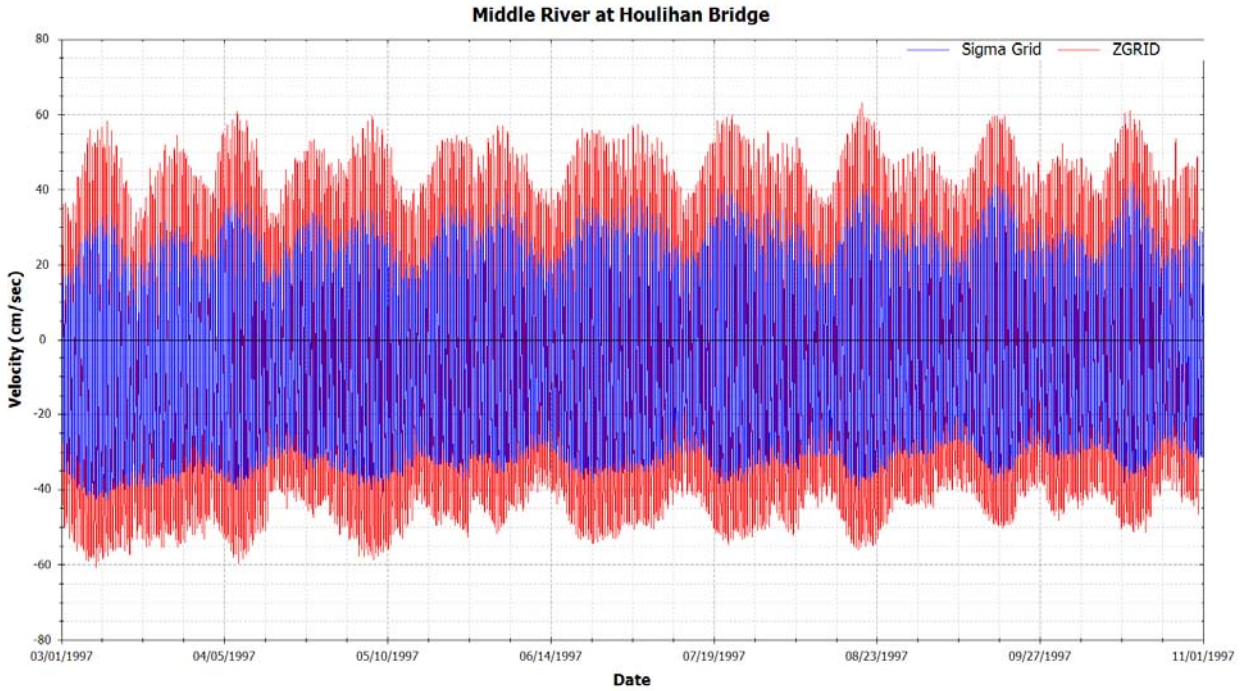

Figure 4-5 Middle River Velocity Comparison

Table 4-6 Back River Velocity Comparisons

Back River Z-Grid - Sigma Grid 1997 Model Comparisons Velocity (cm/sec)			
Percentiles	10th	50th	90th
Sigma Grid	-20	-14	+18
Z-Grid	-45	-23	+29

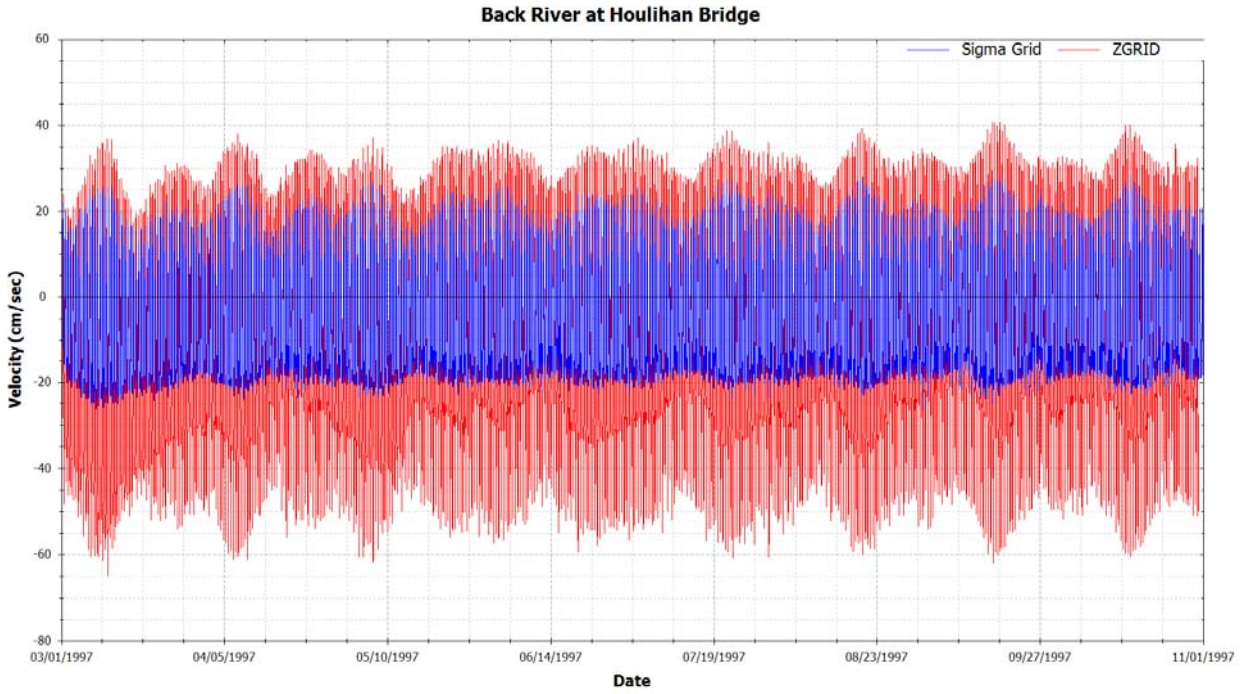

Figure 4-6 Back River Velocity Comparison

4.3 Salinity Comparisons for 48 ft Project Depth with Mitigation Plan 6A

For the Plan6A mitigation scenario, Tables 4-7 to 4-9 and Figures 4-7 to 4-9 show the differences in salinity predictions for Front, Middle and Back Rivers. For the Front and Middle Rivers the Z-Grid model predicts salinity moving upstream slightly farther than the Sigma Grid model, while for the Back River the Z-Grid model predicts salinity moving upstream slightly less than the Sigma Grid model. Also the Z-Grid model show much less tidal variation of salinity, this is due caused by fresh water moving farther down the Back River and the associated marsh areas, damping the impacts of the salinity movement.

Table 4-7 Front River Salinity Comparisons

Front River Z-Grid - Sigma Grid 1997 Model Comparisons Salinity (ppt)			
Percentiles	10th	50th	90th
Sigma Grid	0.0	0.65	3.9
Z-Grid	0.09	1.5	5.3

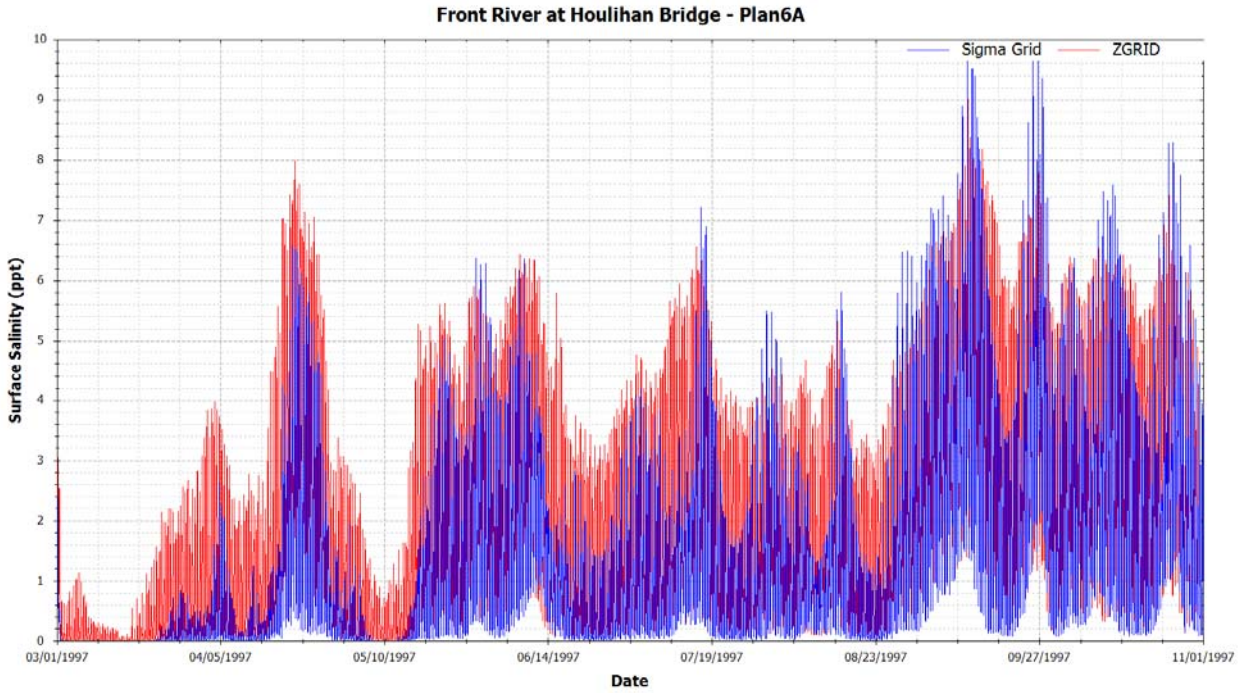

Figure 4-7 Front River Salinity Comparisons – Plan6A

Table 4-8 Middle River Salinity Comparisons

Middle River Z-Grid - Sigma Grid 1997 Model Comparisons Salinity (ppt)			
Percentiles	10th	50th	90th
Sigma Grid	0.0	0.04	0.36
Z-Grid	0.32	2.1	4.3

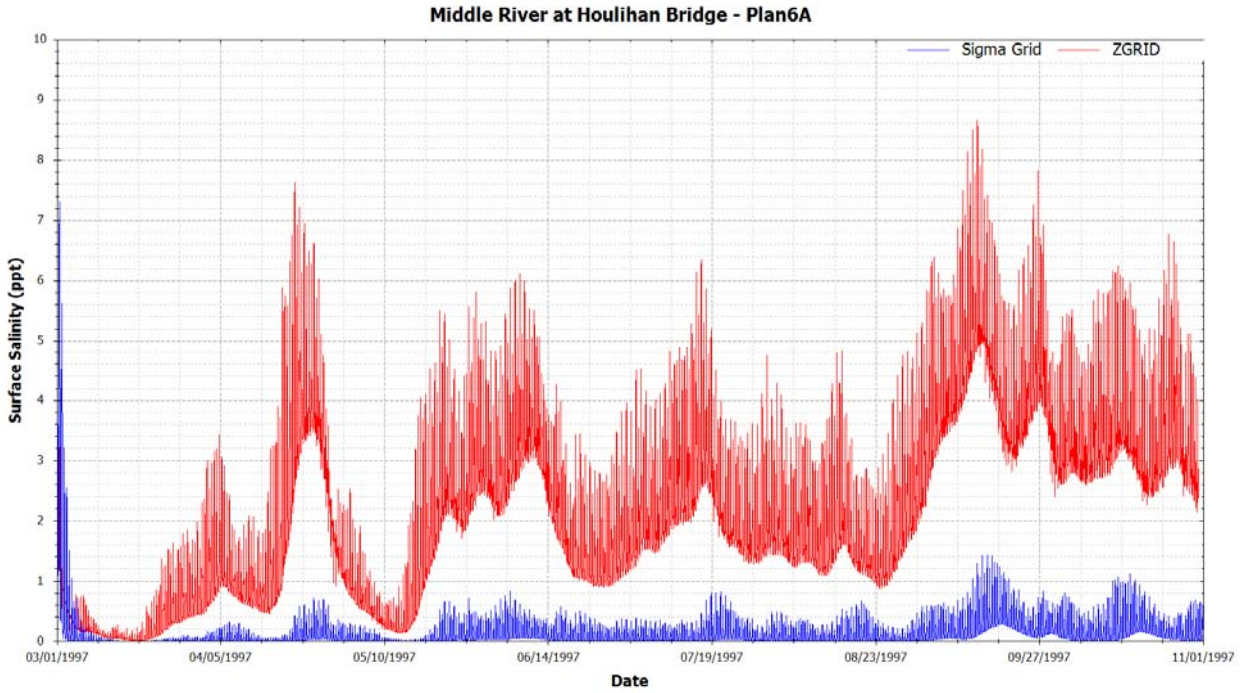

Figure 4-8 Middle River Salinity Comparisons – Plan6A

Table 4-9 Back River Salinity Comparisons

Back River Z-Grid - Sigma Grid 1997 Model Comparisons Salinity (ppt)			
Percentiles	10th	50th	90th
Sigma Grid	0.0	0.04	0.36
Z-Grid	0.0	0.03	0.17

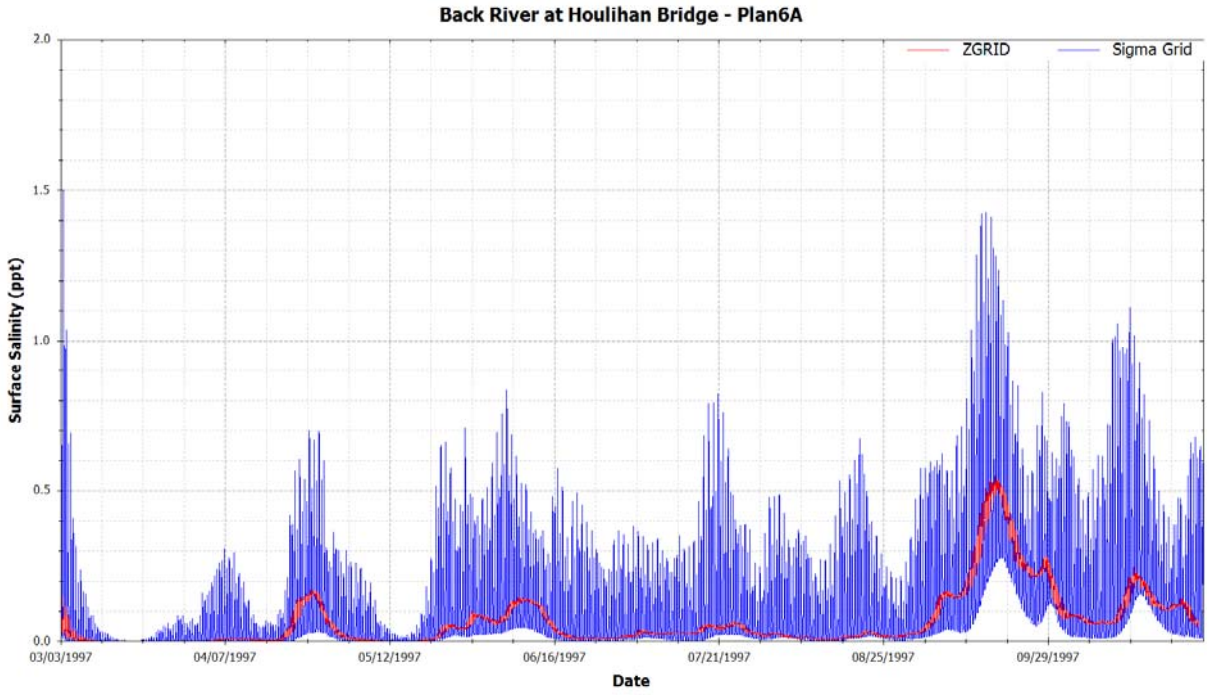

Figure 4-9 Back River Salinity Comparisons – Plan6A

4.2 Velocity Comparisons at Houlihan Bridge for Front, Middle and Back Rivers under Plan6A

Houlihan Bridge crossings at Front, Middle and Back Rivers are used for Velocity Comparisons between the Sigma Grid and Z-Grid Models. Tables 4-10 to 4-12 and Figures 4-10 to 4-12 illustrate the differences in velocity for Front, Middle and Back Rivers. Overall the Z-Grid Model predicts higher surface velocities both in the upstream (+) and downstream (-) directions with an increase in the average surface velocity in the upstream direction. This corresponds with the increased salinity movement upstream.

Table 4-10 Front River Velocity Comparisons

Front River Z-Grid - Sigma Grid 1997 Model Comparisons Average Velocity (cm/sec)			
Percentiles	10th	50th	90th
Sigma Grid	-70	-21	+48
Z-Grid	-101	-36	+85

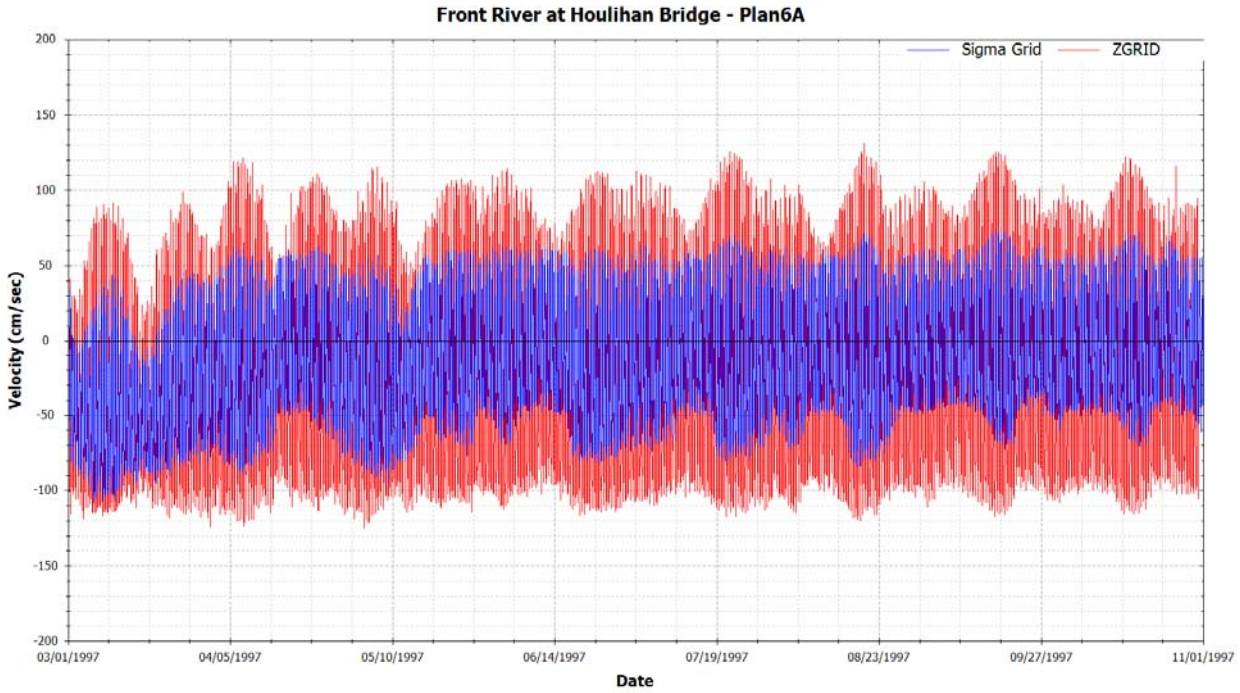

Figure 4-10 Front River Velocity Comparison

Table 4-11 Middle River Model Velocity Comparisons

Middle River Z-Grid - Sigma Grid 1997 Model Comparisons Velocity (cm/sec)			
Percentiles	10th	50th	90th
Sigma Grid	-31	-11	+19
Z-Grid	-41	-21	+37

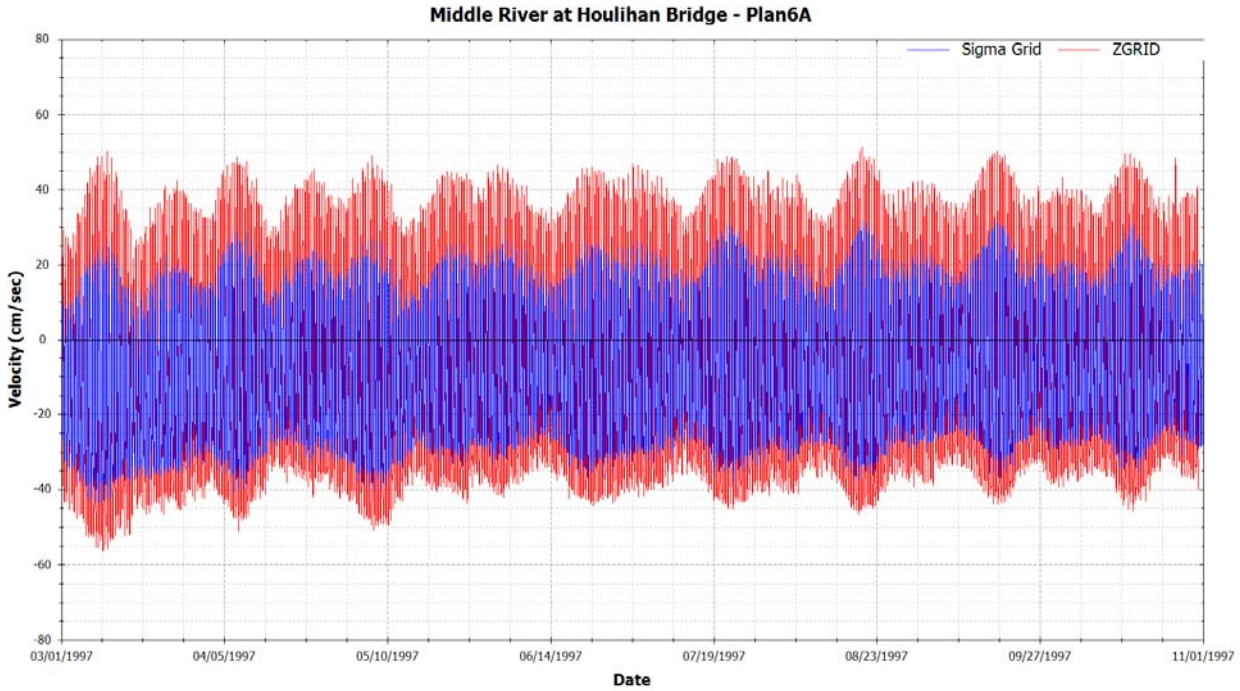

Figure 4-11 Middle River Velocity Comparison

Table 4-12 Back River Velocity Comparisons

Back River Z-Grid - Sigma Grid 1997 Model Comparisons Velocity (cm/sec)			
Percentiles	10th	50th	90th
Sigma Grid	-24	-15	+27
Z-Grid	-33	-21	+35

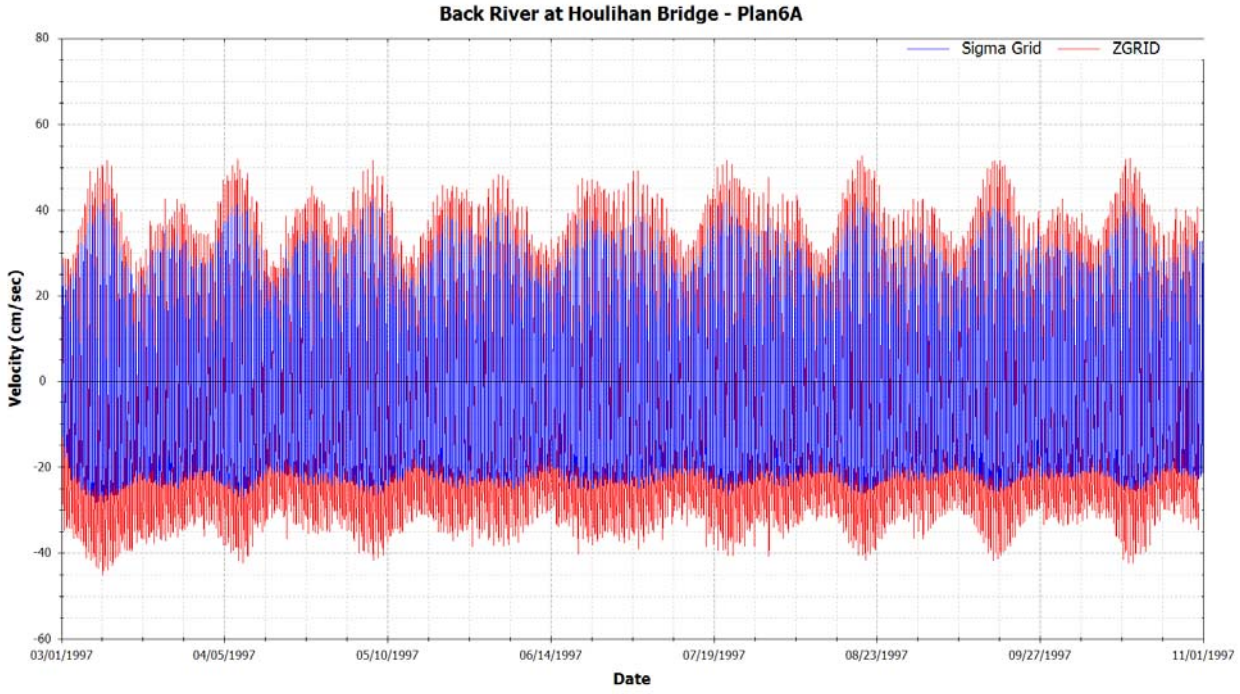

Figure 4-12 Back River Velocity Comparison

5.0 LOCATION OF THE 0.5 PPT SURFACE SALINITY AT THE 50% EXCEEDANCE VALUE

The amount of wetlands impacted was estimated by the Corps using a river salinity of 0.5 ppt at 50th % exceedance value (EV) in the Front, Middle and Back Rivers. Figures 5-1 and 5-2 illustrate the location of the 0.5 ppt 50% EV for Front Middle and Back Rivers and potential wetlands impact using the Sigma Grid. The time period used to determine the 50% EV is March 1 to November 1, 1997 as specified by the Wetland Interagency Coordination Team.

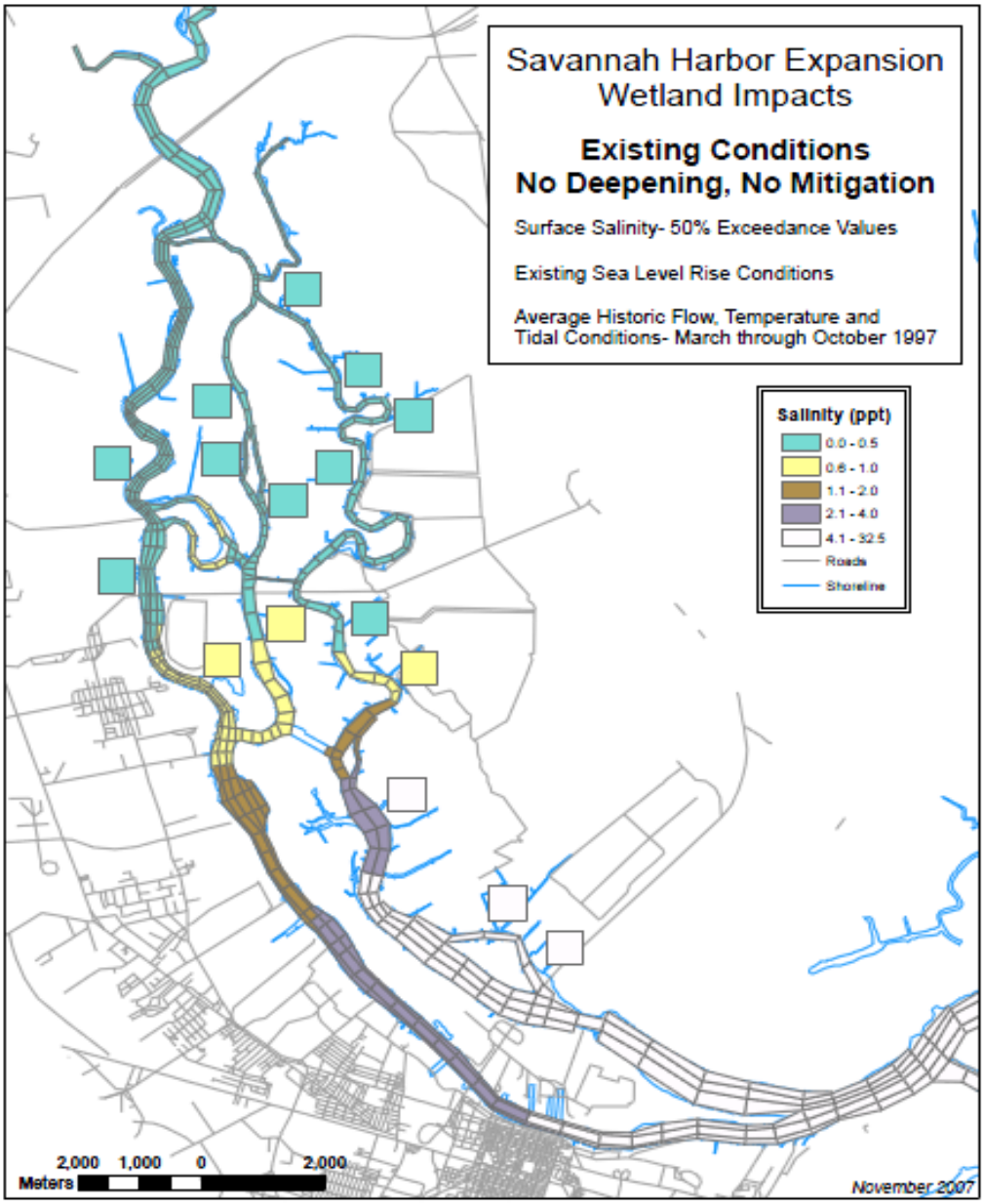

Figure 5-1 Locations of the Surface Salinity 0.5 ppt 50% EV under Existing Conditions
(Courtesy of the USACE Savannah District)

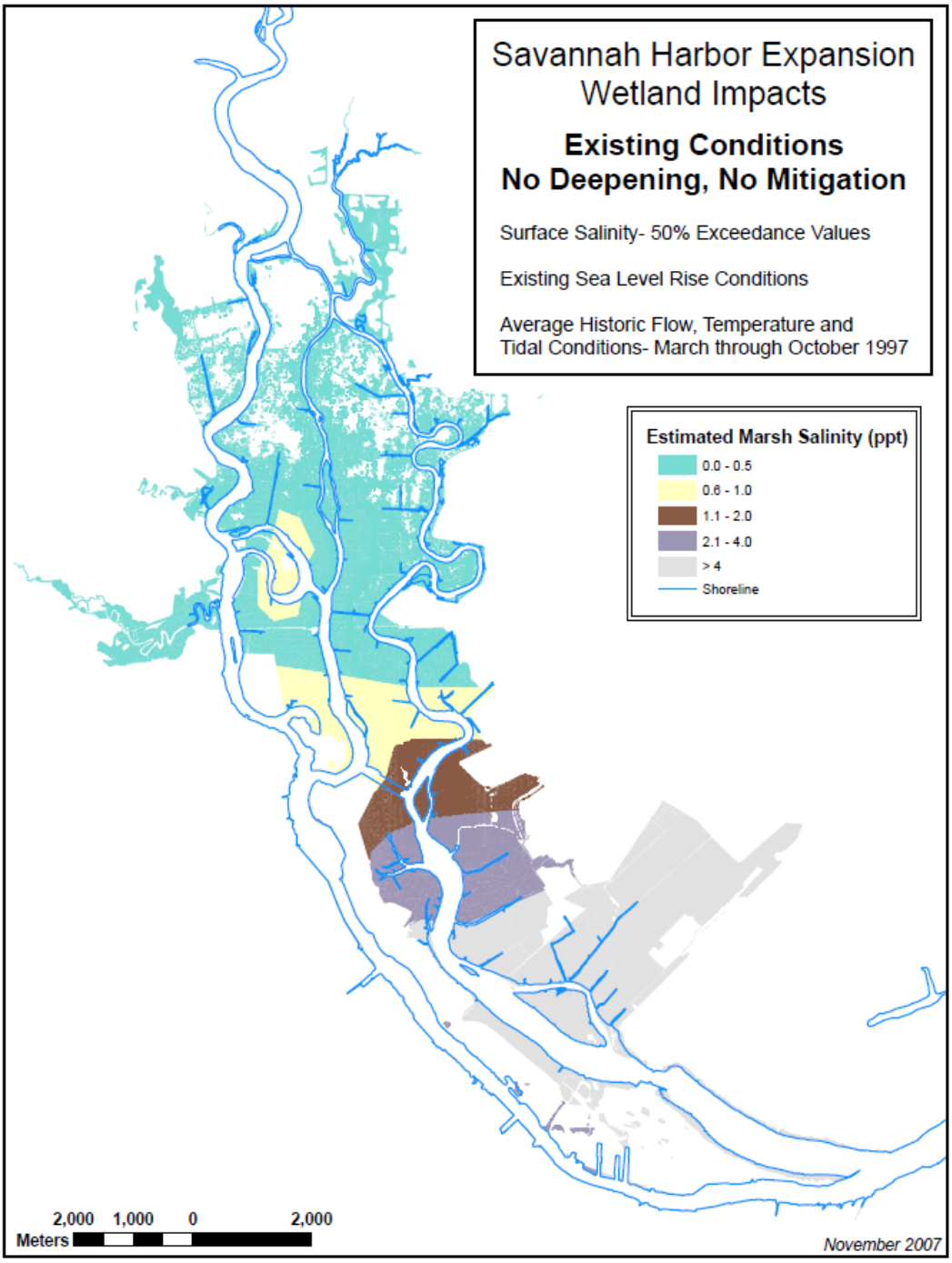

Figure 5-2 Wetland Predictions based on 0.5 ppt 50% EV under Existing Conditions
(Courtesy of the USACE Savannah District)

For the 48 foot proposed maximum channel depth, Figures 5-3 and 5-4 illustrate the location of the 0.5 ppt 50% EV for Front Middle and Back Rivers and potential wetlands impact using the Sigma grid.

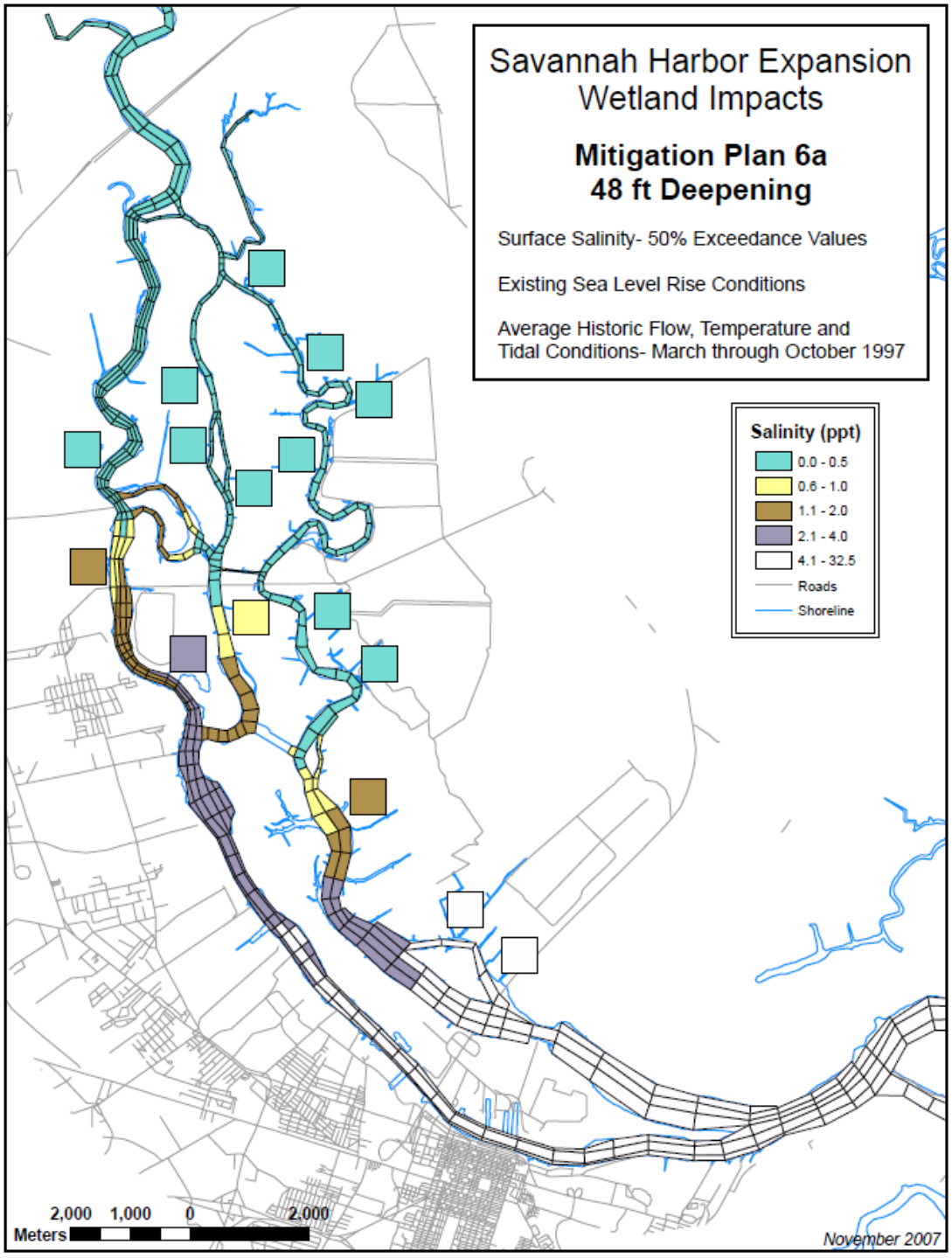

Figure 5-3 Locations of the Surface Salinity 0.5 ppt 50% EV under Deepening Conditions
(Courtesy of the USACE Savannah District)

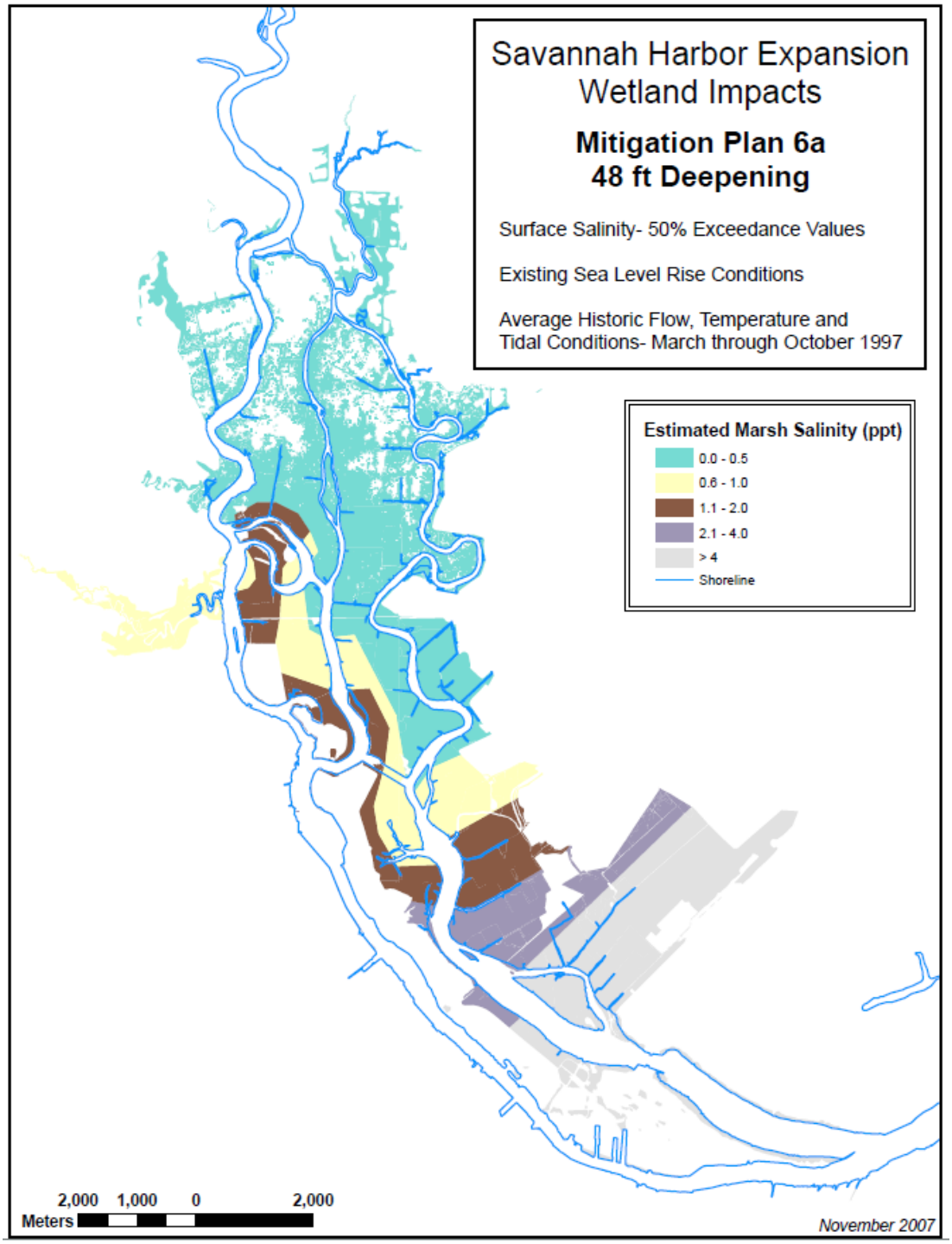

Figure 5-4 Wetland Predictions based on 0.5 ppt 50% EV under Plan6A
(Courtesy of the USACE Savannah District)

The following Sections compare the Zgrid and Sigma models predictions where the 0.5 ppt surface salinity at the 50% exceedance level occurs. The River Mile of each models cell that contains the surface salinity 0.5 ppt 50% was determined using the 1997 March 1 to November 1 predicted salinity data. The River Mile of where Houlihan Bridge crosses the rivers is used as a reference point. For the Front and Middle Rivers the Zgrid model predicts salinity moving slightly farther upstream, while on the Back

River the Zgrid salinity moves much farther downstream for the Plan6A predictions. Since the wetland impacts are based on the location of the 0.5 ppt surface salinity EV, the Zgrid model would move the fresh water wetlands boundary farther upstream for the wetlands in the vicinity of the Front and Middle Rivers and fresh water wetlands boundary downstream for those wetlands around the Back River.

5.1 Front River Surface Salinity 0.5 ppt 50% Exceedance Values

For existing conditions in the Front River, the Sigma Model predicts the 0.5 ppt 50% EV at River Mile 22.3, while the Z-Grid model predicts the 0.5 ppt 50% EV at River Mile 22.9. For reference Houlihan Bridge is at River mile 23.3.

For the 48 foot proposed maximum channel deepening scenario, the Sigma Model predicts the surface salinity 0.5 ppt 50% EV River Mile 23.1, while the Z-Grid model predicts the 0.5 ppt 50% EV River Mile 24.5.

In the Front River the Sigma Model extends the salinity impacts due to deepening 0.8 miles upstream while the Z-Grid extends the salinity impacts 1.6 miles upstream.

5.2 Middle River Surface Salinity 0.5 ppt 50% Exceedance Values

For existing conditions in the Middle River, the Sigma Model predicts the 0.5 ppt 50% EV at River Mile 1.9 while the Z-Grid model predicts the 0.5 ppt 50% EV at River Mile 3.5. For reference Houlihan Bridge is at River mile 2.1.

For the 48 foot proposed maximum channel deepening scenario, the Sigma Model predicts the surface salinity 0.5 ppt 50% EV River Mile 2.2, while the Z-Grid model predicts the 0.5 ppt 50% EV River Mile 3.9.

In the Middle River the Sigma Model extends the salinity impacts due to deepening 0.3 miles upstream while the Z-Grid extends the salinity impacts 0.4 miles upstream.

5.3 Back River Surface Salinity 0.5 ppt 50% Exceedance Values

For existing conditions in the Back River, the Sigma Model predicts the 0.5 ppt 50% EV at River Mile 6.3 while the Z-Grid model predicts the 0.5 ppt 50% EV at River Mile 6.1. For reference Houlihan Bridge is at River mile 7.3.

For the 48 foot proposed maximum channel deepening scenario, the Sigma Model predicts the surface salinity 0.5 ppt 50% EV River Mile 5.4, while the Z-Grid model predicts more upstream fresh water coming down the Back River on outgoing tide pushing the 0.5 ppt 50% EV to River Mile 2.6.

In the Back River the Sigma Model extends the salinity impacts due to deepening 0.9 miles downstream while the Z-Grid extends the salinity impacts 3.5 miles downstream.

6.0 DISSOLVED OXYGEN COMPARISON BETWEEN SIGMA GRID AND Z-GRID

The WASP water quality model had been updated between the Sigma grid WASP model and the Z-Grid WASP model. Some of the major updates were 1) the method of transferring the advection coefficient between EFDC and WASP in the hydrodynamic linkage file; 2) the method of calculating O'Connor-Dobbins reaeration rate using the top layer depth (Sigma WASP) and total depth (Z-Grid WASP) and 3) the different methods in handling the marsh loading. Due to these differences a meaningful side-by-side comparison of the predicted D.O. values was not practical. Each model was calibrated to predict the 1997 and 1999 measured D.O. values and therefore under existing conditions will behave similarly. However the following subjective conclusions can be made based on how each model transfers mass and salinity through out the harbor.

For point source dischargers, since the decay rates are very similar, the response of each models' D.O. predictions to BOD and ammonia loads will be similar.

For the Plan6A mitigation scenario, since the Z-Grid model extends the salinity farther upstream, the Z-Grid model will extend the low D.O range (D.O. less than 4 mg/l) a little farther upstream.

For the oxygen injection scenario the Z-Grid model will distribute the additional oxygen farther upstream in both the Front and Middle Rivers. Since the deepening impacts the D.O. in the upper areas of the Harbor (around River Miles 25 to 26) and the Z-Grid model moves oxygen farther upstream the Z-Grid model would predict less oxygen needed to mitigate the deepening D.O. impacts.

7.0 CONCLUSIONS

For the Front River, the Z-Grid model compared to the Sigma model shows higher surface salinity at Houlihan Bridge, by 0.5 ppt for the existing conditions and 0.9 ppt for the deepening scenario. The Z-Grid model compared to the Sigma model model moves the surface salinity 0.5 ppt 50% EV farther upstream 0.6 miles for the existing conditions and 1.4 miles upstream for the deepening scenario.

For the Middle River, the Z-Grid model compared to the Sigma model shows higher surface salinity at Houlihan Bridge, by 0.7 ppt for the existing conditions and 2.0 ppt for the deepening scenario. The Z-Grid model compared to the Sigma model moves the surface salinity 0.5 ppt 50% EV farther upstream 1.6 miles for the existing conditions and 1.7 miles upstream for the deepening scenario.

For the Back River, the Z-Grid model compared to the Sigma model shows higher surface salinity at Houlihan Bridge, by 0.2 ppt for the existing conditions and 0.0 ppt for the deepening scenario. The Z-Grid model compared to the Sigma model moves the surface salinity 0.5 ppt 50% EV farther downstream 0.2 miles for the existing conditions and 2.8 miles downstream for the deepening scenario.

The net impact on the wetlands due to the deepening, at the 0.5 ppt 50% EV, was estimated using Figures 5-2 and 5-4, The Sigma model predicted a net change of 337 acres of freshwater marsh conversion with the 48-foot depth alternative (Table 2 USACE November 2007 Evaluation of Marsh/Wetlands Impacts with Proposed Mitigation Plan). The Z-Grid model produces approximately 75 percent of the net change in the amount of wetlands as the Sigma model.

Since the Z-Grid model appears to include more tidal mixing, it should show that injected oxygen distributes farther upstream to critical D.O. impact areas. This should help (and not hinder) the performance of the proposed D.O. mitigation systems.

Overall, the Z-Grid model identifies less area of wetland impacts than the Sigma model, therefore using the Sigma model's mitigation estimates would adequately compensate for the deepening impacts.

Also, the Sigma model was peer reviewed by the Modeling Technical Review Group (MTRG) and its successor the Water Quality Interagency Coordination Team, with Agency Technical Review (ATR), and Independent Expert Peer Review (IEPR) in 2005 and 2006. The Sigma model was finalized in the modeling report (Tetra Tech 2006) with agency letters in March 2006 accepting the Sigma model as sufficient for analyzing harbor deepening.

Therefore, our recommendation is to continue to use the Sigma model for the impacts and mitigation analysis for harbor deepening. Since EPA has adopted the Z-Grid model for its TMDL analyses, the Corps could incorporate it if SHEP proceeds to construction.

8.0 REFERENCES

Hamrick, J. M., 1992: A Three-Dimensional Environment Fluid Dynamics Computer Code: Theoretical and Computational aspects. The College of William and Mary, Virginia Institute of Marine Science, Special Report 317, 63 p.

Tetra Tech, Inc., 2006: Development of the Hydrodynamic and Water Quality Models for the Savannah Harbor Expansion Project. Atlanta, Georgia.

Tetra Tech, Inc., 2010: Savannah Harbor Model Update

USACE, 2007: Savannah Harbor Project – Evaluation of Marsh/Wetlands Impacts with Proposed Mitigation Plan.

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
P.O. BOX 889
SAVANNAH, GEORGIA 31402-0889

REPLY TO
ATTENTION OF:

Planning Division

AUG 01 2011

Mr. Chris Beckham
Project Manager
Water Quality Certification and Wetlands Section
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Dear Mr. Beckham:

I am writing to you about the Savannah Harbor Expansion Project. You raised several issues in your June 16, 2011 letter, which I will address.

You requested the Corps' response to letters you had received as a result of the public notice for water quality certification. We provided those responses to you by email on July 13, 2011.

You requested additional information about two water quality modeling issues. The first concerned whether the oxygen injection system design would perform as intended in the shallow waters of Back River. We developed additional information on that issue and provided a report by email last week. The second issue was a comparison of the hydrodynamic model the Corps used to evaluate potential impacts from this project and a later version used by EPA in its TMDL update. We developed additional information on that issue and provided a report by email earlier today. We request a meeting the week of August 15 to discuss any remaining concerns you may have on those issues.

You commented on the values used in the wetland mitigation SOP calculations. We continue to believe the selected values are appropriate. The USFWS concurs with that position, as they adopted those values in the Fish and Wildlife Coordination Act Report that they prepared. As you stated, the values were selected based on years of discussion in the Wetland Interagency Coordination Team, which placed a higher value in this estuary on tidal freshwater wetlands than on brackish marsh or saltmarsh. Your letter correctly identified historic impacts to tidal freshwater wetlands in this estuary as the reason behind those priorities. The team expressed a preference for restoration of

wetlands in the estuary to their former states. The values the Corps used in the SOP calculations reflect those stated agency preferences. Further detailed analysis (provided at the June 1, 2011 interagency meeting) of field investigations conducted in this estuary indicates that vegetative changes identified through modeling likely overstate the effects that would be observed in the field if the harbor is deepened.

The approach the Corps used in the SOP calculations also reflects the interagency coordination that occurred on this project. The agencies requested the Corps first identify the impacts that would occur if the harbor is deepened, then evaluate mitigation measures that could be included to reduce those impacts.

Due to the unique nature of this project and its secondary effects, the impact predictions and the resulting mitigation are addressed differently than those for a Regulatory project impact or wetland mitigation bank. This application of the SOP differs from a normal Regulatory application because the natural resource agencies requested the Corps provide information on this project's impacts with and without its mitigation features. Savannah District used the SOP's restoration worksheet to capture the effects of the project's mitigation features to comply with that desire of the resource agencies. Since the District is not proposing to establish a commercial wetland mitigation bank with the acreage identified as being "restored" in the with-project but without-mitigation scenario, protection of those wetlands in perpetuity is not appropriate.

The proposed project includes mitigation for all wetland impacts, including the calculated conversion of saltmarsh to brackish marsh. Wherever practicable, in-kind mitigation is proposed. The SOP calculations include the modeled reduction in saltmarsh acreage as an impact that is subsequently compensated by either restoration of brackish marsh or preservation of freshwater wetlands. The ecological value of the saltmarsh is included in the SOP analysis.

We trust that this letter and the information we recently provided by email satisfies the Department's need for additional information. We appreciate your continued coordination throughout the certification process and look forward to receiving certification for a project of such significance to the Nation and the region's economy.

If you have any additional questions, please feel free to contact me at william.g.bailey@usace.army.mil or 912-652-5781.

William Bailey

William Bailey
Chief, Planning Division

McIntosh, Margarett (Mackie) SAS

From: Bailey, William G SAS
nt: Friday, September 09, 2011 11:38 AM
: Hall, Jeffrey M COL SAS
Cc: Oddi, Peter A SAS; Okane, Jason D SAS; McIntosh, Margarett (Mackie) SAS
Subject: SHEP: Information for SC DHEC (UNCLASSIFIED)
Attachments: DOT to Corps April 11 2011 Adapt Mngmnt.pdf

Classification: UNCLASSIFIED
Caveats: NONE

You asked for the following information:

1. Operating costs for the dissolved oxygen systems

The Final EIS will show the long term O&M costs as being $1.2M per year. We would add those costs to our normal funding requests for maintenance of the Savannah Harbor Navigation Project. In recent years, we have generally received from $12M to $17M to operate and maintain that project.

2. Latest wording on funding of adaptive management

The Final EIS contains a plan to obtain funds for the adaptive management. The non-Federal sponsor has agreed to set aside their portion of the adaptive management funds prior to the start of the dredging (see attached letter from GA DOT). The Corps would request and tain Federal funds during the construction (dredging) period. A reasonable amount would be arried over if not expended in a given fiscal year.

3. Latest wording on wetland analysis (SOP calculations)

The following language from Appendix C of the Final EIS describes the wetland analysis and SOP process:

Page 53: "The Corps took the impact data produced by the approved hydrodynamic model as the starting point for the SOP. The output included acreage for wetlands at different levels of salinity. The Corps then evaluated the output both before and after the flow-altering features are included in the project. Wetland types that would experience a net loss in acreage were identified as ones that would experience an adverse impact. In a similar manner, wetlands that would experience an increase in net acreage would benefit from and be restored by the project. Finally, the model output was used to characterize and quantify 3 classifications of wetlands – Freshwater (<0.5 ppt), Brackish (0.5 to 4.0 ppt), and Saltmarsh (>4.0 ppt).

Using the previously-described approach, adverse impacts were evaluated with respect to wetlands classified as Freshwater, Brackish and/or Saltmarsh. Model results documented that restoration could occur in either Freshwater or Brackish marsh. The flow-altering features were the primary means through which the net acreage in Freshwater and Brackish marsh would increase. In the 44-foot depth alternative, the flow-altering features of Plan 6B would result in net increases in both Freshwater and Brackish marsh acreage, with a corresponding crease in Saltmarsh acreage. The natural resource agencies had previously determined reshwater and Brackish marshes to be more valuable than Saltmarsh in the evaluation of this project. Since the 44-foot depth alternative with the Plan 6B flow-altering features would

result in net increases in Freshwater and Brackish marsh acreage, the plan would fully mitigate that alternative's adverse impacts to wetlands."

Page 55: "The Corps shared its SOP calculations with the Wetlands Interagency ordination Team (comprised of EPA, USFWS, NOAA Fisheries, SAC DNR, SC DHEC, GA DNR-EPD, and DNR-CRD). In the Draft Fish and Wildlife Coordination Act Report, the USFWS recommended changes to certain factors the Corps proposed to use in the calculations. The Corps agreed with the Service's recommendations and the numbers shown above reflect the factor values supported by the USFWS in their Draft F&W Coordination Act Report, which was included in the DEIS. The Final F&W Coordination Act Report does not address specific factor values, but concurs in the numbers shown above.

Although Savannah District had coordinated use of the SOP with the Wetland Interagency Coordination Team during the analysis period, some natural resource agencies expressed questions about certain aspects of the SOP calculations and it overall application during their review of the DEIS. SC DNR and EPA questioned the use of "0" as the Dominant Effect for expected adverse impacts to saltmarsh. The Corps had selected that value in recognition of the views expressed by the Wetland ICT that (1) freshwater wetlands are presently the most ecologically valuable type of wetland in the estuary (because of losses they have experienced over time), and (2) the Corps should take measures where possible to restore freshwater and brackish marshes in the estuary. The Corps' 2011 detailed analysis of likely wetland effects of the project from salinity changes (contained in Section VII of this appendix) indicates that noticeable changes in existing saltmarsh are unlikely from the expected changes in salinity. This supports the Corps' assignment of a "0" Dominant Effect value for those changes.

SC DNR questioned the use of "1.4" for the Net Improvement in Vegetation for the additional acreage of brackish marsh that is calculated to occur. The Corps selected that alue because it had divided the marshes in to the three classifications identified by the tland Interagency Coordination Team - Freshwater, Brackish, and Saltmarsh. Using the guidelines recommended by the ICT for the wetland categories, the acreage of brackish marsh would increase as a result of the proposed flow rerouting features. Brackish marsh would exist where it otherwise would not. Those newly created brackish marshes would be fully functioning and thus should receive the highest Net Improvement in Vegetation factor available for that category of wetlands.

SC DNR questioned the use of the flow rerouting features as restoration in the SOP. The Corps does not intend to set a precedent by such an application, but the application reasonably reflects the extensive coordination that the Corps had over the years with the Wetland ICT (natural resource agencies) in the development of mitigation plans for this project. Potential adverse effects to saltmarsh predicted using the salinity criteria recommended by the Wetland ICT are included in the SOP calculations.

This is a unique use of the Regulatory SOP that neither Savannah District nor EPA consider precedent-setting. Some mechanism was needed to quantify the amount of mitigation remaining after the flow rerouting was added to the deepening project. The SOP was not designed for such use, but it is a reasonable tool for that purpose. The Regulatory SOP was one of the tools that the Corps used in the development of the mitigation plans. The SOP was not the single mechanism that was used to identify how much mitigation should be performed or the suitability of a potential mitigation measure. Those decisions required consideration of many factors, as described in the previous and subsequent portions of this appendix.

Savannah District consulted the Corps' Center of Expertise for Ecosystem Restoration to onfirm that the Regulatory SOP was a technically sufficient method of determining the amount acres that the Project would need to acquire and preserve in order to compensate for adverse impacts to wetlands. The Center concurred that the SOP was a technically sound technique. Their review can be found in Appendix U. They noted that -- as with other

techniques -- the results depend heavily on the values assigned to specific parameters in the analysis. They also noted that with the approach followed in this application, much of the mitigation requirement was being driven by conversion of saltmarsh to brackish marsh, an activity which was reportedly a goal of the natural resource agencies for this estuary."

Summary: The District is comfortable with the technical analysis that it has performed to evaluate potential indirect impacts to wetlands and application of the Regulatory SOP to quantify mitigation that is still warranted after the flow re-routing features. All natural resource agencies do not concur with each aspect of the analysis, but the analysis reflects the guidance provided by the Wetlands Interagency Coordination Team when the analysis was being developed. The District's results agree with those contained in the USFWS Fish and Wildlife Coordination Act Report, which is intended to incorporate the views of all the natural resource agencies.

William Bailey
Chief, Planning Division

Classification: UNCLASSIFIED
Caveats: NONE

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

September 30, 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: SCDHEC-OCRM Coastal Zone Consistency Determination

Dear Colonel Hall:

As you know the staff of SCDHEC-OCRM provided our determination regarding consistency of the referenced project in our letters of January 25 and 31, 2011. My staff and I appreciate the efforts of you and your staff in meeting with and providing additional explanatory information regarding the Savannah Harbor Expansion Project. Much time has been spent by my staff thoroughly reviewing this information. After careful consideration, SCDHEC-OCRM stands by its January 25 and 31, 2011 letters objecting to the Corps determination that the SHEP project is fully consistent with the enforceable regulations and policies of South Carolina's Coastal Tidelands and Wetlands Act and the accompanying Coastal Zone Management Program.

Sincerely,

Carolyn Boltin-Kelly

Carolyn Boltin-Kelly, Deputy Commissioner
SCDHEC-Office of Ocean and Coastal Resource Management

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

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health
and Environmental Control

Bureau of Water
2600 Bull St
Columbia SC 29201

Public Notice # 2010 SHEP

Public Notice Date: September 30, 2011

NOTICE OF DEPARTMENT DECISION – STATE CERTIFICATION

The South Carolina Department of Health and Environmental Control (Department), acting on an application for Water Quality Certification pursuant to Section 401 of the Federal Clean Water Act, and Construction in Navigable Waters Permit pursuant to R. 19-450. et. Seq., 1976 SC Code of Laws has reached a proposed decision for the project described below:

US Army Corps of Engineers, Savannah District
Savannah Harbor Expansion Project
Savannah River
Jasper County
P/N 2010 SHEP

After reviewing the project plans, staff of the Division of Water Quality determined that there is a not a reasonable assurance that the project will be conducted in a manner consistent with the certification requirements of Section 401 of the Federal Clean Water Act.

Accordingly, the Department proposes to deny State Certification for the proposed work.

The evaluation of the work was conducted by the Bureau of Water. A copy of the staff assessment supporting the proposed decision is enclosed. A copy of plans submitted by the applicant is available for review in the office of the Division of Water Quality, Bureau of Water. Additional information about the technical aspects of this application is available from Chuck Hightower, the section manager, at 803-898-0369.

The final State Certification will be denied if a request for an adjudicatory hearing is not granted by the Administrative Law Court (ALC).

The issuance of this Notice of Department Decision represents a final staff decision that may be appealed. The procedures for appeals went into effect July 1, 2006 pursuant to 2006 Act No. 387. Please see the attached page titled "Notice of Appeal Procedure" for details.

Chuck Hightower, Section Manager
Water Quality Certification
and Wetlands Section

cc: SC DHEC, Beaufort EQC Office District Office

Notice of Appeal Procedure
Pursuant to S.C. Code Section 44-1-60

1. This decision of the S.C. Department of Health and Environmental Control (Department) becomes the final agency decision 15 calendar days after notice of the decision has been mailed or otherwise sent to the applicant, permittee, licensee and affected persons who have requested in writing to be notified, unless a written request for final review accompanied by a filing fee in the amount of $100 is filed with the Department by the applicant, permittee, licensee, or affected person.

2. An applicant, permittee, licensee, or affected person who wishes to appeal this decision must file a timely written request for final review with the Clerk of the Board at the following address or by facsimile at 803-898-3393. A filing fee in the amount of $100 made payable to SC DHEC must also be received by the Clerk within the time allowed for filing a request for final review. However, if a request for final review is filed by facsimile, the filing fee may be mailed to the Clerk of the Board if the envelope is postmarked within the time allowed for filing a request for final review.

   Clerk of the Board
   SC DHEC
   2600 Bull Street
   Columbia, SC 29201

3. In order to be timely, a request for final review must be received by the Clerk of the Board within 15 calendar days after notice of the decision has been mailed or otherwise sent to persons entitled to receive notice. If the 15th day occurs on a weekend or State holiday, the request is due to be received by the Clerk of the Board on the next working day. The request for final review must be received by the Clerk of the Board by 5:00 p.m. on the date it is due. A request for final review will be returned to the requestor if the filing fee is not received on time as described above.

4. The request for final review should include the following:
   a. the grounds on which the Department's decision is challenged and the specific changes sought in the decision
   b. a statement of any significant issues or factors the Board should consider in deciding whether to conduct a final review conference
   c. a copy of the Department's decision for which review is requested

5. If a timely request for final review is filed with the Clerk of the Board, the Clerk will provide additional information regarding procedures. If the Board declines in writing to schedule a final review conference, the Department's decision becomes the final agency decision and an applicant, permittee, licensee, or affected person may request a contested case hearing before the Administrative Law Court within 30 calendar days after notice is mailed that the Board declined to hold a final review conference.

The above information is provided as a courtesy; parties are responsible for complying with all applicable legal requirements.

January 7, 2011

STAFF ASSESSMENT

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (SCDHEC)
DIVISION OF WATER QUALITY
WATER QUALITY CERTIFICATION, STANDARDS, AND WETLANDS PROGRAMS SECTION

I. Background Information

Applicant: US Army Corps of Engineers, Savannah District (Corps) **P/N Number:** 2010-SHEP

P/N Date: November 15, 2010 **Date Received:** November 15, 2010 **P/N Close:** December 30, 2010

Section of Applicable Federal Law: **(x) Section 10** **(x) Section 404** **(x) Section 401**

Section of Applicable State Law: ( ) Coastal Zone Consistency (x) Construction in Navigable Waters Permit

Brief explanation and purpose of activity: The proposed activity consists of deepening the federal navigation channel along the Savannah River. The purpose of theactivity is to increase the efficiency of navigation within the Savannah Harbor.

Waterbody Name: Savannah River **Water Classification:** FW, SA, and SB

Waterbody Location: Jasper County, South Carolina

Waterbody on 2010 303(d) List?
(x) Yes, the lower Savannah River is impaired for aquatic life use, recreational use, and fish consumption due to zinc, fecal coliform bacteria, and mercury, respectively.
( ) No

II. Project Description

A. Description

The proposed work consists of dredging the 32.5 mile Savannah Harbor navigation channel in the Savannah River. The current navigational depth ranges from 30' mean low water (MLW) in the inner harbor to 44' MLW in a portion of the entrance channel. The current channel width ranges from 200' in the upper most areas of the project area to 600' in the entrance channel. Rapid shoaling rates in the navigation channel inhibit the ability to maintain an exact project depth at all times; therefore, the project uses allowable overdepth and advance maintenance procedures to counteract the effects of shoaling. The existing channel includes 2 feet allowable overdepth and up to 6' of advance maintenance. Several depths are being considered for the deepening project. The depths being considered are 44, 45, 46, 47, and 48 feet MLW within the inner harbor navigation channel. The deepening would allow for existing side slopes except in the bend wideners. The overall length of the project is also determined by the depth alternatives since the entrance channel will extend until the depth of the navigation channel matches the depth of the ocean bottom. The proposed deepening will also incorporate the existing overdepth and advance maintenance that is currently allowed for the existing project. The Corps submitted a Draft Environmental Impact Statement (EIS) and Draft General Reevaluation Report (GRR) that was as part of the permit application for this project.

B. Fill

1. Is fill required? ( ) Yes (x) No If no, proceed to Section II. C.

Amount	cubic yards	acres
Total	-	-
Wetlands	-	-
Open Waters of U. S.	-	-

2. Is the fill temporary? ( ) Yes ( ) No

C. Excavation

1. Is excavation required? (x) Yes ( ) No If no, proceed to Section II. D.

Amount	cubic yards	acres
Total	14,935,186	-
Wetlands	-	15.68
Open Waters of U. S.	14,935,186	-

2. Is dredge spoil site adequately sized for the amount of material?
(x) Yes, the Corps plans to use existing dredge material containment areas.
( ) No

D. Other Impacts: (x) Yes ( ) No

In addition to the direct wetland impacts, the project includes indirect impacts to wetlands by changes in salinity, impacts to water quality in the Savannah River, fisheries impacts, and impacts to threatened and endangered species. The draft EIS does not specify the exact depth of the project, but does make the recommendation to deepen the harbor to 47' or 48'. Generally, the environmental impacts decrease as the depth of the deepening decreases. It should be noted that the difference in project impacts from the47' and 48' depth are not significant. Although the impacts for each depth alternative were provided in the draft EIS, the impacts discussed in this assessment will focus on the maximum allowable depth of 48'.

The indirect wetland impacts from this project will occur primarily by changing the salinity within the various wetland types adjacent to the project area. For the purposes of evaluating this project, the wetland types affected by the project were classified according to salinity. The salinity threshold used to determine freshwater wetlands is <0.5 ppt, brackish wetlands were considered to have a salinity between 0.5 and 4.0 ppt, and saltmarsh was considered to have a salinity >4.0 ppt. The extent of the salinity conversion varies greatly based on which depth alternative is selected as the final project depth. For the 48' deepening, salinity will be increased in 337 acres of freshwater wetlands, and salinity will decrease in 730 acres of saltmarsh. The 337of freshwater wetlands that will be lost are located primarily in the state of Georgia, and the saltmarsh impacts are located mostly in South Carolina.

The project will also have an adverse effect on water quality in the Savannah River estuary. Dissolved Oxygen (DO) levels in the lower Savannah River have been a concern for a number of years. In some areas of the river, natural conditions have caused a situation in which DO levels in the harbor are below applicable water quality standards during the warm summer months. Although this portion of the Savannah River is not currently listed on the South Carolina 303(d) list for impairment due to DO, a Total Maximum Daily Load (TMDL) has been developed for the lower Savannah River watershed. In 2006, the EPA published a TMDL report for the Savannah Harbor, and this report was later revised in 2010.

The proposed deepening will exacerbate the existing DO problem within the river for several reasons. A deeper channel will limit the ability of oxygen to reach the river bottom. An enlarged channel prism will move more saltwater to the upper portions of the harbor and into the estuary, further decreasing the ability of those waters to

accept oxygen from the air. The enlarged channel prism will also decrease flow velocity, which will reduce mixing of oxygen throughout the water column. Lower DO levels within the river system will have a deleterious effect on aquatic life use, and will limit the ability of the estuary to handle point and non-point source pollution loads entering the estuary. The Corps has proposed mitigation to offset these water quality impacts.

Some impacts to fisheries will also occur from the proposed project. The primary species that will be impacted by this project are Striped bass and Shortnose sturgeon. The proposed project will adversely affect these species by altering spawning, egg development, and larva habitat within the river system. Federally endangered species such as Shortnosed sturgeon, Atlantic sturgeon, various sea turtles, and West Indian manatees may all be impacted by the project. The loss of a significant portion of Shortnose sturgeon habitat due to lower DO levels and salinity intrusion is of particular concern. A Biological Assessment of Threatened and Endangered Species (BATES) is included in the draft EIS. The Corps has proposed mitigation for the impacts to Shortnose sturgeon and Striped bass.

E. Project Modification

Was the project modified from the original public notice?

(x) Yes,

( ) No

This project was modified from the original public notice. The original public notice included 14.08 acres of direct impact to wetlands. Since the public notice was published on November 15, 2010, the direct impacts to wetlands were increased to 15.68 acres of wetlands.

F. Compensatory Mitigation

Is compensation required by SCDHEC?

(x) Yes

( ) No

( ) N/A

The project will require many extensive mitigation measures to offset each of the various direct and indirect impacts from this project. Various mitigation components of the project include a plan to offset DO impacts by using oxygen injection, a plan to offset the direct and indirect impacts to wetlands from excavation and changes in salinity, a plan to offset the loss of fisheries habitat, and a plan to install fish passage to offset impacts to Shortnose sturgeon.

Since the waters within the lower Savannah estuary will sustain impacts from the reduced DO levels resulting from the proposed deepening, the Corps plans to inject oxygen into the water column to raise DO levels. The injection system will utilize Speece Cones to directly inject oxygen into the river to increase the DO concentration throughout the waterbody. The effects should raise DO levels to acceptable levels as the super oxygenated water is pumped through diffusers back into the river. Modeling data has been provided to determine the extent to which this system will oxygenate the water, and to show the effectiveness of the system to achieve acceptable DO levels.

To achieve the modifications to the harbor proposed by the Corps, some wetlands must be impacted along the shoreline of the navigation channel. The deepening project will cause approximately 15.68 acres of direct impacts to saltmarsh in six different areas. These direct impacts will not vary with each of the depth alternatives. The proposed mitigation for these direct impacts will include the restoration of saltmarsh by reducing the elevation within a confined disposal facility (CDF) located near the confluence of the Front and Middle Rivers. This mitigation activity will consist of grading down high ground within the CDF to an elevation that will allow the growth of *Spartina alterniflora*. Once the appropriate elevation changes are made to site, the restoration area will be allowed to vegetate naturally.

In total, the project will cause indirect impacts to 1,212 acres of freshwater wetlands for the 48'deepening. To avoid and minimize these impacts, several plans were presented in the draft EIS to alter flows by constructing

structures or modifying the channel to decrease salinity in the affected wetlands. The flow altering measures are designed to divert the flow of freshwater into the impacted wetlands, and prevent saline waters from moving inland from the ocean to protect sensitive freshwater tidal wetlands. Many of these freshwater wetlands are located in the Savannah National Wildlife Refuge (SNWR). After implementing the flow altering component of the mitigation plan, there will be approximately 337 acres of freshwater wetlands impacted by increased salinity and approximately 730 acres of saltmarsh impacted by decreased salinity.

To offset the loss of the 337 acres of freshwater wetlands, the Corps proposes to purchase and preserve several ecologically valuable pieces of property. The land proposed for purchase is currently included in the SNWR land acquisition plan, but is under private ownership. The Corps plans to purchase the identified properties, and preserve this land in perpetuity by incorporating the land into the refuge. This acreage has mixed ecological communities and includes both upland and wetland areas. The 337 acres of freshwater wetland impacts will require 3,033 mitigation credits and the preservation component of the mitigation plan will generate 3,219 credits.

An additional component of the wetland mitigation plan includes the restoration of 1,068 acres of brackish marsh. This marsh will be restored as a result of the harbor deepening and flow altering structures. In addition to the impacts to the 337 acres of freshwater wetlands discussed above, the project will impact 730 acres of salt marsh by lowering salinity. The 730 acres of impacts to saltmarsh will require 4,672 mitigation credits. Both the impacted freshwater marsh and the saltmarsh will convert to brackish marsh. The Corps is proposing to take 4,485.6 mitigation credits for the restoration of brackish marsh.

Endangered species impacts are evaluated by resource agencies such as the USFWS and the National Marine Fisheries Service (NMFS). The Corps discussed the fishery impacts from the project in detail with the resource agencies to develop a mitigation plan to offset the loss of fisheries habitat. In summary, the mitigation for impacts to Striped bass habitat will be provided by contributions to the Georgia Department of Natural Resources Striped bass restocking program. To mitigate for impacts to Shortnose sturgeon, the Corps will enhance access to historic sturgeon spawning grounds by installing a fish passage structure at the New Savannah Bluff Lock and Dam. In addition, the Corps will construct a sill in the Middle River to protect important nursery habitat for juvenile sturgeon.

G. Remediation

Is remediation required? **( ) Yes** **(x) No** **( ) N/A**

H. Nonpoint Source Concerns

1. **Are water quality impacts from nonpoint sources expected?**
   ( ) Yes
   (x) Temporary, water quality impacts from non-point sources will be minimized and should not contravene the water quality standards or existing and classified uses of the involved waterbody, if the applicant adheres to the conditions in Section VIII of this staff assessment during and after the project.
   ( ) No

2. **Has the applicant addressed nonpoint source concerns? (x) Yes ( ) No ( ) N/A**

3. **Are any enforceable nonpoint controls required by SCDHEC?**
   (x) Yes, water quality impacts from nonpoint sources will be minimized and should not contravene the water quality standards or existing and classified uses of the involved waterbody, if the applicant adheres to the conditions in Section VIII of this staff assessment during and after the project.
   ( ) No

III. Environmental Assessment

A. Is the proposed activity water dependent? (x) Yes ( ) No

B. Are there feasible alternatives to the proposed activity?

The applicant considered many factors in developing the plans for the proposed project. A detailed alternatives analysis is included in Appendix O of the draft EIS. The alternatives considered by the Corps were developed to alleviate several inefficiencies related to navigation problems within the existing Savannah. Existing shippers utilizing the Savannah Harbor are experiencing inflated shipping costs due to light loading and tidal delays. In addition, light loading and tidal delays will increase as present harbor users increase their annual tonnage and as larger, more efficient ships replace smaller ones. Another problem within the current harbor configuration is that existing ships are experiencing problems with turning capabilities and maneuverability in certain reaches of the inner harbor. As vessel size increases as projected in future years, the severity of these problems will increase.

The EIS evaluated several different terminal locations to remedy the navigation problems in theharbor. These alternatives are listed in Appendix O. The analysis included consideration of a deep water channel to alternative terminal locations. Of the alternative sites considered, four are located in South Carolina and included building a terminal at dredge disposal facilities 12A, 14A, 14B, and at Jones/Oysterbed Terminal. It should be noted that dredge site 14A and 14B are the sites presently under consideration for a Jasper Ocean Terminal. According to the analysis in the draft EIS, the Garden City Terminal of the Georgia Ports Authority best met the criteria of completeness, effectiveness, efficiency, and acceptability. Of all the alternatives considered, the proposed deepening to the Garden City Terminal is the only feasible alternative that will alleviate the navigational problems in the Savannah Harbor. Even if alternative terminal location were developed, the existing harbor would continue to experience the navigational problems previously mentioned.

The Corps also evaluated alternative channel depths to reduce environmental impacts while still achieving the project purpose of increasing harbor navigation efficiency. The draft EIS included consideration of various channel depths from 42' to 48' deep. As channel depth increases, the economic benefits also increase. A detailed economics analysis that included various mitigation features to offset the deepening impacts showed that the 47 foot alternative appears to be the plan that would provide the most economic benefit to the nation. For this reason, the alternatives analysis in draft EIS recommends the 47' deepening or the 48' deepening.

It should be noted that the draft EIS concluded that there are no feasible alternatives to the proposed activity. This conclusion is very difficult to evaluate with the information provided in the draft EIS and the GRR. By focusing the project purpose on improving navigation in the existing Savannah Harbor, the Corps significantly limited the scope of alternatives that were available. By limiting the project purpose, the Corps may have excluded from consideration some feasible alternatives. It is possible that less environmentally damaging alternatives exist that could provide similar benefits to the national economy.

C. Water Quality Assessment

Numeric Standards Contraventions?

( ) Yes

(x) Temporary, the proposed work may cause a temporary increase in turbidity levels, but ambient conditions should resume once the work is completed. Water quality standards will not be contravened and designated uses will not be changed. Potential adverse impacts to water quality can be minimized through the use of best management practices, and the conditions described in Section VIII of this staff assessment.

( ) No

IV. Public Comments Received and Summary of Comments

A. S. C. Department of Natural Resources (SCDNR)
Date: January 25, 2011
( ) Does not object to project provided the applicant adheres to the conditions in Section VIII.
( ) Hold in abeyance.
(x) Objects to the proposed project
( ) No objection.
( ) Has elected to not conduct an investigation nor provide any comments.

The SCDNR submitted a comment letter on the proposed project which stated several concerns about the proposed harbor deepening. The letter urged the Corps to pursue minimal channel deepening to reduce the environmental impacts of the project. Also, the SCDNR asked the Corps to consider alternatives such as developing the Jasper Terminal to reduce the environmental impacts of the project.

B. U. S. Fish and Wildlife Service (USFWS)
Date: April 28, 2011
( ) Does not object to project provided the applicant adheres to the conditions in Section VIII.
( ) Hold in abeyance.
( ) Objects to proposed project
(x) No objection.
( ) Has elected not to take a position at this time.

The USFWS reviewed the proposed project for potential impacts to threatened and endangered species. The agency concurred with the Biological Assessment of Threatened and Endangered Species included in the draft EIS which stated that the project "may affect, but is not likely to adversely affect" the various threatened and endangered species that under the purview of the USFWS.

C. Southern Environmental Law Center (SELC)
Date: January 25, 2011
( ) Does not object to project provided the applicant adheres to the conditions in Section VIII.
( ) Hold in abeyance.
(x) Objects to the proposed project
( ) No objection.
( ) Has elected to not conduct an investigation nor provide any comments.

The SELC submitted a detailed letter and several exhibits listing a wide range of concerns about the proposed project. The organization objects to the proposed project and has substantial concerns that the project does not comply with federal regulations, including Section 401 of the Clean Water Act.

D. United States Environmental Protection Agency (EPA)
( ) Does not object to project provided the applicant adheres to the conditions in Section VIII.
( ) Hold in abeyance.
( ) Objects to proposed project
(x) No objection.
( ) Has elected not to take a position at this time.

Although the EPA does not specifically object to the project, the agency does have some concerns. The letter from EPA lists several concerns about water quality and the wetland mitigation, and the letter makes several project recommendations for the final EIS.

E. Savannah River Maritime Commission (SRMC)
Date: January 21, 2011
( ) Does not object to project provided the applicant adheres to the conditions in Section VIII.
( ) Hold in abeyance.
(x) Objects to the proposed project
( ) No objection.
( ) Has elected to not conduct an investigation nor provide any comments.

The Savannah River Maritime Commission submitted a comment letter on this project on January 21, 2011. The SMRC letter describes four major issues with the project as proposed. One issue is that the project as designed will not allow the development of the Jasper Ocean Terminal. Secondly, the project is inadequate to support the projected growth in shipping. In addition, the environmental impacts to the Savannah River are significant. The final issue is that the draft EIS and GRR completely ignore the benefits that will accrue to South Carolina from a properly designed project.

V. Consistency with the Coastal Zone Management Program, R. 48-39-10 *et seq.*

Staff of the SCDHEC Office of Ocean and Coastal Resource Management (OCRM) found this project to be inconsistent with the State's Coastal Zone Management Act and Coastal Management Program in letters dated January 25, and January 31, 2011.

VI. Conclusion on Water Quality Impacts and Classified Uses

When evaluating the proposed work, the SCDHEC followed procedures for implementing State 401 Water Quality Certification regulations pursuant to Section 401 of the Clean Water Act, 33 U.S.C. Section 1341, and the requirements of Regulation 61-101, Water Quality Certification, and Regulation 19-450 et seq., 1976 Codes of Laws, Construction in Navigable Waters Permitting Program.

The Savannah River is located on the South Carolina border and contains waters shared between South Carolina and Georgia. The South Carolina portion of the river where the project is located is in Jasper County. The lower Savannah watershed includes substantial aquatic resources. The 2008 Draft Fish and Wildlife Coordination Report identified 22,719 acres of emergent wetlands consisting of a mixture of salt tolerant and freshwater plant species. The report also identified 8,577 acres of forested wetlands consisting mainly of cypress/gum and scrub shrub species.

While many freshwater wetland areas exist along the lower Savannah River, much of the waterbody in the vicinity of this project is classified as SA and SB tidal saltwater with a site specific dissolved oxygen standard (DO) of not less than a daily average of 5 mg/l and a minimum of 4 mg/l. This area of the Savannah River is listed on the 2010 303(d) for impairment to aquatic life use due to zinc, for recreational use due to elevated fecal coliform bacteria levels, and for fish consumption due to mercury. The proposed project should not cause or contribute any additional impairment to these uses. The project area is included in the Savannah Harbor Total Maximum Daily Load (TMDL) for DO developed by the Environmental Protection Agency (EPA).

The Department is concerned about the impacts of the proposed project on water quality by lowering DO, andthe plan to use Speece Cones to mitigate for this impact. During the review process for this Certification, the Corps was asked to submit modeling results that evaluated the effectiveness of the injection system to supply an adequate amount of oxygen to restore DO levels to pre-project conditions. The model results showed that the injection system does have the ability to achieve the required oxygen levels necessary to protect aquatic life use during the summer within the shallow water estuarine areas located in the South Carolina portion of the river.

While the injection system has been shown to provide the necessary amount of oxygen, the Department continues to have outstanding concerns about the use of mechanical means to offset the DO impacts of the project. Since the channel modifications proposed by the Corps will occur throughout the life of the project, the DO impacts will exist during the summer as long as the channel is maintained at the selected depth. Mechanical failure of the system would cause significant degradation to aquatic life within the estuary, and limit ability of the river to accept and assimilate pollutants. The Department does not have reasonable assurance that the increased DO deficit caused by the channel deepening will be adequately mitigated by the oxygen injection system. According to correspondence from the Corps dated September 12, 2011, the long term operating and maintenance costs associated with the DO injection system are $1.2 million annually. These costs will be added to their normal funding requests. This system is a very costly method to mitigate for the projected impacts, and the funding for the long-term operational costs depends on unpredictable annual appropriations.

In assessing the water quality impacts of a project, the Department is required in Regulation 61-101 to address and consider several factors. One of these factors requires consideration of all potential water quality impacts, including the impact on existing and classified uses. Regulation 61-68, *Water Classifications and Standards,* was promulgated in accordance with Section 303 of the Clean Water Act. This regulation contains antidegradation rules that were established to ensure the protection of existing uses and water quality. Regulation 61-68 requires existing water uses and the level of water quality necessary to protect these existing uses to be maintained and protected regardless of the water classification. Regulation 61-101 requires the Department to certify that there is reasonable assurance that the activity will be conducted in a manner that will not violate applicable water quality standards. In absence of the oxygen injection system, the project will violate the antidegradation policy in Regulation 61-68. When considering the Department's concerns about the use of mechanical means with questionable funding to permanently maintain oxygen levels in the waterbody, the Department cannot certify that there us reasonable assurance that project will not violate applicable water quality standards.

In addition to the DO impacts associated with the project, the Department also has concerns about the wetland impacts. The proposed dredging and channel modifications will substantially alter the wetlands located in the lower Savannah River estuary. Early in the development phase of this project, an Interagency Coordination Team (ICT) was established to assist in evaluating the wetland impacts and mitigation. The results of this interagency coordination led to the mitigation proposal included in the permit application. The plan places an emphasis on minimizing the loss of freshwater tidally influenced wetlands, because these wetlands have historically been altered by past projects.

The proposed deepening will result in indirect impacts to 1,212 acres of freshwater wetlands. To reduce these impacts the Corps has proposed to modify the channel and construct flow diversion structures to increase freshwater flows and decrease salinity in these impacted wetlands. As result of the channel modifications, 337 acres of freshwater wetlands and 730 acres of salt marsh will be converted to 1,068 acres of brackish wetlands.

The Corps used the Savannah District Standard Operating Procedures (SOP) as a tool to quantify the indirect wetland impacts and determine appropriate compensation for the salinity conversion. The Corps calculated that 3,033 credits would be needed to mitigate for the loss of 337 acres of freshwater wetlands and 4,672 credits would be required to mitigate for the 730 acres of impacts to salt marsh.

With respect to the 730 acres of salt marsh that will be lost, the reduction in salinity will cause a vegetative shift by converting the dominant salt marsh plant species to a vegetative community dominated by more brackish species. Since this change will be minimal, a dominant effect level of 0 was used in the SOP calculation sheets to determine the required credits for the salinity change in the salt marsh. Then the Corps used the highest level (1.4) for the net improvement factor to determine that 4,485.6 credits will generated by the restoration of 1,068 acres of brackish marsh. The high net improvement value is not consistent with the low dominant effect level. Furthermore, the area proposed for restoration is comprised of the same wetlands where the impacts will occur. The Corps agrees that the vegetative shift from the salinity conversion is an impact and is proposing to take restoration credit for these impacts.

The Department is concerned about the precedent set by allowing the Corps to take restoration credit for wetlands that are included in the project impacts. In addition, the Corps has proposed no method of preservation for the wetlands for which restoration credit is being taken. This leaves the entire 1,068 acres of restored brackish marsh unprotected from threat due to any future harbor expansion activities. Without the credit from the brackish marsh restoration area, there is a large deficit in the amount of mitigation credit that will be provided for this project. In order to comply with the provisions in Section F of Regulation 61-101, the Department must require appropriate mitigation to ensure that functions and values in the ecosystem will be protected.

The approach to mitigation used by the Corps does not offset all of the project impacts since no mitigation is provided for the impacts to 730 acres of salt marsh for the 48' deepening. This plan diminishes the ecological value of salt marsh, while placing an arbitrarily elevated value to the creation of brackish marsh. Even though the vegetative shift that will occur from the change in salinity is minimal, there will be some loss to the habitat functions within the large area of converted salt marsh. This plan is not consistent with the state's regulatory obligation to protect existing uses in the ecosystem. The plan does not adequately compensate for all of the wetland impacts, nor does the plan meet the requirements of Regulation 61-101. Lack of appropriate mitigation means that functions within the ecosystem will be eliminated or impaired by the proposed activity. Allowing the Corps to take mitigation credit for the project impacts would also limit the Department's ability to evaluate mitigation proposals on any such future project.

When evaluating this project pursuant to Regulation 61-101, the Department identified potential impacts to endangered and threatened species from this activity. During the review for this project, the Department asked the Corps to provide concurrence from the resource agencies that the project will not cause adverse impacts to endangered or threatened species. Appendix B in draft Environmental Impact Statement (EIS) included a Biological Assessment of Threatened and Endangered Species (BATES). A letter was provided from the USFWS giving concurrence with the BATES; however, the letter acknowledged that some of the endangered species affected by this project fall under the responsibility of the National Marine Fisheries Service (NMFS). The Shortnose sturgeon is one of the species affected by this project that is under the purview of the NMFS.

The Corps acknowledges that the project will adversely impact waters containing the endangered Shortnose sturgeon and has been in consultation with NMFS. The impact to various life stage sturgeon habitat will occur largely from the change in salinity resulting from the project. The Corps has proposed mitigation to offset these impacts, however; the responsibility lies with the NMFS to determine whether or not the proposed mitigation is adequate to alleviate any adverse impacts. It is not likely that concurrence from NMFS will be provided prior to the regulatory timeframes to which the Department must adhere. Since the Department does not have concurrence from the NMFS on the project impacts and proposed mitigation, it would be impossible to completely evaluate any adverse effects on sturgeon. Regulation 61-101 states in Section F.(5)(c) that certification will be denied if the project adversely impacts waters containing State or Federally recognized rare, threatened, or endangered species. Therefore, the Department cannot certify that the project will not adversely impact waters containing endangered species without concurrence from the NMFS.

The Department's ability to certify the proposed activity has also been compromised by the alternatives analysis included in the draft EIS. Regulation 61-101 Section F.(5)(b) states that certification will be denied if there is a feasible alternative to the activity which reduces adverse consequences on water quality and classified water uses. By limiting the project purpose, the Corps may have excluded from consideration some feasible alternatives; therefore, the Department cannot certify that there are no feasible alternatives to the proposed activity.

Regulation 61-101 Section F.(5) states that certification will be denied if the proposed activity permanently alters the aquatic ecosystem in the vicinity of the project such that its functions and values are eliminated or impaired. This section of the regulation also states that certification will be denied if the proposed activity adversely impacts waters containing State or Federally recognized rare, threatened or endangered species. For the proposed activity, the applicant has not given reasonable assurance that existing uses will not be further impaired or eliminated from the proposed activity, nor has the applicant shown conclusively that the activity will not adversely impact waters containing the Federally endangered Shortnose sturgeon. Additionally, the Department cannot certify that there are no feasible alternatives to the

proposed project. Some alternatives may have been excluded from consideration due to the limited project purpose. This project does not meet the requirements for issuance of a Water Quality Certification pursuant to Section 401 of the Clean Water Act, 33 U.S.C. Section 1341, and the requirements of Regulation 61-101, Water Quality Certification. The proposed activity could result in significant degradation to the aquatic ecosystem or remove existing and classified uses of the Savannah River. Information about the technical aspects of this application is available from Chris Beckham, the project manager, by calling 803-898-4261 or by e-mailing beckhajc@dhec.sc.gov.

VII. Staff Recommendation

Deny 401 Water Quality Certification and Construction in Navigable Waters Permit

Prepared by: _____ **Date:** 9/29/11

Reviewed & Approved by: _____ **Date:** 9/30/11

Notice of Right to Request Contested Case Hearing Before Administrative Law Court

S.C. Code §44-1-60(F)(2) provides that within thirty days after the receipt of the Board's written final agency decision an applicant, permittee, licensee, or affected person desiring to contest the final agency decision may request a contested case hearing before the Administrative Law Court, in accordance with the Administrative Procedures Act. A request for a contested case hearing before the Administrative Law Court (ALC) must be filed in accordance with the Rules of the ALC, including payment of the ALC's filing fee, at the following address:

Clerk's Office
South Carolina Administrative Law Court
Edgar A. Brown Building
1205 Pendleton St., Suite 224
Columbia, SC 29201

The ALC's Notice of Request for Contested Case Hearing form and the Rules of the ALC can be found at the ALC's website: http://www.scalc.net. If a party files a request for a contested case hearing with the ALC, the party must serve a copy of the request on DHEC and any other parties at the same time the request is filed with the ALC. A copy of the request for a contested case hearing must be delivered or mailed to DHEC at the following address:

Lisa L. Longshore
Clerk of the Board
SC DHEC
2600 Bull Street
Columbia, SC 29201

The above information on filing a request for a contested case hearing before the Administrative Law Court is provided as a courtesy; parties before the ALC are responsible for complying with all applicable requirements of the Court.

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

CESAS-DE

October 7, 2011

BY FACSIMILE TO 803-898-3393 AND BY EXPRESS MAIL

Clerk of the Board
Board of Health and Environmental Control
South Carolina Department of Health and Environmental Control (SC DHEC)
2600 Bull Street
Columbia, SC 29201

SUBJECT: Savannah Harbor Expansion Project (SHEP) – Request for Final Review of (1) SC DHEC's Proposed Denial of 401 Water Quality Certification and (2) SC DHEC's Proposed Objection to the Federal Consistency Determination Under the Coastal Zone Management Act

To the Clerk of the Board:

The U.S. Army Corps of Engineers (Corps) hereby files this Request for Final Review of the following proposed decisions (Request): (1) SC DHEC's (DHEC or the Department) proposed denial of 401 water quality certification, which was transmitted to the Corps by letter dated September 30, 2011 entitled "Notice of Department Decision – State Certification" and signed by Mr. Chuck Hightower (401 denial letter), and (2) DHEC's proposed objection to the Corps's Federal Consistency Determination under the Coastal Zone Management Act, which was transmitted to the Corps by separate letter also dated September 30, 2011 entitled "Savannah Harbor Expansion Project: SCDHEC-OCRM Coastal Zone Consistency Determination" and signed by Ms. Carolyn Boltin-Kelly (Coastal objection letter).

The Corps is filing this Request for both proposed decisions in accordance with (a) S.C. Code Ann. 44-1-60, (b) the Notice of Appeal Procedure attached to the 401 denial letter, (c) R.61-101.A.7, which provides that the coastal zone consistency determination shall be issued as a component of, and concurrently, with the water quality certification, and (d) R. 61-101.G.5, which provides that appeals of a water quality certification which include coastal zone consistency determination will be heard according to the procedures in R.61-101.G.

Because DHEC issued both proposed decisions on the same date, we assume DHEC intended to act consistent with these legal provisions.[1] While R.61-101 appears primarily geared toward

[1] The 401 denial letter is clearly stated to be a proposed or staff decision. While the Coastal objection letter does not use the same terminology, by operation of law, including R.61.101.A.7, it too must be considered a proposed or staff decision in order to provide the Corps with a right to request final review, especially since the previous Jan. 25 and Jan. 30, 2011 comment letters did not provide any notice of a right to request final review. (In addition, DHEC reserved all rights to supplement its Jan. 25 and Jan. 30, 2011 comments, and DHEC has since received and reviewed additional information from the Corps).

Federal licenses and permits, the policy rationale and efficiencies underlying the concurrent assessment of water quality and coastal zone issues would apply with equal force here. In addition, the facts are identical and many of the issues are the same or interrelated. If, however, DHEC believes it is not able to entertain this Request for combined review of the two proposed decisions, the Corps requests that this filing be processed both as a separate request for final review as to the 401 water quality certification and as a notice of intent to appeal the coastal zone proposed decision pursuant to the Policies and Procedures of Chapter V of the South Carolina Coastal Management Program (which requires forwarding to a review panel).

Before addressing the specific grounds for this Request, the Corps would like to make the following positions clear.

First, this is a request for a final review conference only – made for the purpose of obtaining final Department decisions on both matters (the 401 denial letter states that it is a "staff decision" and that the Department "proposes to deny;" see also S.C. Code Ann. 44-1-60(C)). The Corps does not intend to request a contested case (adjudicatory) hearing for either decision (regardless of the outcome of the final review conference). As a federal agency, the Corps is not legally required to submit to State quasi-judicial or judicial appellate processes.

Second, consistent with its own regulations, the Corps routinely seeks State water quality certification and coastal zone consistency determinations (when applicable) for Federal projects. There are statutory provisions that may exempt a project from State 401 certification where a State refusal to certify impairs interstate navigation or where water quality is thoroughly addressed in an EIS submitted to Congress, and that allow the project to proceed upon a Federal determination of consistency with coastal zone requirements. However, the Corps has made, and will continue to make, every effort to assure that the project fully assesses, avoids or minimizes environmental impacts, and that remaining impacts are fully compensated. Seeking certification at the State level has been a part of that effort, including this request for final review. In the event of a State denial or the inclusion of unreasonable conditions, the Corps expressly reserves the right to proceed based on a Federal exemption and/or determination. However, the Corps would prefer to obtain favorable concurrences from South Carolina.

Grounds for Review and Specific Changes Sought

I. Water Quality Certification

The Corps is requesting that the Department make a final decision issuing a water quality certification for the SHEP selected plan and associated mitigation. A detailed statement of the grounds upon which the proposed decision is challenged is provided in Enclosure A attached hereto. The Corps reserves the right to present additional information, documents, and argument for consideration as appropriate.

II. Objection to Coastal Zone Consistency Determination

The Corps is requesting that the Department make a final decision finding that the SHEP selected plan and associated mitigation is consistent with South Carolina's coastal management plan and concurring with the Corps' Federal Consistency Determination for South Carolina (found in the Draft Tier I Environmental Impact Statement, Appx. J). A detailed statement of the grounds upon which the proposed decision is challenged is provided in Enclosure B attached hereto. The Corps reserves the right to present additional information, documents, and argument for consideration as appropriate.

Procedural

We are separately mailing today a check for $100 to cover the filing fee for this Request. Please return a file-stamped copy of this filing to Mr. William Bailey, Chief of Planning, Savannah District, US Army Corps of Engineers, 100 W. Oglethorpe Ave, Savannah, GA 31401-3640. Mr. Bailey will be this office's point of contact on this matter at (912) 652-5781. We request the final review conference be scheduled within thirty days from the date of this filing, and in no event later than sixty days from the date of this filing as required by S.C. Code Ann. 44-1-60(F). Finally, the Corps is willing to engage in additional discussions with DHEC in an attempt to settle these matters before any final review conference as appropriate.

Respectfully submitted,

JEFFREY M. HALL
Colonel, US Army
Commanding

Enclosures

Enclosure A

Water Quality Certification

As stated in the cover letter, the Corps is filing this statement of the grounds upon which DHEC's proposed decision to deny 401 water quality certification is challenged. This statement provides a point-by-point response to each of the substantive objections raised by DHEC in its proposed decision as set forth in DHEC's September 30, 2011 letter, Staff Assessment, Section VI, Conclusion on Water Quality Impacts and Classified Uses, pages 7-10.

Specific Responses to DHEC Staff Assessment Objections to 401 Certification:

1. OBJECTION: Mechanical failure of the [dissolved oxygen] system would cause significant degradation to aquatic life within the estuary, and limit ability of the river to accept and assimilate pollutants. The Department does not have reasonable assurance that the increased DO deficit caused by the channel deepening will be adequately mitigated by the oxygen injection system. Staff Assessment, at 8.

   RESPONSE: The Savannah Harbor Expansion Project includes a Monitoring and Adaptive Management Plan (Appendix D of EIS) that provides the Department with the assurance it seeks on this issue. After construction of the oxygen injection systems, the Corps will monitor their performance and D.O. levels throughout the harbor. Those actions ensure SC DHEC, the other natural resource agencies, and the public will be able to confirm that the oxygen injection systems are performing as intended. If the monitoring indicates that they are not, the Adaptive Management Plan provides a mechanism for the Corps to modify and/or adjust those systems so that they provide their intended function -- which is to remove the adverse effects on D.O. that harbor deepening could cause. The Adaptive Management Plan describes how the Corps would coordinate the monitoring results with the natural resource agencies to identify if/when modification and/or adjustment of the mitigation features are warranted. The Corps believes that the combination of the Monitoring and Adaptive Management Plan provides assurance that the oxygen injection systems will adequately mitigate the project's effects on dissolved oxygen.

2. OBJECTION: According to correspondence from the Corps dated September 12, 2011, the long term operating and maintenance costs associated with the DO injection system are $1.2 million annually. These costs will be added to their normal funding requests. This system is a very costly method to mitigate for the projected impacts, and the funding for the long-term operational costs depends on unpredictable annual appropriations. Staff Assessment, at 8.

   RESPONSE: The Corps will add the funding needed to operate and maintain the oxygen injection systems to its annual request for funds to operate and maintain the harbor. The Corps cannot guarantee the amount that a future Congress may appropriate in a given year to operate and maintain the Savannah Harbor Navigation Project, but to comply with a provision of the Georgia water quality certification, the Corps has committed to operating the oxygen injection system each year that it receives funds from Congress to operate and maintain the Savannah Harbor Navigation Project. Since operation of the oxygen injection

system is a condition of the Georgia water quality certification and will be a condition of the Corps' Record of Decision (NEPA compliance), we believe that the Department can be reasonably certain the Corps would operate the system in the future. We believe these provide similar certainty (of continued operation of mitigation features) to that obtained through certifications and permits approved by the Department for private individuals and corporations.

3. OBJECTION: When considering the Department's concerns about the use of mechanical means with questionable funding to permanently maintain oxygen levels in the waterbody, the Department cannot certify that there us reasonable assurance that project will not violate applicable water quality standards. Staff Assessment, at 8.

   RESPONSE: We believe that the previous two responses provide reasonable assurance that the oxygen injection systems will adequately mitigate the project's effects on dissolved oxygen and will be operated in the future.

4. OBJECTION: The Department is concerned about the precedent set by allowing the Corps to take restoration credit for wetlands that are included in the project impacts. In addition, the Corps has proposed no method of preservation for the wetlands for which restoration credit is being taken. This leaves the entire 1,068 acres of restored brackish marsh unprotected from threat due to any future harbor expansion activities. Without the credit from the brackish marsh restoration area, there is a large deficit in the amount of mitigation credit that will be provided for this project. In order to comply with the provisions in Section F of Regulation 61-10 I, the Department must require appropriate mitigation to ensure that functions and values in the ecosystem will be protected. Staff Assessment, at 8.

   RESPONSE: The Corps took restoration credit for wetlands that are included in the project impact analysis in response to Federal requirements to incrementally justify the costs of each project feature. In addition, natural resource agencies (such as SC DHEC) requested the Corps evaluate the project's potential impacts if no mitigation were performed and with the proposed mitigation measures. The Corps claimed restoration credit for the effects of the mitigation measures as a way of showing the beneficial effects of those features and identifying when additional mitigation may still be needed. The Corps used the results of that analysis to determine that additional wetland mitigation would be needed, and included acquisition and preservation of freshwater wetlands as another mitigation feature of the project. The USFWS sought the views of the state natural resource agencies (such as SC DNR) before approving the Corps' proposed wetland mitigation plan in their March 2011 Final Fish and Wildlife Coordination Act Report.

5. OBJECTION: Even though the vegetative shift that will occur from the change in salinity is minimal, there will be some loss to the habitat functions within the large area of converted salt marsh. This plan is not consistent with the state's regulatory obligation to protect existing uses in the ecosystem. The plan does not adequately compensate for all of the wetland impacts, nor does the plan meet the requirements of Regulation 61-101. Lack of appropriate mitigation means that functions within the ecosystem will be eliminated or impaired by the proposed activity. Allowing the Corps to take mitigation credit for the project impacts would

also limit the Department's ability to evaluate mitigation proposals on any such future project. Staff Assessment, at 9.

RESPONSE: The Corps developed its mitigation plans through Interagency Coordination Teams, of which SC DHEC and SC DNR were members. As a group, the Wetland Interagency Coordination Team identified tidal freshwater wetlands as being the most ecologically valuable type of wetland in the Savannah River estuary. An EPA team member suggested that Savannah District use its Regulatory Standard Operating Procedures (SOP) to quantify the mitigation that may be needed after the flow rerouting components of the mitigation plan are included. That SOP is very similar to one regularly used by the Corps' Charleston District and SC natural resource agencies when they evaluate Section 404 permits for proposed private projects in SC that may adversely impact wetlands. Savannah District used the methodology in that SOP to consider both the adverse and beneficial aspects of the proposed project on freshwater wetlands, brackish marsh and saltmarsh. Since the SOP calculations include all wetland types, the Corps believes the resulting mitigation plan adequately compensates for all of the salinity-induced wetland impacts. No wetland function would be eliminated as a result of changes in salinity. Adverse effects from the converting one wetland type to another (freshwater to brackish, or saltmarsh to brackish marsh) would be compensated through the acquisition and preservation of tracts that the USFWS has identified as ecologically valuable within the estuary.

6. OBJECTION: Since the Department does not have concurrence from the NMFS on the project impacts and proposed mitigation, it would be impossible to completely evaluate any adverse effects on sturgeon. Regulation 61-101 states in Section F.(5)(c) that certification will be denied if the project adversely impacts waters containing State or Federally recognized rare, threatened, or endangered species. Therefore, the Department cannot certify that the project will not adversely impact waters containing endangered species without concurrence from the NMFS. Staff Assessment, at 9.

   RESPONSE: The Corps is continuing to coordinate with the NMFS on this issue and expects to receive a "no jeopardy" opinion from NMFS. If the Department cannot reach its own assessment of whether the project will unacceptably impact shortnose sturgeon, it could condition its water quality certification upon the Corps successfully obtaining concurrence from NMFS on this issue.

7. OBJECTION: The Department's ability to certify the proposed activity has also been compromised by the alternatives analysis included in the draft EIS. Regulation 61-1 0 I Section F.(5)(b) states that certification will be denied if there is a feasible alternative to the activity which reduces adverse consequences on water quality and classified water uses. By limiting the project purpose, the Corps may have excluded from consideration some feasible alternatives; therefore, the Department cannot certify that there are no feasible alternatives to the proposed activity. Staff Assessment, at 9.

   RESPONSE: The Corps evaluated several potential alternatives to this project. Appendix O of the EIS contained a description of that evaluation, including consideration of a new container terminal in Jasper County. Construction of a new container terminal in Jasper

County and deepening to that site was found to more costly than deepening to the GPA's existing container terminal. The non-structural and other structural means of addressing the present navigation problems in the harbor were all found to be less effective from a combined cost and environmental impact perspective. The Department's staff suggests that the project purpose may exclude some alternatives. However, the 1999 Congressional authorization of the Savannah Harbor Expansion Project effectively limited the scope of the evaluation. The Corps believes that its examination of navigation problems that are being experienced in the harbor is a reasonable response to the Congressional authorization. Neither the Corps nor SC DHEC could identify another feasible alternative to the proposed activity.

8. OBJECTION: Regulation 61-101 Section F.(5) states that certification will be denied if the proposed activity permanently alters the aquatic ecosystem in the vicinity of the project such that its functions and values are eliminated or impaired. This section of the regulation also states that certification will be denied if the proposed activity adversely impacts waters containing State or Federally recognized rare, threatened or endangered species. For the proposed activity, the applicant has not given reasonable assurance that existing uses will not be further impaired or eliminated from the proposed activity, nor has the applicant shown conclusively that the activity will not adversely impact waters containing the Federally endangered Shortnose sturgeon. Additionally, the Department cannot certify that there are no feasible alternatives to the proposed project. Some alternatives may have been excluded from consideration due to the limited project purpose. This project does not meet the requirements for issuance of a Water Quality Certification pursuant to Section 401 of the Clean Water Act, 33 U.S.C. Section 1341, and the requirements of Regulation 61-101, Water Quality Certification. The proposed activity could result in significant degradation to the aquatic ecosystem or remove existing and classified uses of the Savannah River. Staff Assessment, at 9-10.

   RESPONSE: The Corps disagrees that the proposed harbor deepening could result in significant degradation to the aquatic ecosystem or would remove existing and classified uses of the Savannah River. Through the over 10 years of coordination with the federal and state natural resource agencies on this project, the Corps has developed -- and last November proposed -- a plan that would increase the efficiency of moving goods through Savannah Harbor. That increased efficiency would be an economic benefit to shippers and consumers in the southeast, including South Carolina and Georgia. In their comments on the Draft EIS, EPA Region 4 -- who approved SC DHEC's administration of water quality certifications under the Clean Water Act -- did not express concern about any potential failure of the project to comply with the Clean Water Act. EPA stated "After extensive interpretation of DO hydrodynamic modeling data, EPA finds that project DO depletions can be reasonably restored to pre-project conditions and evenly distributed within the affected river reaches using Speece Cones for direct oxygen injection into the River. ... EPA's conclusion concerning the sufficiency of the proposed DO mitigation focuses on a water quality perspective to ensure that pre-project DO levels are maintained." The Corps believes that the proposed project (with its mitigation features) would not significantly degrade the aquatic ecosystem or remove existing and classified uses of the Savannah River.

Conclusion

The Savannah Harbor Expansion Project with its comprehensive mitigation meets the certification requirements of Section 401 of the Clean Water Act as implemented by South Carolina. The Corps has adequately addressed all of the objections (concerns) raised by DHEC staff. For these reasons the Corps's application for water quality certification should be granted. The Corps reserves the right to submit additional documentation and argument as appropriate during the final review process.

Enclosure B

Coastal Zone Consistency Determination

As stated in the cover letter, the Corps is filing this statement of the grounds upon which DHEC's proposed decision to object to the Corps's Federal Consistency Determination under the Coastal Zone Management Act is challenged. The objections of SCDHEC-OCRM were delineated in letters dated January 25, 2011 and January 31, 2011. In section A below, this statement provides a point-by-point response to each of the substantive objections raised by DHEC in those letters, demonstrating that SHEP complies with the Coastal Zone Management Act (CZMA), as it is fully consistent with the enforceable policies of the South Carolina Coastal Management Plan (SCCMP). In Sections B and C, below, the Corps provides a critique of several important omissions from the SCDEHC-OCRM January 25, 2011 consistency review. In Section D, below, the Corps explains additional coordination and information provided to SCDEHC-OCRM after the January 25 and 31, 2011 letters. That information, incorporated herein by reference, provides additional justification supporting this request for final review.

A. Responses to SCDHEC-OCRM Objections:

By letter dated March 30, 2011 the Corps responded to all of the objections proffered by SCDHEC-OCRM in its letters of January 25, 2011 and January 31, 2011. The Corps believes those responses adequately addressed the objections raised by SCDHEC-OCRM, however updated responses are provided as follows:

1. OBJECTION: SCDHEC-OCRM's January 25, 2011 letter raised concerns about the time period allowed for comments. *Letter from SCDHEC-OCRM dated January 25, 2011* at 1.

RESPONSE: Based on events, there is no issue concerning time to comment. After numerous requests, 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 20, 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 20, 2011 letter. Thus, SCDHEC-OCRM had ample opportunity to make additional comments even after January 31, 2011. SCDHEC-OCRM's September 30, 2011 proposed decision contained no further substantive comments, and simply stated that SCDHEC-OCRM "stands by its January 25 and 31, 2011 letters."

2. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 2-3.

RESPONSE: Under the Coastal Zone Management Act, 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. However, the Corps's Federal Consistency Determination (FCD) (DEIS, Appx. J) further demonstrates and confirms that the project with its associated mitigation is also fully consistent with the enforceable provisions of South Carolina's approved Coastal Zone Management Plan (SCCMP). This determination is fully supported by the proposed mitigation features [Mitigation and Monitoring and Adaptive Management Plans] which would protect the resources of the State of South Carolina's coastal zone as mandated by regulation.

3. OBJECTION: The project as proposed will not restore or enhance the resources of the state but will result in a degradation of coastal resources. *Letter from SCDHEC-OCRM dated January 25, 2011* at 3.

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 landscape 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 effects. The Monitoring and Adaptive Management Plans detail the measures which will be implemented to protect the sensitive resources of coastal South Carolina.

4. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 3.

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 features in the lower end of both Middle and Back River to reduce the amount of saltwater that would move up those tidal streams.

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 to expand Shortnose sturgeon spawning habitat would be appropriate mitigation for their loss of habitat. The SHEP is fully consistent with this part of the South Carolina Coastal Zone Management Plan because the project provides adequate mitigation to offset its adverse effects. Additionally, implementation of the Monitoring and Adaptive Management Plan would ensure that the "critical areas" (coastal waters, tidelands) of South Carolina are protected after construction of the project is completed.

5. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 3.

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 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 compensate. 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 NOAA Fisheries, US Fish and Wildlife Service, and SC DNR.

Since the proposed dissolved oxygen system would restore (and marginally 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.

SCDHEC-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.

6. OBJECTION: Models described in the EIS indicate impacts to large areas of freshwater marshlands including important habitat for fish, wading birds, and 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 4.

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 (up to 337 acres with the 48-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 337 acres)**	**Saltmarsh to Brackish Marsh (Approximately 730 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 48-foot depth would have a similar effect on 730 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 48-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 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 2,683 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 2,683 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 337 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.

7. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 4.

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.

8. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 4.

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.

9. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 4.

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 provide for ten 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.

10. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 5.

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 SCDHEC approved for the Corps to use on this project. EPA used a variation of those models in development in its April 2010 the Draft Revised Dissolved Oxygen TMDL for Savannah Harbor. It is our understanding that SCDHEC 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 improve dissolved oxygen conditions in over 90 percent of the estuary compared to existing conditions. To ensure the DO systems function as intended, monitoring 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.

11. OBJECTION: The project as proposed will effect Shortnose Sturgeon spawning, juvenile, and adult habitats. Additionally, SNS habitat will result in a net loss. *Letter from SCDHEC-OCRM dated January 25, 2011* at 5.

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.

12. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 5.

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, local newspapers report the Joint Project Office agreeing that a terminal at Jasper would also require a navigation channel deeper that the present 42-foot depth.

13. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 5-6.

RESPONSE: SDHEC-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.

14. OBJECTION: As proposed, the project will increase the salinities within the immediate and upstream areas, causing a significant impact to the freshwater marshes. *Letter from SCDHEC-OCRM dated January 25, 2011* at 6.

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.

15. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 6.

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.

16. OBJECTION: As proposed dredging under the NED and LP plans, the project will further degrade the existing water quality conditions. *Letter from SCDHEC-OCRM dated January 25, 2011* at 6.

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 improve dissolved oxygen conditions in over 90 percent of the estuary compared to existing conditions.

17. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 6.

RESPONSE: None of the material [rock, stone, and sandy sediments] used to construct the closure structures in McCoy's Cut and Rifle Cut, the sill in Middle River, 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 SC. 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 area.

18. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 6.

RESPONSE: Navigation studies undertaken by the Corps 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.

19. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 7.

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.

20. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 7.

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 1,212 acres of freshwater marsh would be converted to brackish marsh by the 48-feet SHEP project. By implementing flow-routing measure 6A, only 337 acres of freshwater marsh would be similarly converted. Thus, flow routing measure 6A satisfies both avoidance and minimization elements by maintaining 875 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.

21. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 7.

RESPONSE: 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.

22. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 8.

RESPONSE: The SHEP was initiated based on a known problem -- the larger vessels that use Savannah Harbor are constrained by draft because of the existing controlling depth of -42 feet mlw. Those vessels must either light load and/or wait for high tide to safely navigate the harbor. This situation will become even more of an issue once the larger Post-Panamax ships begin replacing older, smaller vessels. The screening of potential management measures to address the identified navigation needs is contained in Appendix O of the EIS. Based on problem identification, the SHEP looked at the benefits and associated environmental impacts of constructing a deeper harbor to either 44, 45, 46, 47, or 48 feet mlw. Increasing the controlling depth in Savannah Harbor is the best alternative to solve the identified problems. The

alternatives analysis in the Draft Environmental Impact Statement was performed in accordance with applicable law and is fully consistent with the SCCMP enforceable policies relating to alternatives.

23. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 25, 2011* at 8.

RESPONSE: As with any water resource development project having a landscape 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 Mitigation and 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.

The screening of potential management measures and development of alternatives to address Savannah's identified navigation needs are contained in Appendix O of the EIS. A port facility in Jasper County was one of the early alternative terminal locations that the Corps evaluated. The Corps found that deepening to the presently-proposed site and its subsequent development into a port facility was less cost effective than deepening up to the existing Garden City Terminal.

Navigation studies undertaken by the Corps 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.

24. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 31, 2011* at 1.

RESPONSE: Based on the Corps's recent coordination (February 2011) with the South Carolina State Historic Preservation Office, the SC SHPO is satisfied with the Programmatic Agreement and has no outstanding concerns regarding the proposed SHEP.

25. OBJECTION: 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. *Letter from SCDHEC-OCRM dated January 31, 2011* at 1.

RESPONSE: Based on the Corps's recent coordination (February 2011) with the South Carolina State Historic Preservation Office, it is satisfied with the Programmatic Agreement and has no outstanding concerns regarding the proposed SHEP. The SHPO has indicated that the proposed mitigation presented in the report is acceptable.

B. SCDHEC-OCRM's Consistency Review Did Not Adequately Consider National Interest and Regional Benefits

SCDHEC-OCRM's 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 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 consistency determinations adequately consider the national interest and regional benefits of projects submitted for review. However, SCDHEC-OCRM's review does not recognize the national interest or regional benefits of the SHEP. In fact, the 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 . . . ." 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, this conclusion is unfounded.

The only acknowledgment of the national interest in the SHEP and its regional benefits was provided in a letter from the SCDHEC-OCRM dated May 27, 2011. This letter contains nothing more than a statement that the SCDHEC-OCRM did consider the national interest and regional benefits and found them insufficient to outweigh the perceived negative environmental effects of the project. This alleged consideration of the national interest in the SHEP and its regional benefits is not sufficient.

C. SCDHEC-OCRM's Consistency Review Did Not Adequately Consider the SCCMP's Presumption in Favor of Developing Existing Port Facilities

SCDHEC-OCRM's consistency review did not comply with the SCCMP 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." SCMP 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. There is no current utility, highway, or

rail access to a potential Jasper Ocean Terminal site while the Savannah Harbor supports existing, fully operation terminal, however, SCDHEC-OCRM asserts that insufficient consideration has been given the Jasper Ocean Terminal.

D. Summary of Additional Coordination and Information Provided to SCDHEC-OCRM

While the Corps contends that earlier responses to SCDHEC-OCRM's objections were sufficient to address those objections, the Corps did subsequently provide additional explanatory information in an attempt to mutually resolve the State's concerns about the impacts of the SHEP. A summary of this coordination is as follows:

1. The Savannah District Engineer and staff met with the SCDHEC-OCRM on April 21, 2011 to discuss the Corps's Federal Consistency Determination (DEIS, Appx. J). OCRM staff had reviewed the responses that the Corps had provided to their comments on the DEIS. They identified three issues on which they still had questions -- wetlands, dissolved oxygen, and Shortnose sturgeon. A good discussion was had on those issues and the Corps agreed to provide more information to clarify the project's expected effects. OCRM did not identify any issues that would necessarily keep them from concurring in the Corps's FCD. The meeting was very cordial and both parties agreed to collaboratively work through the remaining issues.

SCDHEC requested the following information:

a. Draft responses to EPA comments
b. Draft responses to Department of Commerce comments
c. Draft responses to Department of Interior comments
d. Comments from SC SHPO
e. Updated table of wetland impacts
f. Salinity under various conditions (existing, with deepening, with deepening and mitigation (flow rerouting))
g. Wetland areas with direct and indirect impacts
h. Wetland areas benefitting from flow rerouting

2. April 21, 2011: the Corps's Bill Bailey provided items a-d via email (5:56 PM).

3. May 13, 2011: Bill Bailey provided items e-h via email (2:29 PM).

4. Letter from SCDHEC-OCRM date May 27, 2011: SCDHEC-OCRM sent a letter to acknowledge receipt of additional information described in 4, 5, and 6 above and to rebut assertions in the USACE March 20, 2011 letter. Specifically, SCDHEC asserted that it did consider the nation interest as well as regional benefits. SCDHEC-OCRM stated that the "negative impacts [environmental] impacts outweighed any benefits that might be in the national interest." Similarly, for regional benefits, specifically transportation facilities and parks, SHEP was found to be inconsistent and that "the benefits to South Carolina form the project are minimal in light of the direct and indirect impacts." The letter closes by referencing the January 25 and January 31 letters stating the project is inconsistent primarily because of the out-of-kind mitigation proposed for wetland impacts, the DO injection system that "has not been shown to be effective in tidal systems", and the reliance on annual appropriations to fund all the mitigation

features. "For projects of similar scope found consistent with South Carolinas' coastal program, SCHEC-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."

SCDHEC-OCRM concluded the letter by stating they welcome continued discussions that would "reduce the impacts of the project as well as modifications to the proposed mitigation."

5. June 1, 2011: Wetlands Interagency Coordination Team (ICT) Meeting in Atlanta, GA:

Bill Bailey, Mackie McIntosh, and Dr. Jeffrey King met with the Wetlands ICT in Atlanta, GA, at which members of SCDHEC-OCRM staff were present. Corps staff presented technical analyses of the indirect wetland impacts that had been conducted since release of the Draft reports. Dr. King explained that the vegetative conversion would not be a major one and would have a negligible or minor adverse effect on overall wetland function. The group discussion focused on the USACE application of the Regulatory SOP. During part of that discussion, SCDHEC stated that tidal saltwater marsh was more valuable than tidal freshwater marsh, a point which USFWS refuted. The Corps and EPA described the 13-year coordination process, during which time the Wetland ICT agreed along the way that the approach to impacts and associated mitigation was acceptable to all interested parties.

Conclusion

The SHEP project with its comprehensive mitigation is fully consistent with the enforceable policies of the SCCMP. The Corps has adequately addressed all of the objections and concerns raised by SCDHEC-OCRM. In addition, SCDHEC-OCRM has not properly considered the national interest and regional benefits of the SHEP. For these reasons the final review of the Corps' Federal Consistency Determination should result in a "concurrence" from DHEC. The Corps reserves the right to submit additional documentation and argument as appropriate during the final review process.

D H E C
PROMOTE PROTECT PROSPER

Promoting and protecting the health of the public and the environment

Clerk, S.C. Board of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201
Telephone: (803) 898-3309 Fax: (803) 898-3393

October 17, 2011

Via U.S. Mail - Certified

91 7108 2133 3937 3695 9470
US Army Corp of Engineers
Savannah District
William G. Bailey, Chief
Planning Division
100 East Oglethorpe Avenue
Savannah, GA 31402

91 7108 2133 3937 3695 9487
Georgia Ports Authority
Curtis Foltz, Executive Director
PO Box 2406
Savannah, GA 31402

Via Interagency Mail Delivery
Roger P. Hall, Esq.
SCDHEC – Office of General Counsel
2600 Bull Street
Columbia, SC 29201

RE: ***Docket No. 11-RFR-52*** *– Decision dated September 30, 2011, to deny a 401 Water Quality Certification and objection to the Federal Consistency Determination under the Coastal Zone Management Act.*

The South Carolina Board of Health and Environmental Control will hold a Final Review Conference on Thursday, November 10, 2011, at 10:00 a.m. in the Board Room (3420), S.C. Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina, on the above referenced matters.

The Board has approved the following outline of procedures for conferences:

- Swear all witnesses
- Presentation by parties
    - Order of presentation:
        - DHEC Staff
        - Other affected parties supporting staff decision
        - Requestor(s)
        - Other affected parties challenging staff decision
    - Rebuttal:
        - DHEC Staff
        - Other affected parties supporting staff decision
        - Requestor(s)
        - Other affected parties challenging staff decision
- Parties may present evidence; rules of admissibility of evidence do not apply
- At any time during conference, officers conducting conference may request additional information and may question parties and anyone providing information
- Burden of proof is on Requestor(s)
- Presiding officer may impose time limits
- Conference is open to the public
- Officers may deliberate in closed session
- Officers may announce decision at conclusion of conference or may reserve consideration

If any party would like to have a transcript of the review conference, please notify (by e-mail at lucaslm@dhec.sc.gov or mail at the above address) the Clerk of the Board by Wednesday, November 2, 2011, so that arrangements can be made to have a reporter present for the conference. The parties requesting a court reporter will be responsible for payment of the court reporter.

Sincerely,

Lisa Lucas Longshore

Lisa Lucas Longshore
Clerk

OGC # 21304

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D H E C

PROMOTE PROTECT PROSPER

Clerk, S.C. Board of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201
Telephone: (803) 898-3309 Fax: (803) 898-3393

October 24, 2011

Via U.S. Mail and Electronic Mail
Keith.J.Klein@usace.army.mil
US Army Corp of Engineers
Savannah District
Keith Klein,
Acting District Counsel
100 East Oglethorpe Avenue
Savannah, GA 31402

cfoltz@gaports.com
Georgia Ports Authority
Curtis Foltz, Executive Director
PO Box 2406
Savannah, GA 31402

Via Electronic Mail
harlesj@dhec.sc.gov
John Harleston, Esq.
SCDHEC – Office of General Counsel
2600 Bull Street
Columbia, SC 29201

RE: ***Final Review Conference - Docket No. 11-RFR-52*** – *Decision dated September 30, 2011, to deny a 401 Water Quality Certification and objection to the Federal Consistency Determination under the Coastal Zone Management Act.*

The South Carolina Board of Health and Environmental Control will hold a Final Review Conference on Thursday, November 10, 2011, at 10:00 a.m. in the Board Room (3420), S.C. Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina, on the above referenced matters.

The Board has allotted times as follows for the Final Review Conference:

The Department will be allowed forty (40) minutes.

The U.S. Army Corp of Engineers and the Georgia Ports Authority will be allowed forty (40) minutes to be divided as determined by the parties or the Board will allow twenty (20) minutes for each.

Each side will be allowed five minutes in rebuttal.

The Board has approved the following outline of procedures for conferences:

- Swear all witnesses
- Presentation by parties
    - Order of presentation:
        - DHEC Staff
        - Other affected parties supporting staff decision
        - Requestor(s)
        - Other affected parties challenging staff decision
    - Rebuttal:
        - DHEC Staff
        - Other affected parties supporting staff decision
        - Requestor(s)
        - Other affected parties challenging staff decision
- Parties may present evidence; rules of admissibility of evidence do not apply
- At any time during conference, officers conducting conference may request additional information and may question parties and anyone providing information
- Burden of proof is on Requestor(s)
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If any party would like to have a transcript of the review conference, please notify (by e-mail at lucaslm@dhec.sc.gov or mail at the above address) the Clerk of the Board by Wednesday, November 2, 2011, so that arrangements can be made to have a reporter present for the conference. The parties requesting a court reporter will be responsible for payment of the court reporter.

Sincerely,

Lisa Lucas Longshore

Lisa Lucas Longshore
Clerk

OGC # 21304

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DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

November 4, 2011

Office of Counsel

John Harleston
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

SUBJECT: Savannah Harbor Expansion Project (SHEP) – Proposed Conditions

Dear John:

Thank you and DHEC staff for meeting with Savannah District last Friday to discuss the water quality certification and coastal zone consistency determination for the SHEP project. In an effort to resolve key issues, the Corps proposes the following conditions be included in an approved water quality certification:

1. "The USACE shall comply with all terms and conditions in the National Marine Fisheries Service Final Biological Opinion."

2. "To ensure compliance with coastal zone policies, the USACE shall promptly circulate the Programmatic Agreement for Cultural Resources in the Environmental Impact Statement for the Savannah Harbor Expansion Project, Appendix G, as revised to include the US Navy, to the Georgia and South Carolina State Historic Preservation Officers, and the US Navy, in turn, for their signature."

3. "The USACE shall document in the project Record of Decision its binding commitment to install, operate, and maintain the dissolved oxygen injection system in accordance with the project mitigation plan subject to Congressional appropriation of funds for the project, and shall make the dissolved oxygen injection system a top priority for annual operation and maintenance (O&M) funds appropriated and received for the project, above normal maintenance requirements."

In addition, with regard to the dissolved oxygen injection system, please see the attached letter from the District Engineer addressing maintenance funding concerns.

Please let us know if this information and commitments will enable narrowing the issues before the Final Review Conference to only the wetland mitigation (salt marsh conversion) issue.

Sincerely,

Keith J. Klein
Acting District Counsel

Enclosure

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

November 4, 2011

Executive Office

Mr. David Wilson
South Carolina Department of
Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Dear Mr. Wilson:

Thank you for meeting with Savannah District last Friday to discuss potential resolution of key issues regarding water quality certification and coastal zone consistency. At the meeting, my office agreed to further consider ways of addressing DHEC's concerns regarding operation and maintenance of the project's dissolved oxygen (DO) injection system.

The proposed Speece Cone technology has been used in other applications worldwide for 30 years and underwent rigorous on-site testing in Savannah Harbor during 2007. The DO system design for Savannah Harbor already includes reserve capacity and an operational back-up unit at each of two installation locations. The estimated life of the cones and lines is 40 years and the estimated life of the controls, oxygen generator, and pumps is 20 years (Draft General Re-Evaluation Report, page 236). During construction, there will be a Transfer Efficiency Study to optimize the DO system. During the project's 10-year post-construction monitoring period, needed adjustments and modifications to the DO system will be included in the project's $18 million Adaptive Management plan (Draft Environmental Impact Statement, Appendix D, pages 33-34). Successful installation, operation, and maintenance of the DO system is already or will be a requirement of several approvals for the project, including Georgia's water quality certification and the National Marine Fisheries Service Biological Opinion.

In addition, the Corps is making the following commitments to address DHEC's concerns. First, the project Record of Decision will expressly recognize a binding commitment to install, operate, and maintain the DO system in accordance with the project mitigation plan, subject to Congressional appropriation of funds for the project. Second, the Savannah District will make the DO system a top priority for annual operation and maintenance (O&M) funds appropriated and received for the project, above normal maintenance requirements.

We believe that the information and commitments in this letter should satisfactorily resolve the remaining DO system issues.

Sincerely,

Jeffrey M. Hall
Colonel, US Army
Commanding

McIntosh, Margarett (Mackie) SAS

From: Klein, Keith J SAS
Sent: Monday, December 05, 2011 7:24 AM
To: McIntosh, Margarett (Mackie) SAS
Subject: FW: Dkt No. 11-RFR-52 - Corps Filing - Response/Brief (UNCLASSIFIED)
Attachments: Corps Response and Brief - Dkt No 11-RFR-52.pdf

Classification: UNCLASSIFIED
Caveats: NONE

Per your request.

Keith J. Klein
Acting District Counsel
Savannah District
U.S. Army Corps of Engineers
Telephone: 912.652.5142
Blackberry: 912.547.3962

-----Original Message-----
From: Klein, Keith J SAS
Sent: Wednesday, November 09, 2011 1:47 PM
To: Lucas, Lisa M.
Cc: Okane, Jason D SAS
Subject: Dkt No. 11-RFR-52 - Corps Filing - Response/Brief (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Ms. Longshore:

The US Army Corps of Engineers hereby files electronically the attached Response/Brief for the Final Review Conference tomorrow.

It is our understanding that if we filed this by 2 pm you would send it to the Board members today, and we request that you do so.

There are five exhibits that accompany the Response/Brief. Due to their size, I am going to e-mail them separately. If you do not think you can transmit the exhibits to the Board members with the Response/Brief today, it is okay with us if you just send the Response/Brief.

If you would kindly reply that you received this e-mail we would appreciate it. Thank you very much.

Keith J. Klein
Acting District Counsel
Savannah District
U.S. Army Corps of Engineers
Telephone: 912.652.5142
Blackberry: 912.547.3962

Classification: UNCLASSIFIED

STATE OF SOUTH CAROLINA
BOARD OF HEALTH AND ENVIRONMENTAL CONTROL

US Army Corps of Engineers, Georgia Ports Authority, Requestors, v. South Carolina Department of Health and Environmental Control, Respondent.	)	Final Review Conference Docket No. 11-RFR-52

US ARMY CORPS OF ENGINEERS' RESPONSE TO DHEC STAFF POSITION AND BRIEF IN SUPPORT OF REQUEST FOR FINAL REVIEW

The US Army Corps of Engineers ("Corps") submits this brief as additional evidence and argument in response to the South Carolina Department of Health and Environmental Control (DHEC) Summary of Issues and Staff Position ("Staff Position") dated October 31, 2011, and in further support of the Corps's request for final review of the September 30, 2011 DHEC staff decisions proposing (a) that the Board deny a South Carolina water quality certification for the Savannah Harbor Expansion Project ("SHEP" or "project") and (b) that the Board object to the Corps's federal coastal zone consistency determination for South Carolina.

INTRODUCTION

For more than ten years, many federal and state agencies, including DHEC and South Carolina DNR, have participated with the Corps and a wide variety of stakeholders in studying the potential economic benefits and environmental impacts of the Savannah Harbor Expansion Project. On November 10, 2010, the Corps issued a Joint Public Notice, Draft Environmental Impact Statement ("DEIS"), and Draft General Re-Evaluation Report ("DGRR") for the project,

reflecting the results of this lengthy, comprehensive study process. The Joint Public Notice constituted an application for Clean Water Act Section 401 water quality certification ("WQC") from Georgia and South Carolina. The DEIS, Appendices I and J, contained the federal coastal zone management ("CZM") consistency determinations for each State.

In support of its request for final review of the DHEC staff decisions on the WQC and CZM consistency determination for South Carolina, the Corps is making an oral presentation to the Board and filing this brief with attached exhibits. The Corps further incorporates by reference all previous correspondence on these issues contained in the administrative record provided to the Board by DHEC staff, plus the DEIS, GRR, and all supporting studies. This brief will address the five grounds for denial by DHEC in the order set forth in the Staff Position, *i.e.*, (1) dissolved oxygen injection system, (2) wetland mitigation; (3) Shortnose sturgeon; (4) alternatives; and (5) archaeological resources. However, before doing so, it is important to put SHEP in context.

At present, Savannah Harbor is a vital economic engine for jobs and growth in both Georgia and South Carolina. About 40 percent of the Savannah Harbor port workforce lives in South Carolina, and for years Savannah Harbor has been maintained as a federal navigation project with benefits to both States. Previous deepenings, regular dredging, and private activities have also resulted in an adapted environment with certain positive impacts to waters of both States. For example, the Savannah National Wildlife Refuge, which is located mostly on the South Carolina side of the Savannah River, provides outstanding habitat for fish and wildlife, as well as recreation and educational opportunities.

Much of the freshwater tidal marsh in the Savannah National Wildlife Refuge is former rice plantation land that was farmed for many years before being abandoned in the late 1800s due

to a poor economy. Since then, these areas have evolved into a valuable, high priority natural resource. Similarly, wetland areas near the Wildlife Refuge that have been classified as salt marsh for purposes of impact evaluation conducted for this project – and that are now claimed as highly valuable by DHEC staff – were formerly freshwater tidal wetland that was converted by previous harbor deepening.

Now, Savannah Harbor, as well as Charleston Harbor and other South Atlantic ports, confronts a problem as the world shipping industry transitions to much larger ships (referred to as Post-Panamax vessels) that require deeper harbors. But there is great opportunity as well, for both Georgia and South Carolina, because the projected dramatic growth in shipping container volume over the next 35 years will result in substantial business for all South Atlantic ports, including Charleston and Savannah. To deepen Charleston, or a proposed Jasper Ocean Terminal, will require similar study and rigorous analysis and development of environmental impact mitigation techniques as SHEP. Experience shows that Savannah Harbor, like other ports, can be deepened in a manner that is protective of the environment, including South Carolina's water quality and coastal zone. And there is every reason to ensure this remains true after construction: the Savannah River estuary and Savannah National Wildlife Refuge are shared resources that both Georgia and South Carolina have a genuine interest in preserving and enhancing.

I. THE DISSOLVED OXYGEN INJECTION SYSTEM WILL BE PROPERLY MAINTAINED.

One of the key elements of the SHEP mitigation plan is a dissolved oxygen injection system ("DO system") that will maintain or improve DO levels in Savannah River to protect and benefit fish. Over the years, DHEC staff expressed concern about this aspect of the SHEP mitigation plan. The Corps conducted several technical studies to obtain information to address

those concerns, ultimately determining the DO system is a viable technology that will actually increase current DO levels in 90% of the Savannah River estuary, providing a substantial benefit to South Carolina waters. DHEC staff now appears to agree that the DO system will work:

> Since the waters within the lower Savannah estuary will sustain impacts from the reduced DO levels resulting from the proposed deepening, the Corps plans to inject oxygen into the water column to raise DO levels. The injection system will utilize Speece Cones to directly inject oxygen into the river to increase the DO concentration throughout the waterbody. **The effects should raise DO levels to acceptable levels as the super oxygenated water is pumped through diffusers back into the river.** Modeling data has been provided to determine the extent to which this system will oxygenate the water, and to show the effectiveness of the system to achieve acceptable DO levels.

DHEC Sept. 30, 2011 WQC Proposed Decision, at 3 (emphasis added).

At this point, the Corps believes the sole remaining issue is DHEC staff's concern about the long-term operation and maintenance ("O&M") of the DO system. Staff Position, at 3-4. DHEC staff is asking the federal government to go beyond what South Carolina or any state has ever required for a federal navigation project – namely to escrow money sufficient to cover 50 years of annual O&M appropriations at an average $1.2 million per year, or a total of $60 million.[1]

DHEC staff has been unable to provide any example of a situation where the federal government has obligated annual O&M funds in advance of construction of a federal navigation project. DHEC staff did provide two examples of what they believed might be acceptable financial assurance. The first involved the Department of Energy (DOE) at a mixed waste site in Oak Ridge, TN. However, in that situation, DOE expressly made any long-range funds commitment subject to Congressional appropriations. *See* Exhibit A attached hereto, Ordering Paragraph 4 (Consent Order in apparent enforcement action). In the second example involving

[1] If such a precedent were set, it would apply to all future federal navigation projects in South Carolina, including deepening Charleston Harbor.

the South Carolina Port Authority, the Port provided cash as the mitigation, rather than long-term O&M of the proposed mitigation.

As noted in the DOE Consent Order (Ex. A, Ordering Paragraph 4), the Anti-Deficiency Act, 31 USC 1341, prohibits federal government employees from obligating funds in advance of Congressional appropriations. There are other budgetary authorities and restrictions as well. However, regardless of the limitations of the federal government budget process,[2] there is ample assurance that the DO system will be funded over the long-term.

Recently, the Corps's Savannah District sent DHEC staff a letter, attached hereto as Exhibit B, which addresses ways that O&M of the DO system will be assured for the life of the project. First, the letter explained why the DO system will perform as intended over the life of the project. Among other things, the Corps noted that the system design includes back-up capacity to address mechanical breakdowns. In addition, the Corps explained that the DO system will be a well-constructed mechanical system, with 20-year and 40-year life expectancies for the main system components and pumps. *See* Ex. B, second paragraph.

In the second part of the letter, the Corps stated that it will make the DO system's O&M a binding commitment in the project Record of Decision and a top priority in the Savannah District's annual O&M budget (subject to Congressional appropriations). In addition, the Corps recommended the following condition be inserted in an approved WQC certification:

> The Corps shall document in the project Record of Decision its binding commitment to install, operate, and maintain the dissolved oxygen injection system in accordance with the project mitigation plan subject to Congressional appropriation of funds for the project, and shall make the dissolved oxygen injection system a top priority for annual operation and maintenance (O&M) funds appropriated and received for the project, above normal maintenance requirements.

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[2] It is not an option to have the non-federal sponsor provide money in an escrow up front because O&M for a federal navigation project is exclusively a federal responsibility.

See Ex. B, third paragraph.

In addition, the Corps pointed out that the project includes a Monitoring and Adaptive Management Plan, which specifically addresses how the DO system will be reviewed and modified post-construction to ensure it performs as intended. *See* Ex. B, second paragraph, and DEIS, Appendix D. Finally, to the extent additional assurance may be helpful, certain other approvals for the project require the Corps to provide long-term O&M assurance, including the Georgia Section 401 water quality certification (Clean Water Act compliance) and the National Marine Fisheries Service Final Biological Opinion (Endangered Species Act compliance). *See* Ex. B, fourth paragraph. With the foregoing requirements, commitments, and safeguards, the Board can be confident that the DO system will be adequately funded.

II. THE PROJECT'S WETLAND MITIGATION PLAN COMPLIES WITH SOUTH CAROLINA'S WATER QUALITY STANDARDS, THE COASTAL MANAGEMENT PLAN, AND THE 2008 MITIGATION RULE.

DHEC staff contends that the SHEP wetland mitigation plan does not comply with the USACE-USEPA "2008 Mitigation Rule," which is found at 33 CFR Part 332 and 40 CFR Part 230. Staff Position, at 5-6. However, as discussed below and in an 80-page analysis attached to this brief, the SHEP wetland mitigation plan does in fact comply with the 2008 Mitigation Rule.[3] *See* Exhibit C attached hereto, "VII Consideration of the USEPA/USACE Mitigation Rule" and Section II.F, *infra*, as well as other comments in this brief. Among other things, the attached

[3] From a strict legal standpoint, the 2008 Mitigation Rule applies to Clean Water Act Section 404 permit applications, not Corps civil works projects such as SHEP. In addition, SHEP wetland mitigation study and planning began in 2002. The agencies devoted substantial time, effort, and expense to development of the wetland mitigation and associated flow-rerouting plan before the Mitigation Rule was promulgated in 2008. The preamble to the 2008 Mitigation Rule states : "the new requirements should not be applied retroactively to permit applicants who have invested substantial effort in developing data and plans under the previous rules and guidance." 73 Fed. Reg. 19594, at 19608 (Apr. 10, 2008). Nevertheless, the Corps has attempted in good faith to follow the 2008 Mitigation Rule to the extent practicable.

analysis explains the important functional assessment that was conducted to evaluate indirect impacts to wetlands resulting from SHEP. *See, e.g.*, Ex. C, at 5-7. The analysis has previously been provided to DHEC staff.

The primary objection raised by DHEC regarding SHEP wetland mitigation is that the plan reduces salinity in 740 acres of marsh without sufficient compensatory mitigation.[4] *See* DHEC Sept. 30, 2011 letter, at 8-9. The premise for this objection is that wetlands that were classified in the project as salt marsh (for purposes of impact evaluation) have a higher ecological function than lower salinity wetlands (classified as brackish marsh). However, this premise does not hold true in the Savannah River Basin, based on scientific investigations and guidance provided by the project's Wetland Interagency Coordination Team (Wetland ICT), which included representatives of DHEC, SC DNR, GA DNR, USEPA, USFWS, and NOAA Fisheries.

A. Description of the Flow Re-Routing and Wetland Mitigation Plan.

The issue raised by DHEC is a consequence of the project's goal of minimizing impacts to freshwater tidal marsh as much as possible. The Wetland ICT determined in 2003 that freshwater tidal marsh is the highest priority wetland natural resource in the Savannah River Basin. That priority is primarily based on the wetland losses that have occurred since the 1800s in the Savannah River Basin. Tidal freshwater marsh is rare and its acreage in the Savannah River Basin has been particularly reduced over the years. Although ecologically important in their own right, salt marsh and brackish marsh are more available in other basins – over 408,000 acres in South Carolina and another 405,000 acres in Georgia based on National Wetland

[4] In this brief, the Corps is using the wetland acreage figures for the -47 foot alternative, which has tentatively been selected as the preferred alternative. DHEC is using the wetland acreage figures for the -48 foot alternative. The overall wetland impacts for the -47 foot alternative are lower, although the salt marsh figure is slightly higher (740 acres vs. 730 acres).

Inventory maps of Estuarine and Marine Wetlands. *See, e.g.,* DEIS, Appendix E, Fish and Wildlife Coordination Act Report, at 19; DGRR, at Appendix C, Engineering Investigations, at 127.

The flow re-routing plan essentially directs more freshwater into the Back River area on the South Carolina side of the Savannah River Basin, as requested by USFWS and agreed to by the Wetland ICT, in part to respond to the Wetland ICT's concerns (including those of its DHEC and SC DNR members) that further salinity increases in that area should be prevented and reversed if possible to avoid further reduction in diversity of the estuary. *See, e.g.*, SC DNR's Jan. 25, 2011 comment letter, at 3 of the enclosure (stating DNR's "overriding concern" is freshwater tidal marsh). In addition to preventing further loss of tidal freshwater wetlands, the flow re-routing will restore some wetlands classified as brackish to freshwater marsh. One of the other expected effects is to reduce salinity in another 740 acres, which DHEC decided recently was an uncompensated conversion and loss of salt marsh.

Without the flow re-routing plan, the -47 foot deepening alternative for the project would increase salinity in 1,177 acres of freshwater tidal wetland, converting it to brackish marsh. All agencies agree this would be a measurable loss in wetland value. DEIS, Section 5.1.2.2, at 5-13. With flow re-routing, the project will affect (increase) salinity in only 223 acres of freshwater wetland (located in Georgia waters), a far lesser number of acres than without flow re-routing. *Id.* Largely to compensate for the increased salinity in those 223 acres, the mitigation plan includes preservation of 2,245 acres of wetlands (primarily bottomland hardwood) and upland buffer that would be acquired and deeded to the Savannah National Wildlife Refuge.

As for the salinity changes in the 740 acres of wetland referred to as salt marsh that DHEC is concerned about, there is a strong argument that the salinity **reduction** that would

occur in this area does not require mitigation because it would be restoration of lower salinity brackish marsh that had been converted over time in the harbor.[5] Conceptually, the basic question is whether the **reduction** in salinity in the 740 acre area results in a legitimate "trade-off" involving roughly equivalent value, much like selling one car to buy a different model at a comparable price. In both situations, whether the "trade-off" is in fact equal or nearly equal depends on how the wetlands or cars function before and after. Before addressing function, though, it is important to understand how the distinction was made between classifications of salt and brackish marsh for this project.

B. There Is No Exact Scientific Line Between Salt and Brackish Marsh.

For this project, the Wetland ICT agreed to use four parts per thousand (4 ppt) salinity as the dividing line between classification of marsh as salt marsh or brackish marsh. To illustrate, a wetland with 3 ppt salinity would be classified as brackish marsh for this project and a wetland with 5 ppt salinity would be classified as salt marsh.[6] Establishing a dividing line at 4 ppt was necessary to enable numeric computer modeling to provide estimates of quantities and locations of salinity changes in the estuary.

However, the dividing line of 4 ppt between salt and brackish marsh used for this project is a very conservative one. In the scientific literature, there is research that supports setting the dividing line between salt and brackish marsh at 10 or even 17 ppt (the salinity of seawater is 30 ppt). *See* Ex. C, at 5-6. If the dividing line had been set higher for SHEP, DHEC's concerns would be eliminated because the 740 acres at issue would have been classified as brackish marsh. Thus, there is a continuum, rather than a sharp distinction, between brackish and salt

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[5] Restoration is a preferred option under the 2008 Mitigation Rule.

[6] For comparison, a wetland with less than 0.5 ppt salinity would be considered freshwater marsh.

marsh. The real question is whether there is any functional difference between the two levels of salinity in the marsh, regardless of what salinity level is used to classify or label them. This only makes sense because once a wetland is no longer dominated by freshwater, the effect of salinity levels between, for example, 4 and 7 ppt is one of degree, not kind.

It is instructive that nowhere in the DHEC water quality regulations is there any distinction between salt marsh and brackish marsh. In R. 61-68, Water Quality Standards and Classifications, DHEC could have classified salt marsh as a significant resource, one more valuable than brackish marsh. Instead, DHEC drew only one important distinction that is relevant here, that between freshwater and tidal saltwater. *See* R. 61-68, Sec. G, Class Descriptions, Designations, and Specific Standards for Surface Waters, para G.10 – G.13. In sec. B.57 of R. 61-68, DHEC then defined tidal saltwaters as "those waters whose elevation is subject to changes due to oceanic tides and which have chloride ion content in excess of 250 milligrams per liter (mg/l)(salinity = 0.48 parts per thousand)." In other words, DHEC's definition of tidal saltwaters includes both brackish marsh and salt marsh, and nothing in the definition or elsewhere in the regulation evinces any official, regulatory determination that salt marsh is a higher priority resource than brackish marsh.

C. The 740 Acres Will Exhibit Approximately the Same Functional Value, Whether Classified as Brackish or Salt Marsh.

The Corps performed a scientific investigation to determine whether reduction of the salinity in the 740 acres of the marsh at issue would impair the wetland functions of this area. DEIS, Appendix C, at 51 and Appendix A to Appendix C, Worksheets. Again, it is important to understand that the project would **decrease** salinity in the 740 acres at issue. Less salt is usually considered a good thing environmentally in the Savannah River estuary, but in this case, DHEC is contending that more salt is better – in an area 20 miles inland from the coast that long ago

was freshwater tidal wetland, and that has become more saline over time. *See, e.g.*, DHEC Sept. 30, 2011 WQC Proposed Decision, at 8 ("The plan places an emphasis on minimizing the loss of freshwater tidally influenced wetlands, because these wetlands have historically been altered by past projects.").

As set out in a key functional assessment table that is part of the Corps's 80-page analysis of compliance with the 2008 Mitigation Rule, there are 11 commonly accepted functions of wetlands, ranging from water purification to fish and wildlife habitat. *See* Ex. C, at 6 (Table 1). It takes no specialized knowledge to understand that wetland functions such as flood protection, streamflow maintenance, retention of particles, and surface water storage would not be affected by conversion of salt marsh to brackish marsh. *See* Ex. C, at 6 (Table 1), 7-22 (negligible difference in these functions between salt marsh and brackish marsh). The amount of water and the water levels in the marsh will remain the same regardless of whether the water is saline or brackish – it is only the level of salinity that changes (**decreases**).

In addition, decreased salinity would not measurably change the type of vegetation found in the 740 acres at issue. The most common form of salt marsh vegetation – a plant known as *spartina alterniflora* – would continue to grow and flourish in a brackish marsh setting. *See* Ex. C, at 45. Similarly, fish and wildlife habitat would experience only minor change. *See* Ex. C, at 32-34, 44-45. The same large number of generalist species of fish and wildlife that use the 740 acres of salt marsh would continue to live in and use the same 740 acres after re-classification to brackish marsh. *Id.*

Because the functional assessment shows the restoration of brackish marsh would cause negligible change in the 11 key wetland functions, the Corps reasonably concluded that it was appropriate to view the change from the salt marsh to brackish marsh classification as resulting

in "no net loss of wetlands," which is the ultimate goal of the 2008 Mitigation Rule and previous wetland mitigation guidance.

D. The Project Mitigation Plan Complies With DHEC Rules.

DHEC R. 61.101, Water Quality Certification, para F.5.(a), states that certification will be denied "if the proposed activity permanently alters the aquatic ecosystem in the vicinity of the project such that its functions or values are eliminated or impaired," and para F.6 states that "[c]ertification will not be issued unless the Department is assured the appropriate and practical steps . . . will be taken to minimize adverse impacts on water quality and the aquatic ecosystem."

Based on the foregoing discussion, para F.5(a) does not apply because the salinity reduction in 740 acres of marsh will not eliminate or impair the functions or values of that area. And regardless, all appropriate and practical steps are being taken through the SHEP mitigation plan (wetlands, dissolved oxygen, fish passage, etc.) to minimize adverse impacts on water quality and the aquatic ecosystem. Simply stated, there are not likely to be significant effects, much less adverse impacts, to mitigate.

E. DHEC Changed Its Views On Wetland Mitigation.

On January 25, 2011, DHEC-OCRM submitted an objection to the Corps's coastal zone consistency determination. A careful reading of that letter shows that OCRM did not raise the salt marsh to brackish marsh conversion issue. Instead, OCRM focused on deficiencies with regard to **freshwater** marsh mitigation caused by **increasing** salinity. Because DHEC-OCRM's September 30, 2011 proposed decision (coastal zone) merely incorporated its January 25, 2011 letter, and that earlier letter did not specifically raise any issue about the conversion of salt marsh to brackish marsh, or inadequate mitigation for it, DHEC-OCRM has not properly raised any salt marsh conversion issue for consideration by the Board with regard to coastal zone consistency.

More importantly, the January 25, 2011 DHEC-OCRM letter can only fairly be characterized as demonstrating DHEC's position and agreement – at that time, at least – that freshwater marsh is, indeed, the most important wetland resource in the Savannah River Basin. As stated, the priority assigned to freshwater marsh for this project was established early in the process of wetland mitigation planning (well before 2008) – and all agencies then agreed and have continued to do so. As stated, the consequence of assigning freshwater marsh the highest priority was the flow re-routing plan – developed after intense study and much time and cost – which shaped the ensuing mitigation planning.

It was not until June 1, 2011, that DHEC revealed a changed position assigning a higher priority to salt marsh than previously announced (even though the marsh so labeled is only a few ppt more saline and indistinguishable as to vegetation and fish populations), and targeting the restoration from marsh classified as salt marsh to brackish marsh as its key issue. *See* DHEC Sept. 30, 2011 WQC Proposed Decision, at 8-9 (raising issue about impacts to 730 acres of salt marsh).

F. Additional Comments Regarding 2008 Mitigation Rule.

In addition to the detailed technical analysis provided in Exhibit C, the Corps makes the following observations regarding the application of the 2008 Mitigation Rule to this project. First, the Rule is flexible based on what is practicable. 33 CFR 332.3(a) ("The district engineer must determine the compensatory mitigation to be required in a DA permit, based on what is practicable and capable of compensating for the aquatic resource functions that will be lost as a result of the permitted activity.") For this project, what is practicable is heavily influenced by the basic direction established by the Wetland ICT, which is to preserve as much freshwater tidal

marsh as possible, and the constraint that no salt marsh mitigation banks or in-lieu fee programs are available in the Savannah River Basin. *See* Ex. C, at 64-65.

Second, while the Rule prefers "in-kind" mitigation, the definition of in-kind is also flexible. In-kind is broadly defined to mean "a resource of a **similar** structural and functional type to the impacted resource." 33 CFR 332.2 (emphasis added). The conversion to brackish marsh of 740 acres classified as salt marsh using the conservative salinity levels adopted for this project could be viewed as restoration in-kind because those particular 740 acres will be a resource of **similar** structural and functional type before and after. Indeed, the Rule itself draws no distinction between different types of tidal wetland. *See, e.g.*, 33 CFR 332.3(e)(1)(" In general, in-kind mitigation is preferable to out-of-kind mitigation because it is most likely to compensate for the functions and services lost at the impact site. For example, tidal wetland compensatory mitigation projects are most likely to compensate for unavoidable impacts to tidal wetlands . . . ."). Certainly, DHEC has not cited any basis in law, regulation, or any official published policy to support its staff position that brackish marsh, especially when located 20 miles inland, cannot serve as in-kind mitigation for marsh that has only been classified as salt marsh for impact evaluation purposes.

G. Monitoring and Adaptive Management Would Ensure Mitigation Success.

Appendix D to the Draft Environmental Impact Statement contains a Monitoring and Adaptive Management Plan that provides additional assurance that restored brackish marsh will provide the same functional value as the so-called salt marsh. The Monitoring and Adaptive Management Plan envisions a process of detailed monitoring to establish a baseline before construction and then determine deviations from the baseline during and after construction. If important project mitigation features do not perform as planned, the Monitoring and Adaptive

Management Plan includes funding to enable modifications to be made to bring the mitigation in line with its expected performance.

H. Summary.

The Corps has shown that based on a detailed scientific functional assessment (*see* Ex. C), the project's wetland mitigation plan complies with South Carolina's water quality standards and coastal management plan because there would be no functional loss of or impairment to wetlands from restoration of higher salinity marsh to the type of brackish marsh that was historically present in the area. Given the natural resource agency priority assigned to freshwater marsh, the project's wetland mitigation plan, including adaptive management program, is the most practicable solution for compensating for indirect impacts to wetlands caused by salinity changes. The water quality certification should be approved and the Board should concur with the federal coastal zone consistency determination.

III. THE SHORTNOSE STURGEON WILL BE PROTECTED

DHEC staff has agreed that if the National Marine Fisheries Service (NMFS) issues a favorable determination with regard to the shortnose sturgeon, there will no longer be any basis for objection to the project on endangered species grounds. Staff Position, at 6; DHEC Sept. 30, 2011 WQC Proposed Decision, at 9. On November 4, 2011, NMFS issued its Final Biological Opinion for the project, determining the project would not jeopardize the continued existence of the shortnose sturgeon provided the Corps complies with the project mitigation plan, including (a) installation, maintenance, and operation of the DO injection system, and (b) construction of a fish passage at the Savannah New Bluff Lock & Dam site near Augusta, GA. *See* Exhibit D attached hereto (NMFS Nov. 4, 2011 cover letter forwarding Final Biological Opinion). Based on issuance of the Final Biological Opinion, the Corps submits that the DHEC staff concerns regarding shortnose sturgeon have been fully addressed. To ensure additional comfort, the

Board could include the following condition in an approved WQC: "The Corps shall comply with all terms and conditions in the National Marine Fisheries Service Final Biological Opinion." (As noted in Part I, above, such a condition would also help provide additional assurance that the DO injection system will be operated and maintained as proposed.).

IV. THE CORPS PROPERLY ANALYZED FEASIBLE ALTERNATIVES.

In its Staff Position, DHEC briefly states that the consideration of alternatives in the Draft Environmental Impact Statement (DEIS) was inadequate and that the Corps's narrow project purpose excluded some feasible alternatives from consideration. DHEC staff does not identify any specific feasible alternatives. Staff Position, at 7. In its WQC Proposed Decision, DHEC staff omitted many important aspects of the Corps's alternatives analysis, such as the Regional Port Analysis discussed below, without specifying any feasible alternatives that it believed should have been evaluated. DHEC Sept. 30, 2011 WQC Proposed Decision, at 5 and 9. In its January 25, 2011 letter, DHEC-OCRM also misstated the Corps's alternatives analysis by claiming that it "does not consider other locations." *See* Jan. 25, 2011 letter, CZM Objection, at 8. However, DHEC-OCRM did identify one potentially feasible alternative for analysis: the proposed Jasper Ocean Terminal. *Id.*

Any contention that the Corps did not evaluate regional port alternatives or a Jasper Ocean Terminal alternative is absolutely incorrect. The Corps performed a complete Regional Port Analysis, which is found in the Draft General Re-Evaluation Report, Appendix A, Attachment 3 (Final Report and two Interim Reports). The Regional Port Analysis specifically analyzed current and projected port capacity, demand, and growth, and environmental impacts and constraints for Charleston Harbor and a proposed Jasper Ocean Terminal, in addition to other South Atlantic ports (Norfolk, VA; Wilmington, NC; Savannah, GA; and Jacksonville, FL). *Id.*, Final Report, at 1-20; Interim Reports for more detail. In addition, the Corps

separately and thoroughly analyzed the Jasper Ocean Terminal proposed site in the Draft EIS Alternatives Analysis, as part of studying costs and environmental impacts at eight different locations along the Savannah River (four on the South Carolina side, four on the Georgia side). See DEIS, Sec. 3.0 and Appendix O.

DHEC also claims that the Corps improperly limited the project purpose to improving navigation in Savannah Harbor. Again, this is absolutely incorrect. Under the National Environmental Policy Act, the Clean Water Act, and South Carolina regulations,[7] it is entirely proper for an applicant to propose a specific project, especially with regard to location. *See, e.g., Northwest Environmental Defense Center v. Wood*, 947 F.Supp. 1371 (D. Ore. 1996) (validating Hyundai's proposal to construct a large semiconductor fabrication plant in Eugene, Oregon); *Friends of the Earth v. Hintz*, 800 F.2d 822 (9th Cir. 1986) (validating Rayonier's proposal to expand a sawmill/sorting yard/log export complex in Gray's Harbor on Pacific coast of Washington); *Sylvester v. U.S. Army Corps of Engineers*, 882 F.2d 407 (9th Cir. 1989) (validating a land developer's proposal to build golf course at a resort in Squaw Valley, California). Not only may the applicant propose a specific project in a specific area, but the Corps has a "duty to consider the applicant's purpose." *Sylvester*, 882 F.2d at 409 (the Corps cannot change the applicant's purpose to one that it deems more suitable, such as constructing a facility "anywhere"); *Hintz*, 800 F.2d at 833-34 (the Corps's alternatives analysis must take into account the objectives of the applicant's project).

Under the Corps's NEPA regulations, an EIS is only required to "include a discussion of the reasonable alternatives which are to be considered by the ultimate decision-maker." 33 CFR

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[7] DHEC R. 30-1, para D. 23, states that feasibility is determined by the Department with respect to individual proposals, *i.e.*, starting with the applicant's project purpose. There is no requirement under South Carolina regulations for a permit applicant or federal agency to adopt any particular project purpose, much less one that an opponent argues for.

Part 325, App. B.7. An alternative that does not accomplish the purpose of the project in question is unreasonable, but agencies may not define the purpose of a project so narrowly as to preclude consideration of alternatives. *City of Bridgeton v. Federal Aviation Administration*, 212 F.3d 448, 456, 458 (8th Cir. 2000). The range of reasonable alternatives which an agency is required to consider is within its informed discretion. *Vermont Yankee Nuclear Power Corp. v. Natural Res. Def. Council, Inc.*, 435 U.S. 519, 551-52 (1978); *Pogliani v. United States Army Corps of Engineers*, 166 F.Supp.2d 673, 698 (N.D.N.Y. 2001). An agency's consideration of alternatives is sufficient if it considers an appropriate range of alternatives, even if it does not consider every available alternative. *Surfrider Foundation v. Dalton*, 989 F.Supp. 1309, 1327 (S.D. Cal. 1998). In cases involving a construction project, there are normally a finite number of tangible pieces of property that must be considered as alternative sites. *Id.*

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. *See League of Women Voters, et al. v. South Carolina DHEC, et al.*, 2008 WL 5416972, *9 (S.C. Admin. Law Judge, Dec. 15, 2008) and DHEC R. 30-1, para D.23, which states:

> (23) Feasible (feasibility) - As used within these rules and regulations (e.g., "unless no feasible alternative exists"), feasibility is determined by the Department with respect to individual project proposals. Feasibility in each case is based on the best available information, including, but not limited to, technical input from relevant agencies with expertise in the subject area, and consideration of factors of environmental, economic, social, legal and technological suitability of the proposed activity and its alternatives. Use of this word includes, but is not limited to, the concept of reasonableness and likelihood of success in achieving the project goal or purpose. "Feasible alternatives" applies both to locations or sites and to methods of design or construction, and includes a "no action" alternative.

The last sentence of DHEC R. 30-1, para D.23, indicates that 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. As stated above, 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 that included (1) the Regional Port Analysis (DGRR, Appendix A, Attachment 3), (2) a Multi-Port Analysis (DGRR, Appendix A, Attachment 5), (3) an analysis of a reasonable range of alternative locations or sites along the Savannah River (DEIS, sec 3.0 and Appendix O), (4) an analysis of six different depths of harbor deepening along the Savannah River (DEIS, sec. 3.0 and Appendix O)(methods of design or construction), and (5) the no-action alternative (DEIS, at 3-4 – 3-15).

The most relevant conclusions reached about the wide range of alternatives studied for SHEP are startlingly simple: (1) there is no feasible alternative to improving Savannah Harbor because the major South Atlantic ports will experience so much cargo growth from 2005 to 2050 they will all need deepening or improvement, (2) no one port could accommodate all the growth in container volume expected in the region, (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, and (4) it is simply not feasible to build a Jasper Ocean Terminal in lieu of improving Savannah Harbor for various reasons including the tremendous cost involved ($4 billion), the environmental impacts, and the timing (Jasper does

not exist at present and cannot be constructed in time to meet the growth in demand Savannah and other South Atlantic ports are currently facing).

Moreover, 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 Ocean Terminal and the twenty years that will be required to study, permit, and construct that project, weigh heavily against finding a Jasper Ocean Terminal alternative to be feasible.

The Board should also consider a March 11, 2011 "Update" from the Jasper Ocean Terminal project office, attached hereto as Exhibit E. This Update contains numerous statements that SHEP is necessary and beneficial for the Jasper Ocean Terminal project (Ex. E, at 3, 12) ("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 Ocean Terminal will handle container volumes in excess of what an improved (deepened) Savannah Harbor or Charleston Harbor could handle (Ex. E, at 3, 18). The Update also confirms that the Jasper Ocean Terminal will cost $4 billion. Ex. E, at 18.

In light of the information provided in the Update, combined with the fact that Jasper Ocean Terminal would have its own environmental impacts requiring mitigation (Regional Port Analysis, DGRR, Appendix C, Attachment 3, Final Report, at 14-20, and associated Interim Reports), no one can seriously contend Jasper Ocean Terminal is presently a feasible alternative to SHEP. After extensive study, no other specific feasible alternative was identified or found,

either. The Corps is not required to do more than it has with regard to analyzing alternatives. The DHEC staff position criticizing the SHEP alternatives analysis is simply without merit.

V. ARCHAEOLOGICAL RESOURCE CONCERNS HAVE BEEN ADDRESSED.

The Draft Environmental Impact Statement includes an unsigned version of a Programmatic Agreement for Cultural Resources (Programmatic Agreement) designed to address all cultural resource issues. DEIS, Appendix G. DHEC staff advised the Corps that their concerns about archaeological resources would be satisfied once the Programmatic Agreement is signed by all parties including the South Carolina State Historic Preservation Officer (SHPO). After reviewing DHEC-OCRM's January 31, 2011 comments on cultural resource issues, conducting additional coordination with the Georgia and South Carolina SHPOs, and identifying the US Navy as an additional signatory, the Corps determined that all signatories were in agreement with the Programmatic Agreement provided it was revised to include the US Navy. the Corps has now revised the Programmatic Agreement to include the US Navy, signed it, and started the process of circulating it for signature to the Georgia and South Carolina SHPOs and the US Navy. Completion of this action should address the DHEC staff concerns and resolve this issue. the Corps recommends the Board include the following condition in an approved WQC/CZM certification: "To ensure compliance with coastal zone policies, the Corps shall promptly circulate the Programmatic Agreement for Cultural Resources in the Draft Environmental Impact Statement for the Savannah Harbor Expansion Project, Appendix G, as revised to include the US Navy, to the Georgia and South Carolina State Historic Preservation Officers, and the US Navy, in turn, for their signature."

CONCLUSION

For all the foregoing reasons, the concerns raised in the DHEC Staff Position have been fully addressed. The Board should approve the water quality certification, with appropriate conditions, and should concur with the federal coastal zone consistency determination.

Dated: November 9, 2011.

Respectfully submitted,

KEITH J. KLEIN (Oklahoma Bar #18285)
Attorney for US Army Corps of Engineers
Savannah District
100 W. Oglethorpe Ave.
Savannah, GA 31401
Telephone: (912) 652-5142
E-mail: keith.j.klein@usace.army.mil

JEFFREY M. HALL
Colonel, US Army
Commanding

McIntosh, Margarett (Mackie) SAS

From: Klein, Keith J SAS
Sent: Monday, December 05, 2011 7:24 AM
To: McIntosh, Margarett (Mackie) SAS
Subject: FW: Dkt No. 11-RFR-52 - Corps Filing - Response/Brief - EXHIBITS ATTACHED (UNCLASSIFIED)
Attachments: Corps Brief - DHEC - Ex A - DOE Consent Order.pdf; Corps Brief - DHEC - Ex B - DE Ltr re Dissolved Oxygen.pdf; Corps Brief - DHEC - Ex C - 2008 Mitigation Rule Analysis.pdf; Corps Brief - DHEC - Ex D - Biological Opinion Cover Ltr.pdf; Corps Brief - DHEC - Ex E - Jasper Ocean Terminal Update.pdf

Classification: UNCLASSIFIED
Caveats: NONE

In case you want this one too.

Keith J. Klein
Acting District Counsel
Savannah District
U.S. Army Corps of Engineers
Telephone: 912.652.5142
Blackberry: 912.547.3962

-----Original Message-----
From: Klein, Keith J SAS
Sent: Wednesday, November 09, 2011 1:53 PM
To: Lucas, Lisa M.
Cc: Okane, Jason D SAS
Subject: FW: Dkt No. 11-RFR-52 - Corps Filing - Response/Brief - EXHIBITS ATTACHED (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Ms. Longshore:

As noted in the e-mail I just sent (below), here are the exhibits for our Response/Brief. Please confirm receipt.

Please note that Exhibit C is 80 pages long. Again, if the size of some or all exhibits is too large to e-mail to the Board members today, we understand.

Also, we have made enough paper copies of our Response/Brief and the Exhibits to provide to each Board member tomorrow. Hopefully that will save you any printing and copying today. We will bring the materials with us by 10am and provide to you, or if you would like to receive them earlier, we could have someone bring them over. In that case, please let us know how you would like to handle it.

Keith J. Klein
Acting District Counsel
Savannah District
U.S. Army Corps of Engineers
Telephone: 912.652.5142
Blackberry: 912.547.3962

-----Original Message-----
From: Klein, Keith J SAS
Sent: Wednesday, November 09, 2011 1:47 PM
To: 'Lucas, Lisa M.'
Cc: Okane, Jason D SAS
Subject: Dkt No. 11-RFR-52 - Corps Filing - Response/Brief (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Ms. Longshore:

The US Army Corps of Engineers hereby files electronically the attached Response/Brief for the Final Review Conference tomorrow.

It is our understanding that if we filed this by 2 pm you would send it to the Board members today, and we request that you do so.

There are five exhibits that accompany the Response/Brief. Due to their size, I am going to e-mail them separately. If you do not think you can transmit the exhibits to the Board members with the Response/Brief today, it is okay with us if you just send the Response/Brief.

If you would kindly reply that you received this e-mail we would appreciate it. Thank you very much.

Keith J. Klein
Acting District Counsel
Savannah District
U.S. Army Corps of Engineers
Telephone: 912.652.5142
Blackberry: 912.547.3962

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

IN THE MATTER OF:	**)**	**DIVISION OF SOLID**
	)	**WASTE MANAGEMENT**
	)	
U.S. DEPARTMENT OF ENERGY)	**NO. 99-0438**	
	)	
RESPONDENT	**)**	**DOCKET NO. 04.27-007507A**

CONSENT ORDER

Upon the consent of the Commissioner and the United States Department of Energy (hereinafter "DOE"), this matter came before the Solid Waste Disposal Control Board. After consideration of the Commissioner's Order and the Respondent's Petition for Review, the Board made the following findings of fact and conclusions of law.

FINDINGS OF FACT AND CONCLUSIONS OF LAW

1. On November ____, 1999, Commissioner's Order No. 99-0438 was duly served upon DOE. Said Order is attached hereto as Exhibit A and incorporated herein by reference. The referenced Order was timely appealed by DOE to this Board for its review. The petition for review is also attached hereto as Exhibit B and incorporated herein by reference. The Respondent has raised, in the petition for review, various legal issues in challenging the Commissioner's Order, but agrees to accept the provisions of this Consent Order as a settlement of the matters in controversy, without waiving, and specifically preserving, any and all defenses DOE may have with respect to the Commissioner's Order. This Consent Order shall not be construed as an admission or evidence of any liability and shall not be used for any other purpose or in any judicial or administrative proceeding

except for a proceeding brought by a party for the purpose of enforcing the terms and conditions herein.

ORDER

WHEREFORE, PREMISES CONSIDERED**,** the Board approves the parties' Stipulations and Orders that:

1. In settlement of the current controversy, DOE shall pay TDEC the sum of fourteen million dollars ($14,000,000). This sum shall be payable in fourteen (14) equal and consecutive annual installments, with each installment to be paid before September 30 of each year, with the first installment due by September 30, 2000 and the last installment due by September 30, 2013. By written mutual agreement, the DOE Group Leader, ORR Remediation Management Group and the TDEC Director, DOE Oversight Division may modify the schedule and amount of the installments required by this paragraph. Refusal of either official to agree to modify the schedule and amount of the installments shall not be subject to challenge in any forum by any person.

2. TDEC shall deposit the payments in the pooled investment fund established by T.C.A. §9-4-603. The payments shall be invested and managed in accordance with T.C.A. §9-4-602, §9-4-603, and the policy guidelines duly adopted pursuant to the authority of T.C.A. §9-4-602. The Fund shall be otherwise managed and administered in accordance with the Fund Implementation Plan, attached hereto as Exhibit C and incorporated herein by reference.

3. The payments made pursuant to paragraph 1. of this Order shall satisfy any requirement for DOE or its contractors to make future payments, based (in whole or in part) on the authority of T.C.A. §68-212-108, with respect to the EMWMF, including disposal of wastes at the EMWMF for future response actions.

4. It is DOE's position that any requirement for the payment or obligation of funds by DOE established by the terms of this Consent Order, including the Fund Implementation Plan, is subject to the availability of appropriated funds, and that no provision of this Consent Order, including the Fund Implementation Plan, should be interpreted to require the obligation or payment of funds in violation of the Anti-Deficiency Act. 31 USC Section 1341, as amended.

5. It is TDEC's position that the federal Anti-Deficiency Act, 31 USC Section 1341, does not apply to any obligations set forth under this Consent Order or the Fund Implementation Plan. If appropriated funds are not available to fulfill DOE's obligations under this Consent Order, including the Fund Implementation Plan, DOE shall meet promptly with TDEC representatives to discuss whether the parties can reach an accommodation on adjustments to requirements involving the payment or obligation of such funds. If no agreement can be reached, then the TDEC and DOE agree that in an action by the TDEC to enforce any provision of this Consent Order, including the Fund Implementation Plan, the DOE may raise as a defense that its failure or delay was caused by the unavailability of appropriated funds. The TDEC disagrees that the lack of appropriations or funding is a valid defense. However, the TDEC and DOE agree and stipulate that it is premature at this time to raise and adjudicate the existence of such a defense.

6. Nothing in this Consent Order shall be construed as modifying the Oak Ridge Federal Facilities Agreement. In the event that the Fund is insufficient to perform Surveillance and Maintenance for the EMWMF, DOE retains its responsibility pursuant to CERCLA.

REASONS FOR DECISION

The Board encourages settling cases in the interest of avoiding the time and expense of prolonged litigation. The approval of the parties' agreement protects the environment and is in the best interests of the public.

Adopted and approved by a majority of the Board, a quorum being present, this ____ day of _____, 1999.

FOR THE SOLID WASTE DISPOSAL CONTROL BOARD

_____
James P. Newman, Chairman

APPROVED FOR ENTRY:

_____
Nancy Carnes, BPR #009383
Assistant Chief Counsel for Environment
Attorney for U.S. Department of Energy
Office of Chief Counsel
U.S. DOE, Oak Ridge Operations Office

_____
E. Joseph Sanders, BPR #006691
General Counsel
Tennessee Department of Environment
and Conservation

Tenn. Code Ann. § 4-5-316 gives a party the right to submit to the Board a petition for a Stay of Effectiveness of a FINAL ORDER within seven (7) days after its entry.

Tenn. Code Ann. § 4-5-317 gives any party the right to file a Petition for Reconsideration with in ten (10) days after the entry of a FINAL ORDER, stating specific grounds upon which relief is requested.

T.C.A. §§ 4-5-322 and 68-212-113 provide any party the right of judicial review by filing a Petition in the Chancery court of Davidson County within sixty (60) days of this ORDER becoming effective.

DOE understands the aforementioned rights and knowingly and voluntarily waive these rights as to this Consent Order.

A copy of this FINAL ORDER shall be served upon the DOE by certified mail, return receipt requested. This Final Order shall become effective upon entry.

Filed in the Administrative Procedures Division, Office of the Secretary of State, on this _____ day of _____, 1999.

_____
Charles C. Sullivan, II, Director
Administrative Procedures Division

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true and correct copy of this document has been served upon all interested parties by placing a true and correct copy of the same in the United States mail postage prepaid. This _____ day of _____, 1999.

_____
E. Joseph Sanders
Tennessee Department of Environment
and Conservation

DOE/Stewardship/Consent Order 10-22-99.doc

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

November 4, 2011

Executive Office

Mr. David Wilson
South Carolina Department of
Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Dear Mr. Wilson:

Thank you for meeting with Savannah District last Friday to discuss potential resolution of key issues regarding water quality certification and coastal zone consistency. At the meeting, my office agreed to further consider ways of addressing DHEC's concerns regarding operation and maintenance of the project's dissolved oxygen (DO) injection system.

The proposed Speece Cone technology has been used in other applications worldwide for 30 years and underwent rigorous on-site testing in Savannah Harbor during 2007. The DO system design for Savannah Harbor already includes reserve capacity and an operational back-up unit at each of two installation locations. The estimated life of the cones and lines is 40 years and the estimated life of the controls, oxygen generator, and pumps is 20 years (Draft General Re-Evaluation Report, page 236). During construction, there will be a Transfer Efficiency Study to optimize the DO system. During the project's 10-year post-construction monitoring period, needed adjustments and modifications to the DO system will be included in the project's $18 million Adaptive Management plan (Draft Environmental Impact Statement, Appendix D, pages 33-34). Successful installation, operation, and maintenance of the DO system is already or will be a requirement of several approvals for the project, including Georgia's water quality certification and the National Marine Fisheries Service Biological Opinion.

In addition, the Corps is making the following commitments to address DHEC's concerns. First, the project Record of Decision will expressly recognize a binding commitment to install, operate, and maintain the DO system in accordance with the project mitigation plan, subject to Congressional appropriation of funds for the project. Second, the Savannah District will make the DO system a top priority for annual operation and maintenance (O&M) funds appropriated and received for the project, above normal maintenance requirements.

We believe that the information and commitments in this letter should satisfactorily resolve the remaining DO system issues.

Sincerely,

Jeffrey M. Hall
Colonel, US Army
Commanding

VII Consideration of the USEPA/USACE Mitigation Rule

The USACE evaluated the proposed project mitigation with respect to the Mitigation Rule, which was jointly established by the USEPA and USACE and published in the Federal Register on April 10, 2008. Upon review of the rule, the USACE has determined that the proposed project mitigation conforms to its intent, as well as the requirements identified in 33 CFR Chapter II, Part 332. The following sections provide an assessment of the USACE's preferred mitigation alternatives specific to the Mitigation Rule.

A.

Characterization of the Lower SavannahRiver Watershed: The Lower Savannah Watershed is identified by Hydrologic Unit Code (HUC) 03060109. The watershed is approximately 377,000 acres in size and includes portions of Georgia and South Carolina. The Savannah River constitutes the primary drainage feature within the 8-digit HUC watershed, with limits that extend from southern Screven County, Georgia, and Allendale County, South Carolina, to the mouth of the river located between Chatham County, Georgia, and Jasper County, South Carolina. North of Interstate 95 (I-95), the watershed is primarily rural and dominated by agricultural entities. Similar land use trends are also located south of I-95 in South Carolina. However, Chatham and portions of Effingham Counties have experienced considerable urbanization over the last 20 years. A review of data reported by the University of Georgia suggests high intensity urbanization rates within the Lower Savannah Watershed of approximately 260 acres/year (http://narsal.uga.edu/glut/watershed.php?watershed=27), with a predominant amount occurring in Chatham and Effingham Counties. Savannah Harbor and those areas in Georgia adjacent to harbor are primarily dominated by industrial and/or commercial activities. The Georgia Ports Authority (GPA) presently operates the Ocean Terminal and Garden City Terminal in Savannah. In addition, approximately 13 other entities also maintain shipping terminals within the harbor. Please see Section 4 for an additional information concerning characterization of the project area and the Savannah Harbor.

Land use trends within the watershed have also been evaluated with respect to changes in wetland acreage. From 1985 to 2005, the quantity of wetlands within the Lower Savannah Watershed decreased. The table illustrated below was obtained from the University of Georgia's Natural Resources Spatial Analysis Lab (NARSAL) and illustrates the relative decline of wetlands located within the watershed (http://narsal.uga.edu).

	Year				
Land Use Cover (Acres)	**1985**	**1991**	**1998**	**2001**	**2005**
Forested Wetland	126,480	125,398	112,996	106,818	99,290
Non-Forested Wetland (Salt)	3,751	2,954	2,873	2,334	2,235
Non-Forested Wetland (Fresh)	3,788	3,234	4,057	2,229	2,675

All three classifications of wetlands can be found adjacent to the Savannah Harbor. The harbor contains brackish marsh wetlands that are principally dominated by *Spartina alterniflora* and *Spartina cynosuroides* species. Additionally, tidal freshwater wetlands can be found north of the Savannah Harbor and in close proximity to the Savannah National Wildlife Refuge. Please see Section 4 and Appendix C III and IV for greater detail concerning wetlands located within the project review area.

Non-point Source Discharges: Residential, commercial and industrial development increase the amount of impervious surfaces (roof tops, paved roads, parking lots, etc.), which affects storm water discharges. Development increases non-point source contaminant loading through associated increases in urban landscaping (pesticides and fertilizers), increased traffic (oil, grease and metals), and other associated activities. As the amount of impervious surfaces increase, an incremental increase in adverse impacts to water quality would be expected. That would occur independent of a harbor deepening project. The following table is a summary of anticipated population growth and the associated increase in impervious surfaces in the Lower Savannah Watershed. The amount of impervious surface coverage is increasingly recognized as a valuable predictor of overall water quality within a watershed. In general, as population increases, so does impervious surface. As impervious surface area increases, water quality decreases. The table below illustrates population and impervious surface area growth over time for the Lower Savannah River Basin.

The impervious surface data was generated by the US Environmental Protection Agency and provided to the USACE via a table titled "Total Impervious Area Calculations by 12-Digit Hydrologic Unit Code Watershed (based upon National Land Cover Data, 1993). Using simple linear regression analysis, the USACE used county population projection data to estimate the percent increase in impervious surface, by county. The data contained in the table below indicates that as the population of each county continues to increase, there will be an associated increase in impervious surfaces. Two counties in the study area, Chatham and Effingham, would be anticipated to experience an increase of less than one percent impervious surface by the year 2020. The other four counties in this area are expected to experience an increase of less than 0.5 percent impervious surface. Each county is responsible for regulating non-point source storm water discharges pursuant to Section 402 of the Clean Water Act. These county storm water management programs should help minimize the anticipated adverse impacts to water quality.

Projected Population Growth and Projected Increases in Percent Impervious Surface Coverage

COUNTY		2000	2005	2010	2020
Chatham(GA)	Population	232,048	239,861	249,748	265,006
	% Impervious Surface	8.64	8.88	9.18	9.63
Effingham (GA)	Population	37,535	46,515	53,652	68,544
	% Impervious Surface	2.81	3.08	3.29	3.74
Screven (GA)	Population	15,374	15,172	15,639	16,387
	% Impervious Surface	2.14	2.14	2.15	2.17
Allendale (SC)	Population	11,211	10,727	10,237	9,304
	% Impervious Surface	2.02	2.02	2.02	2.02
Hampton (SC)	Population	21,386	20,982	22,116	23,613
	% Impervious Surface	2.32	2.31	2.35	2.39
Jasper (SC)	Population	20,678	21,122	23,559	27,362
	% Impervious Surface	2.30	2.32	2.39	2.50

Using best available data, the USACE identified a historical listing of Section 303(d) listed waters within the Lower Savannah Watershed. A more detailed explanation of the results can be found at the following website: (http://cfpub.epa.gov/surf/huc.cfm?huc_code=03060109. The Table below illustrates the named water, pollutant and listed cause of impairment for those Section 303(d) listed waters.

Section 303(d) Listed Waters in the Lower Savannah Watershed (HUC 0306019)		
Named Water	**Pollutant**	**Listed Cause of Impairment**
Buck Creek	Cyanide, Zinc, and Toxicity	Cyanide, Zinc, and Toxics
Ebenezer Creek	BOD and pH	Organic Enrichment/Low Dissolved Oxygen, pH
Savannah Harbor	BOD, Oxygen Demand	Dissolved Oxygen
Savannah River	Mercury	Fish Consumption Guidance
Savannah River Basin	BOD, Oxygen Demand, Fecal Coliform	Dissolved Oxygen, Fecal Coliform

In October 2006, the EPA finalized a TMDL for Savannah Harbor to satisfy a consent decree obligation established in Sierra Club v. EPA, Civil Action No: 94-CV-2501-MHS (N.D.GA). In summary, the TMDL concluded that Savannah River cannot accept anthropogenic oxygen-demanding substances and still provide acceptable habitat for critical aquatic life that reside in those reaches of the river. This finding means that the States will have to revise their permits for point source discharges in those reaches as they expire and come up for renewal. As part of its analysis, EPA evaluated the dissolved oxygen requirements for several different fish species and the natural conditions for the river.

In 2009, the State of Georgia revised its DO standard for Savannah Harbor. The new standard calls for a daily average in the dissolved oxygen to be no less than 5.0 mg/L throughout the year, with an instantaneous minimum of 4.0 mg/L. These new standards apply throughout the water column and they match the South Carolina standard for waters of the same use classification.

In April 2010, EPA issued a Draft Revised TMDL for DO in Savannah Harbor. They established a TMDL target of 0.1 mg/l DO deficit from natural conditions. EPA provided a "TMDL Calculator" that could be used to identify the effect of individual point source discharges on DO levels in the river. The States are working with industries to develop an acceptable load distribution plan to meet EPA's overall target. EPA hopes to finalize the TMDL in 2012.

The effects of the proposed Expansion Project on DO levels in the Savannah Harbor have been evaluated. Please see Section 4 and Appendix C, Sections IV and VI for more detailed information concerning impacts to DO and the associated mitigation.

B. Functional Assessment of Wetland Impact Areas

1.0 Indirect Impacts to Wetlands

Indirect impacts associated with the proposed deepening would result in a vegetative shift to 337 acres of freshwater marsh and 730 acres of saltmarsh (48-foot depth alternative). The Corps used the EFDC model to evaluate both existing stream salinity levels and salinity levels that would occur with the various channel deepening alternatives in place. However, the EFDC model does not directly predict marsh salinity. Consequently, determining the existing wetland species composition in the estuary, as well as predicting how these species would change with the various channel deepening alternatives, was accomplished using a method where riverine surface salinity levels are extrapolated across the adjacent marshes. This method creates contours that divide the marsh into 5 salinity categories: 0-0.5 ppt, which is considered freshwater, 0.6-1.0 ppt, 1.1-2.0 ppt, 2.1-4.0 ppt, and >4.0 ppt (See Section 5, "Consequences of the Proposed Action" – Section 5.01.2 of the FEIS). In turn, distinctions between marsh types and acreage were defined based on the following salinity ranges: (0-0.5 ppt) Freshwater Marsh, (0.6-4 ppt) Brackish Marsh, and (>4ppt) Saltmarsh.

The results of our functional assessment concluded that the differentiation between salt marsh and brackish marsh recommended by the Wetland Interagency Coordination Team and used in the DEIS was somehwat constrained. The salinity range used in the SHEP to differentiate between brackish marsh (0.6-4 ppt) and salt marsh (> 4ppt) was quite 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). An earlier assessment of wetland vegetation coinciding with the salinity range reported for brackish marsh systems (i.e., 5-10 ppt) which occur within the area of potential effect, also supports those findings. Thus, the salinity range used to quantify salt marsh in the area of potential effect (i.e., > 4 ppt) over estimated the amount of saltmarsh in the system and under estimated 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, would likely be much less if one takes into account vegetative characteristics for wetland environments with associated salinities that are more 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, Savannah District concludes that the 730-acre calculated conversion of saltmarsh to brackish marsh if the harbor is deepened to 48-feet is likely an exaggerated value, with actual vegetative shifts unlikely to be identifiable *in situ* in Savannah. That said, the District was inclusive in its assessment of the potential for project-related effects and elected to include the saltmarsh and brackish marsh conversion in its calculation of minor impacts.

The conversion of 337 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 48-feet as proposed. Again, it is important to reiterate that the ecological values of the impacted 337 acres of freshwater wetlands would not be completely lost. Instead, those acres would be converted to brackish marsh. The Corps' calculation of the number of acres of freshwater wetland that have the potential to be converted 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).

Deepening the harbor to a 48-foot depth would result in a conversion of the dominant vegetative species typically observed in approximately 337 acres of freshwater marsh (freshwater to brackish marsh scenario). It is important to note that 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 (Latham et. al., 1994). Likewise, the 48-foot depth would result in a conversion of the dominant vegetative species typically observed in 730 acres of saltmarsh (saltmarsh to brackish marsh scenario), and 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 provided in the following table.

Changes in Wetland Function as a Result of Wetland Conversion

Elements of Wetland Function	Freshwater to Brackish Marsh (Approximately 337 acres)	Saltmarsh to Brackish Marsh (Approximately 730 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

Negligible Effect – the effect on the resource would be at the lowest levels of detection, barely measurable, with no perceptible consequences, either adverse or beneficial, to the resource.

Minor Effect – the effect on the resource is measurable or perceptible, but it is slight.

Adverse Effect: the action is contrary to the interest or welfare of the resource; a harmful or unfavorable result

As illustrated in Table 1, the only indirect effect the 48-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. It should be noted that areas of the Savannah Harbor identified as saltmarsh or brackish marsh support similar fish and wildlife species (Jennings and Weyers, 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 USACE 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 will 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 classified as brackish marsh.

2.0 Direct Impacts to Wetlands

The harbor deepening project would also result in direct impacts to 15.68 acres of saltmarsh. It should be noted that these impacts would result after all possible avoidance and minimization measures have been used. In brief, these marsh areas are subject to periodic flooding as a result of daily tides and the vegetative communities in these areas generally consist of one plant species, which is a smooth coordgrass known as *Spartina alterniflora*. Approximately 7.3 acres (47%) of the total saltmarsh acreage that would be excavated is subject to the wave action of passing ships and the resulting perturbation. Thus, these areas exhibit vegetation densities which are significantly less than what is typically observed in a pristine marsh. 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 throughout coastal Georgia.

C. Functional Assessment of Mitigation Areas

1.0 Assessment of Preservation Area used to Mitigate for Indirect Impacts

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 (SNWR)". The document characterizes the lands proposed for preservation in the areas identified as Mill Creek and Abercorn Island. On March 12, 2011, USFWS representatives provided the following community descriptors for Mill Creek and Abercorn Island; the two areas that will be used to obtain the preservation sites. The

properties that comprise the Mill Creek and Abercorn Island areas are characterized by primarily wetlands and a few upland pockets. The Mill Creek Area is comprised of wetlands characterized by Ecosystem CES 203.066/Alliance A.292 and CES 203.66/Alliance A.345, which total 4,900 acres (Figure 46). Similarly, the Abercorn Island area is composed of Ecosystem CES 203.240/Alliance A.357 and CES 203.242/Alliance A.375, which total 1,989 acres (Figure 47).

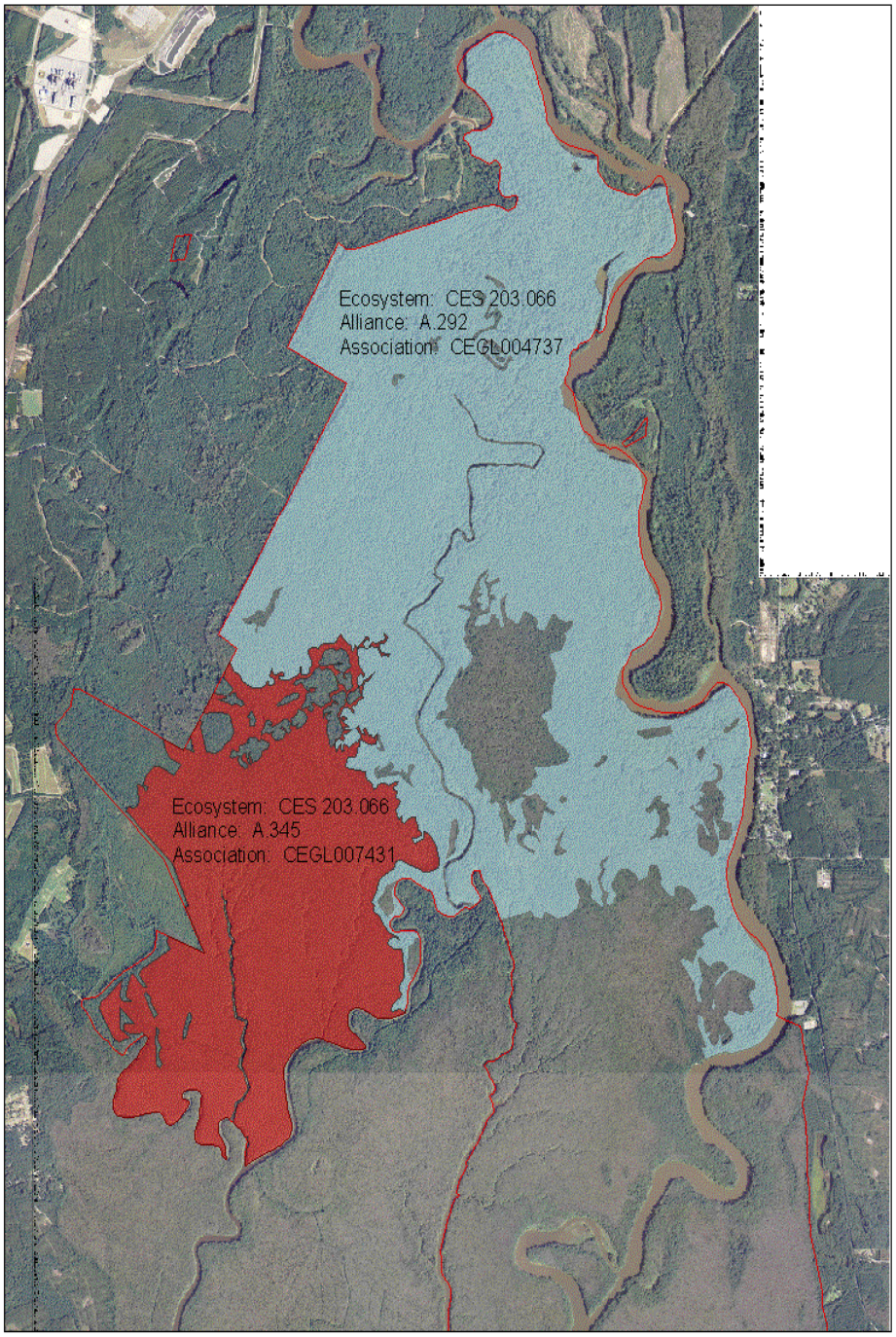


Figure 46

1.1 **Ecosystem CES203.066:** Southern Atlantic Coastal Plain Large River Floodplain Forest

Summary: This system represents a geographic subset of Kuchler's (1964) Southern Floodplain Forest. Examples may be found along large rivers of the Atlantic Coastal Plain, especially the Roanoke, Great Pee Dee, Congaree/Santee, Savannah, and Altamaha rivers. Several distinct plant communities can be recognized within this system that may be related to the array of different geomorphologic features present within the floodplain. Some of the major geomorphic features associated with different community types include natural levees, point bars, meander scrolls, oxbows, and sloughs (Sharitz and Mitsch 1993). Vegetation generally includes forests dominated by bottomland hardwood species and other trees tolerant of flooding. However, herbaceous and shrub vegetation may be present in certain areas as well.

1.1A **Alliance: A. 292** Quercus (phellos, nigra, laurifolia) Temporarily Flooded Forest Alliance

Forests in this alliance are typically dominated by some combination of *Quercus phellos, Quercus nigra*, and/or *Quercus laurifolia*. They may be found throughout the Coastal Plain and adjacent areas of the lower Piedmont, Arkansas Valley, Interior Low Plateau, and the Ouachita Mountains in temporarily flooded environments. These forests may occur in large, relatively high-gradient floodplains (in which they tend to occur on topographically higher portions of the floodplain, such as ridges or terraces), or in small, relatively low-gradient floodplains (in which the landforms are too small and/or too poorly developed to create much consistent, local topographic relief). In the Atlantic and East Gulf coastal plains, these forests may occur more often in association with blackwater / low-sediment / low-nutrient rivers and streams than brownwater ones. They occur on very acidic to mildly alkaline soils, commonly on Portland, Tensas, and Hebert silt loams. Dominant and associated species vary with geographic location and landscape setting. Associated canopy species include *Quercus texana, Fraxinus pennsylvanica, Pinus taeda, Quercus similis, Quercus michauxii, Magnolia virginiana, Pinus glabra, Liquidambar styraciflua, Acer rubrum, Nyssa biflora, Ulmus alata, Carya aquatica, Carya alba, Carya glabra, Quercus pagoda, Taxodium distichum,* and *Celtis laevigata*. Subcanopy and shrub species include *Halesia diptera, Carpinus caroliniana, Ilex decidua, Sebastiania fruticosa, Ostrya virginiana, Viburnum rufidulum, Diospyros virginiana, Itea virginica, Symplocos tinctoria, Rhododendron canescens, Illicium floridanum, Cyrilla racemiflora, Ilex verticillata, Crataegus viridis, Vaccinium elliottii*, and *Ilex opaca*, among others. Woody vines are an important component of these forests; species include *Toxicodendron radicans, Bignonia capreolata, Smilax rotundifolia, Vitis rotundifolia, Parthenocissus quinquefolia, Trachelospermum difforme, Berchemia scandens, Smilax glauca, Campsis radicans, Cocculus carolinus, Ampelopsis arborea*, and others. This alliance also includes forests of large bottomlands dominated by *Quercus phellos* and *Ulmus crassifolia* that occur on flat ridges and grade up from forests dominated by *Quercus lyrata* and *Carya aquatica*. Characteristic canopy species include *Pinus taeda, Quercus similis, Liquidambar styraciflua, Gleditsia triacanthos,* and *Carya aquatica,* but the wettest sites likely will have only *Quercus phellos* and *Ulmus crassifolia*. Understory species include *Ilex decidua, Viburnum dentatum,* and *Crataegus* spp., with *Sabal minor* in drier sites.

Vegetation Summary: Stands of this alliance are typically dominated by some combination of *Quercus phellos, Quercus nigra,* and/or *Quercus laurifolia.* Dominant and associated species vary with geographic location and may include *Quercus texana, Fraxinus pennsylvanica, Pinus taeda, Quercus similis, Quercus michauxii, Magnolia virginiana, Pinus glabra, Liquidambar styraciflua, Acer rubrum, Nyssa biflora, Halesia diptera, Ulmus alata, Carya aquatica, Carya alba, Carya glabra, Quercus pagoda, Taxodium distichum,* and *Celtis laevigata*. Subcanopy and shrub species include *Carpinus caroliniana, Ilex decidua, Sebastiania fruticosa, Ostrya virginiana, Viburnum rufidulum, Diospyros virginiana, Itea virginica, Symplocos tinctoria, Rhododendron canescens, Illicium floridanum, Cyrilla racemiflora, Ilex verticillata, Crataegus viridis, Vaccinium elliottii*, and *Ilex opaca,* among others. Woody vines are an important component of these forests; species include *Toxicodendron radicans, Bignonia capreolata, Smilax rotundifolia, Vitis rotundifolia, Parthenocissus quinquefolia, Trachelospermum difforme, Berchemia scandens, Smilax glauca, Campsis radicans, Cocculus carolinus, Ampelopsis arborea,* and others. This alliance also includes forests of large bottomlands dominated by *Quercus phellos* and *Ulmus crassifolia* that occur on flat ridges and grade up from forests dominated by *Quercus lyrata* and *Carya aquatica*. Characteristic canopy species include *Pinus taeda, Quercus similis, Liquidambar styraciflua, Gleditsia triacanthos,* and *Carya aquatica,* but the wettest sites likely will have only *Quercus phellos* and *Ulmus crassifolia*. Understory species include *Ilex decidua, Viburnum dentatum,* and *Crataegus* spp., with *Sabal minor* in drier sites.

Environmental Summary: Forests in this alliance occur primarily along blackwater or low-sediment / low-nutrient rivers and small streams in the Atlantic Coastal Plain, lower Piedmont, Arkansas Valley, East Gulf Coastal Plain, West Gulf Coastal Plain, Interior Low Plateau, and the Ouachita Mountains in temporarily flooded environments. These forests may occur in large, relatively high-gradient floodplains (in which they tend to occur on topographically higher portions of the floodplain, such as ridges or terraces), or in small, relatively low-gradient floodplains (in which the landforms are too small and/or too poorly developed to create much consistent, local topographic relief). They occur on very acidic to mildly alkaline soils, commonly on Portland, Tensas, and Hebert silt loams.

Association: CEGL004737 Quercus laurifolia - Quercus lyrata / Carpinus caroliniana - Persea palustris / Vaccinium elliottii Forest

Summary: This community type covers forests of low blackwater bottomland river terraces and ridges, in the Atlantic Coastal Plain of the Carolinas and possibly Virginia. This type may have a somewhat longer hydroperiod than other types in this or other temporarily flooded alliances, but it is not seasonally flooded. It is distinguished from some related types by lacking a significant component of levee species. The canopy is dominated by *Quercus laurifolia* and *Quercus lyrata*. The subcanopy characteristically contains *Carpinus caroliniana* and *Persea palustris*. One prominent shrub is *Vaccinium elliottii*. Additional floristic information is needed. Stands of this community have a significant component of *Quercus lyrata* and generally lack a significant component of *Pinus taeda*.

Vegetation Summary: The canopy of this association is dominated by *Quercus laurifolia* and *Quercus lyrata*. The subcanopy characteristically contains *Carpinus caroliniana* and *Persea palustris*. One prominent shrub is *Vaccinium elliottii*. Additional floristic information is needed. Stands of this community have a significant component of *Quercus lyrata* and generally lack a significant component of *Pinus taeda*.

Environmental Summary: This community occurs on low blackwater bottomland river terraces and ridges, in the Atlantic Coastal Plain of the Carolinas and possibly Virginia. This type may have a somewhat longer hydroperiod than other types in this or other temporarily flooded alliances, but it is not seasonally flooded.

1.1B <u>Alliance: A.345 -</u>Nyssa aquatica - (Taxodium distichum) Semipermanently Flooded Forest Alliance

Summary: This alliance encompasses semipermanently flooded forested riverine swamps dominated by *Nyssa aquatica*, with or without *Taxodium distichum* as a codominant. Stands of this alliance may vary in composition from ones largely dominated by *Nyssa* to ones dominated by a mix of *Taxodium, Nyssa*, and other hardwood species. Dominance of *Nyssa* may vary conceptually from 100-25%. Dominance of *Taxodium* may vary from less than 75% to absent. Other canopy and subcanopy species may include *Nyssa biflora, Quercus lyrata, Carya aquatica, Fraxinus profunda, Fraxinus caroliniana, Planera aquatica*, and *Populus heterophylla*. Shrubs and herbs are typically limited to tree bases, fallen logs, and other elevated places in the stand. *Itea virginica* is often the only shrub present. Herbaceous species may be absent and often are sparse. Species present can include *Phanopyrum gymnocarpon (= Panicum gymnocarpon), Pluchea camphorata, Boehmeria cylindrica, Rudbeckia laciniata, Sagittaria latifolia, Onoclea sensibilis, Triadenum walteri, Carex joorii, Carex glaucescens, Proserpinaca pectinata, Asclepias perennis, Saururus cernuus, Justicia ovata, Leersia lenticularis*, and others. Associations in this alliance occur in backwater sloughs, low wet flats, swales and backswamps, and along blackwater streams and other alluvial settings. Related vegetation associated with artificial lakes and millponds are accommodated in another alliance, *Taxodium distichum - (Taxodium ascendens)* Seasonally Flooded Lakeshore Woodland Alliance (A.652). Surface water is present throughout the growing season in most years. Forests in this alliance occur virtually throughout the Atlantic and Gulf coastal plains and the Mississippi River Alluvial Plain within the range of *Nyssa aquatica*, and in the Arkansas River Valley; also reported from the Mobile and Tensaw rivers in Alabama.

Vegetation Summary: This alliance occurs virtually throughout the Atlantic and Gulf coastal plains and the Mississippi River Alluvial Plain within the range of *Nyssa aquatica*. It includes forested riverine swamps dominated by *Nyssa aquatica*, with or without *Taxodium distichum* as a codominant. Other canopy and subcanopy species include *Nyssa biflora, Quercus lyrata, Carya aquatica, Fraxinus profunda, Fraxinus caroliniana, Planera aquatica*, and *Populus heterophylla*. Shrubs and herbs are limited to tree bases, fallen logs, and other elevated places in the stand. *Itea virginica* is often the only shrub present. Herbaceous species may be absent, and often are sparse. Species present can include *Phanopyrum gymnocarpon, Pluchea camphorata, Boehmeria cylindrica, Rudbeckia laciniata, Sagittaria latifolia, Onoclea sensibilis,*

Triadenum walteri, Carex joorii, Carex glaucescens, Asclepias perennis, Saururus cernuus, Justicia ovata, Leersia lenticularis, and others.

Environmental Summary: Associations in this alliance occur in backwater sloughs, low, wet flats, swales and backswamps, along blackwater streams, and in artificial lakes and millponds and other situations with altered or enhanced hydrology. Surface water is present well into the growing season in the forests of this alliance.

Association: CEGL007431 Taxodium distichum - Nyssa aquatica / Fraxinus caroliniana Forest

Summary: This is a semipermanently flooded community of brownwater rivers which occurs primarily in the outer Atlantic Coastal Plain extending through the East Gulf Coastal Plain. Vegetation is characterized by a dense canopy composed almost exclusively of straight, tall individuals of *Taxodium distichum* and *Nyssa aquatica* with a sparse to moderate subcanopy and depauperate shrub and herb layers. Occasional individuals of several species (e.g., *Populus heterophylla, Salix nigra, Nyssa biflora, Planera aquatica, Ulmus americana, Fraxinus profunda, Fraxinus caroliniana, Carya aquatica, Quercus lyrata*) are possible in the canopy or subcanopy. The herbaceous layer is very sparse, and typical species include *Saururus cernuus, Proserpinaca pectinata, Proserpinaca palustris, Asclepias perennis, Commelina virginica, Leersia lenticularis,* and *Phanopyrum gymnocarpon (= Panicum gymnocarpon)*. It is found on the lower Atlantic Coastal Plain from southeastern Virginia to southern Georgia, and possibly on the lower Gulf Coastal Plain west to southeastern Louisiana, excluding the Mississippi River Alluvial Plain. It can be found in oxbow lakes and ponds, along the banks of rivers and lakes, on low wet flats and sloughs, swales and backswamps. It occurs only on saturated or flooded soils. Forests dominated by *Taxodium distichum* and *Nyssa aquatica* are common throughout the southeastern Coastal Plain.

Vegetation Summary: Vegetation is characterized by a dense canopy composed almost exclusively of straight, tall individuals of *Taxodium distichum* and *Nyssa aquatica* (together contributing at least 75% of the canopy cover) with a sparse to moderate subcanopy and depauperate shrub and herb layers. Occasional individuals of several species (e.g., *Populus heterophylla, Salix nigra, Nyssa biflora, Planera aquatica, Ulmus americana, Fraxinus profunda, Fraxinus caroliniana, Carya aquatica, Quercus lyrata*) are possible in the canopy or subcanopy. The herbaceous layer is very sparse, and typical species include *Saururus cernuus, Proserpinaca pectinata, Proserpinaca palustris, Asclepias perennis, Commelina virginica, Leersia lenticularis,* and *Phanopyrum gymnocarpon (Panicum gymnocarpon)*. *Decumaria barbara, Toxicodendron radicans,* and *Bignonia capreolata* are commonly occurring vines but usually have <10% cover.

Environmental Summary: The community occurs on a variety of inundated topographic habitats, including oxbow ponds and lakes, backwater sloughs, along river edges and in various isolated depressions within the floodplain. It is more commonly associated with brownwater than blackwater rivers. Soil types on which it is found include very poorly drained phases of Entisols, Alfisols, Inceptisols, Ultisols, and Spodosols (Burns and Honkala 1990a). Hydrologic

regime is the most important environmental determinant of the distribution of this community. Sites experience frequent flooding to near permanent ponding, with floodwater that may be 3 m deep during rainy seasons and may remain for extended periods (Burns and Honkala 1990a). Probability of annual flooding is 100% with soils nearly permanently saturated (Wharton et al. 1982).

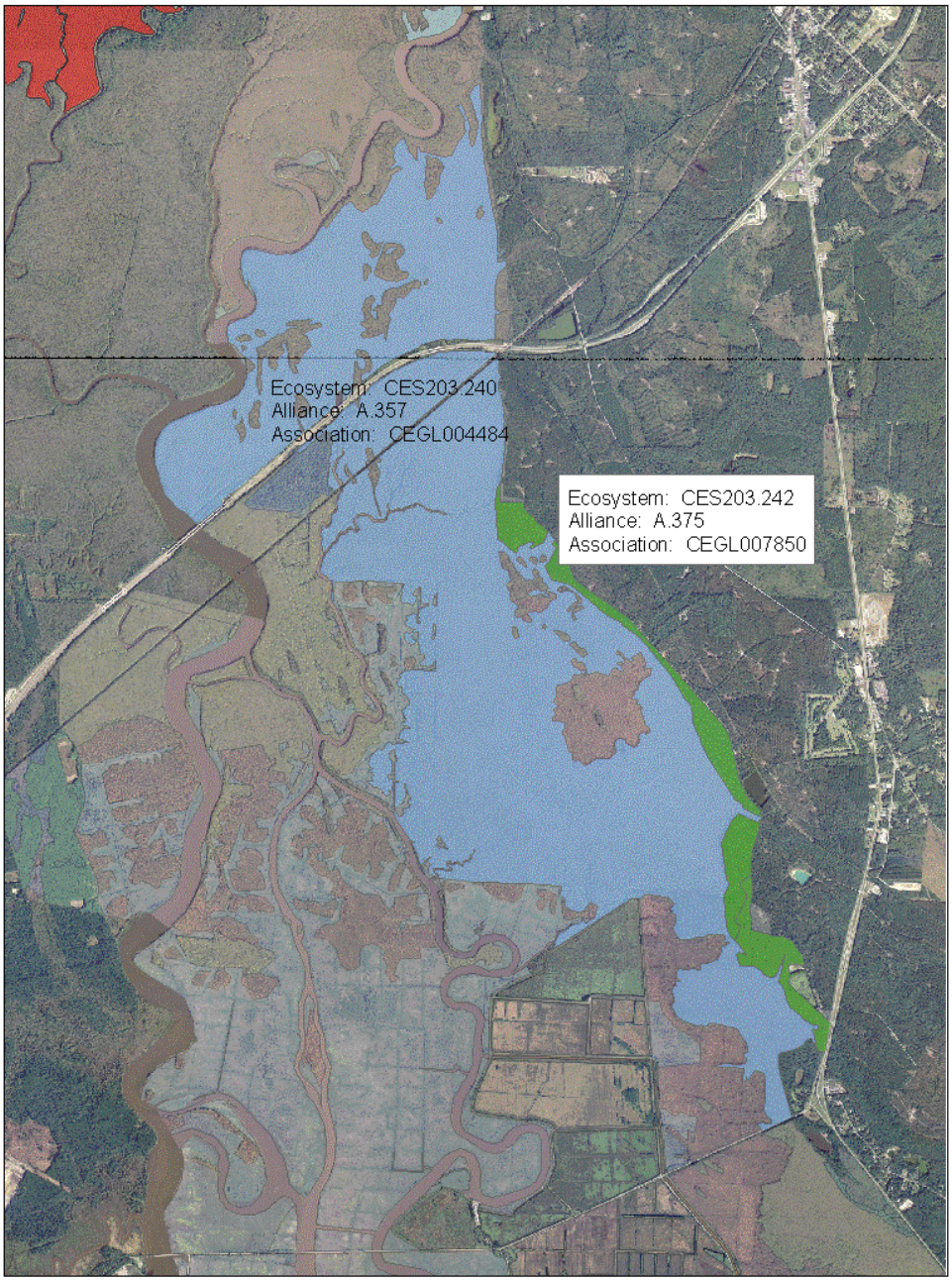


Figure 47

1.2 Ecosystem: CES 203.240 Southern Atlantic Coastal Plain Tidal Wooded Swamp

Summary: This system encompasses the tidally flooded areas in lower river floodplains and edges of estuaries of the Atlantic Coastal Plain from southeastern Virginia southward to northern Florida that have sufficiently fresh water and short enough flooding to be able to support tree canopies. *Taxodium, Nyssa*, or *Fraxinus* generally dominate. Swamps may be either regularly flooded by lunar tides or irregularly flooded by wind tides.

1.2A Alliance: A.357- Nyssa biflora - (Nyssa aquatica, Taxodium distichum) Tidal Forest Alliance

Summary: This alliance accommodates tidally flooded forests in lower, estuarine reaches of brownwater and blackwater rivers in the Outer Coastal Plain (tidewater) and also along estuarine shores. Flooding can be either lunar-tidal or wind-tidal and can be affected as well by riverine flooding events. The trees often have a stressed appearance, and the herbaceous layer usually is well-developed and more species-rich than in most non-tidal swamps, possibly as a result of the tidal nutrient input. Various combinations of *Nyssa biflora, Taxodium distichum*, and *Nyssa aquatica* usually dominate the canopy. One association is characterized by *Pinus taeda* along with *Nyssa biflora* and *Taxodium distichum* in the overstory. On blackwater rivers, *Nyssa aquatica* is often an indicator of a tidal condition, presumably because it requires the higher nutrients provided by tidal flooding. Other species common in tidal situations, such as *Morella cerifera (= Myrica cerifera), Lilaeopsis carolinensis, Peltandra virginica, Thelypteris palustris var. pubescens, Osmunda regalis var. spectabilis, Osmunda cinnamomea*, and *Rosa palustris*, are often common. Typical species of non-tidal swamps, such as *Quercus lyrata, Carya aquatica, Quercus phellos, Smilax laurifolia, Ilex glabra, Lyonia lucida, Woodwardia virginica, Sphagnum* spp., *Chamaecyparis thyoides, Cyrilla racemiflora*, and others, are absent.

Vegetation Summary: The canopy of stands of this alliance are usually dominated by various combinations of *Nyssa biflora, Taxodium distichum*, and *Nyssa aquatica*. On blackwater rivers, *Nyssa aquatica* is often an indicator of tidal condition, presumably because it requires the higher nutrients provided by tidal flooding. Other species common in tidal situations, such as *Morella cerifera (= Myrica cerifera), Lilaeopsis carolinensis, Peltandra virginica, Thelypteris palustris var. pubescens, Osmunda regalis var. spectabilis*, and *Rosa palustris*, are often common. Typical species of non-tidal swamps, such as *Quercus lyrata, Carya aquatica, Quercus phellos, Smilax laurifolia, Ilex glabra, Lyonia lucida, Woodwardia virginica, Sphagnum* spp., *Chamaecyparis thyoides, Cyrilla racemiflora*, and others, are absent.

Environmental Summary: These tidally flooded forests are found in lower, estuarine reaches of brownwater and blackwater rivers in the outer coastal plain (tidewater), and also along estuarine shores. Flooding can be either lunar-tidal or wind-tidal, and can be affected as well by riverine flooding events.

Dynamics: Flooding can be either lunar-tidal or wind-tidal, and can be affected as well by riverine flooding events.

Association: CEGL004484 Nyssa biflora - (Taxodium distichum, Nyssa aquatica) / Morella cerifera - Rosa palustris Tidal Forest

Summary: This broadly defined association accommodates tidally flooded forests in lower, estuarine reaches of brownwater and blackwater rivers in the Outer Coastal Plain (tidewater), and also along estuarine shores. It may require subdivision as more information becomes available. Flooding of these environments can be either lunar-tidal or wind-tidal, and can be affected as well by riverine flooding events. The trees often have a stressed appearance, and the herbaceous layer usually is well-developed and more species-rich than in most non-tidal swamps, possibly as a result of the tidal nutrient input. Various combinations of *Nyssa biflora, Taxodium distichum,* and *Nyssa aquatica* usually dominate the canopy. In addition, *Liquidambar styraciflua* may be present. On blackwater rivers, *Nyssa aquatica* is often an indicator of tidal condition, presumably because it requires the higher nutrients provided by tidal flooding. Other species common in tidal situations, such as *Morella cerifera (= Myrica cerifera), Lilaeopsis carolinensis, Peltandra virginica, Thelypteris palustris var. pubescens, Osmunda regalis var. spectabilis,* and *Rosa palustris,* are often common. Typical species of non-tidal swamps, such as *Quercus lyrata, Carya aquatica, Quercus phellos, Smilax laurifolia, Ilex glabra, Lyonia lucida, Woodwardia virginica, Sphagnum* spp., *Chamaecyparis thyoides, Cyrilla racemiflora,* and others, are absent.

Vegetation Summary: The canopy of stands of this vegetation type are usually dominated by various combinations of *Nyssa biflora, Taxodium distichum,* and *Nyssa aquatica*. In addition, *Liquidambar styraciflua* may be present (Wharton 1978). On blackwater rivers, *Nyssa aquatica* is often an indicator of tidal condition, presumably because it requires the higher nutrients provided by tidal flooding. Wharton (1978) cites *Persea palustris, Forestiera acuminata, Sabal minor, Salix nigra, Cornus amomum, Planera aquatica, Alnus serrulata,* and *Viburnum obovatum* as additional woody components. Other species common in tidal situations, such as *Morella cerifera (Myrica cerifera), Lilaeopsis carolinensis, Peltandra virginica, Thelypteris palustris var. pubescens, Osmunda regalis var. spectabilis,* and *Rosa palustris,* are often common (Schafale and Weakley 1990). Some additional low woody and herbaceous species cited by Wharton (1978) include *Aletris aurea, Decumaria barbara, Onoclea sensibilis, Arisaema dracontium, Justicia ovata, Clematis crispa, Ipomoea pandurata, Physostegia* sp., and *Leersia* sp. Typical species of non-tidal swamps, such as *Quercus lyrata, Carya aquatica, Quercus phellos, Smilax laurifolia, Ilex glabra, Lyonia lucida, Woodwardia virginica, Sphagnum* spp., *Chamaecyparis thyoides, Cyrilla racemiflora,* and others, are absent.

Environmental Summary: These tidally flooded forests are found in lower, estuarine reaches of brownwater and blackwater rivers in the Outer Coastal Plain (tidewater), and also along estuarine shores. Flooding can be either lunar-tidal or wind-tidal, and can be affected as well by riverine flooding events.

1.3 Ecosystem: CES203.242 Southern Atlantic Coastal Plain Mesic Hardwood Forest

Summary: This upland system of the Atlantic Coastal Plain ranges from Delaware south to interior Georgia in a variety of moist but non-wetland sites that are naturally sheltered from frequent fire. Such sites include lower slopes and bluffs along streams and rivers in dissected terrain, mesic flats between drier pine-dominated uplands and floodplains, and local topographic high areas within bottomland terraces or nonriverine wet flats. Soil textures are variable in both texture and pH. The vegetation consists of forests dominated by combinations of trees that include a significant component of mesophytic deciduous hardwood species, such as *Fagus grandifolia* or *Acer barbatum*. Its southern limit is generally exclusive of the natural range of *Pinus glabra* as mapped by Kossuth and Michael (1990) and *Magnolia grandiflora* as mapped by Outcalt (1990). Upland and bottomland oaks at the mid range of moisture tolerance are usually also present, particularly *Quercus alba*, but sometimes also *Quercus pagoda, Quercus falcata, Quercus michauxii, Quercus shumardii,* or *Quercus nigra*. *Pinus taeda* is sometimes present, but it is unclear if it is a natural component or has entered only as a result of past cutting. Analogous systems on the Gulf Coastal Plain have pine as a natural component, and this may be true for some examples of this system. Understories are usually well-developed. Shrub and herb layers may be sparse or moderately dense. Within its range, *Sabal minor* may be a prominent shrub. Species richness may be fairly high in basic sites but is fairly low otherwise.

Classification Comments: There remains some uncertainty how this system and other mesic hardwood systems should be divided. There is a broad gradient in climate and species composition from north to south and west. The boundaries at the northern edge of its range (the Chesapeake Bay Lowlands TNC ecoregion) and at the break between the South Atlantic Coastal Plain and East Gulf Coastal Plain ecoregions are boundaries of convenience to create breaks in this broad gradient. At the southern end, the boundary has been better determined (April 2006) to exclude areas within the combined ranges of *Pinus glabra* and *Magnolia grandiflora*, making this system deciduous rather than mixed evergreen-deciduous. Differences from mesic forests of the Piedmont are sometimes fairly subtle, and species that differentiate them in one part of the range many not work in other parts. In particular, some species that are excluded from the Coastal Plain farther south are common components farther north. In MD and DC, this system can extend into the Piedmont, straddling the fall zone where the Coastal Plain and Piedmont meet. Besides the variation across the range of this system, there are two sets of distinctions within it that may be worthy of consideration for defining separate systems. Acidic and basic substrates have substantial floristic differences. Variants on upland slopes, nonriverine swamp islands, and high ridges in bottomlands could be recognized as separate systems, or the latter two could be treated as part of the systems that surround them. However, the difference between ecological processes in uplands and wetlands separates those surrounded by wetland systems from the surrounding systems. This is especially true in the case of floodplains, which have flood-carried nutrient input as well as wetness as a difference. Floristic differences may exist between these variants, but they are subtle and do not appear to be definitive.

1.3A **Alliance: A.375** Live Oak - Cherrybark Oak Forest Alliance

Summary: Wet-mesic forests of the Outer Coastal Plain of Louisiana, occurring on low ridges of the antecedent Mississippi River. Forests of related environments of South Carolina and possibly Georgia are included here as well. This alliance as presently defined is near the upland/wetland boundary; examples are constantly moist and sometimes have a high water table.

The canopy is dominated by *Quercus virginiana, Magnolia grandiflora,* and *Quercus pagoda,* with lesser amounts of *Liquidambar styraciflua* and *Quercus nigra*. The open understory consists of *Cornus florida, Ilex opaca var. opaca,* and *Ilex decidua*. Woody vines are abundant, especially *Parthenocissus quinquefolia, Toxicodendron radicans,* and *Campsis radicans*. The herb layer is well-developed and includes species such as *Asplenium platyneuron, Sanicula* sp., *Elephantopus carolinianus,* and *Thelypteris kunthii*.

Vegetation Summary: The canopy is dominated by *Quercus virginiana, Magnolia grandiflora,* and *Quercus pagoda,* with lesser amounts of *Liquidambar styraciflua* and *Quercus nigra*. The open understory consists of *Cornus florida, Ilex opaca var. opaca,* and *Ilex decidua*. Woody vines are abundant, especially *Parthenocissus quinquefolia, Toxicodendron radicans,* and *Campsis radicans*. The herb layer is well-developed and includes species such as *Asplenium platyneuron, Sanicula* sp., *Elephantopus carolinianus,* and *Thelypteris kunthii*.

Environmental Summary: Wet-mesic forests of the Outer Coastal Plain of Louisiana, occurring on low ridges of the antecedent Mississippi River. Forests of related environments of South Carolina and possibly Georgia are included here as well. This alliance as presently defined is near the upland/wetland boundary; examples are constantly moist and sometimes have a high water table.

Association: CEGL007850 Live Oak - Cherrybark Oak - Southern Magnolia - Pignut Hickory / American Holly Forest

Summary: This forest occurs on mesic to dry-mesic bluffs in the outer Coastal Plain of southeastern South Carolina. The canopy is dominated by *Carya glabra, Quercus virginiana, Quercus pagoda,* and *Magnolia grandiflora,* with lesser amounts of *Quercus nigra* and *Liquidambar styraciflua*. The subcanopy is open and is dominated by *Ilex opaca,* with lesser amounts of *Pinus glabra, Cornus florida,* and *Carpinus caroliniana ssp. caroliniana*. The shrub layer is open, with *Ilex vomitoria, Vaccinium elliottii, Arundinaria gigantea ssp. tecta, Morella cerifera (Myrica cerifera var. cerifera), Symplocos tinctoria, Callicarpa americana, Juniperus virginiana, Sabal minor, Berchemia scandens,* and *Toxicodendron radicans ssp. radicans*. Herbs are few, though *Chasmanthium laxum* and *Chasmanthium sessiliflorum* may be patchily common.

1.4 Specific Sites Proposed for Preservation

Figures 48 illustrates the specific tracts located within the Mill Creek and Abercorn Island areas that are proposed for preservation. Figure 48 also illustrates the location of the proposed preservation areas relative to the exiting boundaries of the Savannah National Wildlife Refuge (SNWR). Figure 49 and Figure 50 illustrate the wetland area and wetland type as indicated by the National Wetland Inventory (NWI) for the Mill Creek area and Abercorn island area, respectively. Collectively, greater than 95% of the sites are composed of palustrine forested wetland or scrub shrub.

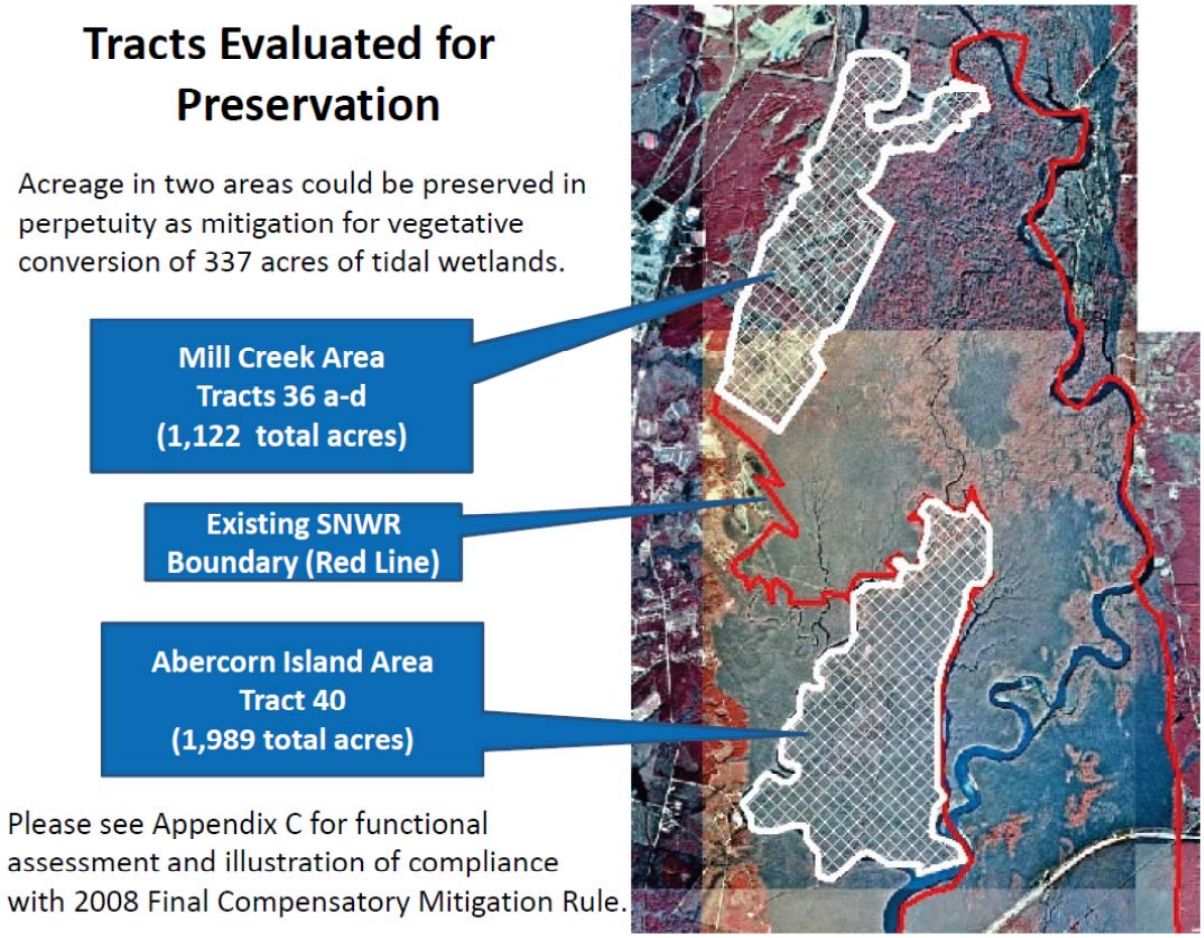

Tracts Evaluated for Preservation
Acreage in two areas could be preserved in perpetuity as mitigation for vegetative conversion of 337 acres of tidal wetlands.
Mill Creek Area
Tracts 36 a-d
(1,122 total acres)
Existing SNWR Boundary (Red Line)
Abercorn Island Area
Tract 40
(1,989 total acres)
Please see Appendix C for functional assessment and illustration of compliance with 2008 Final Compensatory Mitigation Rule.

Figure 48

Mill Creek Area

877 acres of Wetland
135 acres of Upland

National Wetland Inventory GIS Layer –

Wetland Classifications For Mill Creek Area:

PFO1A

PSS1A

PFO1

Please see functional assessment of wetland preservation areas in Appendix C for detailed assessment of wetland types/habitats.

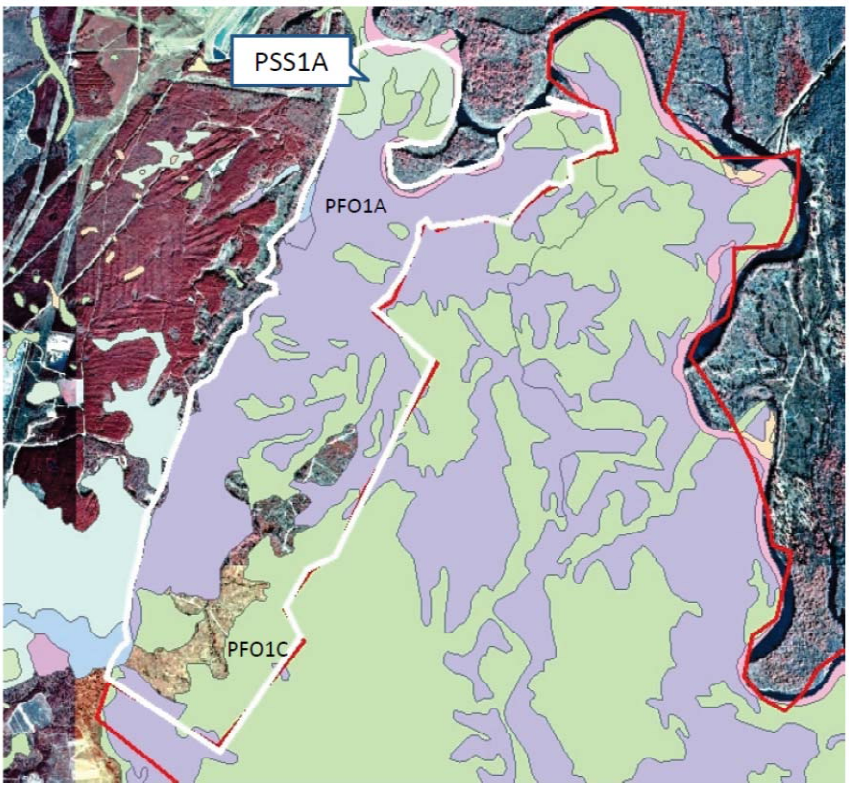


Figure 49

Abercorn Island Area

1,989 Acres of Wetland
0 acres of Upland

National Wetland Inventory GIS Layer -

Wetland Classifications For Abercorn Island Area:

PFO1A

PFO6F

PFO1C

Please see functional assessment of wetland preservation areas in Appendix C for detailed assessment of wetland types/habitats

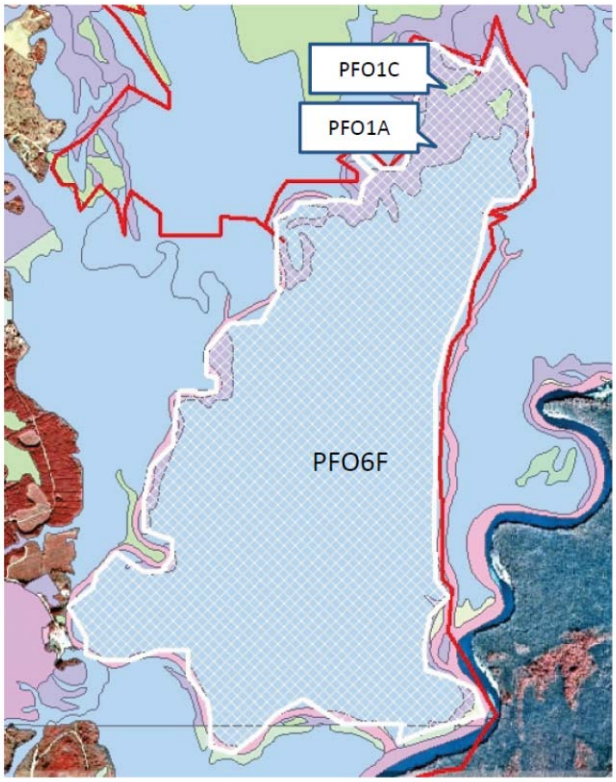


Figure 50

1.5 Descriptions for the NWI Codes presented in Figures 49 and 50

Description for code **PFO1A**:

P System **PALUSTRINE**: The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 ppt. Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics: (1) are less than 8 hectares (20 acres); (2) do not have an active wave-formed or bedrock shoreline feature; (3) have at low water a depth less than 2 meters (6.6 feet) in the deepest part of the basin; (4) have a salinity due to ocean-derived salts of less than 0.5 ppt.
Subsystem : **FO** Class **FORESTED**: Characterized by woody vegetation that is 6 m tall or taller.
1 Subclass **Broad-Leaved Deciduous**: Woody angiosperms (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season; e.g., black ash (Fraxinus nigra).
Modifier(s): **A** WATER REGIME **Temporary Flooded**: Surface water is present for brief periods during growing season, but the water table usually lies well below the soil surface for

most of the growing season. Plants that grow both in uplands and wetlands may be characteristic of this water regime.

Description for code **PFO1C**:
P System **PALUSTRINE**: The Palustrine System includes all non-tidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 ppt. Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics: (1) are less than 8 hectares (20 acres); (2) do not have an active wave-formed or bedrock shoreline feature; (3) have at low water a depth less than 2 meters (6.6 feet) in the deepest part of the basin; (4) have a salinity due to ocean-derived salts of less than 0.5 ppt.
Subsystem : **FO** Class **FORESTED**: Characterized by woody vegetation that is 6 m tall or taller.
1 Subclass **Broad-Leaved Deciduous**: Woody angiosperms (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season; e.g., black ash (Fraxinus nigra).
Modifier(s): **C** WATER REGIME **Seasonally Flooded**: Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.

Description for code **PSS1A**:
P System **PALUSTRINE**: The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 ppt. Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics: (1) are less than 8 hectares (20 acres); (2) do not have an active wave-formed or bedrock shoreline feature; (3) have at low water a depth less than 2 meters (6.6 feet) in the deepest part of the basin; (4) have a salinity due to ocean-derived salts of less than 0.5 ppt.
Subsystem : **SS** Class **SCRUB-SHRUB**: Includes areas dominated by woody vegetation less than 6 m (20 feet) tall. The species include true shrubs, young trees (saplings), and trees or shrubs that are small or stunted because of environmental conditions.
1 Subclass **Broad-Leaved Deciduous**: Woody angiosperms (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season; e.g., black ash (Fraxinus nigra).
Modifier(s): **A** WATER REGIME **Temporary Flooded**: Surface water is present for brief periods during growing season, but the water table usually lies well below the soil surface for most of the growing season. Plants that grow both in uplands and wetlands may be characteristic of this water regime.

Description for code **PFO6F**:
P System **PALUSTRINE**: The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 ppt. Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics: (1) are less than 8 hectares (20 acres); (2) do not have an active wave-formed or bedrock shoreline feature; (3)have at low water a depth less than 2 meters (6.6 feet) in the deepest part of the basin; (4) have a salinity due to ocean-derived salts of less than 0.5 ppt.
Subsystem : **FO** Class **FORESTED**: Characterized by woody vegetation that is 6 m tall or taller.

6 Subclass **Deciduous**: A plant community where deciduous trees or shrubs represent more than 50% of the areal coverage of trees and shrubs. The canopy is normally leafless some time during the year.
Modifier(s): **F** WATER REGIME **Semi-permanently Flooded**: Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land's surface.

Presently, the wetland systems located on these properties exhibit all traditional wetland functions. The upland areas also exhibit relatively undisturbed maritime forest-type ecosystems. In the past 10 years, areas in the vicinity of the SNWR have experienced substantial changes in land use. The USACE and other entities anticipate 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 USACE 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. There are also threats that subtle changes in adjacent land use will also have a detrimental impact on the SNWR. By way of example, a Public Notice published by the Charleston District, Corps of Engineers on September 28, 2009, requests comment on a proposal from a private landowner to divert tidal water flow onto an approximately 693-acre property to increase the hydrology on 485 acres of previously-existing rice impoundment. The 693-acre property, which would be used as a mitigation bank, presently provides benefits to migratory waterfowl during migratory stops similar to those provided by Refuge lands. Conversion of such acreage to saltmarsh could shorten their stay in the area and result in the birds that the Refuge serves resuming their migration with less rest. The expected effects of the proposed regulatory action on the SNWR have not been quantified at this time, but the proposed project is an example of the continued threat that manipulation of adjacent lands pose to the SNWR and the resources it protects.

2.0 Assessment of Restored Marsh Area used to Mitigate for Direct Impacts

Disposal Area (DA) 1S is approximately 45 acres in size and is located north of the Federal Navigation Channel. It is located in close proximity to the Middle River location and directly east of the Atlantic Wood Industries facility within Savannah Harbor. DA 1S was used for the unconfined deposition of dredged sediments for many years. Savannah District stopped using it. Historical records indicate that the composition of the dredged material consisted of approximately 67% sand (#230 sieve), 14% silt, and 9% clay material. Presently, DA 1S supports both tree and shrub vegetation, with some marsh fringe areas dominated by *Spartina alterniflora* at the lower elevations. In addition, an existing 1.7 acre restoration site is also located in an area of the DA that was graded to provide mitigation for a previous GPA project.

The 42 acres of contiguous, restored brackish marsh, which includes development of tidal creeks, will have more ecological value than 47% of marsh proposed for impact (i.e., 7.3 acres of marsh proposed for impact is degraded, poorly functioning brackish marsh along the navigation channel). As previously mentioned, the proposed mitigation site is north of the Federal Navigation Channel that would be a component of all depth alternatives. Thus, the large, non-segmented size of the mitigation area, coupled with its “in basin” location and incorporation of a

strip of trees to separate the restoration site from the harbor, makes it an ideal "in kind / in basin" mitigation option for replacing the brackish marsh acreage that would be impacted.

D. Use of Watershed Assessment to Identify Appropriate Wetland Mitigation

33 CFR 332.2 (b) of the Final Mitigation Rule provides information on the approach to identifying Type and location of compensatory mitigation. The rule states, " *(1) When considering options for successfully providing the required compensatory mitigation, the district engineer shall consider the type and location options in the order presented in paragraphs(b)(2) through (b)(6) of this section. In general, the required compensatory mitigation should be located within the same watershed as the impact site, and should be located where it is most likely to successfully replace lost functions and services, taking into account such watershed scale features as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources (including the availability of water rights), trends in land use, ecological benefits, and compatibility with adjacent land uses. When compensating for impacts to marine resources, the location of the compensatory mitigation site should be chosen to replace lost functions and services within the same marine ecological system (e.g., reef complex, littoral drift cell). Compensation for impacts to aquatic resources in coastal watersheds (watersheds that include a tidal waterbody) should also be located in a coastal watershed where practicable."*

The USACE used this approach as it developed mitigation for both direct and indirect impacts to wetlands. The following sections provide details that illustrate how the Corps' wetland mitigation complies with the 2008 Final Mitigation Rule.

1.0 Identification and Justification of Wetland Mitigation for Indirect Impacts

As defined in the Functional Assessment section of this analysis, deepening the harbor to a 48-foot depth would result in a conversion of the dominant vegetative species typically observed in approximately 337 acres of freshwater marsh (freshwater to brackish marsh scenario). Of the functions associated these emergent wetland systems, the one that would experience a minor impact as a result of the conversion would be fish and wildlife habitat value. Therefore, it was important to the Corps that the mitigation selected offset impacts to this wetland function.

1.1 Evaluation of Mitigation Banks Credits

The District evaluated the Regional Internet Banking Information and Tracking System (RIBITS) for potential mitigation banks that possess tidal freshwater credits within the Lower Savannah River Watershed. As of March 2011, the following banks have primary service areas that overlap the harbor area, and these banks are not sold out of credits: Bath Branch, Brushy Creek, Margin Bay, Millhaven, Old Thorn Pond, and Phinizy Swamp. These banks do not contain tidal, freshwater systems and/or the associated credits. A review of secondary service areas overlapping the project area resulted in the following list of banks that exist and are not sold out of credits: Black Creek and Wilhelmina Morgan. Likewise, these banks do not contain tidal, freshwater systems and/or the associated credits. Thus, at this time mitigation banks with "in kind" mitigation do not exist within the Lower Savannah Watershed.

1.2 Evaluation of In Lieu Fee Program Credits

As of March 2011, the In-Lieu Fee Program in the State of Georgia has not been updated or approved by the USACE and Regulatory Interagency Review Team (IRT) to provide compensatory mitigation credits that would offset impacts to aquatic resources. At this time, the USACE, Regulatory Division is working with interested parties and the Georgia Land Trust Service Center to update the program.

1.3 Evaluation of Permittee-Responsible Mitigation under a Watershed Approach

Per guidance provided at 33 CFR 332.3(c)(1), the Final Compensatory Mitigation Rule includes the following: "*Where a watershed plan is available, the district engineer will determine whether the plan is appropriate for use in the watershed approach for compensatory mitigation."*

The Georgia Department of Natural Resources Environmental Protection Division (GA DNR-EPD) developed the Savannah River Basin Management Plan 2001, *"to provide relevant information on the Savannah River basin characteristics, describe the status of water quality and quantity in the Savannah River basin, identify present and future water resource demands, present and facilitate the implementation of water protection efforts, and enhance stakeholder understanding and involvement in basin planning."* With respect to the Savannah River Basin Management Plan 2001, USACE reviewed the document in order to determine if priorities listed in the plan were compatible with the development of a mitigation plan specific to the indirect impacts associated with the conversion of freshwater marsh to brackish marsh. Although the plan focused on measures for improving water quality and reducing water consumption, the long-term priorities for the Lower Savannah River Basin were considered and are indicated below:

> *"• Protecting water quality in lakes, rivers, streams, estuaries and coastal waters through attainment of water quality standards and support for designated uses;*
>
> *• Providing adequate, high quality water supply for municipal, agricultural, industrial, and other human activities;*
>
> *• Preserving habitat suitable for the support of healthy aquatic and riparian ecosystems;*
>
> *• Protecting human health and welfare through prevention of water-borne disease; minimization of risk from contaminated fish tissue, and reduction of risks from flooding; and*
>
> *• Ensuring opportunities for economic growth, development, and recreation in the region."*

Of the priorities listed in the Savannah River Basin Management Plan, *"preserving habitat suitable for the support of healthy aquatic and riparian ecosystems"* is a priority within the plan that is consistent with the preservation of 2,683 acres of wetland and upland buffer adjacent to the SNWR.

The Mitigation Rule also provides guidance when no formal watershed plan is available. In situations where watershed plans do not exist, 33CFR 332.3(c) (1) also states, "*Where no such plan is available, the watershed approach should be based on information provided by the project sponsor or available from other sources."*

The following facts are presented in support of the proceeding statement. The Corps assembled and used 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 wetlands residing within the SNWR. The Service recommended preservation of lands as a possible solution and recommended sites that are part of their long term lands 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 10-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 USACE proceeded with the identification of preservation sites.

In summer 2003, the Corps assembled a Wetland Interagency Coordination Team (ICT) to assist in its analysis of potential wetland impacts from the SHEP. The team consisted of agency wetland experts from USEPA, USFWS, NMFS, GA DNR, SC DNR, and SC DHEC. The agencies identified an acceptable technical approach to determine wetland impacts. They also identified the information needs they would have when they reviewed the DEIS. Since creation of the team, the USACE hosted 7 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 Corps prepared a Memorandum For Record (MFR), which was provided to all members of the ICT, including EPA. Of the seven meetings that were hosted by the USACE, five were attended by a representative of EPA.

The Corps also conducted an Agency Technical Review (ATR) to assess the use of Savannah District's Regulatory Standard Operating Procedures (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 and was performed by Corps experts in the Engineering Research and Development Center in Vicksburg, MS. The ATR was to determine if the SOP was an appropriate method to determine the preservation acreage needed to compensate for impacts resulting from the SHEP. The ATR was also conducted to comment on the reasonableness of the assumptions and calculations that Savannah District used in applying the SOP for the SHEP. The SOP was used only to determine the amount of preservation acreage necessary to offset the remaining acreage impacted 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 associated mitigation that would be required.

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 2,683 acres of land adjacent to the SNWR for the 48-foot alternative. The Service provided updates to the SOP calculations in Appendix A of the report. The USACE concurred with use of the updated SOP worksheets and adopted the results of those calculations for use in the DEIS. The USFWS provided a Final Fish and Wildlife Coordination Act Report in March 2011. That report reiterated the approval of the USFWS, SC DNR and GA DNR in the use of the SOP and its specific application to the proposed harbor deepening alternatives.

When evaluating possible mitigation options, the USACE also reflected on the guidance identified as *Considerations*, which is defined at 33 CFR 332.2(c)(2) i-v of the Final Mitigation Rule. With respect to the Lower Savannah River Watershed, the following facts were considered with respect to regulations i-v when developing a mitigation plan:

- Deepening the harbor to a 48-foot depth would result in a conversion of the dominant vegetative species typically observed in approximately 337 acres of freshwater marsh (freshwater to brackish marsh scenario). It is important to note that 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 (Latham et. al., 1994). Please see Functional Assessment. As illustrated in Table 1, the only indirect effect the 48-foot project would have on the function of these wetlands systems would be associated with fish and wildlife habitat. When considering SHEP impacts, 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. With respect to fish and wildlife habitat, many of the same species utilize both brackish marsh and saltmarsh habitats.

- The FEIS describes the rationale behind selection of the EFDC model in Section 5.1.2.1 of the FEIS (Pages 5-8 through 5-13). In brief, a comparison of models illustrated that wetland impacts identified by using the EFDC hydrodynamic model are higher (i.e., greater quantity) than those identified by the Marsh Succession Model at all proposed project depths. This indicates that the Corps' use of the EFDC-derived impacts is a more inclusive and conservative estimate. That is, the EFDC model is more likely to capture all impacts than other models presently available.

- Figure 51 from Odum (1988) illustrates the various salinity ranges that occur within a tidal, estuarine system. The EFDC model thresholds for identifying tidal freshwater marsh (0.0 – 0.5 ppt), brackish marsh (>0.5 – 4.0 ppt), and saltmarsh (> 4.0 ppt) have been imposed in red on the right-hand side of the figure. Of interest, Odum's (1988) review article compares tidal freshwater systems (less than 0.5 ppt) to salt marsh systems (annual average between 18.0 to 35.0 ppt) (Figure 52).

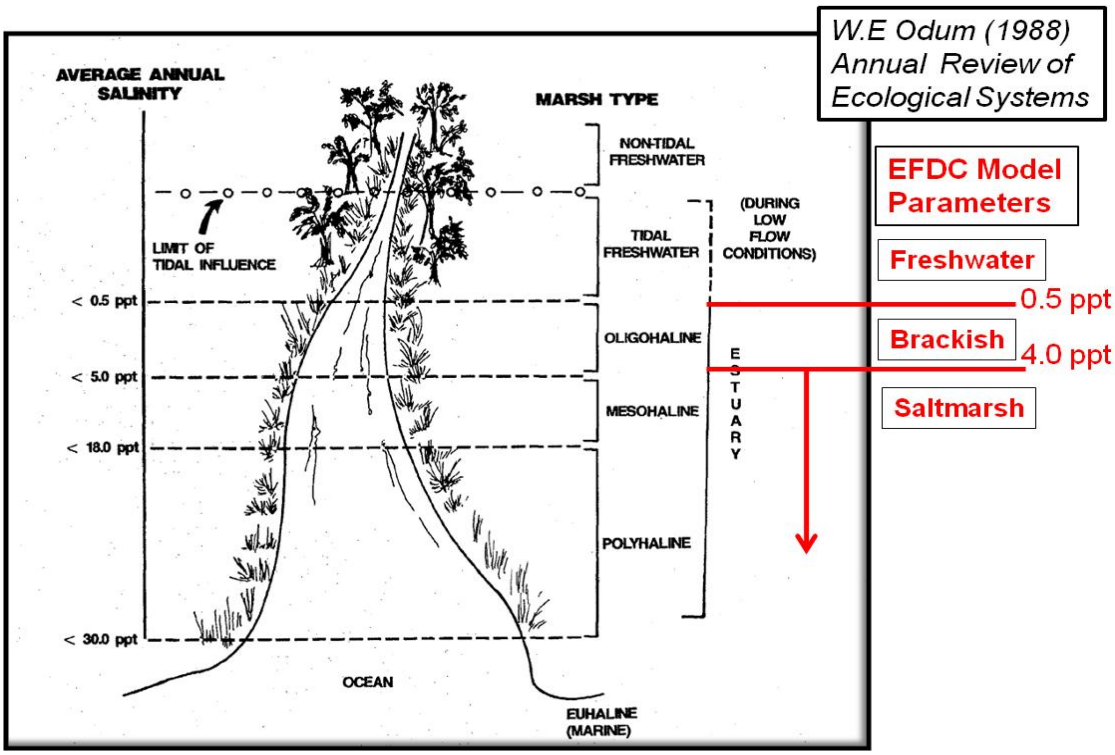


Figure 51. Tidal Estuarine System with EFDC Model Parameters

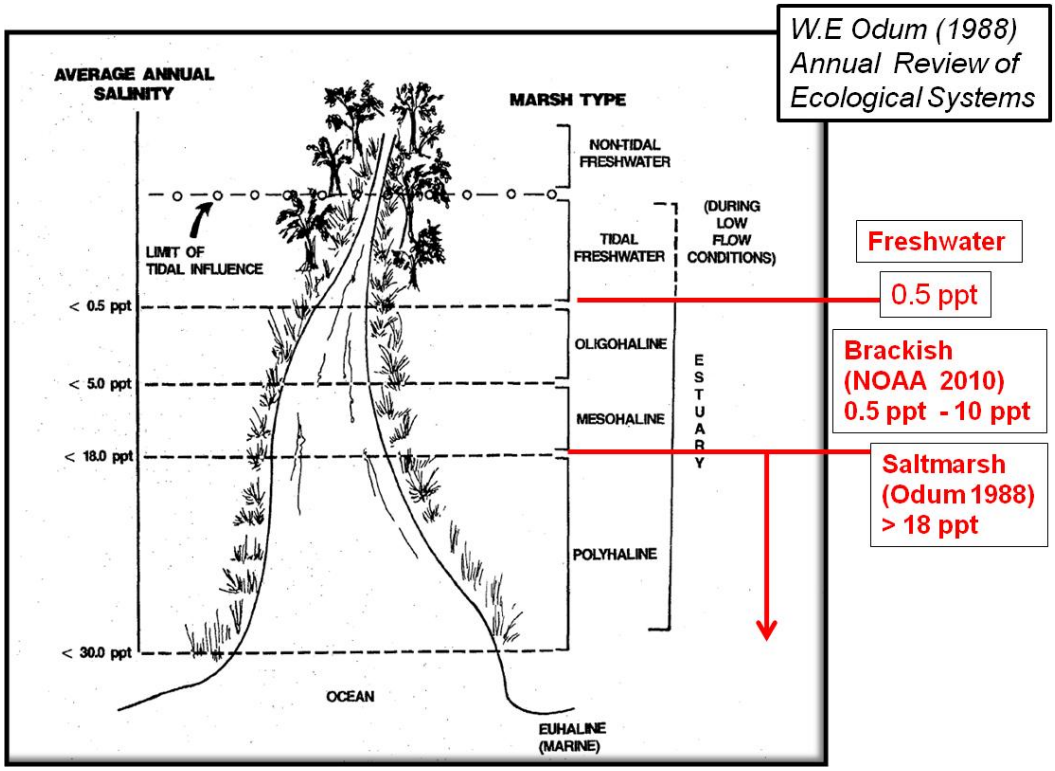


Figure 52. Tidal Estuarine System and salinities reported from references

Additionally, NOAA (2010) reports brackish marsh salinities in the range of 0.5 – 10.0 ppt with saltmarsh vegetative species being more pronounced at > 10.0 ppt (Figure X). The EFDC value for saltmarsh (> 4.0 ppt) is approximately 4.5 times less than what is reported by Odum (1988) and 2.5 times less than that reported by NOAA (2010). Additionally, the NOAA (2010) range for brackish marsh includes areas determined by the EFDC model to be saltmarsh. When considering values reported in the literature, the acreage of saltmarsh conversion (i.e., 730 acres), which was calculated using the EFDC model, is a very inclusive value **and includes** existing vegetative areas that would not transition (post deepening) to brackish marsh following deepening *because* these areas currently exist within the salinity range of a brackish marsh (0.5 -10 ppt).

- The following figures illustrate the pre-project and post-project surface water salinities as determined by the EFDC model within the Savannah River Estuary under average annual, normal flow conditions (Figure 53).

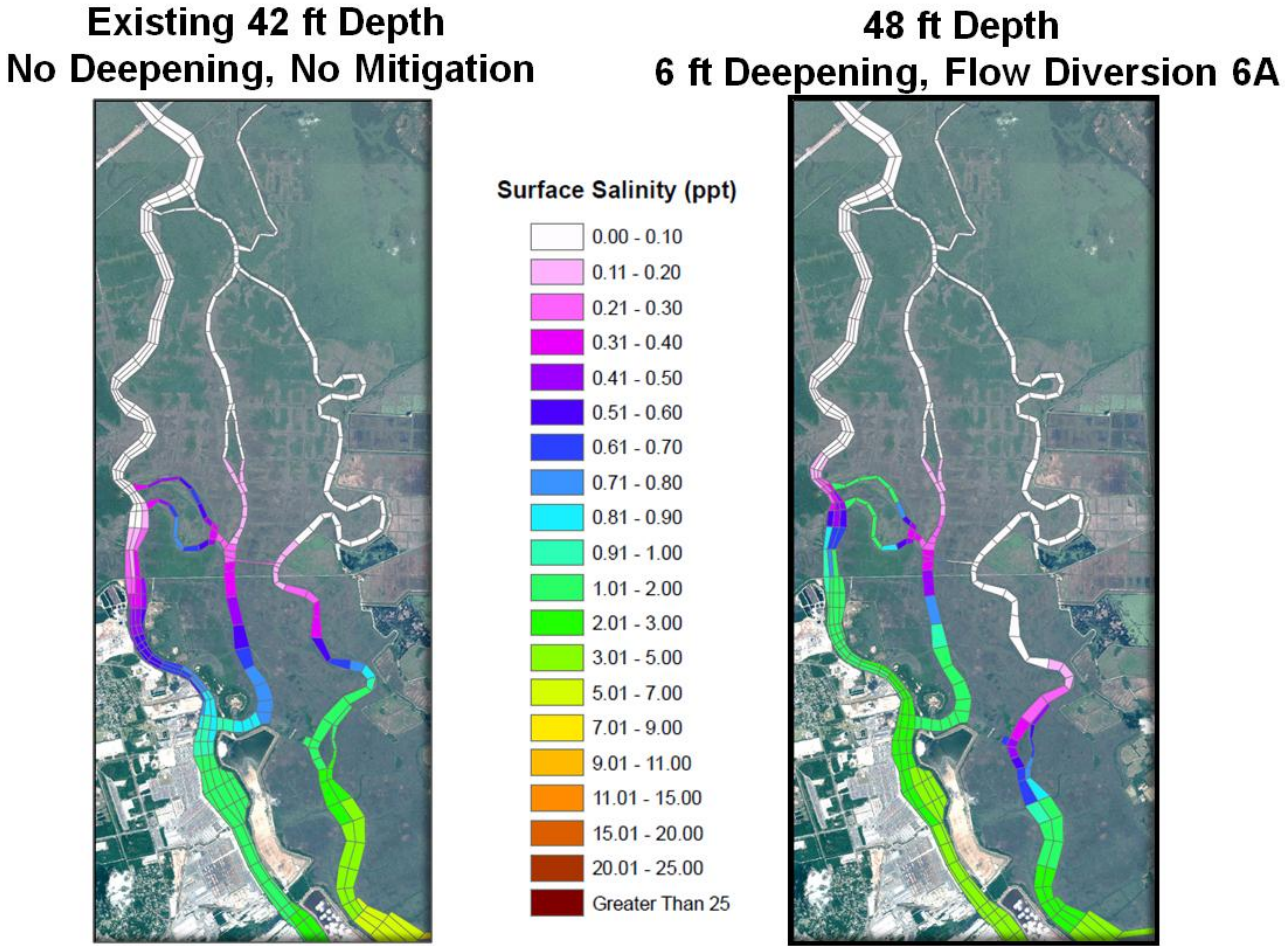


Figure 53

In brief, the areas of the harbor presented in the above figures illustrate the vicinity of the Savannah River Estuary where 337 acres of tidal freshwater marsh and 730 acres of saltmarsh would be converted to 1067 acres of brackish marsh (as quantified with use of

EFDC model). Salinity ranges are presented in the color-coded legend, and illustrated variations in range are reported in increments of 0.1 from 0.00 – 1.00 ppt. A 1.0 variation in range is illustrated from 1.01 – 3.00 ppt, and a 2.0 variation in range is illustrated from 3.01 – 11.00 ppt. When considering the figures above, it is important to note generally all of the areas coincide with the tidal freshwater salinity range (0.0-0.5 ppt) or the brackish marsh salinity range (0.5-10ppt) reported in the references (NOAA, 2010; Odum, 1988). *Thus, no impacts to saltmarsh would be quantified if salinity ranges presented in the literature where adopted by the USACE.* However, the USACE chose to be conservative in the estimate of the brackish marsh range (0.5 ppt – 4.0 ppt), which results in a classification of saltmarsh for some areas.

Figure 54 illustrates the differential in salinity that occurs within each model cell when considering the pre- and post-project conditions. Resulting salinity differentials are

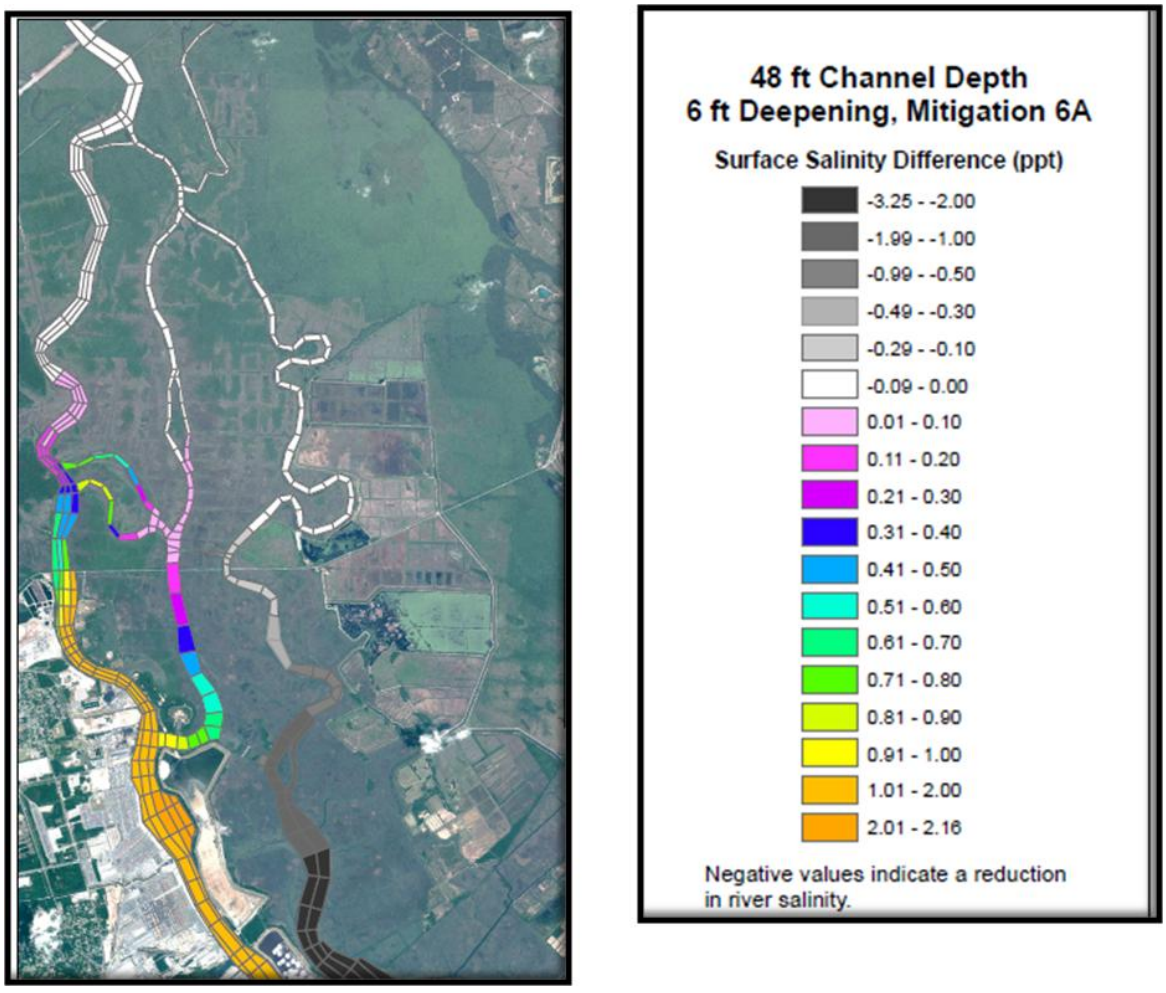


Figure 54

presented in the color-coded legend. It is important to note that the changes in pre- and post project salinities are very small with changes of < 0.5 ppt for the most sensitive areas of the Savannah River Estuary. Little, if any, shifts in vegetation would be expected to

occur with these areas of subtle salinity changes. Areas that would experience changes of approximately ± 2.0 – 3.0 ppt are located in areas where pre-project EFDC-reported salinities are between 3.0-5.0 ppt (oligohaline) and 5.0 – 7.0 ppt (mesohaline) (Figure 53). *In these areas, the post-project resulting salinities would still be consistent with oligohaline and mesohaline environments traditionally observed in estuarine environments (Figure 53).* Thus, vegetation typically observed in these environments would still be present, and shifts in vegetation (if any) in these areas would be minimal.

- River flows used in simulations to determine wetland impacts for the "Basic Evaluation" are average/typical flows for the evaluation period of 1 March to 1 November as specified by the Interagency Coordination Team. Average/typical river flows were determined using recorded gage data for Savannah River at Clyo, Georgia. The EFDC model has continuous input boundary conditions for a 7 year period (1997-2003) available for simulation. The year 1997 was found to have flow conditions representative for the long term average flows for the river. Low or drought river flows were also considered for determining wetland impacts. This flow condition was called "Sensitivity Analysis #1". Low or drought river flows were determined using recorded gage data and 2001 was found to have flow conditions representative for the long term low/drought flows for the river. *As illustrated in the results for drought flow conditions, deepening (48-foot depth) in conjunction with flow diversion plan 6A actually converts 362 acres of brackish marsh to freshwater wetlands.* However, the USACE chose to be more inclusive of impacts and used the results of average/typical river flows that results in 337 acres of freshwater wetland conversion (please see following table).

Freshwater Tidal Marsh/Wetland Impacted Acreages
Deepening WITH Flow Diversion Plan 6A

Model Scenario	44 ft depth	45 ft depth	46 ft depth	47 ft depth	48 ft depth
Basic Evaluation Average/Typical Flow Conditions	**322**	**-32**	**-201**	**-223**	**-337**
Sensitivity Analysis #1 Low/Drought Flow Conditions	**920**	**903**	**678**	**520***	**362**

Acreages shown in red are freshwater tidal wetlands that are not mitigated for by flow altering plans (6a & 6b).
**Interpolated value.*

- The US Fish and Wildlife Service reports that more than 12,000 acres of tidal freshwater marsh existed in the Lower Savannah River Basin in the early 1800s.

Colonization, rice cultivation, harbor deepening projects, and other land manipulations have reduced those numbers over the last 200+ years (See Appendix L-Cumulative Impact Analysis, Section 8-Wetlands, for detailed description of Lower Savannah River Basin wetland composition over time).

- Several studies were conducted during the SHEP to establish baseline conditions in regards to the amount of tidal freshwater marsh remaining in the estuary. Both Applied Technology and Management (March 2003) and USFWS (Welch and Kitchens 2006) conducted studies to classify the various wetland communities in the study area (I-95 Bridge to mouth of Back River). Using a marsh succession model, the USFWS identified the following marsh distribution (Welch and Kitchens 2006):

Marsh Distribution

Marsh Type	Acreage
Freshwater	3,269
Brackish	3,082
Saltmarsh	2,506

- The Savannah Harbor is a very dynamic environment that is subject to continuous manmade and natural perturbations/disturbances. As a result, there are no opportunities in the Lower Savannah River Watershed to provide some form of sustainable, *in situ* tidal freshwater wetland mitigation.

- Wetland creation, which would be derived from upland areas, has a very high risk of failure. For the duration of the project, a created freshwater system would require continuous maintenance. The USFWS determined construction of freshwater habitat in upland would be extremely risky, not self-sustained, and therefore, not a practicable alternative. Ultimately, the USACE and other Wetland Interagency Coordination Team member concluded that the creation of freshwater, tidal wetlands was not a viable option.

- Without the Flow Diversion Structures included in the SHEP project, approximately 1,212 acres of freshwater marsh would be converted to brackish marsh. By implementing flow-altering measure 6A, there would be 337 acres of freshwater conversion to brackish marsh. Thus, the flow altering measure 6A satisfies both avoidance and minimization elements by maintaining 875 acres of freshwater marsh that would otherwise experience some degree of vegetative conversion. In 10 years, the USACE and other members of the Wetland Interagency Coordination Team could not identify any other opportunities to provide restoration and/or enhancement of tidal freshwater marsh. Therefore, the acquisition and preservation of lands (i.e., wetlands and non-wetland riparian corridors) adjacent to the SNWR was identified and

subsequently prioritized as a large-scale method for maintaining the ecological functions of the Lower Savannah River Watershed.

- The Savannah River National Wildlife Refuge (SNWR) is a conservation area of national importance with habitats that are important to many unique plant and animal species, including threatened and endangered species. It is also located in the vicinity of the SHEP project (i.e., "In Basin" mitigation).

- Presently, wetland and non-wetland riparian areas adjacent to the SNWR are being converted to commercial/industrial land uses with increased impervious surface coverage. Development adjacent to the boundaries of the SNWR has the potential to directly and indirectly impact fish/wildlife habitat function; decrease water quality in the vicinity of the wildlife refuge; and increase risk of wildfire probability. All of these impacts are associated with development and human encroachment.

- Preservation of wetlands and upland buffers adjacent to the existing SNWR is a sustainable approach to mitigation that results in the expansion of the refuge property; protection of wetlands and upland buffers, the expansion/protection of wildlife corridors; reduction in likelihood of future indirect impacts associated with stormwater runoff and septic systems; and decrease risk of wildfire probability that comes with development and human encroachment.

- Georgia Department of Natural Resources Environmental Protection Division developed the Savannah River Basin Management Plan 2001 that identified "*Preserving habitat suitable for the support of healthy aquatic and riparian ecosystems"* as a long term priority for the Lower Savannah River Watershed.

- 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". As defined in the plan, *"the proposed acquisition would protect a biologically diverse complex of wetlands with high ecological values for numerous plants and animals."* and *"project lands acquired as part of the refuge would be managed in a manner that would protect and enhance the fish and wildlife habitat values they provide."* By acquiring lands adjacent to the SNWR, and thereby expanding the refuge, a primary initiative of the National Wildlife Refuge System Improvement Act of 1997 is also satisfied. It also satisfies major objectives of Georgia and South Carolina's Comprehensive Wildlife Conservation Strategies.

- Estuarine generalist fish species are found in all Savannah River Estuary (SRE) habitats (i.e., tidal freshwater marsh <1ppt; oligohaline (1-5 ppt); mesohaline (5-15 ppt); and polyhaline (> 15ppt)), and variability in distribution is attributed to seasonal trends. As illustrated in the following table, **s**patial patterns in fish distribution are not discernable particularly in the <1 ppt to 15 ppt salinity range.

Totals for All Species

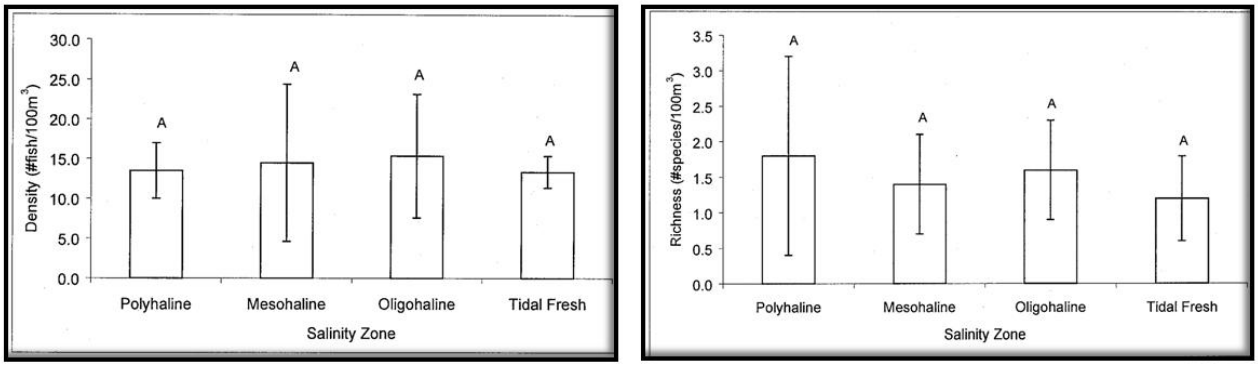
Polyhaline (>15 ppt)				Mesohaline (5-15 ppt)				Oligohaline (1-5 ppt)				Tidal Freshwater (<1 ppt)			
F	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**
141	324	724	3731	1297	1165	9582	14147	2953	4616	5448	6264	1627	3401	7967	4071
TOTAL: 4,920				TOTAL: 26,191				TOTAL: 19,281				TOTAL: 17,066			

Estuarine generalist fish species including: Bay anchovy, Atlantic menhaden, Atlantic croaker, spot, other drum species, gobies, blueback herring, Southern flounder, and striped mullet dominated the fish densities in habitats and comprised over 90 % of the total number of fishes collected. Generally, most of the 91 fish species sampled from the SRE could be considered estuarine generalists that were present in most habitat types during most seasons. Jennings and Weyers (2003) report this finding was not surprising because the variability in salinity distribution in the SRE created a mosaic habitat pattern influenced by tidal fluctuation and river discharge. Many areas of the SRE had different salinity-based habitats in a 6-hour tidal period and from year 1 to year 2 when river discharge was different. The most abundant species seemed capable of using all of the habitats found in the SRE. Statistical comparisons of mean fish density and mean species richness gave variable results. Most variation in fish distributions was attributed to seasonal trends. Density and richness were lowest in fall when many species disappeared from sample reaches and abundances of other species decreased across the estuary (Jennings and Weyers, 2003).

Jennings and Weyers (2002) also normalized the number of fish found in tidal creeks by the volume of water in which the fish were retrieved (Figure 55). This work was completed in tidal creeks for each of the estuarine environments that have been previously discussed. In brief, the authors found no statistical difference in the density of fish or species richness when comparing all four estuarine environments (Tidal Fresh, Oligohaline, Mesohaline, and Polyhaline).

Fish Density and Species Richness in Tidal Creeks

Jennings and Weyers (Feb 2002) Annual Report
Temporal and Spatial Distribution of Estuarine-Dependant Species



Tidal Freshwater (0-1 ppt); Oligohaline (1-5 ppt); Mesohaline (5-15 ppt); Polyhaline (> 15 ppt)

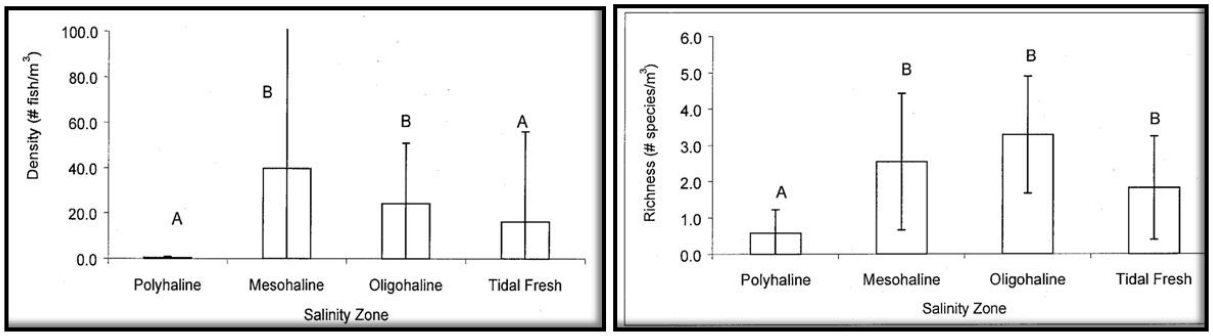
Figure 5. Mean fish density (± st. dev.) and species richness(± st. dev.) for ichthyoplankton surveys conducted in the four salinity zones from September 2000 to August 2001. Different letters denote means that were significantly different.

Figure 55

Jennings and Weyers (2002) also normalized the number of fish found along the marsh edge by the volume of water in which the fish were retrieved (Figure 56). This work was completed along the marsh edge for each of the estuarine environments that have been previously discussed. In brief, the authors found a statistical difference in fish density when comparing tidal fresh water marsh to oligohaline and mesohaline marsh systems. However, no statistical difference in species richness was observed when comparing all three of the estuarine environments that have been identified within the three marsh areas (i.e., tidal fresh, oligohaline, and mesohaline).

Fish Density and Species Richness Along Marsh Edge

Jennings and Weyers (Feb 2002) Annual Report
Temporal and Spatial Distribution of Estuarine-Dependant Species



Tidal Freshwater (0-1 ppt); Oligohaline (1-5 ppt); Mesohaline (5-15 ppt); Polyhaline (> 15 ppt)

Figure 9. Mean fish density (± st. dev.) and species richness (± st. dev.) for marsh-edge drop surveys conducted in the four salinity zones from October 2000 to September 2001. Different letters denote means that were significantly different.

Figure 56

When evaluating possible mitigation options, the USACE also reflected on the guidance identified as *Information Needs*, which is defined at 33 CFR 332.3 (c)(3) i-iii of the Final Mitigation Rule. The following facts are presented in compliance with regulations i-iii that was previously cited.

- With respect to overall development trends in the Lower Savannah River Watershed, estimates of increases in population and associated impervious surface coverage are provided in Section A titled, "Watershed Characterization" of this Appendix. Within the watershed, Chatham and Effingham counties (lower end of watershed) are expected to experience the greatest percent increase in percent impervious surface coverage from 2010 to 2020, which is estimated at 4.9% (Figure 57).

- The USACE has evaluated development trends within 5 miles of the Savannah National Wildlife Refuge for the last 15 years. In those 15 years, the USACE has authorized approximately 170 Corps permit actions (Savannah and Charleston Districts) that resulted in more than 230 acres of wetland impacts. Figure 58 illustrates the number of actions and acreage of wetland impacts authorized during the past 15 years. The reduced number of actions associated with the 2006-2010 period reflects a decrease in economic growth across the Nation, with less associated development occurring during that time. This has also been reflected in the total number of regulatory actions processed throughout the state during this time period. However, those trends are expected to change in the future. It is also important to note that these

USACE-permitted actions do not account for other projects in the area that would result in land use changes but did not require a Corps permit. Figure 53 illustrates the rate at which the cumulative number of USACE permitted actions has occurred. Although the magnitude of wetland impact cannot be assumed with each future action, the trends illustrated in Figure 59 suggest that by 2015 the USACE will have potentially authorized 230 wetland impact actions (cumulative since 1995) within 5 miles of the SNWR. Figure 60 illustrates the type of USACE-permitted activity that has occurred within 5 miles of SNWR as a percentage of the total actions.

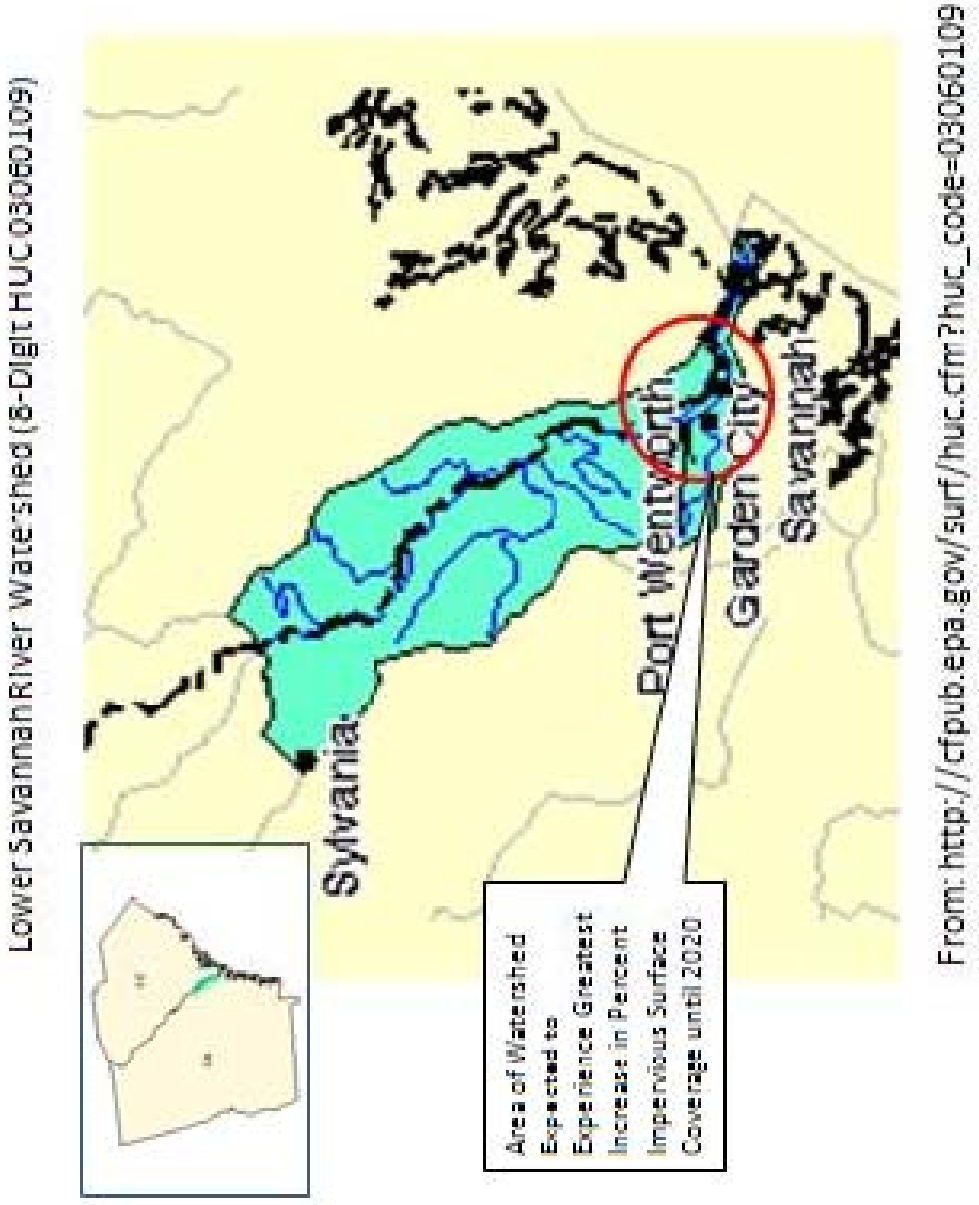


Figure 57. Lower Savannah Watershed Identified with Area of Greatest Percent Increase In Percent Impervious Surface Coverage.

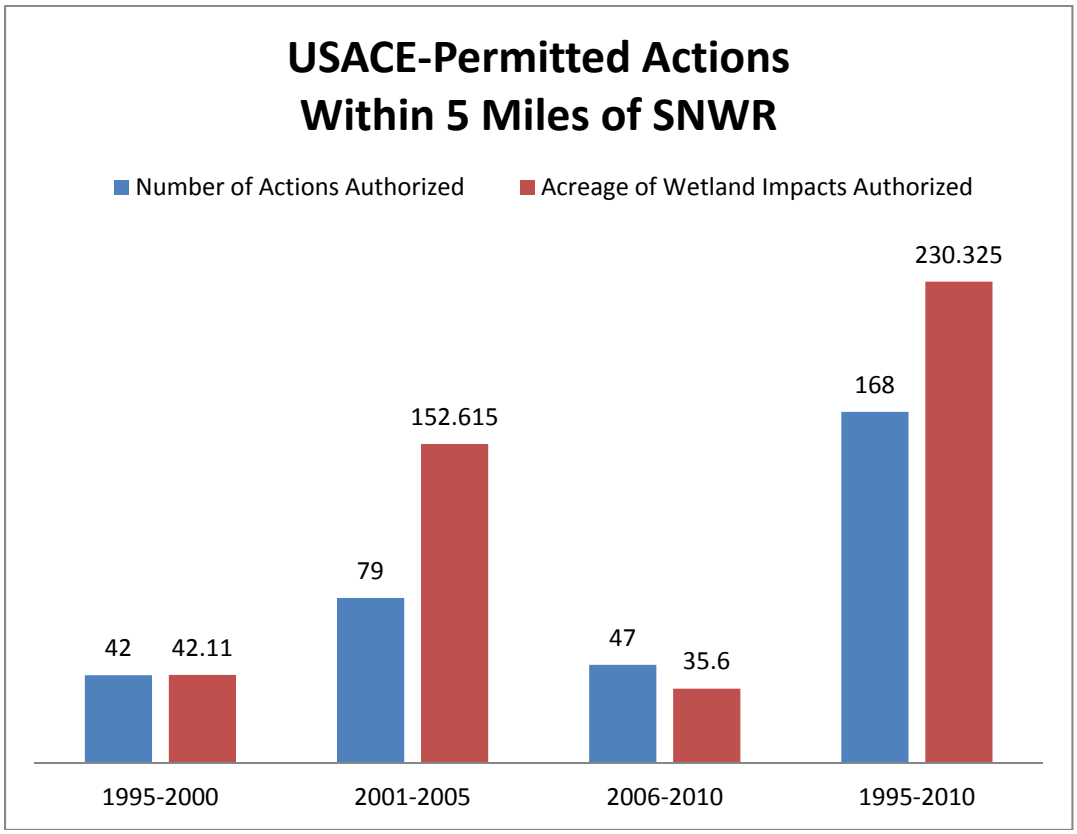


Figure 58. Number of USACE-permitted actions and acreage of wetland impacts authorized during the past 15 years within 5 miles of SNWR.

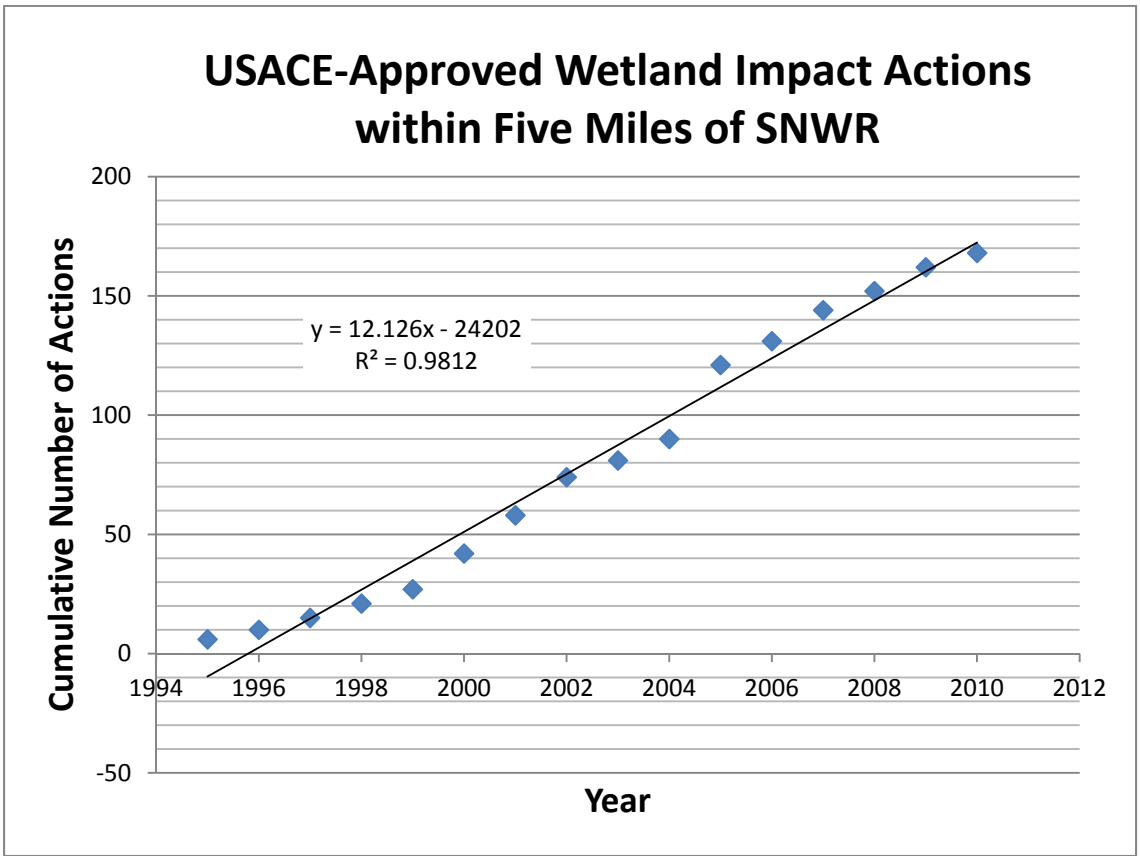


Figure 59. Cumulative Number of USACE-Permitted Actions Over Time

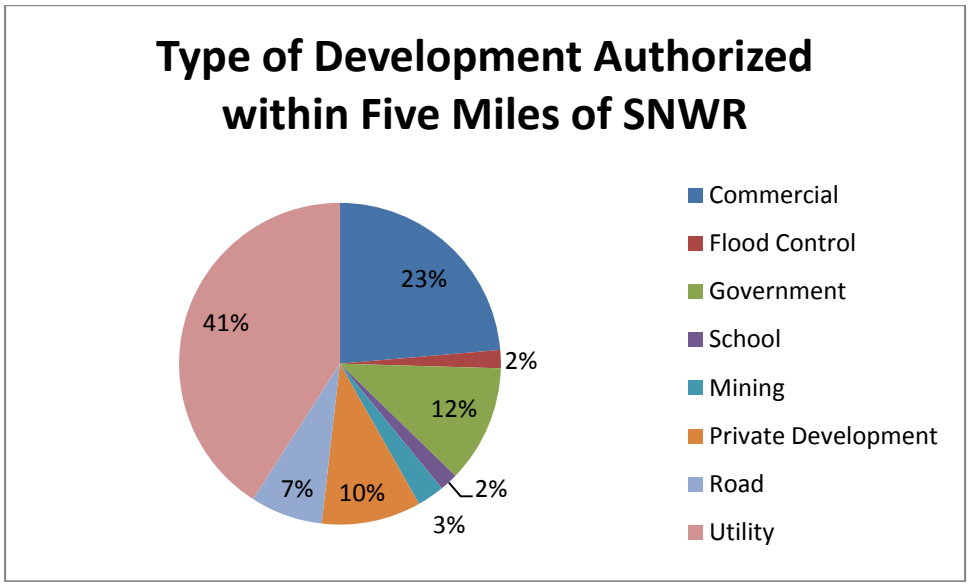


Figure 60. Type of USACE-permitted activity that has occurred within 5 miles of SNWR as a percentage of the total 168 actions.

- The USACE also evaluated water quality impairments using USEPA's MyWATERS Mapper (www. watersgeo.epa.gov). This version of MyWATERS Mapper depicts the status of NPDES permits for each State, summary information from the Clean Watershed Needs Survey, and water quality assessments. A review of the Impaired Waters Layers identified three impaired water points on the Savannah River, from south of Savannah Electric's Plant McIntosh to the mouth of the Savannah River (Please see following table). These impaired water points have been identified relative to features located on the vicinity map as well as the approximated boundaries of the SNWR. The following table also provides information concerning the cause of impairment and designated use for the waters where samples have been collected. Data for these sites and the associated designation was acquired during the 2008 cycle.

Impaired Water Points/Locations, Causes and Designated Use

Sample I.D.	Cause of Impairement	Impairment Group	Designated Use	State TMDL
244972	Mercury	Mercury	Fish Consumption	Needed
244965	Fecal Zinc	Pathogens Metals	Aquatic Life Support (Both)	Needed Needed
276597	Mercury	Mercury	Fish Consumption	Needed

As depicted in Figure 61, the Impaired Water Points are located in the Savannah River at locations that are adjacent to the SNWR. The impairments associated with these waters suggest that existing commercial, industrial and residential land use maybe contributing to the degradation in reported water quality. Previous USACE permitting data suggests that areas in the vicinity of the SNWR (< 5 miles away) will continue to urbanize in the future. Thus, it is reasonable to assume that these future-anticipated conversions in land use will have a negative effect on the water quality within the SNWR. However, the integration of land buffers adjacent to the SNWR would help to ameliorate any long-term direct and/or secondary impacts by preventing additional development in such close proximity.

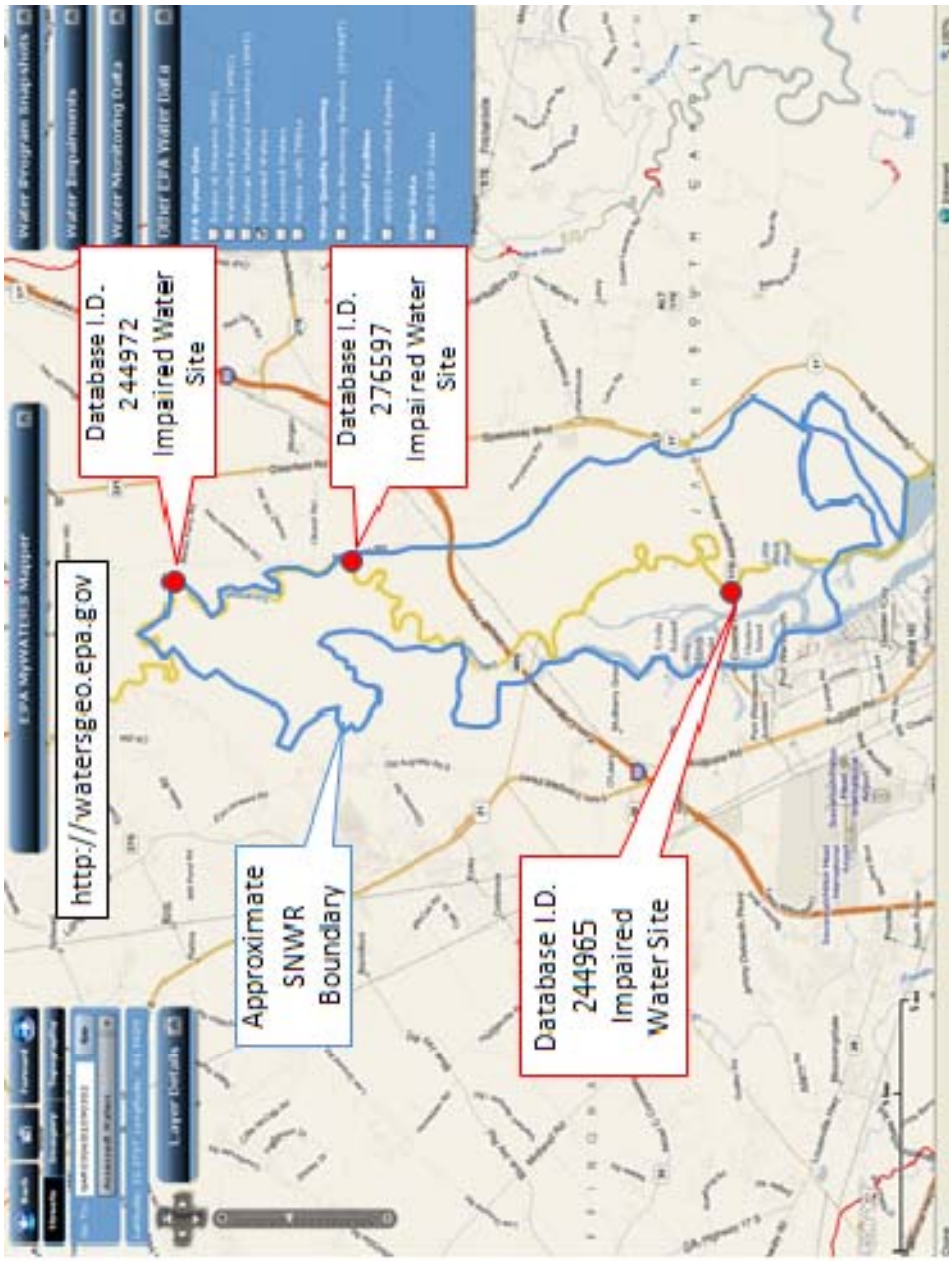


Figure 61. Approximate SNWR Boundary and Location of Impaired Waters in Lower Savannah River.

- The Corps assembled and used 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 wetlands residing within the SNWR. The Service recommended preservation of lands as a possible solution and recommended sites that are part of their long term lands 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 10-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.

As an information need, the USACE also determined the extent of project influence on freshwater marsh, brackish marsh and salt marsh. The functional assessment provided in previous sections described impacts to 337 acres of freshwater marsh and the associated fish and wildlife habitat (See functional assessment). The approximate freshwater marsh contour (0.5 ppt salinity threshold) that would result with a 48-foot project is indicated in Figure 62. Following project construction, marsh systems immediately downstream of that contour line would be more closely aligned with brackish marsh. Also downstream of that contour line is an area of the harbor that is heavily industrialized and subject to continuous manmade perturbations via dredging, industry operation, or other port-related activities (Figure 62). These two circumstances preclude the identification of potential freshwater marsh mitigation sites downstream and in the vicinity of the 0.5 ppt contour line.

When trying to identifying long-term and self-sustaining wetland mitigation, it is also important to recognize that coastal ecosystems are very dynamic and subject to natural variation. Regardless of the SHEP, marsh areas in the Lower Savannah River Watershed and other coastal areas are susceptible to natural transitions and vegetative shifts when environmental conditions change (North Carolina DENR Draft Report, 2010). The extent and duration of that change will dictate the magnitude of conversion within a marsh (White and Alber, 2009). Changes in marsh composition have been observed in a period of 1 year in association with drought periods (Davis, 2004). Drought conditions, storm events and sea level rise all have the potential to influence the vegetative composition of marsh habitats within the Lower Savannah River Watershed. The approximated marsh areas that could be subject to such future influences are identified within the dashed area in Figure 57. Although no opportunities were available to provide tidal freshwater marsh restoration in any area of the Lower Savannah River Watershed, the rationale presented in this section provides justification for why tidal freshwater wetland mitigation sites east of Interstate 95 would not be sustainable.

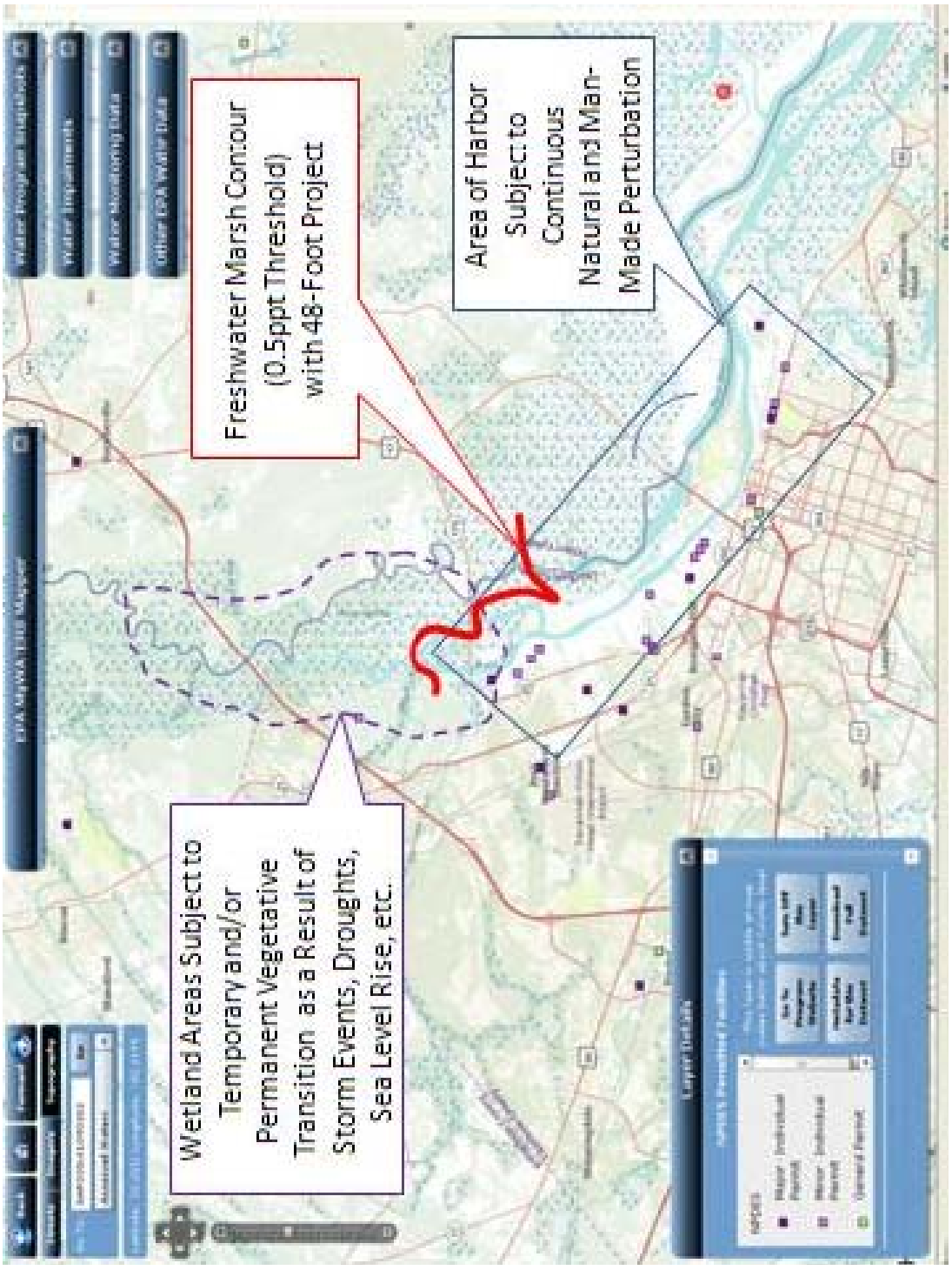


Figure 62. Project-Related Impacts, Existing Land Use, and Other Influences on Vegetative Shifts in the Savannah Harbor.

- From a geographic standpoint, mitigation opportunities west of Interstate-95 and in close proximity to SNWR represents the next logical location for identifying wetland mitigation opportunities that would still provide "In Basin" mitigation. The SHEP project will result in the vegetative conversion of 337 acres of tidal freshwater marsh to brackish marsh. Consequently, the USACE's functional assessment concluded that fish and wildlife habitat would be the key wetland function impacted as a result of the conversion. However, similarities in wildlife composition would remain between habitats. For example, insect abundance and diversity have been reported as similar in salt and freshwater marsh systems (Brinson *et al.*, 1981). Muskrats are also known to be common in both tidal fresh and brackish marsh (Brinson *et al.*, 1981, Odum, 1984). Still others have observed reptiles such as black rat snakes (*Elaphe obsoleta*), brown water snakes (*Nerodia taxispilota*), and diamondback terrapins (*Malaclemys terrapin*) in both tidal freshwater marsh and brackish marsh systems located in the Chesapeake Bay National Estuarine Research Reserve (Perry, J.E. and R.B. Atkinson (1997).

- The USACE's functional assessment concluded that fish and wildlife habitat would be the key wetland function impacted as a result of the conversion. However, similarities in fish composition have also been established in the Savannah River Estuary (SRE) habitats (i.e., tidal freshwater marsh <1ppt; Oligohaline (1-5 ppt); Mesohaline (5-15 ppt); and Polyhaline (> 15ppt)), and variability in distribution has been attributed to seasonal trends. As illustrated in the following table, **s**patial patterns in fish distribution are not discernable particularly in the <1 ppt to 15 ppt salinity range.

Totals for All Species

Polyhaline (>15 ppt)				**Mesohaline (5-15 ppt)**				**Oligohaline (1-5 ppt)**				**Tidal Freshwater (<1 ppt)**			
F	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**
141	324	724	3731	1297	1165	9582	14147	2953	4616	5448	6264	1627	3401	7967	4071
TOTAL: 4,920				TOTAL: 26,191				TOTAL: 19,281				TOTAL: 17,066			

Estuarine generalist fish species including: Bay anchovy, Atlantic menhaden, Atlantic croaker, spot, other drum species, gobies, blueback herring, Southern flounder, and striped mullet dominated the fish densities in habitats and comprised over 90 % of the total number of fishes collected. Generally, most of the 91 fish species sampled from the SRE could be considered estuarine generalists that were present in most habitat types during most seasons. Jennings and Weyers (2003) report this finding was not surprising because the variability in salinity distribution in the SRE created a mosaic habitat pattern influenced by tidal fluctuation and river discharge. Many areas of the SRE had different salinity-based habitats in a 6-hour tidal period and from year 1 to year 2 when river discharge was different. The most abundant species seemed capable of using all of the habitats found in the SRE. Statistical comparisons of mean fish density and mean species richness gave variable results. Most variation in fish distributions was attributed to seasonal trends. Density and richness were lowest in fall when many species disappeared from sample reaches and abundances of other species decreased across the estuary.

Jennings and Weyers (2002) also normalized the number of fish found in tidal creeks by the volume of water in which the fish were retrieved (See Figure 55). This work was completed in tidal creeks for each of the estuarine environments that have been previously discussed. In brief, the authors found no statistical difference in the density of fish or species richness when comparing all four estuarine environments (Tidal Fresh, Oligohaline, Mesohaline, and Polyhaline).

Jennings and Weyers (2002) also normalized the number of fish found along the marsh edge by the volume of water in which the fish were retrieved (See Figure 56). This work was completed along the marsh edge for each of the estuarine environments that have been previously discussed. In brief, the authors found a statistical difference in the density of fish when comparing tidal freshwater marsh to oligohaline and mesohaline marsh. However, there was no statistical difference in species richness when comparing all three of the estuarine environments that have been identified within marsh areas susceptible to vegetative conversion (i.e., tidal fresh, oligohaline, and mesohaline).

- In addition, 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 USACE'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, will likely be sustained in areas predicted to experience salinity concentrations in the range of 2.5 ppt.

  With respect to the SNWR, similarities in support of fish and wildlife habitat also overlap between bottomland hardwood wetlands and freshwater marsh wetlands. All of the previously identified species would be common within freshwater marsh and bottomland hardwoods. In addition, Threatened and Endangered Species such as American alligator, American bald eagle, and Wood stork are thought to inhabit and/or use both types of wetlands within the SNWR (SNWR 2011). Kirkland's warblers may also stop at the SNWR during their migration and utilize both freshwater and bottomland hardwood wetlands. Bottomland hardwoods also support freshwater fish and their associated habitat by capturing and filtering stormwater before the resulting surface water discharges into creeks and open water habitats.

- In closing, the USACE has considered the scope and scale of the proposed impacts as well as the functions that would be lost as a result of the impacts. The USACE is satisfied that the level of information provided in this section satisfies the watershed approach and analysis as outlined in the Final Mitigation Rule.

When evaluating possible mitigation options, the USACE also satisfied the criteria for evaluating mitigation options as reflected in the determination of a *Watershed Scale*, which is defined at 33 CFR 332.3 (c)(4). For purposes of our analysis, we established the Lower Savannah River Watershed as the appropriate scale to assess impacts and mitigation opportunities. The Lower Savannah River Watershed is also defined by the 8-digit Hydrologic Unit Code (HUC) 03060109. Characteristic of this watershed maybe found in previous sections of this analysis. The selection of this watershed scale is supported by the historical review of projects requiring USACE permits and the associated cumulative impacts analysis that considers past, present and reasonably foreseeable future impacts within the same 8-digit HUC. Additionally, most state and Federal resource agencies use a watershed approach that has typically been scoped using an 8-digit hydrologic unit code (NRCS, 1997).

1.4 Evaluation of Site Selection for Permittee-Responsible Mitigation

When evaluating possible mitigation options, USACE also reflected on the guidance identified as *Site Selection*, which is defined at 33 CFR 332.3 (d)(1-3) of the Final Mitigation Rule. The following facts are presented in compliance with regulations 1-3 that were previously cited.

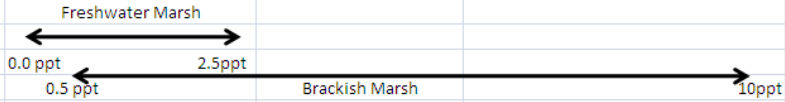
- USACE prepared a wetland comparative analysis when considering the SHEP-derived conversion of freshwater wetland, wetland threats reported for the Lower Savannah River Watershed, function of wetland systems, opportunities for mitigation, and long term sustainability (Please see following table). The comparative analysis evaluated the three types of wetlands commonly observed within the Lower Savannah River Basin and assessed similarities/differences based on function and threat. The analysis was also structured toward an evaluation of freshwater wetlands functions that are most susceptible to impacts from the SHEP (See functional assessment section). A ranking system was then used to characterize each sub-element of threat or function being considered. In brief, the values "High", "Medium", and "Low" were assigned values of 30, 20, and 10, respectively. The basis for the rankings is supported in previous sections of this document. Once values were assigned, the sum total derived for overall Threats was subtracted from the value for overall Function, which resulted in a Total Comparability Score. The resulting scores for each wetland type were then compared. When taking into consideration: (1) predominant function (i.e., fish and wildlife habitat) impacted as a result of freshwater marsh conversion, (2) opportunities for mitigation, (3) threats to wetlands in the watershed, and (4) long-term sustainability, the freshwater marsh and bottomland hardwood wetlands have the same resulting score. These same or similar scores suggest that bottomland hardwood wetlands would provide suitable mitigation for the replacement of freshwater marsh function that is impacted as a result of SHEP. This analysis also takes into consideration a watershed assessment that illustrates the overall threats internal to the Lower Savannah River Watershed. In contrast, the negative value derived for the brackish marsh is indicative of the expansion of brackish marsh acreage that would occur as a result of the SHEP and the lower assigned value for

supporting freshwater biota. Thus, brackish marsh as a mitigation option would not be practicable.

Consideration of Wetland Mitigation Based on Watershed Analysis of Threats and Functional Assessment in Conjunction with SHEP-Derived Impacts to Wetlands			
THREATS	Freshwater Marsh (0-0.5 ppt)*	Bottomland Hardwood	Brackish Marsh (0.5-4 ppt)*
SHEP Impacts	Medium (conversion)	N/A	N/A (increase in acreage)
Threat from Direct Impacts Associated with Coastal Sprawl	Low	High	Low
Threat from Indirect Impacts Associated with Coastal Sprawl	Medium	High	Medium
Subject to Conversion as a Result of Storm, Drought, Sea Level Rise	High	Low	Medium
SUBTOTAL	60	70	50
FUNCTION	Freshwater (0-0.5 ppt)*	Bottomland Hardwood	Brackish Marsh (0.5-4 ppt)*
Support Freshwater Avian and Terrestrial T&E Species	High	High	Low
Support Freshwater Terrestrial Wildlife	High	High	Low
Support Freshwater Fish Species	High	Medium	Low*
Mitigation Opportunities in Lower Savannah Watershed	Low (non-existent)	High	N/A
SUBTOTAL	100	110	30
TOTAL COMPARABILITY SCORE (= Function-Threats)	40	40	-20

High = 30
Medium = 20
Low = 10

* Literature indicates that freshwater marsh charactistics can exist up to 2.5 ppt on salinity continuum. Therefore, overlap with brackish marsh salinity suggest support for freshwater fish species in the salinity range of 0-2.5 ppt.



- When considering mitigation options that take into account the previous analysis, mitigation with bottomland hardwoods would provide compensation for impacted functions associated with the conversion of 337 acres of freshwater marsh to brackish marsh. Additionally, the Corps' assessment of watershed needs concluded that the SNWR and all of the associated wetland habitats are currently subject to stressors associated with urbanization. Total current refuge acreage consists of 29,175 acres of freshwater marshes, tidal rivers and creeks, and bottom land hardwoods (USFWS, 2010). The following table from the USFWS's Draft Comprehensive Conservation Plan (2010) provides the acreage associated with each of the habitat types located on the SNWR. Figure 63 illustrates the general habitat types with respect to location on the SNWR (USFWS, 2010).

Acreages of Habitat Types on Savannah National Wildlife Refuge

Habitat Type	Acres
Bottomland hardwood	6,546
Harwood hammocks	437
Upland Pine	275
Cypress–Gum Swamp	10,398
Mixed Hardwoods	883
Grassland Field	155
Upland Hardwood	178
Managed Impoundments	3,000
Tidal Marsh	7,192
Right-of-ways	24
Administrative Areas	87
Total	**29,175**

The Refuge is dominated by forested wetlands to the north with oak hammocks located toward the interior. The southern refuge boundary is comprised of tidal marsh, scrub/shrub, freshwater impoundments and freshwater marsh.

- Figure 64 obtained from the USFWS's Draft Comprehensive Conservation Plan illustrates the areas proposed for long term acquisition (yellow line) and the existing boundaries of the SNWR (red line). The sites that will be acquired as mitigation for SHEP are located in the green ellipses. The two sites are known as the Mill Creek property (1,122 total acres) and the Abercorn Island property (1,989 total acres). The properties comprising Mill Creek and Abercorn Island are characterized by 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 (USFWS, 2007) (See Functional Assessment for characteristics of preservation sites).

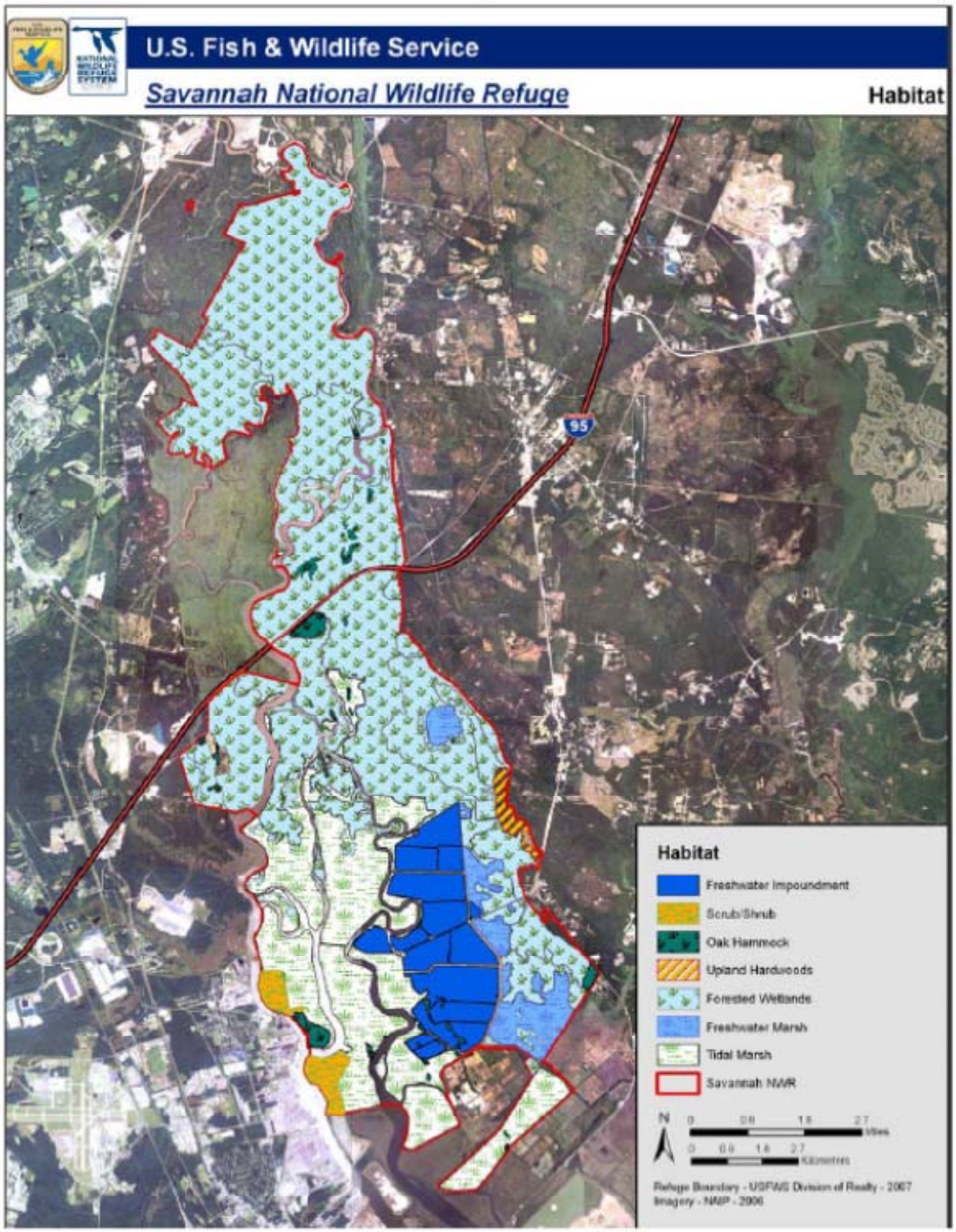


Figure 63. Habitat Types within SNWR Boundaries

Savannah Island National Wildlife Refuge Acquisition Boundary

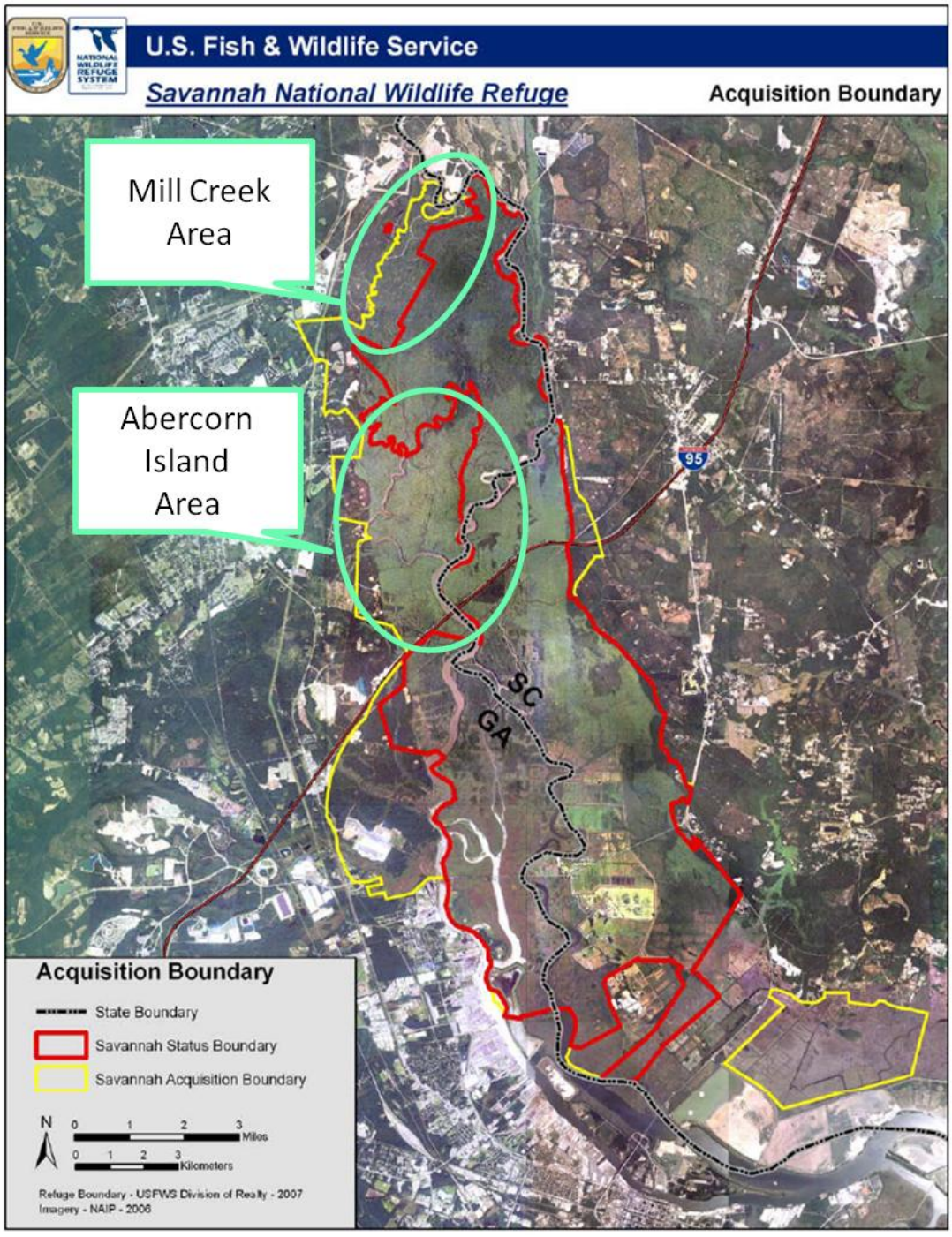


Figure 64. Areas proposed for Acquisition

- Preservation of wetlands and upland buffers adjacent to the existing SNWR is a sustainable approach to mitigation that results in the expansion of the refuge property; protection of wetlands and upland buffers, the expansion/protection of wildlife corridors; reduction in likelihood of future indirect impacts associated with stormwater runoff and septic systems; and decrease risk of wildfire probability that comes with development and human encroachment.

- The Mill Creek and Abercorn Island areas are approximately 1,122 acres and 1,989 acres in size, respectively. Like the forested wetlands areas of the SNWR depicted in Figure 63, both the Mill Creek and Abercorn Island parcels would provide similar ecological values with respect to aquatic habitat and connectivity with the existing wildlife habitat corridors within the SNWR. The lands proposed for preservation are completely compatible with the existing use of adjacent lands (i.e., SNWR), and acquisition of such lands would promote USFWS's Draft Comprehensive Conservation Plan. Integration of the 2,683 acres of wetland and upland buffer would be an approximate 9.1 percent increase in the total acreage of the SNWR. The additional lands would have a positive, net beneficial effect on wetlands and water quality as well as fish and wildlife habitat values within the SNWR and the surrounding area. Given the protective measures that would be afforded the 2,683 acres and the existing land use associated with the adjacent 29,175 acres (i.e. acreage associated with SNWR), this compensatory mitigation project would provide a substantial buffer for a very fragile, intact ecosystem. In the foreseeable future, this mitigation plan would also prevent any additional degradation of waters that comprise the SNWR and provide lasting protection to ecosystems that serve as habitat for several Threatened and Endangered species.

- Issues concerning development trends in the area of the mitigation sites were reported in previous sections of this analysis. Likewise, the local and regional goals for the restoration or protection of particular habitat types or functions have already been discussed. Finally, the 2,683 acres of wetland preservation that is being provided as compensatory mitigation is adjacent to arguably the most valuable, contiguous 29,175 acres of aquatic resources in the Lower Savannah River Watershed.

- 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". As defined in the plan, *"the proposed acquisition would protect a biologically diverse complex of wetlands with high ecological values for numerous plants and animals."* and *"project lands acquired as part of the refuge would be managed in a manner that would protect and enhance the fish and wildlife habitat values they provide."* By acquiring lands adjacent to the SNWR, and thereby expanding the Refuge, a primary initiative of the National Wildlife Refuge System Improvement Act of 1997 is also satisfied. It also satisfies major objectives of Georgia and South Carolina's Comprehensive Wildlife Conservation Strategies.

1.5 Evaluation of Permittee-Responsible Mitigation with Respect to Mitigation Type, Mitigation Amount, Mitigation Hierarchy and Preservation

When evaluating possible mitigation options, the USACE also reflected on the guidance identified as *(e) Mitigation Type, (f) Amount of Compensatory Mitigation, (g) Use of Mitigation Banks and In-Lieu Fee Programs,* and *(h) Preservation,* which is defined at 33 CFR 332.3 (e-h) of the Final Mitigation Rule. The following facts are presented in compliance with regulations e-h that were previously cited.

- The proposed preservation of 2,683 acres consists of bottomland hardwoods, maritime forest 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 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 2,683 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 337 acre freshwater to brackish marsh conversion (See previous sections).

- USACE conducted a watershed assessment in the Lower Savannah River Harbor to evaluate the mitigation opportunities that would compensate for the vegetative conversion of 337 acres of freshwater wetland. The District conducted this watershed assessment in conjunction with the results of the functional assessment that concluded the only element of wetland function that would be impacted as a result of the conversion was fish and wildlife habitat. USACE has again reviewed the listing of approved mitigation banks in the Lower Savannah River Watershed. As of this response date, there are no mitigation banks established with tidal, freshwater wetland characteristics. Additionally, the In-Lieu Fee program has not been updated or approved by the USACE and Interagency Review Team (IRT) to provide compensation at this time. The USACE also looked for opportunities to provide "In Basin" restoration and/or enhancement of tidal, freshwater wetlands. However, no sites where identified in a 10-year period of time. The USACE also considered the creation of freshwater, tidal wetlands. The USFWS determined that wetland creation which would be derived from upland areas has a very high risk of failure. Ultimately, the USACE determined that the creation of freshwater, tidal wetlands was not a viable option, and for the duration of the project, a created freshwater system would not be sustainable.

- The Corps assembled and used 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 wetlands residing within the SNWR. The Service recommended preservation of lands as a possible solution and recommended sites that are part of their long term lands 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. No restoration or enhancement sites (including tidal freshwater marsh or bottomland hardwood) were identified. Over the 10-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 USACE proceeded with the identification of preservation sites.

- In compliance with 33 CFR 332.3 (f)(1), the Savannah District Regulatory SOP was used as a tool to determine an acceptable amount of preservation acreage required to offset the vegetative conversion of wetlands. The approach for use of the SOP was approved by the ATR and other agency representatives. In summer 2003, the Corps assembled a Wetland Interagency Coordination Team (ICT) to assist in its analysis of potential wetland impacts from the SHEP. The team consisted of agency wetland experts from USEPA, USFWS, NMFS, GA DNR, SC DNR, and SC DHEC. The agencies identified an acceptable technical approach to determine wetland impacts. They also identified the information needs they would have when they reviewed the DEIS. Since creation of the team, the USACE hosted 7 meetings of the ICT. The Corps conducted an Agency Technical Review (ATR) to assess the use of Savannah District's Regulatory 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 and was performed by Corps experts in the Engineering Research and Development Center in Vicksburg, MS. The ATR was to determine if the SOP was an appropriate method to determine the preservation acreage needed to compensate for impacts resulting from the SHEP. The ATR was also conducted to comment on the reasonableness of the assumptions and calculations that Savannah District used in applying the SOP for the SHEP. The SOP was used only to determine the amount of preservation acreage necessary to offset the remaining acreage impacted 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 associated mitigation that would be required. 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 2,683 acres of land adjacent to the SNWR for the 48-foot alternative. The Service provided updates to the SOP calculations in Appendix A of the report. The USACE concurred with use of the updated SOP worksheets and adopted the results of those calculations for use in the DEIS. The USFWS provided a Final Fish and Wildlife Coordination Act Report in March 2011. That report reiterated the approval of the USFWS, SC DNR and GA DNR in the use of the SOP and its specific application to the proposed harbor deepening alternatives. In its Adaptive Management Program, the USACE also proposed acquisition of up to an additional five percent of wetlands if monitoring demonstrates that wetland impacts are under predicted.

- 33 CFR 332.3 (h) (1) (i-v) of the 2008 Mitigation Rule 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 the Corps' analysis and coordination with the natural resource agencies that participated in the Wetland ICT, the USACE has (i) concluded that the preserved lands 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 will 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 will be protected with a significant area of land that will function as a buffer in perpetuity. The preservation tracts will 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 2,683 acres is appropriate and practicable; and (iv) the USACE and other entities anticipate 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 USACE 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 2,683 acres ensures aquatic resources on the associated properties will be protected in perpetuity. The preserved land will 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. By way of example, a Public Notice published by the Charleston District, Corps of Engineers on September 28, 2009, requests comment on a proposal from a private landowner to divert tidal water flow onto an approximately 693-acre property to increase the hydrology on 485 acres of previously-existing rice impoundment. The 693-acre property, which would be used as a mitigation bank, presently provides benefits to migratory waterfowl during migratory stops similar to those provided by Refuge lands. Conversion of such acreage to saltmarsh could shorten their stay in the area and result in the birds that the Refuge serves resuming their migration with less rest. The expected effects of the proposed Regulatory action on the SNWR have not been quantified at this time, but the proposed project is an example of the continued threat that manipulation of adjacent lands pose to the SNWR and the resources it protects. Acquisition and preservation of the proposed 2,683 acres as mitigation for the SHEP project would provide additional buffer and protection from these type of activities as well; and (v) preservation of the 2,683 acres will include a restrictive covenant and the recording of a conservation easement with conveyance of the

property to the USFWS. Collectively, the information provided in this response justifies the preservation of 2,683 acres adjacent to the SNWR as satisfying the mitigation requirements for the conversion of freshwater and saltmarsh wetlands.

- 33 CFR 332.3(h) of the 2008 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 approach described in paragraph (c) of this section, but compensation ratios shall be higher*." The USACE has provided a watershed approach that was used to evaluate the selection and acceptability of the proposed preservation mitigation. The District's watershed assessment concluded that preservation of 2,683 acres of bottomland hardwood and upland adjacent to the SNWR was a high priority mitigation alternative for the Lower Savannah River watershed. Furthermore, the functional assessment of the impacts to tidal, freshwater wetlands and the benefits of the proposed mitigation sites concluded that the acreage proposed for preservation was an appropriate compensation ratio. Additional information on the appropriateness of USACE's compensation ratios maybe found in subsequent bullets.

- EPA's 2001 Region 4 Compensatory Mitigation Policy provides examples of preservation projects that were used to offset impacts to aquatic resources. USEPA describes these examples as, *"preservation projects that have accomplished the goals of the Clean Water Act while meeting the specific goal of the management agencies that accepted or will accept the preserved wetlands."* A project known as Walker Ranch in Osceola and Polk Counties, Florida, is included as an example project. In brief, Walker Ranch (8,500 acres) was purchased and preserved by the Disney Development Company as mitigation for filling approximately 600 acres of wetlands (Stutzman, 1992). The Orlando Sentinel newspaper reported this action as the "one of the largest wetlands losses ever requested in Florida at one time" (Regan, 1991). Although the mitigation-to-impacts ratio is 14:1, the preservation mitigation was provided in exchange for the irretrievable *and complete loss* of 600 acres of swamp and pristine wetland. All elements of wetland function were lost as a result of filling and/or draining of those 600 acres.

- Preservation of 2,683 acres (consisting of bottom land hardwoods and upland buffer) is more than sufficient to offset any conversion in freshwater wetland vegetation that might occur. Considering the vegetative conversion that is expected, the mitigation-to-impacts ratio of roughly 8:1, which is consistent with ratios recommended in the 2001 EPA Region 4 Compensatory Mitigation Policy concerning wetland preservation. Using the DF analysis reported by Latham et al (1994) which aligned 37% of freshwater species with oligohaline sites, the 337 acres of freshwater to brackish marsh conversion is reduced further such that the mitigation-to-impacts ratio is increased to 12:1. It is important to reiterate that the SHEP impact would be a shift in vegetation, and that these wetlands would still provide the ecological functions associated with emergent wetland systems. This is significantly different from other example projects identified in EPA

Region 4 Mitigation Policy where preservation was used for the irretrievable *and complete loss* of wetlands.

- The USACE has used a watershed approach when identifying and establishing the 2,683 acres of preservation as mitigation for the 337 acres of freshwater marsh conversion to brackish marsh. Using a watershed approach, these areas of preservation have been identified as high priority mitigation (33 CFR 332.3(h)(2)). As such, the USACE has determined that acquisition of these lands shall satisfy the complete mitigation requirement in conjunction with the establishment of the resulting brackish marsh system. The information provided in the previous bullet illustrates that the mitigation preservation ratio would be 12:1. Given the impact to tidal freshwater marsh would result in a vegetative conversion with minor impacts to fish and wildlife habitat, the mitigation ration is satisfactory and also compliant with EPA Region 4's Mitigation Policy.

1.6 Evaluation of Permittee-Responsible Mitigation and Responsible Parties

The Final Mitigation Rule also provides the following guidance at 33 CFR 332.3(l)(1) *Party responsible for compensatory mitigation. "For permittee-responsible mitigation, the special conditions of the DA permit must clearly indicate the party or parties responsible for the implementation, performance, and longterm management of the compensatory mitigation project."* To mitigate for the vegetative conversion of 337 acres of tidal freshwater wetland, the Corps proposes to acquire 2,683 acres of land identified in the SNWR's Comprehensive Conservation Plan. Once acquired, the land would be provided to the USFWS to manage as additions to the SNWR. As part of the SNWR, the lands would be subject to the same protections and use requirements as defined in National Wildlife Refuge System Improvement Act of 1997 (Improvement Act). As defined in the SNWR's Comprehensive Conservation Plan,

"*All programs and uses must be evaluated based on mandates set forth in the Improvement Act. Those mandates are to:*

- *Contribute to ecosystem goals, as well as refuge purposes and goals;*
- *Conserve, manage, and restore fish, wildlife, and plant resources and their habitats;*
- *Monitor the trends of fish, wildlife, and plants;*
- *Manage and ensure appropriate visitor uses as those uses benefit the conservation of fish and wildlife resources and contribute to the enjoyment of the public; and*
- *Ensure that visitor activities are compatible with refuge purposes.*

The Improvement Act further identifies six priority wildlife-dependent recreational uses. These uses are: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. As priority public uses of the Refuge System, they receive priority consideration over other public uses in planning and management.

The Improvement Act directs the Service to ensure that the biological integrity, diversity, and environmental health of the Refuge System are maintained for the benefit of present and future generations of Americans. The policy is an additional directive for refuge managers to follow while achieving refuge purpose(s) and the Refuge System mission. It provides for the consideration and protection of the broad spectrum of fish, wildlife, and habitat resources found

on refuges and associated ecosystems. When evaluating the appropriate management direction for refuges, refuge managers will use sound professional judgment to determine their refuges' contribution to biological integrity, diversity, and environmental health at multiple landscape scales. Sound professional judgment incorporates field experience, knowledge of refuge resources, refuge role within an ecosystem, applicable laws, and best available science, including consultation with others both inside and outside the Service."

The Refuge has the authority to accept these lands, since the lands are already included in the Refuge's approved Acquisition Plan. The USFWS would manage these properties using funds obtained through the Department of Interior's normal budget process. Based on the information provided, the USACE has determined that the protective measures that would be afforded by the USFWS for the 2,683 acres of bottomland hardwoods and upland adequately satisfy the requirement of identifying the responsible party and defining implementation, performance and long-term management of the compensatory mitigation project.

1.7 Evaluation of Permittee-Responsible Mitigation and Timing

The Final Mitigation Rule provides the following guidance at 33 CFR 332.3(m) *Timing which states, "Implementation of the compensatory mitigation project shall be, to the maximum extent practicable, in advance of or concurrent with the activity causing the authorized impacts. The district engineer shall require, to the extent appropriate and practicable, additional compensatory mitigation to offset temporal losses of aquatic functions that will result from the permitted activity."* As illustrated in Section VIII titled, "Timing of Construction" of Appendix C- Mitigation Planning, all of the properties comprising the 2,683 acres of preservation mitigation would be acquired during the harbor deepening. Thus, the required mitigation would be provided prior to or concurrent with the activity that results in the conversion of wetland.

1.8 Evaluation of Permittee-Responsible Mitigation and Financial Assurances

The Final Mitigation Rule provides the following guidance at 33 CFR 332.3(n) *Financial Assurances, "The district engineer shall require sufficient financial assurances to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with applicable performance standards. In cases where an alternate mechanisms available to ensure a high level of confidence that the compensatory mitigation will be provided and maintained (e.g., a formal, documented commitment from a government agency or public authority) the district engineer may determine that financial assurances are not necessary for that compensatory mitigation project."*

The 2008 Final Mitigation Rule is now commonly applied in the USACE's Regulatory Program. The Rule was used as the principal document for updating the USACE's mitigation banking program in the State of Georgia. Both commercial and county- managed mitigation banks exist within the state. Financial assurances are required for commercial, private-based mitigation banks where the responsible party (i.e., banker) could abandon a mitigation bank before it achieves success.

However, the Georgia IRT has not required county-owned mitigation banks, which use bank credits exclusively for the purpose of mitigating public projects (i.e., road improvement, utility lines, etc.) to provide financial assurances. Similarly, the Georgia Department of Transportation (state agency) is not required to provide financial assurances for its mitigation banks. The reason for this difference in policy is based on 33 CFR 332.3 (n)(1) of the Final Mitigation Rule and the fact that government entities are neither transient nor fleeting.

Like the Georgia Department of Transportation, the Federal government is neither transient nor fleeting, so requiring financial assurances for successfully completing and maintaining the proposed mitigation is not warranted.

The need for Financial Assurances, as defined in the 2008 Final Mitigation Rule, and its application toward civil works projects like the SHEP is not justified. Regulation 33 CFR 332.3 (n)(1) of the 2008 Final Mitigation Rule states *"In cases where an alternate mechanism is available to ensure a high level of confidence that the compensatory mitigation will be provided and maintained (e.g., a formal, documented commitment from a government agency or public authority) the district engineer may determine that financial assurances are not necessary for that compensatory mitigation project."* The SHEP is a civil works project that will receive funding from Congress and the State of Georgia (through the Georgia Department of Transportation). The mitigation will be implemented prior to or concurrent with the construction that causes the adverse impacts. Congress would provide funds over a period of years to work on the project. No distinction will be made in those funds between construction and mitigation funds. The Corps treats mitigation as an integral component of the total project, so it would implement the mitigation at the same time as it does the other physical constriction. The EIS contains a figure that shows the timing that Savannah District expects to perform the dredging and the mitigation. Maintenance of the mitigation would be a responsibility of the Federal Government. The USFWS would maintain the lands that are added to the Refuge. Savannah District would maintain the other mitigation features. The Corps places its highest budget priority on performance of required mitigation so that its civil works projects remain in compliance with their NEPA commitments and clearances.

1.10 Evaluation of Permittee-Responsible Mitigation and Ecological Performance Standards

The Final Mitigation Rule provides the following guidance at 33 CFR 332.5(a) *Ecological Performance Standards, "The approved mitigation plan must contain performance standards that will be used to assess whether the project is achieving its objectives. Performance standards should relate to the objectives of the compensatory mitigation project, so that the project can be objectively evaluated to determine if it is developing into the desired resource type, providing the expected functions, and attaining any other applicable metrics (e.g., acres)."* The project's secondary impacts to tidal freshwater and saltmarsh would be mitigated through the preservation of 2,683 acres of bottomland hardwood wetland and upland adjacent to the SNWR. As such, there would be no need to establish ecological performance standards for the preservation mitigation sites.

1.11 Evaluation of Permittee-Responsible Mitigation and Monitoring

The Final Mitigation Rule provides the following guidance at 33 CFR 332.6(a)(1) *Monitoring, "Monitoring the compensatory mitigation project site is necessary to determine if the project is meeting its performance standards, and to determine if measures are necessary to ensure that the compensatory mitigation project is accomplishing its objectives. The submission of monitoring reports to assess the development and condition of the compensatory mitigation project is required, but the content and level of detail for those monitoring reports must be commensurate with the scale and scope of the compensatory mitigation project, as well as the compensatory mitigation project type. The mitigation plan must address the monitoring requirements for the compensatory mitigation project, including the parameters to be monitored, the length of the monitoring period, the party responsible for conducting the monitoring, the frequency for submitting monitoring reports to the district engineer, and the party responsible for submitting those monitoring reports to the district engineer."* The project's secondary impacts to tidal freshwater marsh and saltmarsh will be mitigated through the preservation of 2,683 acres of bottomland hardwood wetland and upland adjacent to the SNWR. As such, there would be no need to establish monitoring protocols for the mitigation preservation sites. However, the unique nature of the impact (i.e., vegetative conversion) does warrant monitoring to ascertain the magnitude of marsh conversion that does occur. To that end, the USACE has developed a monitoring plan (Please see Appendix D of the EIS for specifics). Figure 65 illustrates the existing 0.5 ppt salinity contour within the harbor (blue line). The pink line indicates the 0.5 ppt salinity contour with the 48-ft deepening and implementation of Flow Diversion Plan 6A (Please see Appendix C-Mitigation Plan for a full description of the proposed impacts and the associated mitigation plan).

In brief, the USACE will establish 12 monitoring sites in these transitional areas that are predicted to most likely experience a vegetative shift as a result of the SHEP (Figure 65). Seven of those sites have already been established and have been monitored in a 2000/2001 characterization by the USGS Florida Fish and Wildlife Cooperative Research Unit. The five new monitoring locations (two triangles represent most recent additions) were chosen to expand monitoring in highly sensitive marshes, in other areas of marsh where significant salinity changes are possible under a variety of scenarios, and to monitor community shifts both vertically (up and down river) and laterally (interior vs. exterior). One of the upriver sites and downriver sites would be used as a freshwater marsh and brackish marsh reference site, respectively. These data, coupled with the modeling results, would be used to quantifying indirect impacts to freshwater and saltmarsh. These areas will again be studied for 1 year as part of the pre-construction phase of the project. Monitoring of marsh vegetation will also occur during the 3-6 year period of construction and for an additional 7-year post-construction period. For this period of time (i.e., pre-, post-, and construction phases of the project) the marsh sites will be characterized with respect to vegetation composition and compared to the reference marsh site. Tidal sample stations installed at these marsh sites would also record water surface elevation, specific conductance of surface waters that flood the marsh, specific conductance of waters in the root zone, and water depth every 30 minutes. Measurement of specific conductance would allow one to calculate the salinity values. The recorded data would be downloaded monthly. The marsh transects would be sampled twice annually (June and October), following sampling protocols described in Kitchens (2003) and generally those

performed when the USGS monitored in 2000/2001. The project would fund the USGS Florida Fish and Wildlife Cooperative Research Unit (or a similarly qualified organization) to perform this work. The USGS Cooperative Research Unit would prepare and provide annual reports of their findings to the Interagency Coordination Team (ICT) for review. In turn, the ICT would

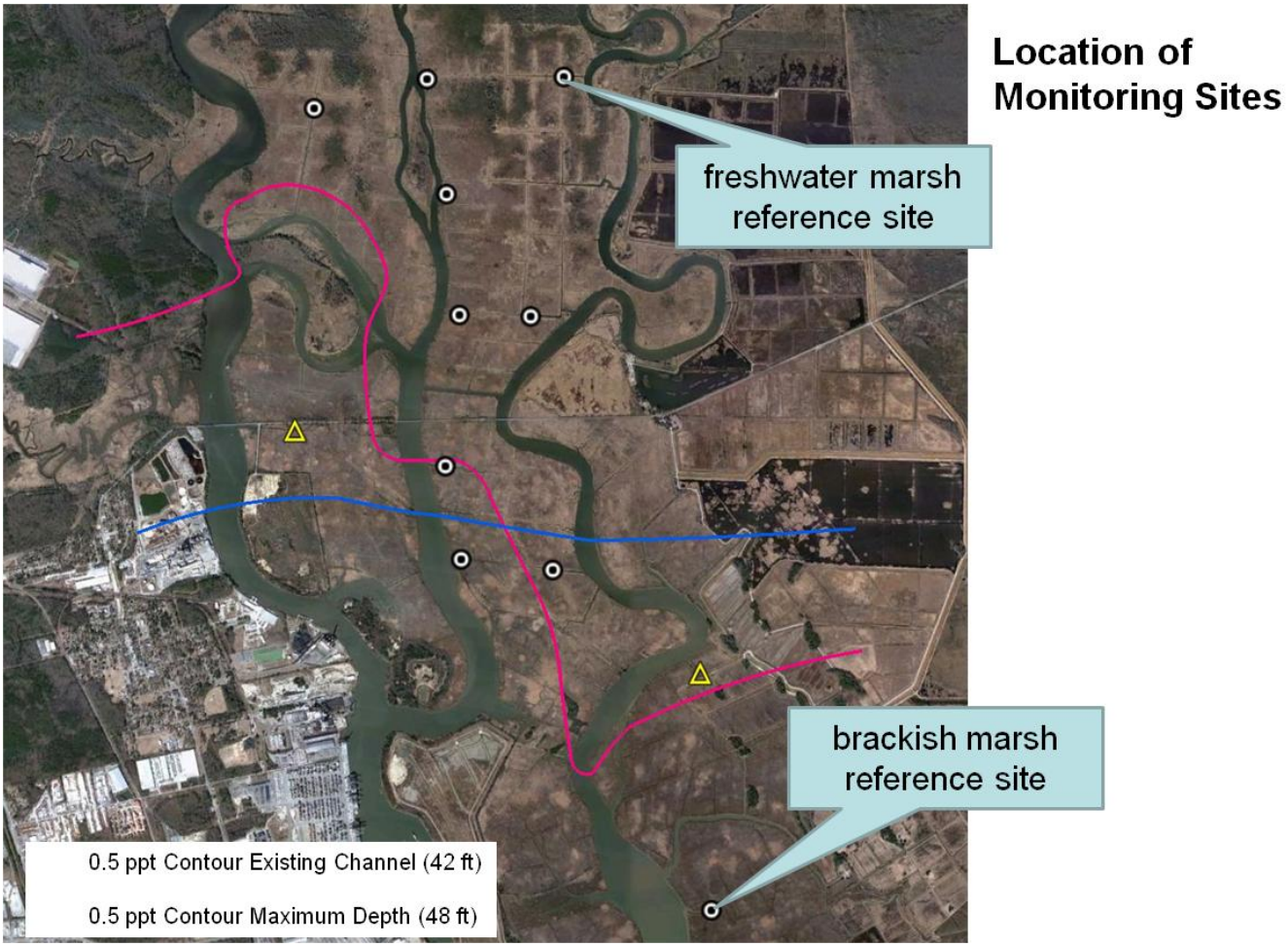


Figure 65

meet on an annual basis to discuss the result of those findings. The USACE believes this level of monitoring is acceptable and commensurate with the scale and scope of the anticipated impact.

1.12 Evaluation of Permittee-Responsible Mitigation and Site Protection

The Final Mitigation Rule provides the following guidance at 33 CFR 332.7(a)(1) *Site Protection:"The aquatic habitats, riparian areas, buffers, and uplands that comprise the overall compensatory mitigation project must be provided long-term protection through real estate instruments or other available mechanisms, as appropriate. Long-term protection may be provided through real estate instruments such as conservation easements held by entities such as federal, tribal, state, or local resource agencies, non-profit conservation organizations, or private land managers; the transfer of title to such entities; or by restrictive covenants. For*

government property, long-term protection may be provided through federal facility management plans or integrated natural resources management plans." To mitigate for the vegetative conversion of tidal wetlands, the Corps proposes to acquire 2,683 acres of land identified as ecologically valuable in the SNWR's Comprehensive Conservation Plan. Once acquired, the land would be provided to the USFWS to manage as additions to the SNWR. As part of the SNWR, the lands would be subject to the same protections and use requirements as defined in National Wildlife Refuge System Improvement Act of 1997 (Improvement Act).

1.13 Evaluation of Permittee-Responsible Mitigation and Sustainability

The Final Mitigation Rule provides the following guidance at 33 CFR 332.7(b)(1) *Sustainability "Compensatory mitigation projects shall be designed, to the maximum extent practicable, to be self-sustaining once performance standards have been achieved."* The conversion of tidal wetlands will be mitigated through the preservation of 2,683 acres of bottomland hardwood wetland and upland adjacent to the SNWR. Once acquired by the USACE, the land would be provided to the USFWS to manage as additions to the SNWR. As part of the SNWR, the lands would be subject to the same protections and use requirements as defined in National Wildlife Refuge System Improvement Act of 1997 (Improvement Act). The USACE has determined that integration of these preserved lands into the SNWR is a self-sustaining form of mitigation.

1.14 Evaluation of Permittee-Responsible Mitigation and Adaptive Management

The Final Mitigation Rule provides the following guidance at 33 CFR 332.7(c)(2-3) *Adaptive Management "If monitoring or other information indicates that the compensatory mitigation project is not progressing towards meeting its performance standards as anticipated, the responsible party must notify the district engineer as soon as possible. The district engineer will evaluate and pursue measures to address deficiencies in the compensatory mitigation project. The district engineer will consider whether the compensatory mitigation project is comparable to the original objectives of the compensatory mitigation project. (3) The district engineer, in consultation with the responsible party (and other federal, tribal, state, and local agencies, as appropriate), will determine the appropriate measures. The measures may include site modifications, design changes, revisions to maintenance requirements, and revised monitoring requirements. The measures must be designed to ensure that the modified compensatory mitigation project provides aquatic resource functions comparable to those described in the mitigation plan objectives."* The conversion of tidal wetlands will be mitigated through the preservation of 2,683 acres of bottomland hardwood wetland and upland adjacent to the SNWR. As such, there would be no concern with performance standards and/or deficiencies on the actual preservation mitigation sites. However, the unique nature of the project impacts (i.e., vegetative conversion) does warrant an adaptive management plan should *in situ* monitoring of the impact site conclude additional tidal, freshwater acreage has converted to brackish marsh.

It is important to note that the FEIS describes the rationale behind selection of the EFDC model in Section 5.1.2.1 of the FEIS (Pages 5-8-5-13). In brief, a comparison of models illustrated that wetland impacts identified by using the EFDC hydrodynamic model are higher (i.e., greater quantity) than those identified by the Marsh Succession Model at all proposed project depths.

This indicates that the Corps' use of the EFDC-derived impacts is a more inclusive and conservative estimate of the impacts that could occur. That is, the EFDC model is more likely to capture more impacts than other models that are presently available.

Also, the salinity value that USACE used to define a 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, will 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, they would still 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 USACE has also adopted a seven year, post-construction monitoring plan to evaluate and quantify the degree of wetland conversion that occurs. In its Adaptive Management Program, the USACE also proposed acquisition preservation of up to an additional five percent of wetlands if monitoring demonstrates that wetland impacts are under predicted. The USACE is satisfied that the proposed Adaptive Management plan is sufficient at this time. If monitoring results indicate additional mitigation is required, then the USACE shall coordinate with the ICT to develop an appropriate course of action.

1.15 Evaluation of Permittee-Responsible Mitigation and Long-Term Management

The Final Mitigation Rule provides the following guidance at 33 CFR 332.7(d)(1), *Long-term management, "The permit conditions or instrument must identify the party responsible for ownership and all long-term management of the compensatory mitigation project. The permit conditions or instrument may contain provisions allowing the permittee or sponsor to transfer the long-term management responsibilities of the compensatory mitigation project site to a land stewardship entity, such as a public agency, non-governmental organization, or private land manager, after review and approval by the district engineer. The land stewardship entity need not be identified in the original permit or instrument, as long as the future transfer of long-term management responsibility is approved by the district engineer."* To mitigate for the vegetative conversion of tidal wetlands, the Corps proposes to acquire 2,683 acres of land identified in the SNWR's Comprehensive Conservation Plan as being ecologically valuable. Once acquired, the land would be provided to the USFWS to manage as additions to the SNWR. As part of the SNWR, the lands would be subject to the same protections and use requirements as defined in National Wildlife Refuge System Improvement Act of 1997 (Improvement Act). Thus, the USACE has concluded that no additional long-term management requirements are necessary for the preserved land.

2.0 Identification and Justification of Wetland Mitigation for Direct Impacts

As defined in the Functional Assessment section of this analysis, deepening the harbor to a 48-foot depth would result in direct impacts (i.e., excavation) to 15.68 acres of brackish marsh. It should be noted that these impacts would result after all possible avoidance and minimization measures have been used. In brief, these marsh areas are subject to periodic flooding as a result of daily tides and the vegetative communities in these areas generally consist of one plant species, which is a smooth coordgrass known as *Spartina alterniflora*. Approximately 7.3 acres (47%) of the total saltmarsh acreage that would be excavated is subject to the wave action of passing ships and the resulting perturbation. Thus, these areas exhibit vegetation densities which are significantly less than what is typically observed in a pristine marsh. 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, brackish marsh systems located throughout coastal Georgia. Figure 66 illustrates the location and acreage of brackish marsh that will be excavated as a result of the SHEP.

With respect to the Lower Savannah River Watershed, data obtained from the University of Georgia's Natural Resources Spatial Analysis Lab (NARSAL) reports that approximately 2,235 acres of non-forested wetland (salt) or saltmarsh was present in the Lower Savannah River Watershed. Based on the 2005 estimate, excavation of 15.68 acres of saltmarsh in the watershed would result in the loss of approximately 0.7% in saltmarsh acreage. However, the following sections of this analysis illustrate how the proposed mitigation will result in no net loss of saltmarsh as a result of the direct impacts.

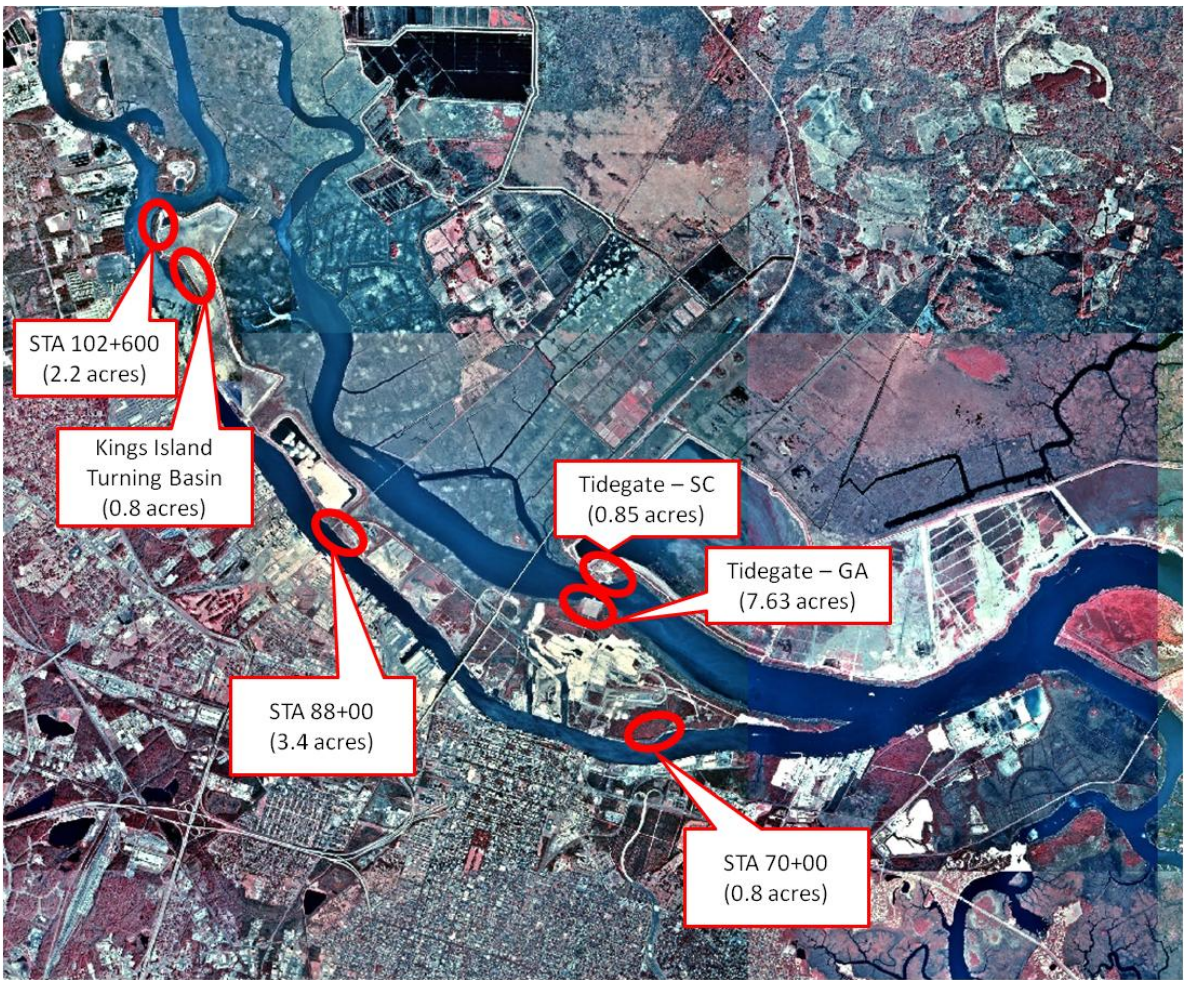


Figure 66. Location of direct impacts to brackish marsh within the Savannah Harbor

2.1 Evaluation of Mitigation Bank Credits

The USACE evaluated the Regional Internet Banking Information and Tracking System (RIBITS) for potential mitigation banks that possess saltmarsh mitigation credits within the Lower Savannah River Watershed. As of March 2011, no commercial saltmarsh mitigation banks were authorized within the Lower Savannah River Watershed. Other coastal watersheds immediately adjacent to the Lower Savannah were also evaluated. Again, no saltmarsh mitigation banks are currently authorized in the Ogeechee-Coastal Watershed (HUC 03060204) or the Broad-St Helena Watershed (HUC 03050208). The Savannah District, Regulatory Division is currently tracking three pending saltmarsh banks, and the Charleston District is currently tracking one (Please see following table). Thus, at this time mitigation banks with "in kind" saltmarsh mitigation do not exist within the Lower Savannah Watershed or adjacent watersheds.

Pending Saltmarsh Mitigation Banks

Bank Name	Watershed	Acreage of Bank*	Status	District
Salt Creek	Ogeechee-Coastal	98.9	Pending	Savannah
Tronox	Lower Savannah	88	Pending	Savannah
Vallambrosa	Ogeechee-Coastal	1,513	Pending	Savannah
Clydesdale Club	Lower Savannah	693	Pending	Charleston

* Acreage reflects total size of bank and may include additional habitat other than saltmarsh.

2.2 Evaluation of In Lieu Fee Program Credits

As of March 2011, the In-Lieu Fee Program in the State of Georgia has not been approved by the USACE and Regulatory Interagency Review Team (IRT) to provide compensatory mitigation credits that would offset impacts to aquatic resources. At this time, the USACE, Regulatory Division is working with interested parties and the Georgia Land Trust Service Center to update the program.

2.3 Evaluation of Permitee-Responsible Mitigation under a Watershed Approach

As identified in Section 2.1 of this analysis, there are presently no salt marsh mitigation banks that could compensate for the loss of 15.68 acres of brackish marsh that will be directly impacted as a result of widening three bends in the channel, enlarging the Kings Island Turning Basin, and removing the Tidegate. Likewise, the In-lieu fee program is not presently structured to provide the necessary mitigation for the previously identified direct impacts to brackish marsh. The Georgia DNR Environmental Protection Division (Ga DNR-EPD) developed the 2001 Savannah River Basin Management Plan, *"to provide relevant information on the Savannah River basin characteristics, describe the status of water quality and quantity in the Savannah River basin, identify present and future water resource demands, present and facilitate the implementation of water protection efforts, and enhance stakeholder understanding and involvement in basin planning."* Per guidance provided at 33 CFR 332.3(c)(1) of the Final Mitigation Rule, "*Where a watershed plan is available, the district engineer will determine whether the plan is appropriate for use in the watershed approach for compensatory mitigation."* A detailed assessment of Ga DNR-EPD's 2001 Management Plan is provided in Section D 1.3. As with the previous analysis of this plan, two long-term priorities "(1) *Preserving habitat suitable for the support of healthy aquatic and riparian ecosystems, and (2) Protecting water quality in lakes, rivers, streams, estuaries and coastal waters through attainment of water quality standards and support for designated uses,"* are of interest with respect to providing suitable mitigation for the 15.68 acres of unavoidable impacts to brackish marsh.

Presently, almost 50% of the brackish marsh acreage that will be excavated is subject to the wave action of passing ships and the resulting perturbation. These areas exhibit vegetation densities which are significantly less than what is typically observed in a pristine marsh. 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 throughout coastal Georgia. Obviously, it will be important that any of the identified mitigation options compensates for loss of excavated brackish marsh, but there is a strong likelihood that a watershed assessment for the Lower Savannah Watershed could identify "In kind/In basin" mitigation sites that actually allow for greater marsh productivity levels than the areas subject to direct impacts. Achieving this goal will support the two, long-term objectives of Ga DNR-EPD's 2001 Mitigation Plan that were previously stated.

When evaluating possible mitigation options, USACE also reflected on the guidance identified as *Considerations*, which is defined at 33 CFR 332.2(c)(2) i-v of the Final Mitigation Rule. With respect to the Lower Savannah River Watershed, the following facts were considered with respect to regulations i-v when developing a mitigation plan for the excavation of 15.68 acres of brackish marsh:

- The unavoidable excavation of 15.68 acres of brackish marsh will occur as a result of the harbor deepening project within the Lower Savannah Watershed (HUC 03060109). Excavation results in a complete loss of all wetland function (Please see following table). Therefore, the best method for replacing all of the lost functions (or suite of functions) and ensuring "no net loss of aquatic resources" is to restore (or reestablish) a suitable brackish marsh ecosystem.

Changes in Wetland Function as a Result of Brackish Marsh Excavation

Elements of Wetland Function	Effect of Excavation on Wetland Function (15.68 acres)
Water Purification	Major Adverse (lost)
Flood Protection	Major Adverse (lost)
Shoreline Stabilization	Major Adverse (lost)
Groundwater Recharge	Major Adverse (lost)
Streamflow Maintenance	Major Adverse (lost)
Retention of Particles	Major Adverse (lost)
Surface Water Storage	Major Adverse (lost)
Subsurface Storage	Major Adverse (lost)
Nutrient Cycling	Major Adverse (lost)
Values to Society	Major Adverse (lost)
Fish and Wildlife Habitat	Major Adverse (lost)

Major Effect – the effect on the resource is substantial, noticeable, and permanent. The action severely changes one or more characteristics of the resource.

Adverse: the action is contrary to the interest or welfare of the resource; a harmful or unfavorable result.

- Results of the previous USACE watershed assessment, which are reported in earlier sections of this analysis (Section D 1.3 through 1.4), have merit when considering opportunities and threats for the mitigation of brackish marsh in the Lower Savannah River Watershed. Those results included inventories of historic and existing aquatic resources, identification of degraded aquatic resources, and identification of immediate and long-term needs with the watershed.

- Current and future-anticipated salinity concentrations that are observed upstream of the most active, industrialized areas of the harbor will support long-term reestablishment of brackish marsh.

- Approximately 7.3 of the 15.68 acres of brackish marsh that will be excavated occur in the most active areas of the Savannah Harbor. These areas are prone to disturbances caused by passing vessels as well as the overall maintenance needs of the harbor. These areas exhibit vegetation densities which are significantly less than what is typically observed in a pristine marsh. 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 throughout coastal Georgia.

- Given the ongoing perturbation within the area of the harbor with greatest vessel traffic and associated support activities, the search for "in kind/in basin" mitigation in the Lower Savannah River Watershed has focused on areas that are removed from these stressors.

- The Savannah National Wildlife Refuge (SNWR) is a conservation area of national importance with habitats that are important to many unique plant and animal species, including threatened and endangered species. It is located in the vicinity of the SHEP project (i.e., "In basin").

When evaluating possible mitigation options for impacts to brackish marsh, USACE reflected on the guidance identified as *Information Needs*, which is defined at 33 CFR 332.3 (c)(3) i-iii of the Final Mitigation Rule. The following facts are presented in compliance with regulations i-iii that was previously cited.

- Information concerning watershed conditions and needs has already been provided in Section D 1.3 of this analysis.

- Development activities, current developments, the presence and needs of sensitive species have already been provided in Section D 1.3 – 1.4 of this analysis.

- Figure 61 illustrates the Savannah Harbor, the Federal Navigation Channel, and the upstream limits of the SHEP. The identification of an in kind/in basin mitigation site requires that the location be outside the primary "zone of influence" of large container vessels. This zone of influence would hinder success of a brackish marsh compensatory mitigation project. As indicated in previous sections, approximately 7.3 acres of brackish

marsh proposed for impact is subject to the wave action of passing ships and the resulting perturbation (Figure 67). Thus, avoiding areas of increased wave action and hydrodynamic intensity will promote long-term, sustainable mitigation. Additionally, Figure 67 illustrates the boundaries of the SNWR. The USACE has detailed all of the advantageous (location, size, habitat quality and connectivity, wildlife and aquatic resources diversity, protections, etc.) that make the SNWR a priority in terms of sustainable ecosystems within the Lower Savannah River Watershed (See Section D 1.3-1.4). Therefore, identifying a degraded site within the boundaries of the SNWR that could be restored would favor the long-term success, health and productivity of a brackish marsh mitigation project.

When evaluating possible mitigation options, USACE also satisfied criteria for evaluating mitigation options as reflected in the determination of a *Watershed Scale*, which is defined at 33 CFR 332.3 (c)(4). For purposes of our analysis, we established the Lower Savannah River Watershed as the appropriate scale to assess impacts and mitigation opportunities. The Lower Savannah River Watershed is also defined by the 8-digit Hydrologic Unit Code (HUC) 03060109. Characteristic of this watershed maybe found in previous sections of this analysis (Section D 1.3 – 1.4). The selection of this watershed scale is supported by the historical review of projects requiring USACE permits and the associated cumulative impacts analysis that considers past, present and reasonably foreseeable future impacts within the same 8-digit HUC. Additionally, most state and Federal resource agencies have used a watershed approach that has typically been scoped using an 8-digit hydrologic unit code (NRCS, 1997). Additionally, the identification of potential brackish marsh mitigation sites was further constrained by the availability of salinity concentrations necessary to support the function and integrity of such sites. Information presented in the C*onsiderations* and *Information Needs* sections was also important when evaluating brackish marsh mitigation options within the Lower Savannah River Watershed.

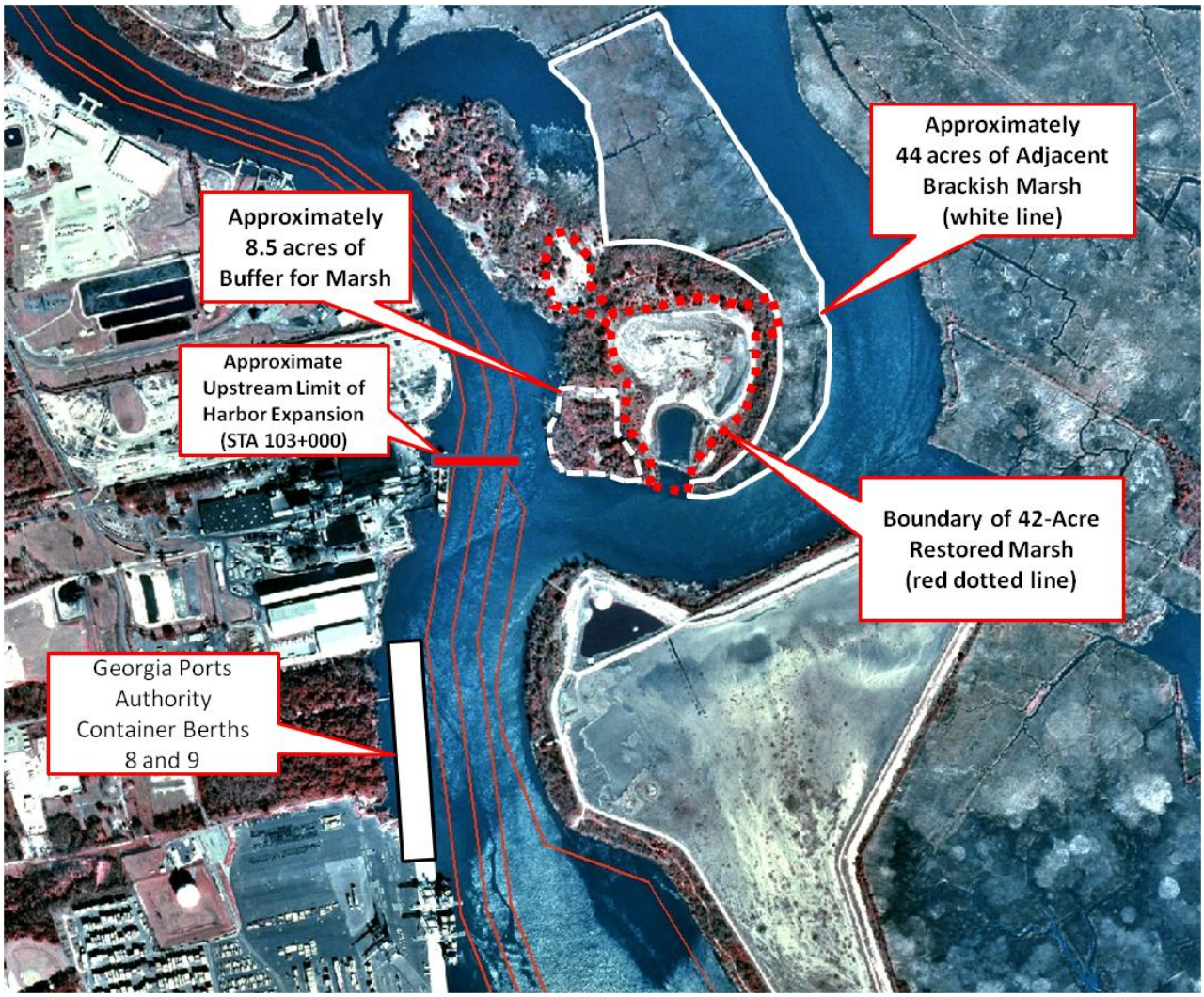


Figure 67. Location of Restored Brackish Marsh in Lower Savannah River Watershed

2.4 Evaluation of Site Selection for Permittee-Responsible Mitigation

When evaluating possible mitigation options, USACE also satisfied criteria for evaluating mitigation options as reflected in the determination of *Site Selection*, which is defined at 33 CFR 332.3 (d)(1-3) of the Final Mitigation Rule. The following facts are presented in compliance with regulations 1-3 that were previously cited.

- Figure 67 illustrates the proposed brackish marsh mitigation site. This site was operated as Disposal Area 1S that for many years to place dredged maintenance sediments from the upstream reaches of the Savannah Harbor.

- Disposal Area (DA) 1S was used for the disposal of maintenance sediments collected from approximately STA 110+000 to 100+000. Historical records indicate that the composition of the dredged sediment consisted of approximately 67% sand (#230 sieve), 14% silt, and 9% clay. The high percentage of sand reduces the potential that contaminants would reside in the legacy dredged sediments. (Note: Prior to the start of any restoration activity, the site would be sampled and evaluated for the possibility of contaminants located within sediments proposed for removal. Results of those tests would be shared with the Wetland Interagency Coordination Team).

- Prior to its use as a Disposal Area, the site existed as a brackish marsh and had continuity with other marsh located immediately adjacent and east of the site's footprint (Figure 61). This abutting marsh area is dominated by *Spartina alterniflora* with *Spartina cynosuroides* located in areas that are relatively higher in elevation and distance from the tidally influenced surface water.

- The vicinity of Disposal Area (DA) 1S is subject to the flood and ebb of the tide. The salinity in this reach of the harbor can vary between 7 and 15ppt. Following harbor deepening, the resulting salinity will still be capable of supporting a brackish marsh ecosystem at this site.

- DA 1S is located within the designated boundaries of the SNWR (Figure 67). As such, it is provided the same protections as other areas that comprise the Refuge. The 42-acre restored marsh would abut approximately 44 acres of existing brackish marsh that is also located in the SNWR. When completed, the continuity of the restored marsh, coupled with the 44 acres of abutting marsh, will result in an expanded and improved estuarine ecosystem. Thus, the proposed restoration will be compatible with adjacent land uses and the plans/goals of the SNWR as defined in their Comprehensive Conservation Plan.

- The proposed mitigation site is north of the Federal Navigation Channel. The design includes retention of protective high ground and trees along the east side of the restored marsh. Retention of the berm feature with protective trees would result in a site that is outside the primary "zone of influence" of large container vessels, thereby avoiding areas of increased wave action and hydrodynamic intensity within the harbor. This berm feature would provide additional protection for the graded marsh area during the plant recruitment phase and growth of juvenile plant *Spartina* plants.

2.5 Evaluation of Permittee-Responsible Mitigation with Respect to Mitigation Type and Amount

When evaluating possible mitigation options, USACE also satisfied criteria for evaluating mitigation options as reflected in the determination of *Mitigation Type* and *Amount of Compensatory Mitigation*, which is defined at 33 CFR 332.3 (e-f) of the Final Mitigation Rule. The following facts are presented in compliance with regulations e-f that were previously cited.

- 33 CFR 332.3 (e)(1) states the following, *"In general, in kind mitigation is preferable to out-of kind mitigation because it is most likely to compensate for the functions and services lost at the impact site. For example, tidal wetland compensatory mitigation projects are most likely to compensate for unavoidable impacts to tidal wetlands, while perennial stream compensatory mitigation projects are most likely to compensate for unavoidable impacts to perennial streams. Thus, except as provided in paragraph (e)(2) of this section, the required compensatory mitigation shall be of a similar type to the affected aquatic resource."* The proposed restoration of 42-acres of brackish marsh would be considered "in kind" mitigation. Furthermore, the location of the mitigation site is within the Lower Savannah River Watershed. For the reasons previously identified in other sections of this evaluation, the restoration of the Disposal Site 1S site would also constitute "in basin" mitigation as well.

- 33 CFR 332.3 (f)(1) states the following, "*If the district engineer determines that compensatory mitigation is necessary to offset unavoidable impacts to aquatic resources, the amount of required compensatory mitigation must be, to the extent practicable, sufficient to replace lost aquatic resource functions. In cases where appropriate functional or condition assessment methods or other suitable metrics are available, these methods should be used where practicable to determine how much compensatory mitigation is required. If a functional or condition assessment or other suitable metric is not used, a minimum one-to-one acreage or linear foot compensation ratio must be used."* The USACE used the 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 Savannah District 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, which authorize impacts and or loss of saltmarsh. Data obtained from the Savannah District Regulatory Division identified 5 projects in Chatham County (which is located in the Lower Savannah Watershed), where saltmarsh was impacted, and the creation of saltmarsh was approved as mitigation typically on a ratio of 2 acres created to 1 acre impacted ratio (or less) (Please see the following table).

Projects impacting Saltmarsh and the Associated Brackish March Mitigation

Project Name	USACE File Number	Brackish Marsh Impacts (Acres)	Brackish Marsh 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 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 as other authorized projects that impacted brackish marsh. Savannah District used the SOP, ensuring that the amount of proposed mitigation would be appropriate given the area of marsh impact and the currently associated function/integrity. The natural resource agencies approved of the District's SOP calculations in the Fish and Wildlife Coordination Act Report. In support of site-specific mitigation, it is important to note that the 42 acres of contiguous, restored saltmarsh, which includes development of tidal creeks, will have more ecological value than 47% of marsh proposed for impact (i.e., 7.3 acres of marsh proposed for impact is degraded, poorly functioning saltmarsh along the navigation channel). Furthermore, the proposed mitigation site is north of the Federal Navigation Channel that would be operated at the 48-foot depth. Thus, the large, non-segmented size of the mitigation area, coupled with its "in basin" location and incorporation of a strip of trees to separate the restoration site from the harbor, makes it an ideal mitigation option for replacing the brackish marsh acreage that would be impacted.

The Savannah District SOP has been used, and will continue to be used, to evaluate Regulatory Division permit applications with wetland impacts that are greater than 10 acres. The USACE can document 15 permitted projects in the last 5 years with authorized wetland impacts greater than 10 acres (Please see following table).

Projects with Impacts Greater than 10 acres that Used SOP Calculations to Determine Mitigation Requirements.

Project Name	USACE File Number	Wetland Impacts (Acres)
Northport/Oak Grove Plantation	200414950	33.2
Broadhurst Landfill	200501435	96.55
GDOT US441 / SR 89	200600828	64.04
Houston American Cement	200700577	21.21
Newton Tract	200701309	31.86
Robins Air Force Base	200701096	19.5
Fort Benning 69741	200900567	15.94
Fort Benning 69668	200900568	12.33
The Carter Group	200801428	11.3
GDOT I-95 Widening	200502310	14.47
Grady County	200500967	129.0
Fort Stewart	200900886	26.7
Fort Stewart Machine Gun Range	200900786	103.34
Fort Stewart Multipurpose Range	200901852	202.9
Fort Stewart Digital Multipurpose Range	200900885	43.6

For these projects, the SOP was used as the best available tool to quantify credits required for impacts to wetlands. With many of these projects, the SOP was also used to determine the credits generated in association with permittee-responsible mitigation (i.e., restoration, enhancement and preservation), if applicable. In every case where impacts were greater than 10 acres, the SOP was used as an assessment tool to ensure the credits required for mitigation were practicable given the magnitude of impact associated with the authorized project.

It is important to note that the SOP is a tool for calculating mitigation, but the Regulatory Division also uses sound, science-based judgment when evaluating an applicant's project that would impact Waters of the US. As defined in the USACE's General Regulatory Policies, 33 CFR 320.4 (r)(2) states, *"All compensatory mitigation will be for significant resource losses which are specifically identifiable, reasonably likely to occur, and of importance to the human or aquatic environment. Also, all mitigation will be directly related to the impacts of the proposal, appropriate to the scope and degree of those impacts, and reasonably enforceable."* To that end, Savannah District always ensures that calculated mitigation credits derived from the SOP pass the sensibility test and are consistent with actual, project-derived impacts.

It should be noted that Savannah District is working to develop an updated Regulatory Mitigation SOP that is based on a functional assessment. However, to date that tool is still being developed, and therefore, is unavailable for use at this time. Regulatory Division will continue to use the current SOP as a tool for assessing mitigation requirements for all projects (including projects with impacts greater than 10 acres) until such time that the updated Mitigation SOP has been completed, tested and validated.

2.6 Evaluation of Permittee-Reponible Mitigation and Preservation

When evaluating possible mitigation options, USACE also satisfied criteria for evaluating mitigation options as reflected in the determination of *Preservation*, which is defined at 33 CFR 332.3 (h) of the Final Mitigation Rule. The following facts are presented in compliance with regulation h that were previously cited.

- Disposal Area (DA) 1S is located within the borders of the SNWR. However, USACE and GDOT still maintain an easement on the site that could allow for disposal and continued management of dredged material at a later date. As illustrated in Appendix A of this report, the USACE used a 0.5 value for the "Control" factor in the SOP calculation. The 0.5 value is the highest value that can be recorded for the "Control" factor. By using this control factor, USACE and GDOT will relinquish the easement that could allow for future use of Disposal Area1S. Once the area has been restored to a functioning brackish marsh ecosystem, it will also be permanently protected through the State of Georgia's Coastal Marshlands Protection Act. Finally, the restoration area is already within the boundaries of the SNWR. The resulting marsh will be contiguous with existing marsh that abuts the restoration site. As such, the restored marsh will be

permanently integrated into the same conservation and management plan that currently protects existing brackish marsh areas within the SNWR.

- The restored brackish marsh will replace the 15.68 acres of excavated brackish marsh. When compared to the excavated sites, the location and overall area of the restored marsh will provide greater physical, chemical and biological functions within the Lower Savannah River Watershed.

- Restoration and preservation of the brackish marsh site will contribute significantly to the ecological sustainability of the Lower Savannah River Watershed.

- Preservation is an element of the "Control" factor identified in the SOP calculation. Use of the Savannah District SOP to determine a credit requirement was accepted by the Wetland ICT. The ratios of mitigation to impact (i.e., 1.8:1) is comparable with other public projects that have directly impacted brackish marsh. Therefore, use of the preservation element in the SOP calculation is appropriate and practicable.

- The Preservation element identified through use of the SOP will be fulfilled in conjunction with restoration of brackish marsh at the CDF 1S site.

2.7 Evaluation of Permittee-Responsible Mitigation and Responsible Parties

When evaluating possible mitigation options, USACE also satisfied criteria for evaluating mitigation options as reflected in the determination of *Party Responsible for Compensatory Mitigation,* which is defined at 33 CFR 332.3 (l) of the Final Mitigation Rule. The following facts are presented in compliance with regulation l that was previously cited.

- The USACE will be responsible for the implementation, performance and long-term management of the restored brackish marsh site.

- The Wetland ICT, which is comprised of representatives from USEPA, USFWS, NOAA, GA DNR-CRD, and SC DHEC-OCRM will receive biannual updates on the status of the compensatory mitigation project.

2.8 Evaluation of Permittee-Responsible Mitigation and Timing

When evaluating possible mitigation options, USACE also satisfied criteria for evaluating mitigation options as reflected in the determination of *Timing*, which is defined at 33 CFR 332.3 (m) of the Final Mitigation Rule. The following facts are presented in compliance with regulation *m* that was previously cited.

- 33 CFR 332.3(*m*) states the following, "*Implementation of the compensatory mitigation project shall be, to the maximum extent practicable, in advance of or concurrent with the activity causing the authorized impacts. The district engineer shall require, to the extent appropriate and practicable, additional compensatory mitigation to offset temporal*

losses of aquatic functions that will result from the permitted activity." USACE would restore Disposal Area 1S concurrently with dredging in the Inner Harbor (See Timing of Construction Table). This would ensure that excavation of the 15.68 acres of brackish marsh happens at the same time (possibly before depending on positioning of hydraulic dredge and dredging window) as development of the 42-acre brackish marsh system.

2.9 Evaluation of Permittee-Responible Mitigation and Financial Assurances

The Final Mitigation Rule provides the following guidance at 33 CFR 332.3(n) *Financial Assurances, "The district engineer shall require sufficient financial assurances to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with applicable performance standards. In cases where an alternate mechanism is available to ensure a high level of confidence that the compensatory mitigation will be provided and maintained (e.g., a formal, documented commitment from a government agency or public authority) the district engineer may determine that financial assurances are not necessary for that compensatory mitigation project."* The need for Financial Assurances, as defined in the 2008 Final Mitigation Rule, and its application toward civil works projects like the SHEP, has not been justified. Regulation 33 CFR 332.3 (n)(1) of the 2008 Final Mitigation Rule states, *"In cases where an alternate mechanism is available to ensure a high level of confidence that the compensatory mitigation will be provided and maintained (e.g., a formal, documented commitment from a government agency or public authority) the district engineer may determine that financial assurances are not necessary for that compensatory mitigation project."* The SHEP is a civil works project that will receive funding from the Federal government. USACE will include provisions in the Record Of Decision (ROD) that specify that the mitigation features will be operated and maintained in the future. If the mitigation is not operated and maintained, the Federal Navigation Project would not be incompliance with its NEPA commitments.

Of note, the 2008 Final Mitigation Rule has significant application within the USACE's Regulatory Program. The Rule was used as the principal document for updating the USACE's mitigation banking program in the State of Georgia. Both commercial and county- managed mitigation banks exist within the state. Financial assurances are required for commercial, private-based mitigation banks where the responsible party (i.e., banker) could abandon a mitigation bank before it achieves success. However, county-owned mitigation banks, which use bank credits exclusively for the purpose of mitigating public projects (i.e., road improvement, utility lines, etc.), are not required to provide financial assurances. Likewise, the Georgia Department of Transportation (state agency) is not required to provide financial assurances for its mitigation banks. The reason for this difference in policy is based on 33 CFR 332.3 (n)(1) of the Final Mitigation Rule and the fact that government entities are neither transient nor fleeting. Similarly, the Federal government and the Georgia Department of Transportation would not be required to provide financial assurances for the same reasons.

2.10 Evaluation of Permittee-Responsible Mitigation and Ecological Performance Standards

The Final Mitigation Rule provides the following guidance at 33 CFR 332.5(a) *Ecological Performance Standards, "The approved mitigation plan must contain performance standards*

that will be used to assess whether the project is achieving its objectives. Performance standards should relate to the objectives of the compensatory mitigation project, so that the project can be objectively evaluated to determine if it is developing into the desired resource type, providing the expected functions, and attaining any other applicable metrics (e.g., acres).” The objective of this compensatory mitigation project is to restore the Disposal Area 1S site to a fully functional, 42-acre brackish marsh ecosystem. As a result, compensatory mitigation for the excavation of 15.68 acres of brackish marsh, which is required for the SHEP, would be satisfied, and the remaining 63.6 mitigation credits (13.25 acres) associated with the restoration effort would be held in reserve for any future USACE Civil Works actions in the Savannah Harbor. Restoration of the Disposal Area 1S site would occur by grading it down to an elevation that allows for the growth of *Spartina alterniflora* (i.e., +7.6 to +7.8 MLLW). The Corps selected that elevation range after inspection and surveying the elevations of natural marsh that is immediately adjacent to the proposed restoration site. Once the new elevations have been established, the approximately 42-acre site would be allowed to naturally vegetate. The abutting marsh, which is dominated by *Spartina alterniflora*, would provide the necessary seed stock to vegetate the restoration site. Given the prolific nature of plant, and its ability to outcompete other vegetative species within the salinity range observed in this reach of the harbor, we expect successful recruitment of the *Spartina* species with coverage of vegetation occurring at the following rate:

Revegetation Rate for Restored Marsh	
Time Period	**Percent Vegetative Cover**
Construction	0
Year 1	15
Year 2	25
Year 3	40
Year 4	60
Year 5	80

The density of Spartina plants and the resulting percent vegetative cover will be determined on an annual basis and reported to the Wetland ICT. In brief, ten 30-foot transects will be established on the restoration site. Additionally, one reference site transect will be established in the adjacent marsh. Vegetation counts and density measurements using 1 ft^2 quadrats will be collected along each of the transects, and all data will be compiled and reported on an annual basis. As requested by the USFWS, a “feeder” creek system would also be constructed toward the interior of the restored marsh. The creek would provide another mechanism of ensuring adequate exchange of brackish, surface water with pore waters that are located on the interior of the site.

The need for hydrology data is negligible since vegetative cover, and ultimate success of a brackish marsh system, is primarily dictated by the elevation of the marsh site in conjunction with two daily tidal cycles. Because elevation and the tides ultimately determine the health and

function of the *Spartina* plants, which will subsequently dictate the primary productivity of the marsh, USACE will not deploy instruments to measure hydrology nor propose any hydrologic indicators as a means of gauging ecological performance or success. Rather, the success of the marsh site will be determined based on the coverage of *Spartina alterniflora* as indicated by the revegetation rate depicted in the previous table. See Section 2.12 "Evaluation of Permittee-Responsible Mitigation and Adaptive Management" for the identification of contingency plans should the mitigation site not progress toward meeting its performance standards.

2.11 Evaluation of Permittee-Responsible Mitigation and Monitoring

The Final Mitigation Rule provides the following guidance at 33 CFR 332.6(a)(1) *Monitoring, "Monitoring the compensatory mitigation project site is necessary to determine if the project is meeting its performance standards, and to determine if measures are necessary to ensure that the compensatory mitigation project is accomplishing its objectives. The submission of monitoring reports to assess the development and condition of the compensatory mitigation project is required, but the content and level of detail for those monitoring reports must be commensurate with the scale and scope of the compensatory mitigation project, as well as the compensatory mitigation project type. The mitigation plan must address the monitoring requirements for the compensatory mitigation project, including the parameters to be monitored, the length of the monitoring period, the party responsible for conducting the monitoring, the frequency for submitting monitoring reports to the district engineer, and the party responsible for submitting those monitoring reports to the district engineer."* The excavation of 15.68 acres of brackish marsh will be mitigated through the restoration of a 42-acre brackish marsh site. Approximately 28.8 acres of the restored marsh will be used as mitigation for the impacts associated with excavation. The remaining mitigation credits/acreage would be used for any additional compensatory mitigation that might be needed by the Corps to maintain the Savannah Harbor Navigation Project at a future date. The USACE will monitor the restoration site for a period of seven years and the success of the brackish marsh will be based on meeting or exceeding the annual values defined for the percent of vegetative coverage for *Spartina alterniflora* (Please see previous table). The marsh transects would be sampled twice annually (June and October). The Corps would provide annual reports of the performance monitoring to the Interagency Coordination Team (ICT) for review. In turn, the ICT would meet on an annual basis to discuss the result of those findings. The USACE believes this level of monitoring is acceptable and commensurate with the scale and scope of the anticipated impact.

2.12 Evaluation of Permittee-Responsible Mitigation and Site Protection

The Final Mitigation Rule provides the following guidance at 33 CFR 332.7(a)(1) *Site Protection "The aquatic habitats, riparian areas, buffers, and uplands that comprise the overall compensatory mitigation project must be provided long-term protection through real estate instruments or other available mechanisms, as appropriate. Long-term protection may be provided through real estate instruments such as conservation easements held by entities such as federal, tribal, state, or local resource agencies, non-profit conservation organizations, or private land managers; the transfer of title to such entities; or by restrictive covenants. For government property, long-term protection may be provided through federal facility management plans or integrated natural resources management plans."* The excavation of 15.68

acres of brackish marsh will be mitigated through the restoration of a 42-acre brackish marsh site. Approximately 28.8 acres of the restored marsh will be used as mitigation for the impacts associated with excavation. The remaining mitigation credits/acreage would be used for any additional compensatory mitigation that might be needed by the Corps to maintain the Savannah Harbor Navigation Project in the future. The restoration site (Disposal Area 1S) is located within the boundaries of the SNWR. However, USACE and GDOT still maintain an easement on the Disposal Area that could allow for disposal and continued management of dredged material at a later date. As illustrated in Appendix A of this report, the USACE used a 0.5 value for the "Control" factor in the Savannah District's SOP calculation. The 0.5 value is the highest value that can be recorded for the "Control" factor. By using this control factor, USACE and GDOT agree to relinquish the easement that could allow for future use of Disposal Area 1S. Once the area has been restored to a functioning brackish marsh ecosystem, it will also be permanently protected through the State of Georgia's Coastal Marshlands Protection Act. Finally, the restoration area is already within the boundaries of the SNWR. The resulting marsh will be contiguous with existing marsh that abuts the restoration site. As such, the restored marsh will be permanently integrated into the same conservation and management plan that currently protects existing brackish marsh areas within the SNWR. Thus, the lands would be subject to the same protections and use requirements as defined in the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act).

2.13 Evaluation of Permittee-Responsible Mitigation and Sustainability

The Final Mitigation Rule provides the following guidance at 33 CFR 332.7(b)(1) *Sustainability "Compensatory mitigation projects shall be designed, to the maximum extent practicable, to be self-sustaining once performance standards have been achieved."* The health and function of the restored Spartina marsh will ultimately be determined by achieving the appropriate elevation and the continued input of brackish water by the twice daily tides events. This critical step (i.e., setting the correct ground elevation) and resulting success will be known early in the restoration process as indicated by the recruitment of Spartina plants in the first few years. As requested by the USFWS, a "feeder" creek system would also be constructed toward the interior of the restored marsh. The creek would provide another mechanism of ensuring adequate exchange of brackish, surface water with pore waters that are located on the interior of the site. If 80% vegetative cover is achieved at the end of the five year monitoring period, then the self-sustaining nature of the site will be assured since selection of the appropriate "productive" elevation is relatively finite. In other words, there would be no need for pumps or other mechanical features to maintain the hydrologic input or vegetation of the established site. Thus, the restored site would be as likely to thrive in the future as any of the other adjacent brackish marsh sites in the vicinity.

2.14 Evaluation of Permittee-Responsible Mitigation and Adaptive Management

The Final Mitigation Rule provides the following guidance at 33 CFR 332.7(c)(2-3) *Adaptive Management "If monitoring or other information indicates that the compensatory mitigation project is not progressing towards meeting its performance standards as anticipated, the responsible party must notify the district engineer as soon as possible. The district engineer will*

evaluate and pursue measures to address deficiencies in the compensatory mitigation project. The district engineer will consider whether the compensatory mitigation project is comparable to the original objectives of the compensatory mitigation project. (3) The district engineer, in consultation with the responsible party (and other federal, tribal, state, and local agencies, as appropriate), will determine the appropriate measures. The measures may include site modifications, design changes, revisions to maintenance requirements, and revised monitoring requirements. The measures must be designed to ensure that the modified compensatory mitigation project provides aquatic resource functions comparable to those described in the mitigation plan objectives." The development of the restored marsh also includes an adaptive management plan, which would require the planting of juvenile *Spartina alterniflora* plants if the site does not begin to naturally revegetate with the rate of colonization indicated in Table X. The site will be inspected twice annually (June and October). The presence of invasive species will be documented. If invasive species are identified, they will be removed from the site via hand grubbing or another method approved by the Wetland Interagency Coordination Team (ICT). Should the restored marsh not meet the success criteria illustrated in the previous table, the ICT would identify and/or recommend corrective actions, including planting requirements and associated sprig densities, which would achieve compliance with the reported percentages in the previous table. The need for corrective action(s) would be determined and/or implemented annually with agency involvement and concurrence. Annual monitoring reports would be generated over a period of five years and provided to the ICT. If at the end of five years the plant density at the restored marsh does not achieve 80% coverage, then Savannah District would purchase saltmarsh mitigation credits from an approved mitigation bank to compensate for the remaining loss in function. If no saltmarsh mitigation banks were available, then the ICT would be consulted for a determination on how to proceed (Please see updated Appendix C-Mitigation Planning).

If monitoring results indicate additional mitigation is required, then the USACE shall coordinate with the ICT to develop an appropriate course of action.

2.15 Evaluation of Permittee-Responsible Mitigation and Long-Term Management

The Final Mitigation Rule provides the following guidance at 33 CFR 332.7(d)(1), *Long-term management, "The permit conditions or instrument must identify the party responsible for ownership and all long-term management of the compensatory mitigation project. The permit conditions or instrument may contain provisions allowing the permittee or sponsor to transfer the long-term management responsibilities of the compensatory mitigation project site to a land stewardship entity, such as a public agency, non-governmental organization, or private land manager, after review and approval by the district engineer. The land stewardship entity need not be identified in the original permit or instrument, as long as the future transfer of long-term management responsibility is approved by the district engineer."* If 80% vegetative cover is achieved at the end of the five year monitoring period, then the self-sustaining nature of the site will be assured since selection of the appropriate "productive" elevation is relatively finite. The restored site would be as likely to thrive in the future as any of the other adjacent brackish marsh sites in the vicinity. The restoration area is already within the boundaries of the SNWR, and the resulting marsh will be contiguous with existing marsh that abuts the restoration site. As such,

the restored marsh will be permanently integrated into the same conservation and long-term management plan that currently protects existing brackish marsh areas within the SNWR. Thus, the lands would be subject to the same protections and use requirements as defined in the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act).
The Final Mitigation Rule provides the following guidance at 33 CFR 332.7(d)(2) which states, *"A long-term management plan should include a description of long-term management needs, annual cost estimates for these needs, and identify the funding mechanism that will be used to meet those needs."* With respect to restoration of the 42-acre marsh site, long-term management needs would be negligible. The methodology for restoring and sustaining a brackish marsh system is somewhat rudimentary with the greatest risk of success being identified within 1-2 years following the initial grading and/or establishment of the appropriate elevations (please see section 2.13 *Sustainability* for additional information). The *in situ* tidal flushing, protection of SNWR, and continuity with 44 acres of existing brackish marsh, all validate the USACE's position that there are no long-term needs required specific to the restored marsh. However, long-term management needs of the SNWR, which will include the restored salt marsh, are determined by annual budget authorizations from Congress. In 2005, the SNWR had an operating budget of $3,582,000. Although the monetary value cannot be ascertained from year to year, the same type of annual budget authorization from Congress is expected to continue well into the future for SNWR. As such, protection and long-term management of the SNWR as well as the restored marsh site are also anticipated.

The Final Mitigation Rule provides the following guidance at 33 CFR 332.7(d)(3) which states, *"In cases where the long-term management entity is a public authority or government agency, that entity must provide a plan for the long-term financing of the site."* Once restored and the success of the site has been achieved at the end of five years, the brackish marsh would be managed like the other diverse habitats located within the SNWR. As part of the SNWR, the lands would be subject to the same protections and use requirements as defined in National Wildlife Refuge System Improvement Act of 1997 (Improvement Act). Thus, USACE has concluded that no additional long-term management requirements are necessary for the preserved land.

3.0 Conclusion

This section of Appendix C-Mitigation Planning, entitled "Consideration of 2008 USEPA/USACE Mitigation Rule," provides detailed analysis and justification for use of 2,683 acres of preservation mitigation to offset impacts associated with indirect impacts (i.e., vegetative conversion) to tidal marsh. Additionally, this section also justifies the restoration of brackish marsh at Disposal Area 1S as mitigation that offsets direct impacts to 15.68 acres of brackish marsh. As specified in the 2008 Final Compensatory Mitigation Rule, the USACE used a sequential and systematic approach to reach a definitive conclusion regarding the validity of the respective mitigation plans for impacts to wetlands, and therefore, USACE has complied with all elements of the Rule. By complying with the Rule, USACE is also satisfied that acceptable and appropriate compensatory mitigation for wetland impacts has been achieved, and implementation of the proposed mitigation plans will ensure that the national policy of "no net loss" of aquatic resources has been fulfilled.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
(727) 824-5312; FAX 824-5309
http://sero.nmfs.noaa.gov

F/SER31: KBD

NOV 04 2011

Colonel Jeffrey M. Hall
Commander, Savannah District
U.S. Army Corps of Engineers
Department of the Army
100 W. Oglethorpe Avenue
Savannah, Georgia 31402-0889

Dear Colonel Hall:

NOAA's National Marine Fisheries Service (NMFS) provides the attached final biological opinion (opinion) on species listed under the Endangered Species Act (ESA) of 1973. NMFS is providing the U.S. Army Corps of Engineers (COE) this opinion pursuant to 50 CFR 402.14(h). This document is based on our review of impacts associated with the proposed federal navigational channel dredging activities for the Savannah Harbor Expansion Project (SHEP) to be conducted by the Savannah District COE.

Information concerning the proposed action was obtained by our review of the Biological Assessment (BA), Draft Environmental Impact Statement (DEIS), and Draft General Re-evaluation Report (DGRR) for the SHEP in Chatham County, Georgia, and Jasper County, South Carolina. Supplemental reports were also provided by the Savannah District. This opinion concludes that the proposed action is not likely to jeopardize species listed or proposed for listing under the ESA under NMFS purview and provides reasonable and prudent measures, along with their implementing terms and conditions.

The findings presented in the opinion are not intended to act as the Secretary of Commerce's (the Secretary) final approval of this project as required by the Water Resources and Development Act of 1999 (WRDA) Section 101(b)(9), Public Law 106-53. The Secretary's final decision will depend on a determination that the proposed mitigation measures will adequately address the potential environmental impacts of the project. The mitigative measures include the following actions that must be fulfilled in the agreed upon time frames included in the opinion:

1) Finalization of the off-channel rock ramp fish passage design in coordination with NMFS and the other federal and state resource agencies.

2) Construction of the fish passage facility at the New Savannah Bluff Lock and Dam to provide access to historical spawning habitat for sturgeon as a mitigation measure.

3) Completion of the development and implementation of a comprehensive monitoring and adaptive management plan in coordination with NMFS and the other federal and state resource agencies to help insure the success of all mitigative measures including the fish passage facility.

The no jeopardy conclusion of the opinion is contingent on agreement to implement and maintain all of the mitigative measures.

We appreciate the COE's efforts in working together with NMFS to identify methods and measures to address complex conservation issues that, when implemented, will provide protection for endangered species under NMFS' authority.

We will continue to provide interagency coordination on this project under all our authorities and to work with the COE to finalize the agreed upon protective measures associated with this project. Our primary contact for endangered species issues is Kay Davy. She may be reached by phone at (954) 356-6791 or by e-mail at Kay.Davy@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

JASPER
OCEAN TERMINAL

An Update on the Jasper Ocean Terminal

March 11, 2011

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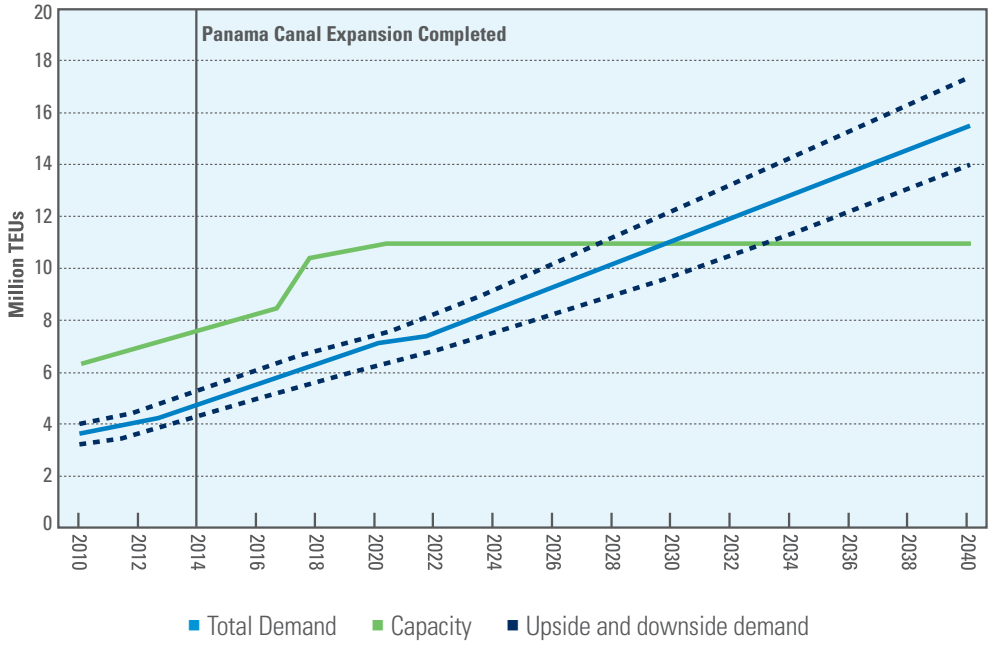
CHARLESTON, GARDEN CITY DEMAND AND CAPACITY

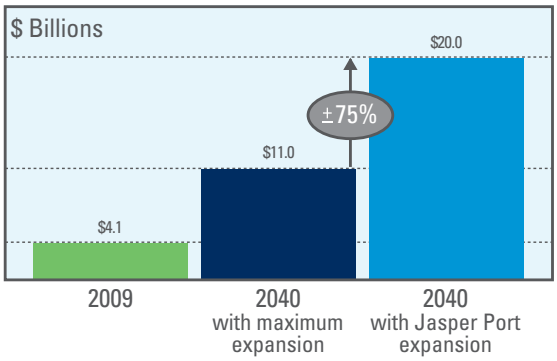


SOURCE: Moffatt and Nichol

THE JASPER TERMINAL COULD ADD ONE MILLION JOBS AND $9 BILLION TAX REVENUE TO SOUTH CAROLINA AND GEORGIA

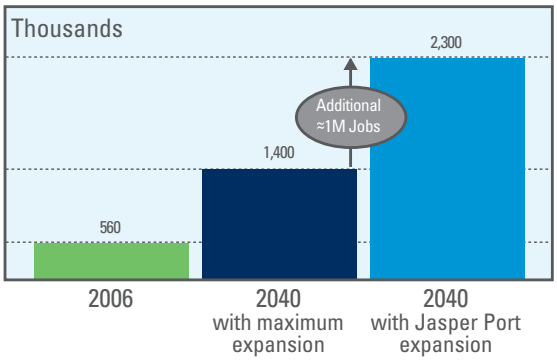
PORT EXPANSION CAN SIGNIFICANTLY INCREASE STATE AND LOCAL TAX REVENUES IN 2040...

State and local taxes[1] generated by ports in South Carolina and Georgia



...AND GENERATE SUBSTANTIAL EMPLOYMENT OPPORTUNITIES

Jobs[2,3] created by ports in South Carolina and Georgia



- Assuming taxes and jobs scale with port volume
- Assumes that higher container density and efficient operations will lead to increased port utilization of existing port facilities

[1] Taxes measured in billions
[2] Jobs measured in thousands
[3] Job creation does not include construction

SOURCE: American Association of Port Authorities (AAPA), University of Georgia study, Wilbur Smith Associates, US Census Bureau

EXECUTIVE SUMMARY

With our nation's trade realities changing, one-time challenges are becoming future opportunities.

After years of competition, Georgia and South Carolina have agreed to jointly develop and oversee a deep-water container terminal on the banks of the Savannah River. This new port—known as the Jasper Ocean Terminal—has the potential to generate one million jobs and $9 billion in tax revenue for the two states by the year 2040[1].

In 2007, this opportunity convinced South Carolina Gov. Mark Sanford and Georgia Gov. Sonny Perdue to put aside years of litigation and agree upon a collaborative approach for development of the Jasper Ocean Terminal. This was documented in a term sheet and subsequently an intergovernmental agreement to deepen the harbor and free a large potential site from an easement held for dredge placement:

> "m. After the release, modification or removal of the Corps Easement from the Phase One property and the required approval and ratification of the interstate compact approving the Bi-State Compact Authority by the Georgia and South Carolina legislatures and the U.S. Congress, the parties acknowledge that the deepening of the Savannah River navigation channel as conditionally authorized in the federal 1999 Water Resources Development Act and set forth as the Savannah Harbor Project further described at www.sav-harbor.com will be beneficial to the development of the Phase One Property."

This simple deal, to support deepening the harbor, enter a bi-state compact and release the easement, led to establishing the Joint Project Office. Work done since then has confirmed the value of the enterprise and the wisdom of the agreement.

Driving this opportunity are several factors that will cause East Coast container traffic to triple by 2020[2]:

- Southeastern businesses and farmers produce many of the most valued exports in the United States, including agricultural products and industrial equipment. These exports generate tremendous private- and public-sector revenue. Demand will increase for these raw materials which, in turn, will drive the increase in exported cargo.
- A 2014 expansion of the Panama Canal will enable vessels up to three times larger than most ships that currently traverse the canal to quickly and easily reach ports along the East Coast. This will reduce the cost of a container from Shanghai traveling into the Southeast by roughly 20 percent, extending the region's logistics competitiveness into the Midwest.
- Population and business growth in the Southeast are expected to drive consumer demand for imported products.
- More goods are being manufactured in Southeast Asia, and that cargo is being shipped through the Suez Canal and then to the East Coast, bringing additional containers to the region.

Located 10 miles downstream of Savannah's Garden City Terminal, the Jasper Ocean Terminal will be built on recovered dredge material along the Georgia-South Carolina border. Once completed, it will be the premier port on the East Coast, complete with state-of-the-art technology and green features that will reduce its environmental footprint and increase service efficiencies.

The Jasper Ocean Terminal will be designed as a state-of-the-art, world-class terminal able to handle effectively the new post-Panamax ships (up to 12,600 TEUs) which require 50-foot depth and 158-foot width. The Georgia Ports Authority, through its Savannah Harbor Expansion Project, is planning to deepen the river channel from 42 to 48 feet ahead of the required schedule for the terminal, and the South Carolina State Ports Authority also is planning to deepen the harbor in Charleston.

As planned, the new terminal will feature 10 berths (phased in to meet rising demand), a turning basin, road and rail access corridors, and supporting infrastructure on 1,500 acres in Jasper County, S.C. This new investment will increase the region's capacity by seven million twenty-foot equivalent units (TEUs) while propelling the local economy of one of the nation's poorest counties.

Despite recent and planned investments to upgrade and expand facilities in Charleston and Savannah, both ports are expected to be at capacity for container throughput between 2025 and 2030. The Jasper Ocean Terminal will handle the millions of additional containers that current plans for Georgia and South Carolina will not.

To seize the opportunity, the two states must put aside their differences and continue to work together to turn future opportunities into jobs and dollars for their citizens. If not, international shippers will move to other states offering more capacity, greater efficiency and deeper harbors.

[1] University of Georgia study; Wilbur Smith & Associates study
[2] American Association of Ports Authorities; Moffatt & Nichol

A LANDMARK OPPORTUNITY

Located approximately 12 miles from the sea buoy, the 1,500-acre Jasper Ocean Terminal site is widely considered to be the best remaining undeveloped port site on the East Coast. For more than 15 years, local leaders have sought a port in Jasper County.

While located on the South Carolina side of the Savannah River, the site was controlled by the Georgia Department of Transportation and utilized by the U.S. Army Corps of Engineers for storing dredge material. The desire to secure the land for a port led to protracted litigation between Georgia and South Carolina.

Accomplishments to Date

Recognizing not just the need but also the potential of a shared port, Governors Perdue and Sanford signed a memorandum of understanding in 2007, setting up the original framework to guide the construction and oversight of the Jasper Ocean Terminal. The premise was simple—there was more to be gained by working together than competing against one another. Since then, much has been done.

Most importantly, the landmark agreement paved the way for an intergovernmental agreement and the establishment of the Joint Project Office. Comprised of six volunteer board members—three from each state—the Joint Project Office is charged with developing the new port.

In July 2008, the Joint Project Office, working through the Georgia and South Carolina ports authorities, evaluated potential sites, secured funds and jointly acquired the 1,500-acre Jasper County site from the Georgia Department of Transportation for $7.5 million or $3.75 million from each state[3].

The Joint Project Office has also contracted with Moffatt & Nichol, one of the most respected maritime engineering firms in the world, to manage the process of conducting site analysis, planning and permitting. The process will be lengthy, but strategic and thorough. The resulting analysis will guide the port through complex federal and state processes and ensure protection of the delicate Lowcountry ecosystem.

Throughout 2009 and 2010, the Joint Project Office and Moffatt & Nichol interfaced with the U.S. Army Corps of Engineers for guidance on the permitting process and a dredge material management plan, finalized capacity and economic studies, and developed a detailed Preliminary Planning & Development Services Report that will guide the port's development.

In late 2010, the Joint Project Office retained Doug Marchand, a respected port executive, as a part-time executive advisor, to guide the port forward.

Full Speed Ahead

Currently, the site is under easement running to the U.S. Army Corps of Engineers, which manages the dredging process for the Savannah River. The Corps has indicated that, if the two states work together to develop the property and manage a joint port, which includes identification of an alternate site for dredge disposal, it will release the easement once the permitting process is complete.

Given these factors, the 15-year timetable for permitting and construction is not unusual. Georgia has devoted the past 15

[3] The Joint Project Office acquired 1,517.8 acres at $5,000 per acre for a total purchase price of $7,588,900 or $3,794,450 from each state.

years to the permitting and study of deepening the Savannah River, while South Carolina, which received approval to expand the Charleston port in 2007, projects to open its new terminals in 2018. The two authorities have used long-term planning to grow their businesses over the past two decades.

The Jasper Ocean Terminal will be designed as a state-of-the-art, world class terminal, able to handle effectively the new Panamax 12,000 TEU ships, requiring 50-feet depth and 158-feet width. The Georgia Ports Authority, through the Savannah Harbor Expansion Project, is planning to deepen the river channel from 42 to 48 feet, ahead of the required schedule for the Jasper Ocean Terminal.

Charleston, too, is planning to deepen its harbor.

The proximity and accessibility of three deep-water ports in the Southeastern U.S. has the potential to transform the region into a global shipping hub. With a projected 12 million-plus TEUs expected to pass through the ports of Charleston and Savannah by 2025-2030[4], and East Coast ports in need of additional capacity in that same timeframe, the Jasper Ocean Terminal offers a unique opportunity for the region.

Other ports along the East Coast are already taking concrete steps to accommodate the future influx of cargo. In Norfolk, Va., the Virginia Ports Authority is undertaking a massive reclamation project on Craney Island that will grow its cargo capacity. The Norfolk harbor is already 52 feet deep. The Port Authority of New York & New Jersey hopes to expand its container terminal on Staten Island and raise the Bayonne Bridge, while the Jacksonville Port Authority has strengthened ties to overseas shippers and is investing in terminal expansions and joint ventures.

By bringing the Jasper Ocean Terminal online, the two states will have positioned themselves to gain upward of 19 million TEUs annually through the three primary deep-water ports in Savannah, Charleston and Jasper[5]. Furthermore, doing so will accommodate continued export growth in the Southeast, spur accelerated economic growth in the two-state area and strengthen the region as a major player in international trade.

PANAMA CANAL EXPANSION AND GLOBAL ECONOMIC CHANGES WILL BRING BIGGER SHIPS TO OUR PORTS

Current "Panamax" Vessels - 4,000-5,500 TEUs

Future "Post-Panamax" Vessels - 8,000-12,600 TEUs

SOURCE: Courtesy of the Panama Canal Authority

[4] American Association of Ports Authorities; Moffatt & Nichol
[5] Moffatt & Nichol

THE DEMAND

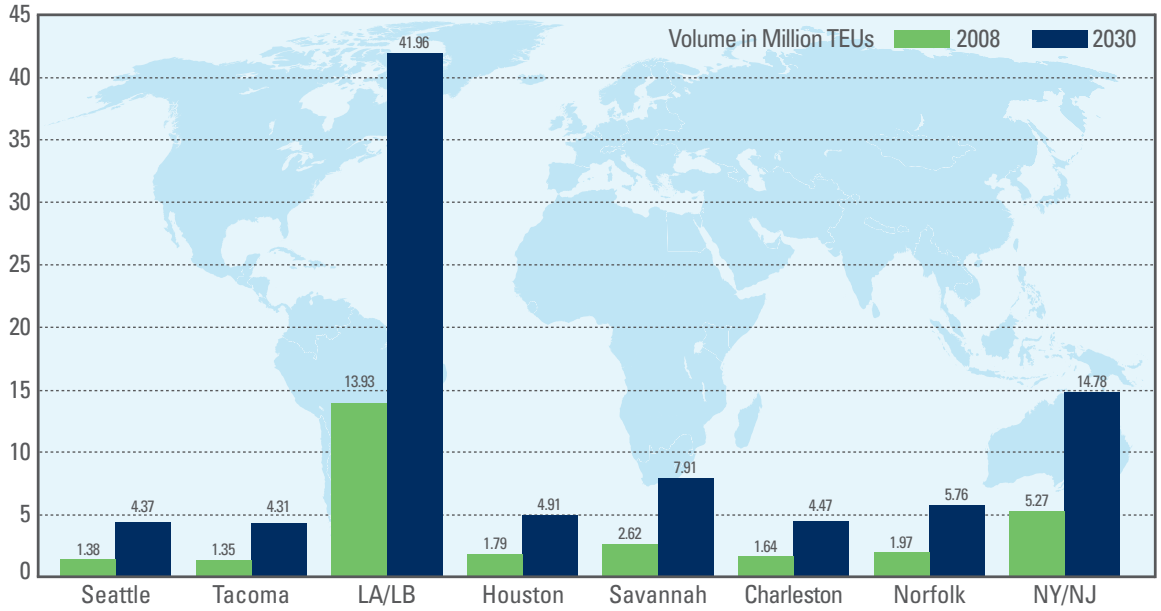
In 2008, the ports of Garden City (Ga.) and Charleston handled a combined 4.26 million TEUs of containerized cargo[6]. By 2030, it is expected the two ports will be near capacity with a need to handle more than 12.3 million TEUs[7].

This amounts to a 6 percent annual increase through 2025, which is twice the expected rate of GDP growth, the experience of the last 30 years, as well as a 4.6 percent annual growth from 2025 through 2040. Accommodating this growth requires careful planning and an understanding of a number of factors that make the Southeast a focal point for a boom in container shipping.

Most critically, the Southeast is the U.S. export leader, and this dominant role is expected to increase in the decades ahead. As personal incomes rise in developing nations, much of that money is spent on a key U.S. export: meat. The Southeast is a leading exporter of poultry, pork and beef. Developing nations also have a strong appetite for manufactured goods produced in the South as well as wood fiber and minerals from the region. State and federal governments also benefit from taxes on U.S. exports, which help lower the trade deficit.

Secondly, the Panama Canal Authority will have completed one of its most ambitious goals in time for its centennial in 2014: the deepening

FUTURE DEMAND AND PORT CAPACITY CONSTRAINTS OPEN THE POSSIBILITY OF AT LEAST FOUR TIMES THE CONTAINER TRAFFIC IN 10 TO 15 YEARS



- Container imports are expected to double by 2020
- Rail freight tonnage is expected to increase by 50% by 2020 and could become a bottleneck

SOURCE: American Association of Port Authorities (AAPA); Moffatt & Nichol; U.S. Army Corps of Engineers

[6] *Georgia Ports Authority; South Carolina State Ports Authority*
[7] *Moffatt & Nichol*

of the canal to 50 feet, which will allow a new breed of container ships called "Post-Panamax" to quickly access the Eastern U.S. from Asia. These new Post-Panamax ships will carry 15 to 50 percent more container volume when fully laden than most ships currently visiting Savannah and Charleston.

Deepening the canal could have a larger impact than volume alone. The new, larger ships won't just carry more containers; they will reduce costs for shipping to Midwestern states via the East Coast by as much as $400 per TEU, or $800 per 40 foot container, a 20 percent reduction[8], making Southeastern ports more competitive for business that has traditionally entered through the West Coast and traveled over land to Chicago, Memphis and other mid-continent destinations.

Container traffic also will continue to grow from the Atlantic Ocean, arriving from Africa and Southwest Asia via the Suez Canal. Trade with Vietnam, Indonesia, India and other nations should increase significantly as they expand their manufacturing capacity and build out their logistics infrastructure. Ships traveling from these regions often use the Suez Canal, which is already deep enough to accommodate Post-Panamax vessels.

It is expected that harbors in Savannah, Charleston and throughout the East Coast will be deepened and expanded to accommodate the new and larger ships by 2015. But will the ports have the capacity to handle the containers?

Moffatt & Nichol has analyzed this pivotal question using data from the Port Import Export Reporting System (PIERS), published in the *Journal of Commerce*, and taking into account expansion plans at leading ports throughout the nation. Southeastern U.S. container port demand will begin to exceed capacity in 2029, and the unmet demand grows to almost eight million TEUs by 2037[9]. The Georgia Ports Authority's Garden City Terminal and South Carolina State Ports Authority's Charleston terminals are expected to be near capacity between 2025 and 2030. The Jasper Ocean Terminal will be delivered just in time to ensure that the Southeastern U.S. remains a strong hub for global trade.

THE BENEFITS

Development of the Jasper Ocean Terminal offers opportunities on multiple levels. The advantages to local communities are obvious, but the region and nation will benefit as well. A new deep-water, state-of-the-art port on the Georgia-South Carolina border will boost international trade for the good of exporting companies and the nation's trade balance. The new terminal will be more than an economic engine: It will send a message to the world that the Southeast is fully committed not just to the container business, but to working cooperatively to develop state-of-the-art facilities that can accommodate all types of goods and services.

Capitalizing on careful planning, a new site and insights from some of the world's most advanced ports, plans call for a state-of-the-art "green" port that will use new technology and techniques to drive efficiency and minimize environmental impact.

[8] *Moffatt & Nichol*
[9] *Jasper Ocean Terminal, Preliminary Business Case*

Building a Southeastern hub

Just as the ports of Los Angeles and Long Beach and the Port Authority of New York & New Jersey have built international reputations based on their cooperative approaches to maritime commerce, the Jasper Ocean Terminal offers the opportunity for the two leading ports authorities in the Southeast to do the same (see page 16 for more on the impact on the current ports). Currently a leader in container shipping with a combined 4.3 million TEUs annually[10], both ports authorities anticipate they will be at or near capacity between 2025 and 2030 as container growth continues. Planning and opening a jointly operated container terminal just eight miles from the open water of the South Atlantic will show shipping lines, and their domestic and foreign trade partners, the region's commitment to an ongoing investment in their business.

Bolstering international trade

International trade is expected to continue exponential growth well into the middle of this century. The addition of an efficient container port with capacity in excess of seven million TEUs will further enhance the U.S.'s international position as an importer and exporter, offering further capacity not just to the Deep South, but to companies based in Kentucky, Ohio, Indiana and Illinois as well. This 12-state market is home to many of the nation's leading consumer goods companies, as well as top exporters of poultry, chemicals, pulp and paper, kaolin, agricultural commodities, construction equipment and many other top U.S. products. By investing in infrastructure that allows American businesses to serve the world more quickly and efficiently, the two states are preserving jobs and helping corporations grow stronger.

Lower exchange values and rising demand from emerging markets also foster a climate of growth for U.S. exports. This combination will reduce the nation's existing trade imbalance, boosting the overall American economy by aiding the domestic manufacturing sector and generating millions of dollars in tax revenue for the federal government and state governments.

Both states' ports are known for their balance between imports and exports, reflecting the relative health and diversity of the Southeastern economy. In 2010, Georgia's import/export ratio was 48 percent to 52 percent; Charleston's was 50 percent to 50 percent.

Breaking new ground with a green port

The Jasper Ocean Terminal will have the advantages of a clean slate. For decades, ports around the nation have expanded, but are often constrained in terms of efficiency and innovation by existing site conditions, brownfield challenges and ongoing operations.

By building on a new site atop dredge material, the Jasper Ocean Terminal will turn an underutilized location into an economic engine that will be an international model for the use of cutting-edge technology to improve customer service, create high tech jobs and minimize environmental impacts in a port setting.

[10] *American Association of Ports Authorities; Moffatt & Nichol*

Green technology

The Joint Project Office has committed to building a best-of-class green terminal. Engineering firm Moffatt & Nichol is utilizing its green building experience on the Jasper Ocean Terminal. State-of-the-art technologies will allow storage, sorting and retrieval of specific containers with minimal handling. The only planned buildings on site (an administration/operations building and maintenance facility) are expected to be LEED-certified through the use of careful building siting, construction with recycled materials and energy-efficient equipment. Other green plans for the site include:

- **Smart grid:** Preliminary plans call for the installation of a smart grid on the site, which will allow energy to be recaptured from quay and yard cranes as they deposit containers. This energy can be returned to the grid, allowing for a net-zero effect when it comes to power use.

- **Alternate energy:** The location of the port across from one of the nation's largest liquid natural gas terminals could offer the ability to utilize LNG as an alternate fuel.

- **Shore power systems:** Container berths will be designed with a shore-power system to allow vessels to shut-off on-board generators and use on-shore electricity to reduce emissions. This system is particularly effective for longer stays at berth and is normally associated with larger vessels.

- **Best-of-class terminal operating system:** An integrated terminal operation system will efficiently coordinate operations by minimizing the number of moves for each container from ship to truck or train.

- **Electric emphasis:** The Jasper Ocean Terminal is expected to rely heavily on electric-powered container handling equipment, drastically reducing the carbon footprint of terminal operations.

- **Energy reduction:** Use of sophisticated, motion-sensitive lighting systems balance worker safety and energy reduction. These lighting systems eliminate light pollution while also saving energy and money. The net result will be an innovative container terminal that is safer, quieter, more energy efficient and environmentally friendlier that blends in well with the sensitive surrounding ecosystem and residential communities.

Site advantages and aggressive mitigation

The 1,500-acre site, due to its location on recovered dredge material, will require little mitigation, and it offers the unique opportunity to develop a major terminal with minimal impact on existing marsh front and beachfront property, residential homes and commercial developments.

Providing infrastructure to the site will require road, rail and utility access across wetlands. These access points will be extensively mitigated by preserving and replenishing sites elsewhere in the immediate area. The infrastructure also will feature the most advanced construction techniques to reduce environmental impact and minimize footprint size. A lack of at-grade crossings will limit noise pollution for inbound and outbound traffic, and the latest technologies will be used to make sure water, power and other utilities are delivered to the site with the least possible impact.

Local economic impact

With its location on the Savannah River along the Georgia-South Carolina border, both states will benefit significantly from the development of the new terminal. Specifically, construction of phase I of the Jasper Ocean Terminal, as currently planned, has the potential to create:

- One million jobs both at the port and in spin-off business by 2040[11].
- More than 900 direct and indirect jobs annually in construction and engineering from 2020-2025 to install the necessary infrastructure (roads, bridges, utilities) and build out the first phase of the terminal[12], including $81 million in total wages paid over the life of the build out.

South Carolina and Jasper County

Residents of South Carolina's Jasper County have been working for decades to secure a port on the South Carolina side of the river. With a 20.7 percent poverty rate[13], Jasper County is one of South Carolina's poorest counties. The benefits of a deep-water container port are many:

- Jasper County offers any number of greenfield sites that are ideal for distribution facilities. A planned interchange on I-95 will create additional opportunities for port-related development.
- Various studies have projected the creation of thousands of jobs for residents of Jasper and surrounding counties from development of the port and ancillary facilities. More importantly, the jobs will offer relatively stable, high wages and full benefits, and help shift the economy of the region. Residents will become less dependent on service jobs in the tourism and resort industries in neighboring Beaufort (S.C.) and Chatham (Ga.) counties.
- By building on an existing dredge site, the project will transform an underutilized portion of the county into an economic engine for the region. The necessary upgrades in infrastructure—widening of U.S. Highway 17 and revitalizing existing and building new rail lines—will lay the foundation for future commercial and residential growth in Jasper County while employing additional residents.

One of the original reasons for the development of a port in Jasper County was to help lift many of the residents of Jasper and surrounding counties out of chronic poverty. High-paying, high-quality jobs in the international trade supply chain will support that transition.

Ripple effects of the Jasper Ocean Terminal carry beyond the Lowcountry. Columbia, Anderson and Greenville-Spartanburg have made a concerted effort to grow their international profiles. Companies such as BMW, Michelin and many others employ thousands and are critically attuned to the competitive nature of international commerce. They are active importers and exporters.

Georgia

For Georgia, the case for the Jasper Ocean Terminal is simple mathematics. Most importantly, the state can continue to expand its highly successful container business as capacity becomes constrained at the Georgia Ports Authority's existing terminals. Also, many of the shippers can be expected to use existing or planned distribution facilities in Chatham and Bryan counties for goods that come off the ships at Jasper.

Georgia is home to leaders in international trade like AJC International, the world's largest importer and exporter of proteins, and

[11] University of Georgia economic study; Wilbur Smith & Associates
[12] Moffatt & Nichol
[13] 2008 U.S. Census Estimate

companies such as The Home Depot, Georgia Pacific, GE Energy Systems and others that are critically reliant on increased port capacity for both imports and exports. These Georgia-based businesses will benefit from the efficiencies and savings of a regional port, making them more competitive in an expanding global marketplace.

TECHNICAL DETAILS

Engineering, planning and permitting a new container port is a complex undertaking, requiring up to eight years to complete.

For those eager to get construction underway, the wait can be frustrating. However, careful planning and permitting ensure not only compliance with federal law, but protection of the environment around the site and region. The Joint Project Office has retained the services of Moffatt & Nichol, one of the nation's pre-eminent maritime engineering and planning firms, to help move through the process.

Prior to the permitting process, Moffatt & Nichol is working with the Joint Project Office on various preliminary reports ranging from economic justification for the project to design schematics. After approval from the Joint Project Office, an application for a permit will be filed.

Once underway, the permitting process will involve meticulous planning, careful analysis and intense public outreach. Federal law, including the National Environmental Policy Act (NEPA), requires that any federal action incorporate environmental values into its decision-making process. This is done by evaluating the project's impacts on the environment and exploring reasonable alternatives.

Instrumental to this process is the Corps' preparation of an Environmental Impact Statement (EIS) that identifies the best ways to develop the project while mitigating environmental impact. A public document with numerous opportunities for comment from community groups and government agencies, the EIS is developed by an independent consultant selected by the Corps. This work would be contracted for and funded by the Joint Project Office.

Another important task for the Joint Project Office will be preparing a Sponsor Plan to supplement the U.S. Army Corps of Engineers' Dredged Materials Management Plan (DMMP) for the Savannah Harbor. The Jasper Ocean Terminal will be built on an existing dredge site, relying on material from the FY96 Dredge Plan, as well as from the construction phase of the planned SHEP, to elevate the site and lay the foundation for the terminal's construction.

Once the permitting process is completed and construction is set to begin, a location must be established to accommodate future dredged material from the Savannah River that would otherwise have been deposited on the terminal site. Several options will be outlined in the Sponsor Plan, including alternative sites and the likely use of an existing Offshore Dredge Material Disposal Site.

Based on coordination with the U.S. Army Corps of Engineers, it is anticipated that the permitting timeline will run from 2012 through the end of 2019, with design and construction slated to begin shortly thereafter.

Status of the easement

The U.S. Army Corps of Engineers currently holds an easement on the proposed site, which it uses as a confinement facility for dredge material from the Savannah River. Every three years, the Corps pumps material onto the site to maintain the river's current depth of 42 feet.

The Jasper Ocean Terminal will have to be built upon solid footing, and it also will have to be above the 100-year flood plain. Current planning is to be 15 feet above the river for the terminal, while the dock and buildings will be elevated by 16 feet. The initial SHEP material will help in raising the site, while at the same time save the overall project an estimated $300 million in construction costs.

While it may seem unusual to build a site on dredge material, this is a proven approach that may actually keep capital costs down. The ground will be prepared through the rather simple process of surcharging: At first, perforated pipes known as wick drains will be installed in the existing soil to remove moisture from the subsurface layers of sand. Then suitable fill material is placed on the site to compress the previously deposited dredged material. In approximately one year, the weight of the placed fill material will slowly compress the lower layers of moist sand, forcing ground water up and out, ultimately reducing the potential occurrence of global settlement in the future.

As a condition for releasing the easement, the Corps has said the two states must work jointly on the new port and craft a viable plan for its development. A congressional authorization even addresses the requirements that must be met for release of the easements (full copy of text on page 19). Included in these requirements are the preparation of a Sponsor Plan, bi-state agreement on governance of the Jasper Ocean Terminal, and plans for financing the port.

The Joint Project Office has been in constant contact with the Corps throughout the preliminary stages. As of now, the existing project timelines anticipate release of the easements in 2019 after completion of the permitting process and demonstrated progress in other areas listed above.

Deepening the Savannah River

Stretching from the mouth of the river all the way to the Garden City Terminal, SHEP will deepen the waters of the Savannah River from 42 feet to 48 feet and provide greater access for Post-Panamax container ships to Garden City and Jasper.

The development of the Jasper site is predicated on the success of ports in Charleston and Savannah. A completed SHEP and the planned expansion in Charleston are the first steps to accommodating the supply of containers that ultimately will fuel a successful Jasper Ocean Terminal. It is intended to complete additional channel deepening and widening of the channel to effectively accommodate the Post-Panamax ships.

Other environmental concerns

Since the terminal is being built on land reclaimed from the river bottom, no mitigation will be needed on the actual site. However, project infrastructure will impact some existing wetlands.

As outlined on page 9, aggressive steps are being taken to mitigate the off-site environmental impacts.

Within the 1,500-acre terminal, several "critical areas" have been identified, including numerous "bird islands" and tidal wetlands that will be impacted by the construction of transportation infrastructure. Out of more than 3,300 acres of wetlands, there are 226 acres that will be impacted by the development of the transportation corridor, and, in accordance with the Corps' protocol, the Joint Project Office will purchase mitigation credits within a 10-mile radius as an offset.

Connecting the infrastructure

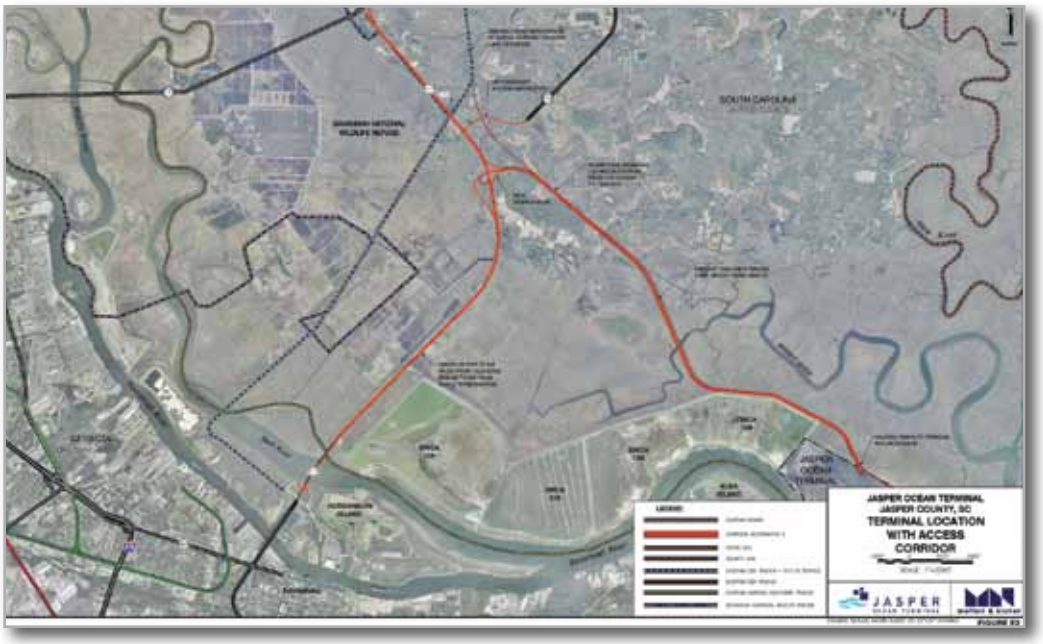
This port needs to have multi-modal access to best facilitate the transport of its cargo to inland distribution centers, storage areas and ultimately consumers in the heartland. Service by rail and road is crucial, and the Jasper Ocean Terminal features a comprehensive plan to link the facility to major transportation corridors.

Winding its way through wetlands and marshes, a new rail corridor will span eight miles and connect the now dormant Hutchinson Lead with Jasper Ocean Terminal during phase II of the project.

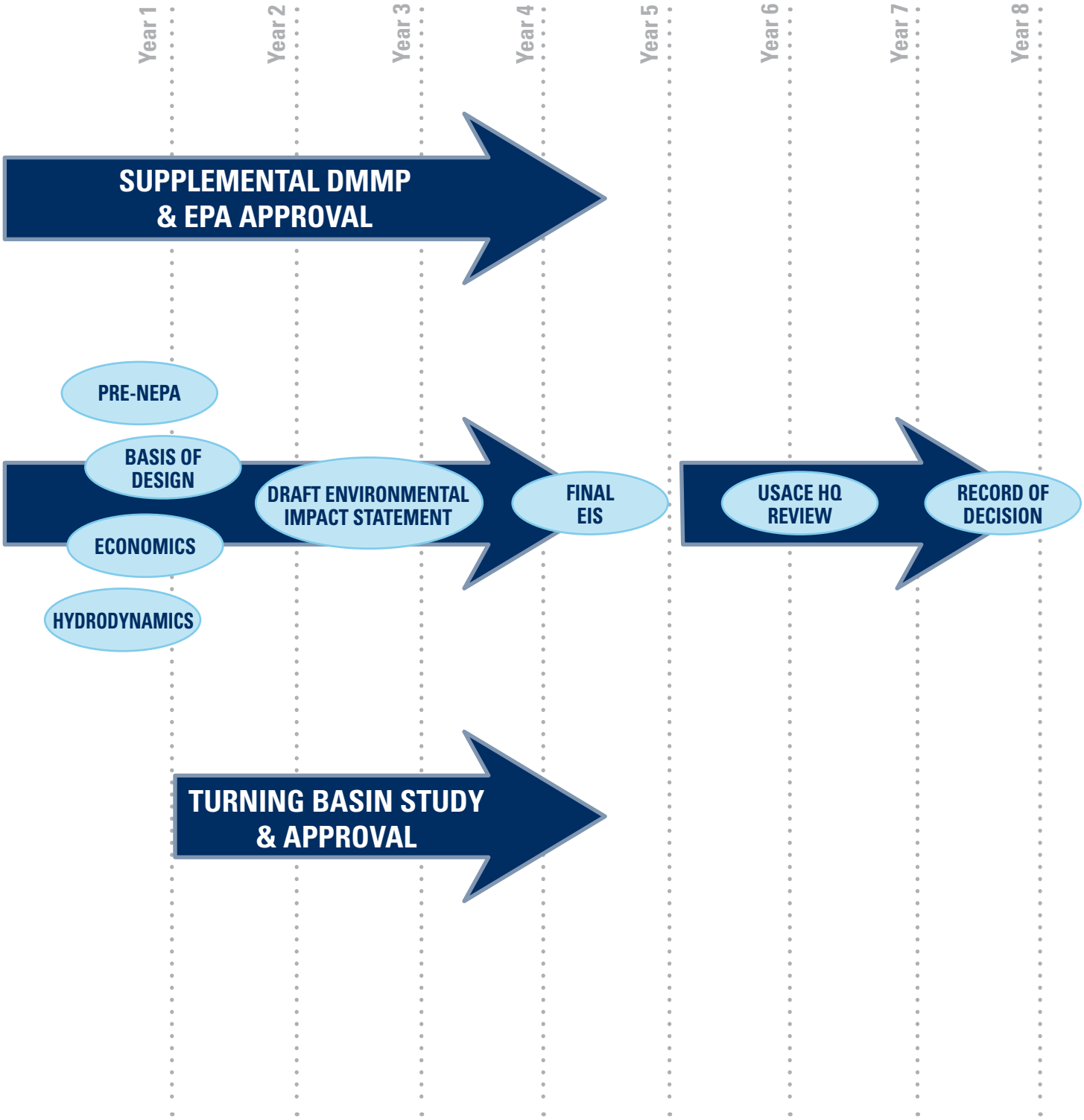
The two Class I railroads that serve Savannah are CSX Corporation and Norfolk Southern, and the Jasper Port Authority intends that both will have dual access to Jasper Ocean Terminal. This accessibility will require the creation of a marshalling yard near the CSX Mainline at the Hutchinson Lead and a state-owned rail spur from the yard to the terminal.

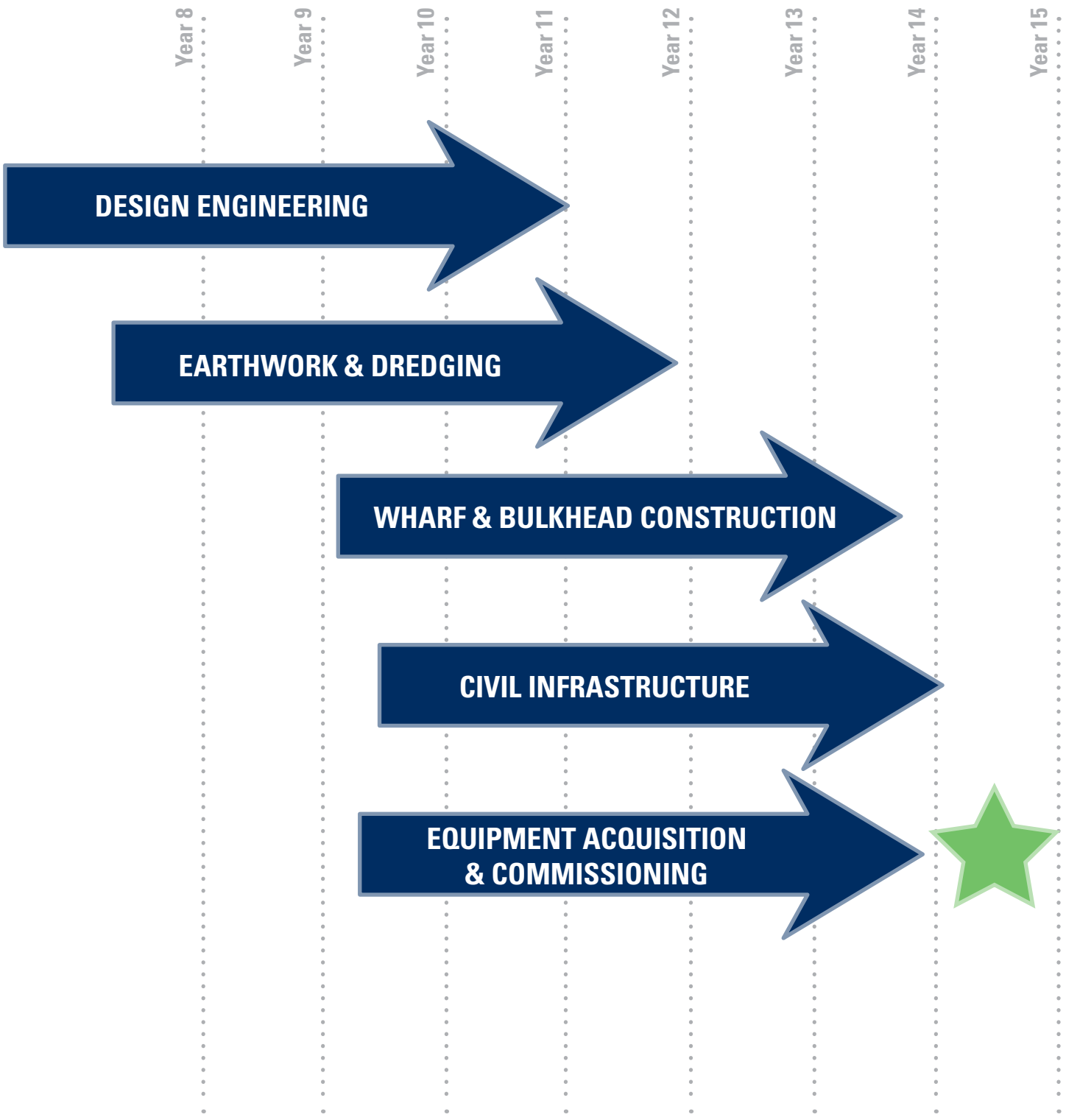
To accommodate trucks, plans call for widening U.S. Highway 17 to four lanes from the Savannah Harbor Parkway to SC 170 Alternate, as well as from SC 170 Alternate to SC 170 West. In addition, a four-lane, divided, limited-access highway will be needed to connect the Jasper Ocean Terminal to U.S. Highway 17. A new South Carolina interchange on I-95 being sought by private developers could also serve trucks carrying containers.

Water, sewer, electric and telecommunications services will be provided by South Carolina Electric & Gas, Beaufort Jasper Water & Sewer Authority and Hargray Communications. All three providers have included the Jasper Ocean Terminal in their long-range master plans.



JASPER PORT TERMINAL PROJECT TIMELINE




Year 8
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DESIGN ENGINEERING
EARTHWORK & DREDGING
WHARF & BULKHEAD CONSTRUCTION
CIVIL INFRASTRUCTURE
EQUIPMENT ACQUISITION
& COMMISSIONING

STRENGTHENING OUR TWO PORTS AUTHORITIES

Georgia and South Carolina have proud legacies as centers for commerce. Indeed, both states were founded in port cities, and maritime commerce has remained a foundation of their economies ever since.

Today, the commercial port activities in each state are directed by ports authorities, quasi-public agencies chartered by the respective state governments. The model used in Georgia, South Carolina, and a few other states is widely seen as the most cost-efficient approach. The ports authority model also allows states to control key investments in port infrastructure and closely track the economic impact of those investments.

The South Carolina State Ports Authority (SCSPA), based in Charleston, was founded in 1942. It oversees five separate terminals in Charleston that serve the container and Ro-Ro markets, and one in Georgetown that is a smaller, break bulk facility.

The Georgia Ports Authority (GPA) is headquartered in Garden City, just west of Savannah. It oversees six terminals in Savannah and Brunswick, including the flagship container terminal at Garden City, a break bulk facility along the Savannah River, and another in Brunswick that serves primarily as a Ro-Ro facility.

Planning for the future is critical for ongoing strategic and future planning is critical to the success of any port, and both ports authorities are planning for growth after strong growth in 2010. GPA is in the midst of deepening the Savannah River to accommodate Post-Panamax vessels. SHEP is expected to be completed in 2016.

As part of a 10-year, $1.3 billion capital plan, SCSPA is adding three new berths at a new terminal on a former Navy Base site and is also in the early stages of planning to deepen the harbor in Charleston.

The two authorities, historically fierce competitors, have committed to work together on the Jasper Ocean Terminal. The project will have the benefit of established and proven planning processes that have been successful in Georgia and South Carolina. In both states, the systematic, strategic expansion of ports has generated hundreds of millions of dollars of economic impact, millions of tax dollars and thousands of jobs.

THE ROAD FORWARD

Since Governors Sanford and Perdue set the Jasper Ocean Terminal in motion more than three years ago, tremendous progress has been made. As discussed earlier, the two ports authorities are fully engaged, lending their credibility and planning skills to the process.

To move the Jasper Ocean Terminal to reality, several key issues must be resolved in 2011 and 2012:

Budget

The current Joint Project Office is working from a $6 million allocation split by the SCSPA and the GPA. These funds should be sufficient to fund activities through 2011. Once the permitting process begins, each state will need to devote $1-2 million annually to cover the necessary costs. State leaders and the ports authority boards need to determine the best funding mechanism for planning, engineering, future permitting and eventually construction.

Further economic analysis

While a preliminary economic analysis was conducted in 2009, and additional studies from the University of Georgia and Wilbur Smith and Associates make a solid case for the port, it is expected that post-recession analysis could show an even stronger need for the Jasper Ocean Terminal. The Joint Project Office expects to task Moffatt & Nichol with an in-depth economic analysis and feasibility study as part of its program of work.

Governance

As required by law, the Joint Project Office has drafted a bi-state compact and submitted it to the state legislatures for review. In 2011, additional attention will be given to how the operations of the port will be handled, including questions related to jurisdiction, revenue sharing between ports authorities, and additional considerations.

Permitting

Permitting for harbors has become more complex. Federal resources are limited in a post-recession atmosphere, and it is likely the Jasper Ocean Terminal will have to self-fund many of the studies undertaken by the U.S. Army Corps of Engineers and other governmental bodies. The GPA and SCSPA also have other significant capital projects at various stages of the permitting process that must be considered. Developing a clear path to permitting will be a critical effort for the board in 2011.

FREQUENTLY ASKED QUESTIONS

Who will pay for it and how much will it cost?

The intergovernmental agreement signed by the governors of Georgia and South Carolina calls for the two states to share in the capital costs for developing the Jasper Ocean Terminal. The states have already shared the expense of acquiring the land and preliminary planning and engineering. Given the expense of developing the port, the board and ports authorities expect to find creative ways to engage private sector investment in the project.

The total cost of the project—covering construction, dredging, infrastructure developments and other direct and indirect expenses— is expected to be in excess of $4 billion. Phase 1, which is projected to begin construction in 2020, will cost approximately $1.7 billion. Annual investments in the $1-2 million range per state are necessary over the next 10 years to fund the permitting process and make sure Georgia and South Carolina will have the opportunity to capture the growth in the U.S. container market.

How will it be governed?

Oversight for the Jasper Ocean Terminal during the permitting process is shared by the GPA and SCSPA through the Joint Project Office. A draft of a bi-state compact has been submitted to the state legislatures for their consideration.

Won't the Jasper Ocean Terminal compete with Charleston and Savannah?

Success at Charleston and Savannah are a pre-condition for development of the Jasper Ocean Terminal. Plans call for the new port to come online in 2025 when both Charleston and Savannah are expected to be at capacity. The Jasper Ocean Terminal will be jointly managed by Georgia and South Carolina. Given that container traffic will continue to migrate to the existing ports, the Jasper Ocean Terminal will be utilized as a cooperative expansion of terminal space that will maximize the port investments already made in both states and provide economic benefits to both states.

What is the role of the U.S. Army Corps of Engineers?

The primary role of the Corps is to prepare the Environmental Impact Statement. It also holds the easement that, for now, limits the development potential of the Jasper County site.

Currently, the site stores dredge material from the maintenance of the Savannah River. Before construction begins, the U.S. Army Corps of Engineers will have to release the easements. This will only occur pending acceptance of the Joint Project Office's proposed Sponsor Plan that identifies an alternative location to place dredge material and how any incremental increase in cost will be funded.

According to Gen. Joe Schroedel, former commander of the South Atlantic Division of the Corps, any release of the easement is contingent upon cooperation of the two states. In the 2007 Water Resources Development Act, the U.S. Congress passed legislation that instructed the Corps to release the easement once both states have reached a mutually acceptable governing structure[14]:

> (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.
>
> (b) Factors for Consideration- In making a determination under subsection
>
> (a), the Secretary shall take into consideration--
>
> (1) landside infrastructure;
>
> (2) the provision of any additional dredged material disposal area as a consequence of removing 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; and
>
> (3) the results of the proposed bi-state compact between the State of Georgia and the State of South Carolina to own, develop, and operate port facilities at the proposed Jasper County port site, as described in the term sheet executed by the Governor of the State of Georgia and the Governor of the State of South Carolina on March 12, 2007.

The Corps also will work with the Joint Project Office on issues of environmental mitigation and permitting. As part of the attempt to curb the impact from the transportation corridor, mitigation credits will be purchased and applied in accordance with existing Corps protocol.

Why will it take 14 years to get the Jasper Ocean Terminal online?

As with any port project, there is a considerable amount of time needed to evaluate the feasibility of a targeted site, understand potential environmental impacts and secure the necessary permits needed to move ahead with construction. Much work has already been done, but the Joint Project Office has been notified by the U.S. Army Corps of Engineers to expect an eight-year

[14] 2007 Water Resources Development Act

permitting process, as well as two additional years for final design and three years for construction.

In the wake of Hurricane Katrina, the Corps requires additional analysis and reviews to help verify the integrity of the project and its impact on the environment. As part of this process, an independent third-party will conduct its own site analysis and project review to determine if the project can move forward.

These processes, while lengthy, are essential and part of the protocol that accompanies the development of any port.

Would a smaller, non-container terminal be a viable alternative?

Developing a port that specialized in smaller cargo (i.e. bulk goods, liquids) has been proposed as a faster alternative. However, the permitting and infrastructure needs for a smaller port are nearly identical to the proposed container terminal. For instance, it would still take eight years to permit a smaller port. While the time taken to construct the terminal and conduct environmental mitigation could conceivably be shorter, significant investments associated with permitting and infrastructure development remain.

Furthermore, in order for the Corps to agree to release the easements, the project must pass a host of stringent environmental and economic hurdles that a smaller port is not likely to pass. In recent years, smaller ports that focus on non-container cargo, such as Port Royal, have struggled financially in the two-state region.

Container terminals offer the highest return on investment, which is crucial given the significant capital costs of such a project. In Jasper Ocean Terminal's case, it is doubtful a smaller port would generate enough revenue to justify the necessary infrastructure and permitting costs.

Why containers?

The decision to plan an international deep water container port at the Jasper site was based on an extensive study of global shipping trends. Traditional industries, including foodstuffs manufacturers, pulp and paper companies and mineral industries also are moving aggressively toward greater containerization, and have critical mass in both Georgia and South Carolina.

With both Charleston and Garden City expecting to run out of container capacity by 2025, expanding the container business at Jasper to the benefit of both authorities makes strategic and economic sense. The return on investment from a container operation is more consistent and higher than from any other type of shipping, allowing for a quicker pay-off for the extensive infrastructure cost. Given the high expenses associated with the off-site infrastructure, as well as the length of time required to obtain a permit, it is necessary that a long-term investment be made in a container terminal that supports Southeastern exports and imports.

Without the additional capacity provided by the Jasper Ocean Terminal, both authorities fear congestion at their existing terminals. Meanwhile, investments at competitive ports in Norfolk, Jacksonville and elsewhere will begin to draw container market share. Focusing on container shipping at the Jasper Ocean Terminal allows both states to preserve their leadership in the container industry, maximize their investments at existing facilities in Charleston and Savannah, and allows time to permit and build the terminal of the future in Jasper County.

What is the projected economic impact of the Jasper Ocean Terminal?

The Jasper Ocean Terminal has the potential to create one million jobs in Georgia and South Carolina and generate more than

$9 billion in tax revenue for the two states[15]. With the coming investments in road and rail infrastructure, Jasper County, as well as neighboring Beaufort, Hampton, Allendale and Colleton counties, are positioned to attract complementary industries such as distribution centers and cargo storage that will actualize the immediate economic potential for the community.

More than 900 direct and indirect jobs will be created through the construction of the Jasper Ocean Terminal with more than $210 million in wages generated[16]. It is expected that these projects would begin in 2020, creating more near-term impact.

How strong is your economic data?

The Joint Project Office is confident in the existing economic evidence it has for the project. The economic data, compiled in 2010, is drawn from multiple credible sources, including studies conducted by the University of Georgia, Wilbur Smith & Associates and Moffatt & Nichol.

As we develop additional information about the cost of the construction project, we will periodically commission studies to update our projections.

What does SHEP have to do with the Jasper Ocean Terminal?

SHEP is sponsored by the GPA to provide Post-Panamax access to the Garden City Terminal. It will provide two benefits to Jasper. First, the dredged material from the deepening will serve as the fill dirt for the new port, elevating the site above the flood plain and saving more than $300 million in site preparation costs.

In addition, it will deepen the river to 48 feet to the Jasper Ocean Terminal from the harbor entrance, contributing to the ultimate depth for the terminal.

But, we're not at capacity yet, so why plan the Jasper Ocean Terminal now?

There are several reasons planning has begun and must continue.

First, it will take eight years (or more) to plan and permit a major ocean port, two more to design it and three to built it. As a result, any delay in moving ahead with the project subjects Georgia and South Carolina to losing market share when demand is at its greatest.

Also, the influx in trade is coming regardless. Emerging trade patterns from the Far East, strong export markets and population growth in the Southeastern U.S., the expansion of the Panama Canal and the increasing use of the Suez Canal as a trade route all point to increased shipping traffic on the East Coast. If forward-thinking action isn't taken now to accommodate this growth, that traffic will bypass our region and move elsewhere, putting our businesses and economy at a disadvantage.

How are you engaging the private sector?

Bringing the private sector into the Jasper Ocean Terminal is an important piece of its long-term success, and steps are being taken to identify viable private partners. It is not likely that federal or state money will cover the cost of the project, so Georgia and South Carolina may need additional capital to move forward.

Port leaders will look at all options for engaging the creativity and resources of the private sector in this project while preserving a structure that is efficient and effective for the terminal. As well as its indirect impact on the economy, the port will generate a positive return on investment. Because of this, it will be appealing to potential investors and will be able to attract private capital if needed.

[15] University of Georgia; Wilbur Smith & Associates; Moffatt & Nichol
[16] Moffatt & Nichol

One option is the signing of long-term leases with shipping companies.

Can Georgia and South Carolina cooperate?

The boards of both ports authorities and the board of the Joint Project Office, which manages the Jasper Ocean Terminal, are committed to a container port at the site.

As noted earlier, success in Charleston and Savannah are pre-conditions for success in Jasper County. By working collaboratively on the Jasper Ocean Terminal, the two states will position their coasts as a global hub for trade, reap tremendous economic benefits and lay the foundation for future regional projects that will better serve their citizens and the entire region.

JASPER
OCEAN TERMINAL

The Joint Project Office

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Georgia Ports Authority

South Carolina Ports

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D H E C

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Board of Health and Environmental Control; Telephone (803) 898-3309 Fax: (803) 898-3393

November 15, 2011

U.S. Mail – Certified and Electronic Mail

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RE: ***Final Review Conference - Docket No. 11-RFR-52*** – *Decision dated September 30, 2011, to deny a 401 Water Quality Certification and objection to the Federal Consistency Determination under the Coastal Zone Management Act.*

Dear Counsel:

Please find enclosed the Final Agency Decision in the above referenced matter.

Sincerely,

Lisa Lucas Longshore

Lisa Lucas Longshore
Clerk

IN THE STATE OF SOUTH CAROLINA
BEFORE THE BOARD OF HEALTH AND ENVIRONMENTAL CONTROL

FINAL AGENCY DECISION

IN RE: Savannah Harbor Expansion Project (SHEP)

Board Docket Number 11-RFR-52

Appearances:

Col. Jeffrey M. Hall, for Requestor US Army Corps of Engineers

Curtis Foltz, for Requestor Georgia Ports Authority

John Harleston, Esq. for South Carolina Department of Health & Environmental Control

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This Final Agency Decision is issued with the consent of the Department of Health and Environmental Control staff (DHEC), the US Army Corps of Engineers (COE), and the Georgia Ports Authority (GPA) to resolve the Requests for Review presented herein regarding the Savannah Harbor Expansion Project.

DHEC staff denied COE's request for certification from DHEC under Section 401 of the Clean Water Act and for concurrence from DHEC with COE's consistency determination under the federal Coastal Zone Management Act for the Savannah Harbor Expansion Project ("the Project"). COE and GPA requested review by the Board of the staff decisions and a final review conference was scheduled before the Board at its November 10, 2011 meeting. At the conference, it was stated that DHEC staff and the Requestors, COE and GPA, reached an agreement that resolves the disputed issues among them concerning the Project, and presented the agreement to the Board for approval.

The Board finds that the agreement is consistent with the laws of the State of South Carolina and that the applicant COE is entitled to the requested approvals. The Board adopts the agreement of DHEC staff, COE, and GPA as the Final Agency Decision.

FINDINGS OF FACT

The Savannah District of the United States Army Corps of Engineers (COE) proposes to deepen the Savannah Harbor navigational channel. The Project will involve dredging the Savannah Harbor navigational channel in the Savannah River which forms the boundary between the State of Georgia and the State of South Carolina. The COE requests Section 401 Water Quality Certifications from the Georgia Department of Natural Resources (Georgia DNR) and from the South Carolina Department of Health and Environmental Control and seeks concurrence from Georgia DNR and DHEC that the Project is consistent with the States' Coastal Zone Management Programs.

On November 15, 2010, COE issued a Joint Public Notice for the Project which served as an application to DHEC for a Section 401 Water Quality Certification and Coastal Zone Management consistency determination. On January 25 and 31, 2011, DHEC's Office of Ocean and Coastal Resource Management issued letters objecting to COE's determination that the project is fully consistent with the South Carolina Coastal Tidelands and Wetlands Act and the Coastal Zone Management Program. On September 30, 2011, DHEC issued a letter reiterating that position. On September 30, 2011, DHEC also issued a Notice of Department Decision proposing to deny the application for a Section 401 Water Quality Certification.

On October 7, 2011, COE filed a timely Request for Final Review of both the proposed denial of the Section 401 Water Quality Certification and the finding that the project was not consistent with the South Carolina Coastal Tidelands and Wetlands Act and the Coastal Zone

Management Program. GPA also filed a timely Request for Review of both staff decisions. On November 3, 2011, the South Carolina Coastal Conservation League, South Carolina Wildlife Federation, and Savannah Riverkeeper filed a motion to intervene, which the Board denied.

CONCLUSIONS OF LAW

DHEC has authority under Section 401 of the Clean Water Act, 33 USC §1341, the S.C. Pollution Control Act, S.C. Code Ann. §§48-1-10, et seq., and S.C. Code R.61-101 to grant and deny certifications of projects affecting waters of the State. DHEC also has authority to certify projects affecting the Coastal Zone for consistency with the Coastal Management Program under the federal Coastal Zone Management Act, 16 U.S.C. §§1451, et seq., and South Carolina Coastal Tidelands and Wetlands Act, S.C. Code Ann. §§48-39-10, et seq. Subject to the conditions of this agreement, the Board concludes that DHEC has reasonable assurance that the Project will comply with South Carolina water quality standards, and that the Project is consistent with enforceable provisions of the Coastal Management Program.

IT IS THE FINAL AGENCY DECISION OF THE BOARD, WITH THE CONSENT OF THE PARTIES, that:

1. COE will commit to operation of the Dissolved Oxygen system as stated in the letter from Col. Jeffrey M. Hall of November 4, 2011, specifically:

> First, the project Record of Decision will expressly recognize a binding commitment to install, operate, and maintain the DO system in accordance with the project mitigation plan, subject to Congressional appropriation of funds for the project. Second, the Savannah District will make the DO system a top priority for annual operation and maintenance (O&M) funds appropriated and received for the project, above normal maintenance requirements.

2. The GPA will provide financial assurance, in a manner acceptable to DHEC, that it will fund operation and maintenance of the Dissolved Oxygen system in any year that sufficient

federal funds for the operation and maintenance of the system are not made available. This obligation extends for the life of the project (50 years). Such financial assurance may be achieved through a Standby Trust Fund, Surety Bond, Letter of Credit, Insurance, or other means deemed acceptable to DHEC. The GPA will provide the financial assurance before any dredging begins. For purposes of the COE, this offer and commitment by GPA to provide financial assurance does not constitute an item of local cooperation or cost-shared feature.

3. To address DHEC concerns about the sufficiency of mitigation for potential impacts on salt marsh, the State of Georgia agrees to transfer salt marsh to the State of South Carolina to maintain as a marsh or for the State of Georgia to preserve as marsh in perpetuity and from development an amount of acreage of salt marsh in South Carolina equivalent to 2,200 mitigation credits (generally 1,690 acres) as part of its Environmental Sustainability Program. For purposes of the COE, this offer and commitment by GPA to transfer salt marsh does not constitute an item of local cooperation or cost-shared feature.

4. COE shall comply with all terms and conditions in the National Marine Fisheries Service Final Biological Opinion.

5. To ensure protection of cultural resources, DHEC must receive an executed Programmatic Agreement for Cultural Resources signed by COE and the South Carolina Historic Preservation Office.

6. To ensure that the levels of environmental effects predicted in the Environmental Impact Statement (EIS) are not exceeded, COE will comply with the Monitoring and Adaptive Management Plan provided as Appendix D of the EIS. The Monitoring and Adaptive Management Plan will ensure the accuracy of the predicted environmental impacts, assess the effectiveness of the mitigation features, and provide for modification of the Project as needed.

7. The attached 401 certification and concurrence with COE's Coastal Management Plan consistency determination are hereby issued.

8. COE agrees that no Project dredging will begin until compliance with these conditions, and specifically that no dredging will begin until the provision by the Georgia Ports Authority of the financial assurance required above.

9. The GPA represents and agrees that it has authority to execute this agreement on behalf of itself and the State of Georgia, with regard to their respective obligations, and that its consent to this agreement fully binds the GPA and the State of Georgia to the terms of this agreement.

10. COE and the GPA acknowledge that this agreement is legally binding and DHEC may enforce their respective obligations assumed herein as necessary and appropriate in a court of law with jurisdiction.

11. Neither COE nor the GPA admits that the project as described in the Environmental Impact Statement was or is not in compliance with the requirements of the 2008 Mitigation Rule or any other applicable requirements for mitigation. The GPA and the State of Georgia agree to the additional measures required above in order to facilitate settlement of the disputes among the parties and to alleviate DHEC concerns regarding the environmental effects of the Project. DHEC understands that the COE may not include these additional measures in the Final EIS or ROD for the Project.

Allen Amsler
Chairman
Board of Health and Environmental Control
For the Board

11/15, 2011

CONSENTED TO AND AGREED BY:

11/15/11

John Harleston
Attorney for DHEC, Respondent

15/NOV/2011

Jeffrey M. Hall. Col, US Army
For COE, Requestor

11/15/11

Curtis Foltz
For GPA, Requestor

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

November 15, 2011

US Army Corps of Engineers
PO Box 889
Savannah GA 31402-0889

Re: Certification in Accordance with Section 401 of the Clean Water Act, as amended.

US Army Corps of Engineers
Savannah Harbor Expansion Project
Savannah River
Jasper County
P/N 2010 SHEP

Dear Sir,

The Bureau of Water of the South Carolina Department of Health and Environmental Control (Department) has reviewed plans for this project and determined that there is a reasonable assurance that the proposed project will be conducted in a manner consistent with the Certification requirements of Section 401of the Federal Clean Water Act, as amended, and the permitting requirements of R. 19-450 et. seq., 1976 SC Code of Laws.

The Department issued a Notice of Department Decision proposing to deny the Certification for this project on September 30, 2011. Timely requests for review were filed with the Board of Health and Environmental Control by the US Army Corps of Engineers – Savannah District and the Georgia Ports Authority in accordance with S.C. Code Section 44-1-60. Subsequent to the filing of the requests for review, the Department and the parties entered into negotiations towards a settlement. The parties reached an agreement and the DHEC Board adopted the agreement on November 10, 2011, authorizing issuance of this certification on terms consistent with the agreement.

In accordance with the provisions of Section 401, we certify that this project, subject to the indicated conditions, is consistent with applicable provisions of Section 303 of the Federal Clean Water Act, as amended. We also hereby certify that there are no applicable effluent limitations under Sections 301(b) and 302, and that there are no applicable standards under Sections 306 and 307.

This certification is subject to the following conditions:

1. The project must comply with the terms and conditions of the Final Agency Decision of the Board of Health and Environmental Control signed on November 15, 2011.

2. The project must comply with the terms and conditions of the Water Quality Certification issued on February 16, 2011, by the Georgia Department of Natural Resources.

The Department reserves the right to impose additional conditions on this Certification to respond to unforeseen, specific problems that may arise and to take any enforcement action necessary to ensure compliance with State water quality standards.

Sincerely,

Heather Preston, Director
Division of Water Quality
Bureau of Water

cc: U.S. Army Corps of Engineers,
Charleston District Office
SC DHEC, Beaufort EQC Office District Office
SC DHEC, OCRM

D H E C
PROMOTE PROTECT PROSPER

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

November 15, 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 (SHEP) – Federal Consistency Determination

Dear Colonel Hall:

Based on the executed consent agreement entered into by SCDHEC, US Army Corps of Engineers and the State of Georgia, SCDHEC-OCRM removes its objection to the Corps finding of Consistency for the SHEP.

Sincerely,

Carolyn Boltin-Kelly

Carolyn Boltin-Kelly, Deputy Commissioner
SCDHEC- Office of Ocean and Coastal Resource Management

cc: Earl Hunter, Commissioner, SCDHEC