
FINAL
ENVIRONMENTAL IMPACT STATEMENT
SAVANNAH HARBOR EXPANSION PROJECT
Chatham County, Georgia and Jasper County, South Carolina

January 2012
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**US Army Corps
of Engineers**
*Savannah District
South Atlantic Division*

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ENVIRONMENTAL IMPACT STATEMENT
FOR THE
SAVANNAH HARBOR EXPANSION**

CHATHAM COUNTY, GEORGIA AND JASPER COUNTY, SOUTH CAROLINA

The responsible lead agency is the US Army Engineer District, Savannah. Cooperating agencies are the Environmental Protection Agency (Region IV), the Department of Commerce (acting through the National Marine Fisheries Service), the Department of the Interior (acting through the US Fish and Wildlife Service) and the Georgia Ports Authority.

ABSTRACT: Savannah Harbor is an approximately 32.7 mile long Federal navigation project located along the Savannah River in southeast Georgia. The current Savannah Harbor Navigation Project (Figure 1) has an authorized project depth of 30 feet Mean Low Water (MLW) in the inner harbor (Stations 112+500 to 105+000), 36 feet MLW (Stations 105+000 to 103+000), 42 feet MLW (Stations 103+000 to 0+000), 42 feet MLW in the entrance channel (Stations 0+000 to -14+000B), and 44 feet MLW 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. Due to rapid shoaling in the Federal navigation channel, it is difficult to maintain the exact project depth (i.e., -42 feet MLW) at all times. Allowable overdepth and advance maintenance are procedures used to accomplish this objective (See Section 3.01 for additional information on these terms). The existing Federally-maintained navigation channel includes 2-feet allowable overdepth and up to 6-feet advance maintenance (depending on location). Savannah Harbor was last deepened in 1993/1994. Since that time container traffic has greatly exceeded projections. In excess of 70% of the vessels do not call on Savannah Harbor at their maximum capacity or design draft. The "light loading" of vessels increases costs to the shipper, which are eventually passed onto the consumer. Less efficient vessels also generally result in higher shipping costs. Congress conditionally authorized deepening the harbor up to six feet in the Water Resources Development Act of 1999 (Section 102(b)(9)). The authorization is contingent upon: (1) completion of an Environmental Impact Statement, (2) approval of the Selected Plan by the Secretary of Interior, Secretary of Commerce, Secretary of the Army, and the Administrator of the Environmental Protection Agency; and (3) a determination by the Secretaries that the associated mitigation plan adequately addresses the potential environmental impacts of the project. The Corps of Engineers issued a Report of the Chief of Engineers (Chief's Report) later in 1999 which provided further direction on the additional studies that needed to be conducted. This EIS accompanies a General Re-evaluation Report. These two documents describe the work conducted and present information and analysis

to satisfy the conditional authorization, the National Environmental Policy Act (NEPA), and the direction of the Chief's Report.

The Corps evaluated a wide range of alternatives for addressing the navigation problems in the harbor, including structural and non-structural methods. An iterative alternatives evaluation revealed that channel deepening would be the only way to reasonably address the problems. Detailed evaluations were conducted on the channel deepening alternatives based on a 50-year period of analysis. This Final EIS contains information about each of those alternatives. As a result of its investigations, the Corps has identified the 47-foot depth alternative as the National Economic Development (NED) Plan – the plan that maximizes net economic benefits to the Nation and fully complies with Army policy. The Selected Plan is the 47-foot depth alternative.

The Selected Plan includes dredging most of the navigation channel and one existing turning basin (Kings Island Turning Basin at Stations 98+500 to 100+500) 5 feet deeper (to an authorized navigation depth of 47-feet), deepening eight berths at the Garden City Terminal (Berths 2, 3, 4, 5, 6, 7, 8, and 9), constructing three bend wideners (Stations -23+000B to -14+000B, 27+700 to 31+500, and 52+250 to 55+000), constructing two meeting areas (Stations 14+000 to 22+000 and 55+000 to 59+000), and constructing an approximately 38,000 foot (7.1 mile) long extension to the existing ocean bar channel from Station -60+000B to -97+680B. The existing 2-feet of allowable overdepth and up to 6-feet advance maintenance (depending on location) would be retained. Features of the existing Navigation Project that would not be improved would remain as components of the Savannah Harbor Navigation Project. Dredging methods recommended include hydraulic pipeline, hopper dredge, mechanical dredge, or similar equipment. This equipment would be used to excavate approximately 13 million cubic yards of new work sediment from the Inner Harbor (Garden City Terminal from Station 103+000 to Station 4+000) with disposal in the existing upland confined disposal facilities (CDFs) and about 10.6 million cubic yards of new work sediment for the Entrance Channel (Stations 4+000 to -97+680B) with placement in the US Environmental Protection Agency approved Ocean Dredged Material Disposal Site (ODMDS) or existing CDFs. This proposed action would result in the initial excavation of about 23.6 million cubic yards of dredged sediment. Subject to the availability of funds, the construction would likely occur over a three to four year period. The authorized depths would be maintained by periodic dredging over the 50-year period of analysis.

The proposed action would impact habitat of Striped bass and the endangered Shortnose sturgeon, tidal freshwater wetlands, and fringe brackish marshes. Impacts to these resources would occur as a direct result of sediment removal and the physical act of dredging. Additional impacts to these resources would also occur through increased salinity and changes in dissolved oxygen levels, which are indirect water quality effects resulting from deepening of the harbor. Conversion of salt marsh to brackish marsh would occur as a result of mitigation features to protect freshwater marshes. All impacts are discussed in detail in the Final EIS and impacts are avoided or minimized to the maximum extent possible. Mitigation is proposed for unavoidable impacts to significant resources such as loss of Shortnose sturgeon and Striped bass habitat, loss and/or conversion of tidal freshwater, brackish and salt marsh in the project area, and changes in dissolved oxygen levels in the inner harbor.

Council on Environmental Quality (CEQ) regulations for implementing NEPA state that an EIS “*shall be concise, clear, and to the point, and shall be supported by evidence that the agency has made the necessary environmental analyses*” and an EIS “*shall be analytic rather than encyclopedic*”. Because of the large amount of information and data involved in this project, incidental material from the September 1998 Tier I Final EIS is considered supporting documentation. This supporting documentation is incorporated by reference in this Final EIS and is available at the Savannah District, US Army Corps of Engineers.

A Notice of Intent (NOI) to prepare a Draft EIS for this project was filed with the USEPA on January 22, 2002. Within the NOI, the public and agencies were notified that a scoping meeting would be conducted for the proposed project. On February 21, 2002, a scoping meeting was held for the proposed action at the Savannah International Trade and Convention Center. Additionally, on April 12, 2002, a NEPA scoping meeting was convened. A list of commenters is presented in Section 7.01 of this EIS. All comments received on the NOI and scoping letter and/or meetings were considered during project planning and design, and writing of this EIS.

A Notice of Availability of the Draft EIS was published in the Federal Register on November 15, 2010 providing a 45-day comment period for the document. The comment period for the Draft EIS was extended an additional 15 days until January 25, 2011. A public information meeting on the Draft EIS was held at the Savannah Civic Center on December 15, 2010. Comments received on the Draft EIS as well as responses to those comments are contained in Appendix A of this document.

A Notice of Availability of the Final EIS will be published in the Federal Register providing a 30-day comment period for the document. Comments on the Final EIS may be sent to the following:

SEND YOUR COMMENTS TO THE
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LIST OF ACRONYMS & ABBREVIATIONS

ACP	Panama Canal Authority
AFB	Alternative Formulation Briefing
AIWW	Atlantic Intracoastal Waterway
ANN	Artificial Neural Networks
ASA	Assistant Secretary of the Army
ATM	Applied Technology and Management, Inc.
ATR	Agency Technical Review
BL	Base/Bilge Line
BR	Back River
CADET	Channel Analysis & Design Evaluation Tool
CB	Container Berth
CD	Circuit Distance
CDF	Confined Disposal Facilities
CEDEP	Corps of Engineers Dredge Estimating Program
CH	High liquid limit clay
CHL	Coastal and Hydraulics Laboratory
CL	Low liquid limit clay
CSPS	Container Shipping Planning Service
CWCCIS	Civil Works Construction Cost Index System
CWE	Current Working Estimate
CZM	Coastal Zone Management
DMCA	Dredged Material Containment Areas
DMMP	Dredged Management and Material Plan
DO	Dissolved Oxygen
DOT	Department of Transportation
DOTS	Dredging Operations Technical Support
DQC	District Quality Control
EFDC	Environmental Fluid Dynamics Computer Code
EIS	Environmental Impact Statement
EN	Engineering
EPA	Environmental Protection Agency
ERDC	Engineering Research and Development Center
EWT	Effective Work Time
FCC	Fully Cellular Container Vessels
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
GAEPD	Georgia Environmental Protection Division
GI HIS	Global Insight
GIS	Geographic Information System
GP	Poorly graded gravels
GPA	Georgia Ports Authority
GRR	General Reevaluation Report
HH&C CoP	Hydrology, Hydraulics and Coastal Community of Practice

HTRW	Hazardous, Toxic, and Radioactive Waste
IEPR	Independent External Peer Review
IP	International Paper
IWR	Institute for Water Resources
JOI	Jones/Oysterbed Island
KITB	King's Island Turning Basin
LFA	Load Factor Analysis
LNG	Liquefied Natural Gas
LSE	Lloyd's Shipping Economist
LTMS	Long Term Management Strategy
M2M	Model-to-Marsh
MARAD	Maritime Administration
MCACES	Microcomputer Aided Cost Estimating System
MGD	Million Gallons per Day
MH	High liquid limit silt
MHW	Mean High Water
ML	Low liquid limit silt
MLLW	Mean Lower Low Water
MLW	Mean Low Water
MPC	Maximum Practicable Capacity
MPD	Maximum Practicable Draft
MPLD	Maximum Practicable Loading Draft
MR	Middle River
MSA	Metropolitan Statistical Area
MSI	Maritime Strategies International, Limited
MSL	Mean Sea Level
MSM	Marsh-succession Model
MTL	Mean Tide Level
MTRG	Modeling Technical Review Group
MXSLLD	Maximum Summer Load Line Draft
NAVD	North American Vertical Datum
NED	National Economic Development
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries
NOAA	National Oceanic and Atmospheric Administration
NSBL&D	New Savannah Bluff Lock and Dam
O&M	Operations and Maintenance
ODMDS	Ocean Dredged Material Disposal Site
OH	Organic silts
OSHA	Occupational Safety and Health Administration
OSI	Ocean Surveys, Incorporated
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PD	Planning Division
PDT	Project Delivery Team
PED	Planning, Engineering, and Design

PIANC	World Association for Waterborne Transport Infrastructure
PX	Panamax Vessel Class
PPX	Post-Panamax Vessel Class
PPX1	Generation 1 Post-Panamax Vessel Class
PPX2	Generation 2 Post-Panamax Vessel Class
RED	Regional Economic Development
RTG	Rubber-tired Gantries
RMSE	Root Mean Square Error
S&A	Supervision and Administration
SAD	South Atlantic Division
SAS	Savannah District
SC	Clayey sands
SCDHEC	South Carolina Department of Health and Environmental Control
SEG	Stakeholders Evaluation Group
SET	Scientific and Engineering Technology
SHEP	Savannah Harbor Expansion Project
SM	Silty sand
SNG	Southern Natural Gas
SNS	Shortnose sturgeon
SOD	Sediment Oxygen Demand
SP	Poorly graded sand
SPT	Standard Penetration Test
SPX	Sub-Panamax Vessel Class
SRBA	Savannah River Below Augusta
STS	Ship Tow Simulator
STS	Ship-to-Shore
TCSM	Transportation Cost Savings Model
TEU	Twenty Foot Equivalent Units
TMDL	Total Maximum Daily Load
TPCS	Total Project Cost Summary
TPI	Tons per Inch Immersion
TS	Technical Services
UKC	Underkeel Clearance
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USEC	United States East Coast
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VE	Value Engineering
WASP	Water quality Analysis Simulation Package
WTS	World Trade Service

**FINAL
ENVIRONMENTAL IMPACT STATEMENT
FOR
SAVANNAH HARBOR EXPANSION
CHATHAM COUNTY, GEORGIA AND
JASPER COUNTY, SOUTH CAROLINA**

1.00 SUMMARY

Congress authorized initial construction of the Federal navigation project at Savannah Harbor in 1874. In 1896, two jetties were constructed at the mouth of the Savannah River entrance. A submerged offshore breakwater was completed in 1897 to stabilize the inlet and provide a shelter for shipping traffic entering Tybee Roads. Tybee Island is located on the south side of the entrance channel to the Savannah River.

The navigation channel of the Savannah River was deepened from 21.5-foot Mean Low Water (MLW) to a depth of 26-foot MLW in 1912 to accommodate larger ships. Depth increases were later made in 1936 to 30-foot MLW and 1945 to 36-foot MLW. The channel was widened and deepened in 1972 to a depth of 40-foot MLW. In 1994, much of the authorized depth of the channel was increased to 42-foot MLW. The navigation project includes 2-foot allowable overdepth and up to 6-foot advance maintenance (depending on location) to help maintain the authorized navigation depth, in spite of the rapid shoaling that occurs in some areas of the harbor. At present, approximately 32.7 miles of navigation channel exist, extending from Savannah Harbor across Tybee Roads into the Atlantic Ocean (see Figure 1-1).

Figure 1-1 shows the station numbering convention that is used in the harbor. The proposed oceanward extent of the Entrance Channel (or Ocean Bar Channel) for the 47-foot depth alternative is at Station -97+680B (or 97,680 feet east or oceanward of the river entrance and B stands for Ocean Bar Channel). The entrance to the river is at Station 0+000 (or near the Fort Pulaski National Monument in Georgia). Upstream of the river entrance is Fort Jackson and the CSS Georgia at Stations 55+000 to 60+000 (or 55,000 to 60,000 feet upstream of the Fort Pulaski National Monument). The upstream end of the proposed deepening of the harbor at the Garden City Terminal is at Station 103+000 (or 103,000 feet upstream of the river entrance). The upstream terminus of the entire Savannah Harbor Navigation Project is at Station 112+500. Therefore, the total project length is 210,180 feet (112,500 feet of river channel plus 97,680 feet of ocean bar channel equals 210,180 feet) or 39.8 miles (210,180 feet divided by 5,280 equals 39.8 miles), where River Mile is defined as the river Station in feet divided by 5,280 feet. For example, the upstream limit of the project is at Station 112+500 or River Mile 21.3 (112,500 feet divided by 5,280 feet per mile equals 21.3 miles). Both conventions are used interchangeably throughout the report documents.

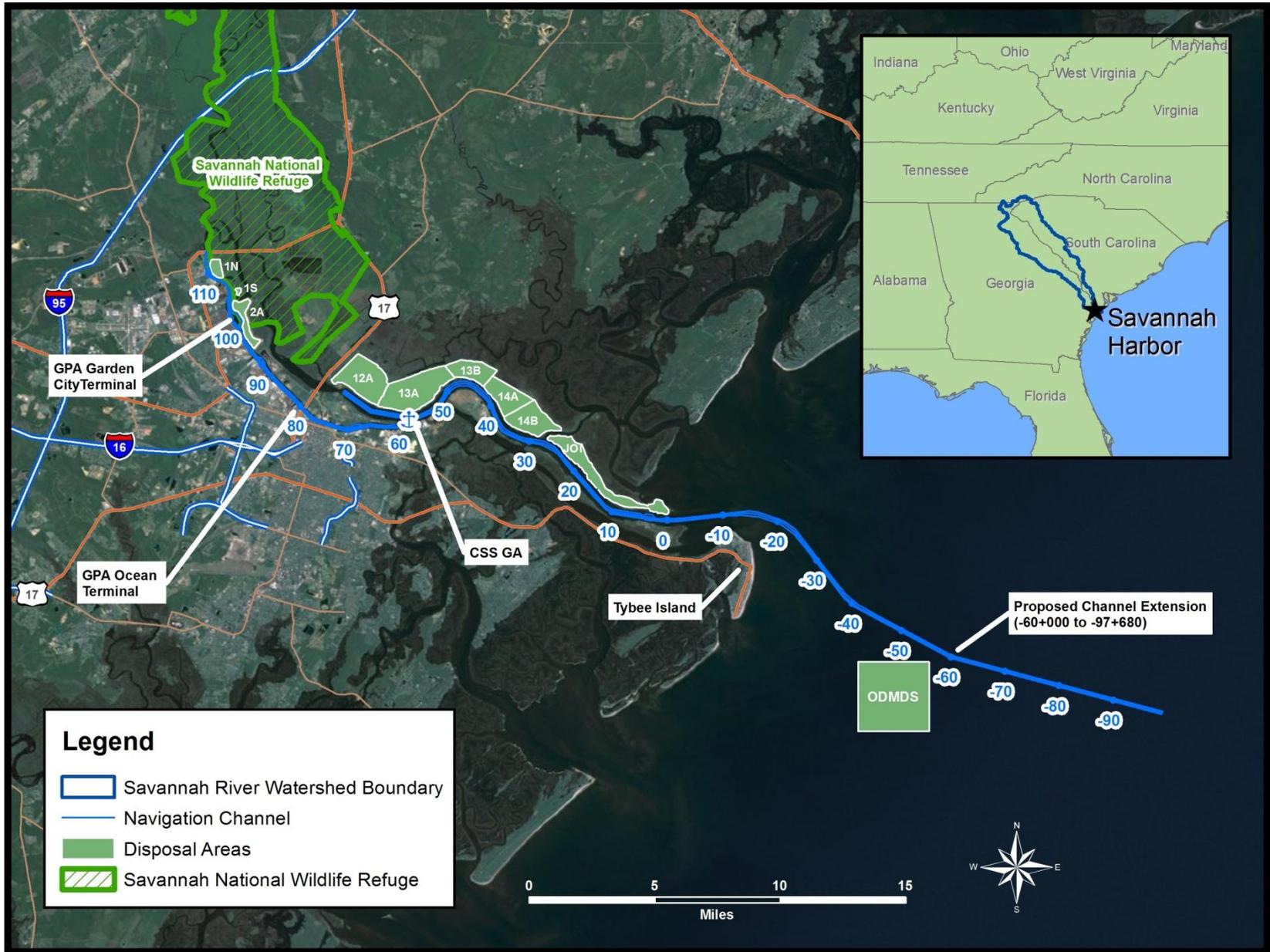


Figure 1-1. Overview map of Savannah Harbor.

1.01 Background and Purpose

Following the provisions of Section 203 of the Water Resources Development Act of 1986, the Georgia Ports Authority (GPA) conducted a feasibility study of various methods of improving navigation in Savannah Harbor and the expected environmental effects of those proposals. The US Army Corps of Engineers (the Corps) adopted these documents prepared by the GPA and published a Draft Tier I EIS in May 1998 and the Final Tier I EIS in September 1998. In the Water Resources Development Act of 1999 (Section 101(b)(9)), the US Congress conditionally authorized deepening the Savannah Harbor navigation channel to a maximum depth of -48 feet Mean Low Water (MLW). Approval of additional studies and the project is required from the Administrator of the Environmental Protection Agency, the Secretary of Commerce, the Secretary of Interior, and the Secretary of the Army.

The Corps completed the Tier I EIS process when it signed a Record of Decision (ROD) in December 1999. The ROD included additional requirements, including additional review by the Corps of Engineers and approval of the Chief of Engineers to ensure that construction of the project would comply with all applicable laws and policies.

After the authorization, the GPA formed the Stakeholders Evaluation Group (SEG) in 1999 to provide a recurring public forum about the project and to assist them and the Corps in identifying scientific studies and analyses that should be performed to identify environmental impacts that may result from proposed deepening of the harbor. The SEG has as its principal charge the development of consensus amongst the participants regarding:

- A. the scope and content of the scientific investigations and analyses to be performed pursuant to the development of the Final EIS, and
- B. the appropriate increment of channel depth and the appropriate mitigation measures.

As those studies were identified, GPA and the Corps began conducting those tasks. Since its inception, the SEG provided input to GPA, Federal and State agencies on all aspects of the scientific investigations, analyses, and mitigation options for the proposed action. The Corps performed additional studies and investigations which it believed were necessary to properly evaluate the alternatives.

The Savannah District has prepared a General Reevaluation Report (GRR) and this Final Environmental Impact Statement (EIS) which evaluates engineering, environmental and economic acceptability of various alternatives for addressing the existing and future navigation issues. These alternatives are based on deepening the Savannah Harbor navigation channel in increments from the existing depth of 42-foot MLW up to 48-foot MLW, including the “No Action” alternative. The GRR and the EIS serve as decision documents regarding whether to implement the authorized deepening.

1.02 Areas of Concern and Issues

The proposed deepening of the Savannah River Federal Navigation Channel would impact habitat of Striped bass and the endangered Shortnose sturgeon, tidal freshwater wetlands, brackish marsh, and salt marsh. The project would also periodically increase chloride levels at the City of Savannah's Water Intake in Abercorn Creek. During the NEPA process for the GPA Tier I DEIS and FEIS and the GPA information meeting on July 25, 2000, a number of concerns and issues were identified that required additional study for the proposed action. Additional issues were also identified through the SEG process. These issues were listed within the NOI dated January 22, 2002. Additional concerns were identified and discussed during the subsequent scoping meetings on February 21, 2002 and April 12, 2002 for this EIS. Table 1-1 lists all these identified issues and indicates where they are discussed within the document.

All these impacts are discussed in detail in the EIS, along with measures to avoid, minimize, or mitigate the impacts as described. Mitigation is proposed for unavoidable impacts to significant resources such as the conversion of tidal freshwater marsh within the Savannah National Wildlife Refuge, dissolved oxygen (DO) levels within the inner harbor, impacts to recreational boaters, and loss of habitat for the Shortnose sturgeon and Striped bass.

1.03 Major Conclusions and Findings

Substantial efforts have been made to inform and listen to the public, the SEG, local communities, and State and Federal resource agencies regarding the proposed harbor deepening. Since its inception in January 1999 to the present day, the Corps has met with the SEG approximately 70 times to discuss the proposed action. In addition to the Public Scoping Meeting on February 21, 2002 and the NEPA scoping meeting on April 12, 2002, a number of meetings with the public and agencies have discussed the project issues including salinity, DO levels, conversion of freshwater to brackish marsh, nekton, benthos, contaminated sediments, economics, and other impacts related to the proposed harbor deepening. A public information meeting was held 30 days after release of the DEIS to provide opportunity for public and agency input. The models used to quantify impacts to water quality, DO, chlorides, salinity, fisheries, and conversion of freshwater to brackish wetlands have been reviewed and agreed to by the State and Federal agencies. Copies of memorandums recording these meetings as well as PowerPoint presentations made to the SEG, impact groups, etc. can be found at the Savannah District Office, US Army Corps of Engineers. The conclusions from these meetings and subsequent comments are incorporated into this FEIS. The dredging impacts have been minimized to the extent feasible. Additional groundwater studies and surface water modeling efforts were conducted regarding the saltwater water intrusion and DO levels within the project area. Loss of habitat for Shortnose sturgeon and Striped bass, DO levels in the harbor, conversion of tidal freshwater marsh within the Savannah National Wildlife Refuge, loss of brackish marsh, conversion of salt marsh, and increases in chlorides at the City of Savannah's water intake on Abercorn Creek will be mitigated. The results of these efforts are presented in the EIS.

Table 1-1. Issues Identified for the Savannah Harbor Expansion Project

Impacts to wetlands from changes to salinity within the project area as well as within the Savannah National Wildlife Refuge	See Sections 4.08, 5.01, and Appendix C
Impacts to Threatened and Endangered Species from changes in salinity, dissolved oxygen, and other factors	See Section 5.03, 5.11, and Appendices B and Z
Impacts to Striped Bass Spawning and Nursery Habitat from changes in salinity and dissolved oxygen	See Section 5.03 and Appendix C
Impacts to Anadromous Fish Populations (river herring, American Shad, etc.) from changes in salinity, 04 and dissolved oxygen, and other factors	See Section 5.03 and Appendix C
Impacts to the City of Savannah’s water quality at the intake structure on Abercorn Creek from changes in chloride levels	See Sections 4.02, 5.02.3 and Appendix C
Verification of the EFDC and WASP (3-Dimensional Hydrodynamic Models)	See Tetra Tech (2006) in References and GRR Appendix C, Attachment 3
Water Quality - Salinity Changes	See Sections 4.02.3, 5.02 and Appendix C
Water Quality - Dissolved Oxygen	See Sections 4.02.2, 5.02.1, and Appendix C
Water Quality - Chloride Concentrations	See Sections 4.02.2, 5.02, and and Appendix C

Table 1-1. Issues Identified for the Savannah Harbor Expansion Project (Continued)

Tidal Freshwater Wetlands	See Sections 4.08, 5.01.2, and Appendix C
Cumulative Impacts (from previous, current and proposed dredging)	See Section 5.15 and Appendix L
Fishery Management Plans	See Appendix N
Impacts to Other Fish Species (i.e., Red Drum, etc.)	See Sections 4.04 and 5.03
Essential Fish Habitat	See Sections 4.05 and 5.14 Appendix S
Management of Contaminated Sediments	See Sections 4.01.2.1, 5.04.2.2 and Appendix M
Beach Erosion	See Sections 4.07, 5.09, and Appendix L
Channel Slope Erosion	See Sections 4.07 and 5.09
Fort Pulaski Shoreline Erosion and other impacts	See Sections 4.07 and 5.09
Agitation Dredging	See Appendix B and DMMP in GRR
Sand as a Resource or Beneficial Use of Dredge Sediment	See Sections 3.07 and 5.20
Project Economics	See GRR

Table 1-1. Issues Identified for the Savannah Harbor Expansion Project (Continued)

USACE Section 1135 Restoration Project	See Section 3.0
Bend Wideners and Meeting Areas Impacts	See Sections 3.01 and 5.01
Dredged Material Disposal Capacity and Impacts	See DMMP in the GRR
Impacts on adjacent Georgia and South Carolina properties	See Sections 2.01, and 5.01
Integration with the USACE Savannah River Basin Comprehensive Water Resources Management Study	See Sections 4 and 5
Tidal Amplitude	See Section 4
Ballast Water	See Sections 4.06 and 5.20
Drinking water aquifer (groundwater)	See Sections 4.02, 5.05 and Appendix L
Cultural and Historic Resources (CSS Georgia, Fort Jackson, Fort Pulaski, etc.)	See Sections 4.10, 5.12, and Appendices F and G
Environmental Justice	See Section 5.19
Multiport Analysis	See Section 3 and GRR
Landside Infrastructure	See GRR
Alternative Methods to Improve Transportation Efficiencies	See GRR
Alternate Sites for Terminal Operations	See Section 3, Appendices H and O, and GRR
Consistency with Coastal Zone Management Plans	See Section 5.13 and Appendices I, J, and Z

1.04 Relationship of the Proposed Action to Environmental, Legal, Regulatory, and Policy Requirements

Table 1-2 starting on the next page identifies the status of environmental requirements of the proposed action. Compliance with all applicable Federal, State, and local policies has been assessed in this Final EIS and is summarized in Section 6.0.

1.05 Previous Corps of Engineers Reports Related to Savannah Harbor

Dredging and disposal methods for the Savannah Harbor project have been addressed in previous environmental documents which were circulated for public and environmental agency review. Much of the information from these documents is included in this Final EIS for easier reference by the reader.

Previous reports include:

US Army Corps of Engineers, Savannah District. July 1991. Savannah Harbor Deepening Feasibility Report. In 1991, the U.S. Army Corps of Engineers, Savannah District, published the final interim feasibility study on a proposed deepening of Savannah Harbor. The study resulted in a 1994 project to deepen the inner harbor from the existing 38 feet to 42 feet (Stations 103+000 to 0+000), deepen the existing entrance channel from the existing 38 feet to 42 feet (Stations 0+000 to -14+000B), and deepen the entrance channel from the existing 40 feet to 44 feet (Stations -14+000B to -60+000B). Dredged sediment from the entrance channel was placed at the existing ocean dredged material disposal site and, for the first time, on the beach at Tybee Island. Sediment from the inner harbor channel was placed in the existing upland disposal areas.

US Army Corps of Engineers, Savannah District. September 1991. Environmental Improvement (Section 1135) Study. The Savannah District conducted a study to evaluate proposed modifications for environmental improvements to the Savannah Harbor Navigation Project, pursuant to the authority provided by Section 1135 of the 1986 Water Resources Development Act. The approved modification closed New Cut with hydraulic fill and ceased tide gate operation, by removal of the tide gates. The tide gate abutments along the adjacent high ground and the tide gate supports (or piers) within the sediment basin in the Back River were not removed and remain in place. The purpose of this action was intended to substantially reduce salinity levels in Back River and eliminate the flushing of striped bass eggs and larvae through New Cut to increase survival rates. A Section 1135 report and Environmental Assessment for this proposed action were completed in September 1991. Construction was completed in April 1992 at a total cost of \$2.05 million.

Table 1-2. Relationship of Proposed Action to Environmental Requirements

<u>Federal Law</u>	<u>Recommended Action</u>
Abandoned Shipwreck Act of 1987	Not Applicable
Anadromous Fish Conservation Act	Compliance, see 5.03
Clean Air Act of 1972, as amended	Compliance, see 4.03, 5.06, and Appendix K
Clean Water Act of 1972, as amended	Compliance, see 4.08, 5.01, 5.02, and Appendices C, H, Z
Coastal Barrier Improvement Act of 1990	Compliance, see 5.23
Coastal Barrier Resources Act of 1982	Compliance, see 5.23
Coastal Zone Management Act of 1972, as amended	Compliance, see 5.13 and Appendices I, J, Z
Endangered Species Act of 1973, as amended	Compliance, see 4.09, 5.03, 5.11, and Appendices B, Z
Estuary Protection Act of 1968	Compliance, see 5.13 and Appendices I, J
Federal Water Project Recreation Act of 1968, as amended	Not Applicable
Fish and Wildlife Coordination Act of 1934, as amended	Compliance, see 5.03, 7.02, and Appendix E
Land and Water Conservation Act of 1964, as amended	Not Applicable
Magnuson-Stevens Fishery Conservation and Management Act of 1976	Compliance, see 7.02 and Appendix E

**Table 1-2. Relationship of Proposed Action to Environmental Requirements
(Continued)**

<u>Federal Law</u>	<u>Recommended Action</u>
Marine Mammal Protection Act of 1972, as amended	Compliance, see 4.09, 5.11, and Appendix B
Marine Protection, Research, and Sanctuaries Act of 1972, as amended (Section 103 of MPRSA is also known as the Ocean Dumping Act or ODA)	Compliance, see 4.04 5.14, and 6.03
Migratory Bird Treaty Act of 1918 as amended	Compliance, see 4.07 and 5.08
National Environmental Policy Act of 1969, as amended	Compliance, see EIS and GRR
National Historic Preservation Act of 1966, as amended	Compliance, see 4.10, 5.12, Appendices F and G
Prime and Unique Farmland	Not Applicable
Resource Conservation and Recovery Act, as amended (Hazardous Waste Issues)	Compliance, see 4.01, 5.24, and Appendix M
River and Harbor Act of 1970, Public Law 91-611, Section 122	Compliance, see 3.0
Safe Drinking Water Act of 1974, as amended	Compliance, see 5.02 and Appendix C
Sunken Military Craft Act	Compliance, see 4.10, 5.12, and Appendices F, G
Water Resources Development Act of 1976, Public Law 94-587, Section 150	Not applicable
Water Resources Development Act of 1986, Public Law 99-662, Section 906	Compliance, see EIS, including Appendix C and authorizing legislation for SHEP: WRDA 1999 Section 101(b)(9)
Watershed Protection and Flood Prevention Act of 1954, as amended	Not Applicable
Wild and Scenic Rivers Act of 1968, as amended	Not Applicable

**Table 1-2. Relationship of Proposed Action to Environmental Requirements
(Continued)**

<u>Executive Order</u>	<u>Recommended Action</u>
EO 11988, Floodplain Management	Compliance, see 5.10
EO 13112, Invasive Species	Compliance, see 5.01, and Appendices C and D
EO 11990, Protection of Wetlands	Compliance, see 5.01, and Appendix C
EO 11593, Protection and Enhancement of the Cultural Environment	Compliance, see 5.12, and Appendices F and G
EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	Compliance, see 5.19
EO 13045, Protection of Children From Environmental Health Risks and Safety Risks	Compliance, see 5.19
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds	Compliance, see 4.07 and 5.08
<u>State Law (to comply with Federal requirements)</u>	<u>Recommended Action</u>
Coastal Zone Management (CZM) Programs Georgia and South Carolina	Compliance, see 5.13 and Appendices I, J and Z
Clean Water Act Section 401 Water Quality Certifications from Georgia and South Carolina	Compliance, see 4.02.4, 5.02 and Appendix Z

Note: Compliance is defined as having met the requirements of the statute, Executive Order, or other environmental requirement for the current stage of planning.

US Army Corps of Engineers, Savannah District. August 1996. Long Term Management Strategy (LTMS). In 1996, the Savannah District developed a comprehensive plan for addressing navigation and navigation related issues in Savannah Harbor. The primary focus was channel maintenance and disposal of dredged material. The EIS prepared during the study presented a new Base Plan (Federal Standard) for harbor maintenance activities, including rotational use of disposal areas. It is a comprehensive EIS for harbor operations and maintenance including Federal and local assurer responsibilities. This plan was adopted as the baseline for evaluation of the Dredged Material Management Plan needs for this project. The Division Engineer signed the ROD on 3 February 1997.

US Army Corps of Engineers, Savannah District. 1996. Lower Savannah River Basin Environmental Restoration Study. The Savannah District completed the final interim feasibility report in 1996 on the Lower Savannah River Basin Environmental Study. The purpose of the study was to investigate the feasibility of environmental restoration of two navigation cuts and bends on the Savannah River. The Chief of Engineers report was approved 30 June 1996 and the project was authorized for construction in the Water Resources Development Act of 1996. Construction was completed in July 2002. A portion of the river flow was diverted down Bear Creek to rehydrate bottomland adjacent hardwoods.

US Army Corps of Engineers, Savannah District. Tier I Draft (May 1998) and Final (September 1998) Environmental Impact Statements, Savannah Harbor Expansion Feasibility Study Report (includes main report and appendixes A, B, and C), Completed by the Georgia Ports Authority and adopted by the Chief of Engineers.

US Army Corps of Engineers, Savannah District. September 2003. Dredged Material Management Plan (DMMP) Update. Implemented the cost sharing changes proposed in the Water Resources Development Act of 1996, as well as updating the rotation of the confined disposal facilities (CDFs) laid out in the Long Term Management Strategy (LTMS) dated 1996. US Army Corps of Engineers guidance requires that DMMP's be developed for management of dredge material from a Federal navigation project. The original DMMP was completed by the USACE, Savannah District in September 1995 and became the Federal Standard, or Base Plan for cost-effective and environmentally acceptable harbor maintenance by the Savannah District. Moreover, the LTMS dated 1996 stated that it also fulfilled the requirement for a DMMP.

US Army Corps of Engineers, Savannah District. 2004. EA/FONSI for the Savannah Harbor Navigation Project, Disposal Areas 13A and 13B, Bank Erosion Protection.

US Army Corps of Engineers, Savannah District. 2006. EA/FONSI for the Savannah Harbor Federal Navigation Channel, Chatham County, Georgia. Actions consisted of a realignment of the Federal navigation channel along Ranges 37 and 38 (referred to as the CB-8 realignment) and a separate realignment along Ranges 41, 42, and 43 (referred to as the Upper Harbor realignment).

US Army Corps of Engineers, Savannah District. August 2006. EA/FONSI for a Drought Contingency Plan Update for the Savannah River Basin. The action retained the major components of the 1989 Savannah River Basin Drought Contingency Plan and adding several new features. The new features consisted primary of different discharge rates from Thurmond Dam and changes to water management operations while in a drought.

US Army Corps of Engineers, Savannah District. July 2008. EA/FONSI for Renourishment of Tybee Island, GA. The action evaluated the planned renourishment of the Tybee Island Shore Protection Project.

US Army Corps of Engineers, Savannah District. November 2008. EA/FONSI for a Temporary Deviation to the Drought Contingency Plan for the Savannah River Basin. The action consisted of a reduction in the discharge from 3,600 to 3,100 CFS from Thurmond Dam while in Level 3 drought from November 1, 2008 through February 28, 2009.

US Army Corps of Engineers, Savannah District. October 2011. EA/FONSI for Level 4 Drought Operations in the Savannah River Basin. The action defined how the Corps would operate when a severe drought has depleted the conservation pools of its three reservoirs on the Savannah River.

1.06 Tiering

Tiering is recommended by the CEQ NEPA regulations when a broad (Tier I) EIS has been prepared and then later a (Tier II) EIS is prepared on an action included within the scope of the initial, broader (Tier I) EIS.

The 1998 Feasibility Study Report and Tier I EIS was written by the Georgia Ports Authority (GPA) and provided to the Corps and to Congress for authorization. After Congress conditionally authorized the project, the Corps completed its review of the documents. The Corps determined that the project was not formulated in accordance with applicable US Army Corps of Engineers planning procedures and that an acceptable mitigation plan was not determined. Analyses included in the SHEP Tier I EIS only evaluated the potential impacts for a -50-foot MLW channel depth. The Corps required a special report and EIS be prepared to identify the NED Plan and the appropriate mitigation. This EIS was prepared to fulfill the environmental portion of those requirements. It should be noted that the Draft EIS was referred to as a Tier II EIS, but, as discussed, the Final EIS is more appropriately considered a full EIS.

The Corps conducted a full EIS (not tiered) in this phase of the project to reconsider methods that may be available to meet the needs for the project, more completely identify and evaluate the potential impacts of project alternatives, develop acceptable mitigation plans, and conclusively determine the NED plan. These include refinement of the hydrodynamic and water quality models, and obtaining agreement from USACE and the natural resource agencies in the models' ability to reasonably predict the impacts of the proposed project alternatives, including mitigation features. In-depth investigations were performed of issues identified through the NEPA scoping process. The findings and

conclusions of these additional evaluations are complete, and the information is included in the Final GRR and EIS.

1.07 Comparison of Draft and Final Reports

A notice of availability for the Draft GRR and EIS was published in the Federal Register on November 26, 2010. The Corps has since revised to those documents as a result of Headquarters Policy Review, public and agency reviews, Agency Technical Review, Independent External Peer Review, and to provide updated information. The list below provides a summary of the changes that affected the total project cost.

- A. Incorporating a larger fish passage design at the New Savannah Bluff Lock and Dam near Augusta, Georgia, as mitigation for impacts to habitat of the endangered Shortnose sturgeon
- B. Removal from the project the construction of an underwater sill in lower Middle River
- C. Increasing Post-Construction Monitoring from 5 to 10 years for several elements
- D. Adding two Speece cones to the Dissolved Oxygen Injection System
- E. Completing additional evaluation of chloride impacts on the City of Savannah's Abercorn Creek intake and adding mitigation for those impacts
- F. Removing nearshore placement of new work dredged sediments near Tybee Island, Georgia from the project
- G. Adding real estate to address additional fish passage and chloride mitigation needs
- H. Increasing construction management costs to address additional fish passage and chloride mitigation needs
- I. Increasing the amount of Planning, Engineering and Design costs across all project features and to address additional fish passage and chloride mitigation needs
- J. Updating costs from October 2010 to October 2011 price levels

The economic analysis in the draft report depended on data and information from vessel operations and forecasts up through 2007 and 2008. The final report incorporates vessel operations information and forecasts available through 2010. Key elements incorporated include establishing a new baseline for forecasting commodity flow and traffic, updating the world fleet and Savannah vessel call information, including vessel operating costs, and inclusion of Post-Panamax Generation 2 vessels in the without-project condition.

Changes made to the Final GRR and EIS that did not affect project costs or benefits include updating the air quality evaluation, incorporating the conditions from the National Marine Fisheries Service Final Biological Opinion, conducting additional dissolved oxygen modeling in shallow areas, and documenting interagency coordination from November 2010 to the present.