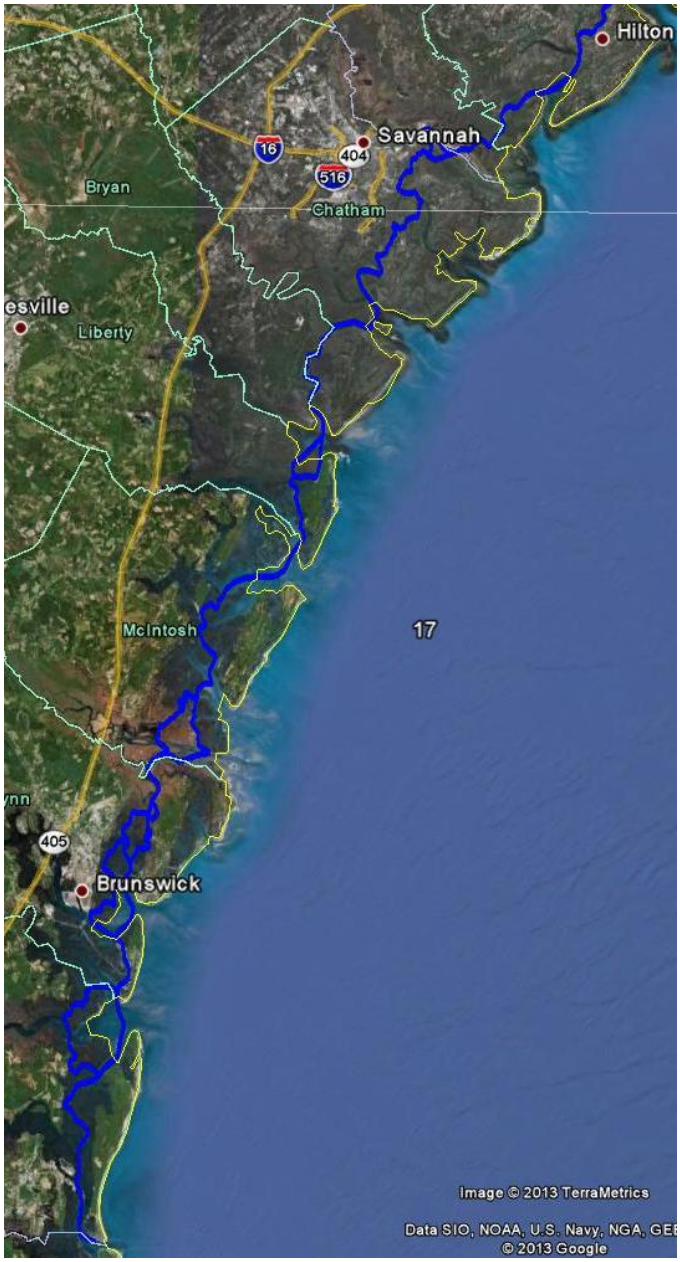
Draft Dredged Material Management Plan
Atlantic Intracoastal Waterway

Port Royal Sound, South Carolina to Cumberland Sound, Georgia

March 2014

Draft Environmental Assessment



US Army Corps of Engineers®
South Atlantic Division
Savannah District

FINDING OF NO SIGNIFICANT IMPACT

Name of Action: Implementation of a Dredged Material Management Plan for the Atlantic Intracoastal Waterway, Port Royal Sound, South Carolina to Cumberland Sound, Georgia

1. Project Description: The Savannah District, U.S. Army Corps of Engineers (Savannah District) is proposing to implement a new 20-year Dredged Material Management Plan (DMMP) for its portion of the Atlantic Intracoastal Waterway (AIWW) between Port Royal Sound, South Carolina and Cumberland Sound, Georgia. This 161-mile section of the AIWW comprises a 24-mile section in South Carolina with the remaining 137 miles located in Georgia. The purpose of the authorized AIWW project is to provide a continuous sheltered route for shallow-draft vessels along the Atlantic coast. The Dredged Material Management Plan (DMMP) was analyzed to ensure that the Savannah District portion of the AIWW has sufficient dredged material disposal capacity for a minimum of 20 years as required by the USACE Planning Guidance Notebook (ER 1105-2-100). Since the last EIS (1976) and DMMP (1983), 13 out of 36 operational reaches within the Savannah District's portion of the AIWW lack sufficient 20-year sediment disposal area capacity; therefore, the Savannah District has prepared a new DMMP to address the capacity deficiencies.

In the proposed DMMP, sediments dredged to maintain authorized navigation depths in the AIWW would be placed in existing upland dredged material containment areas in South Carolina and Georgia; previously used open water placement areas in Ossabaw and Buttermilk Sounds, Georgia; or in existing and new Ocean Dredged Material Disposal Sites located off the Georgia coast. Creation of new Ocean Dredged Material Disposal Sites will require additional site investigations, preparation of environmental assessments, and separate approval from federal and state agencies. Dredging of the AIWW would occur in accordance with the Without Project Condition until the new DMMP is implemented.

2. Coordination: Savannah District coordinated this project with Federal and State natural resources agencies and the interested public and issued a Notice of Availability of the Draft Environmental Assessment (EA) to:

a. Inform agencies and individuals of the proposed work and the environmental evaluation contained in the Draft EA, and

b. Provide an opportunity for comments on that evaluation and findings.

3. Environmental Impacts:

a. With the proposed new DMMP, dredged sediments would be placed in existing DMCAs, previously used open water sediment placement tracts in Ossabaw and Buttermilk Sounds, or in existing and new Ocean Dredged Material Disposal Sites.

b. Overall, the environmental impacts of implementing the proposed action are expected to be minor in scope and temporary in duration.

c. A biological assessment evaluating the potential impacts of the proposed action on endangered and threatened species has been prepared. This assessment concluded that the proposed action would not likely adversely affect any listed endangered or threatened species. The assessment is being coordinated with the USFWS (jurisdiction over several terrestrial and freshwater species, the Florida manatee, piping plover, and nesting sea turtles) and NMFS (jurisdiction over other protected marine and aquatic species which may occur in the project vicinity) pursuant to Section 7 of the Endangered Species Act of 1973 (PL 93-205), as amended. The USFWS and NMFS would provide their position on the project's compliance with Section 7 as part of their review of the Draft EA. Compliance obligations under Section 7 would be satisfied prior to or during implementation of the proposed action.

d. Significant impacts to known archaeological or historic resources are not anticipated as a result of the proposed work. The Savannah District, in consultation with the Georgia and South Carolina SHPOs and the Advisory Council on Historic Preservation, has developed a Programmatic Agreement for the project's compliance with Section 106 of the National Historic Preservation Act.

e. Implementing the new DMMP would require a Section 401 Water Quality Certificate from the States of Georgia and South Carolina. Savannah District has requested Section 401 Water Quality Certification from both states in conjunction with their review of the EA.

f. The proposed action is in compliance with all applicable environmental laws, including the Anadromous Fish Conservation Act of 1965, as amended; Clean Air Act of 1972, as amended; Coastal Barrier Improvement Act of 1990; Coastal Barrier Resources Act of 1982; Coastal Zone Management Act of 1972, as amended; Estuary Protection Act of 1968; Fish and Wildlife Coordination Act of 1934, as amended; Magnuson-Stevens Fishery Conservation and Management Act of 1976; Marine Mammal Protection Act of 1972, as amended; Marine Protection, Research, and Sanctuaries Act of 1972, as amended (Section 103 of MPRSA is also known as the Ocean Dumping Act or ODA); Migratory Bird Treaty Act of 1918 as amended; National Environmental Policy Act of 1969, as amended; and the National Historic Preservation Act of 1966, as amended.

g. Impacts to approximately 37.5 acres of previously impacted estuarine emergent wetlands (saltmarsh) would occur in the future from implementing the new DMMP. Compensatory mitigation would be provided by payment to a land trust or state natural resource agency of $375,000 (37.5 acres at $10,000 per acre). These funds would be provided for the purpose of purchase and/or preservation/restoration of saltmarsh. With this compensatory mitigation in place, the implementation of the new DMMP would not result in a net loss of wetlands.

h. No adverse secondary impacts which have a significant probability of occurrence were identified from the operations proposed in the new DMMP.

4. Determination: I have determined that this action does not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, the action does not require the preparation of a detailed statement under Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 *et seq.*). My determination was made considering the following factors discussed in the EA:

a. The proposed action has been designed to minimize impacts and avoid adverse impacts to threatened or endangered species potentially occurring in the project area.

b. No unacceptable adverse cumulative or secondary impacts would result from project implementation.

c. The work has been designed to avoid impacts to any potential cultural resources in the project area.

d. No additional long term adverse impacts to the environment would be associated with the proposed project.

e. No significant impacts on air quality are expected from the proposed project.

f. The proposed action complies with Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations", and does not represent disproportionate high and adverse human health or environmental effects on minority populations and low-income populations in the United States.

g. The proposed action does not involve activities that would pose any disproportionate environmental health risk or safety risk to children in accordance with EO 13045, Protection of Children from Environmental Health Risks and Safety Risks (21 April 1997).

5. Findings: Implementation of the proposed Dredged Material Management Plan for Savannah District's portion of the Atlantic Intracoastal Waterway would result in no significant adverse environmental impacts and is the alternative that represents sound engineering practices and meets environmental standards.

_____
Date

_____
Thomas J. Tickner
Colonel, U.S. Army
Commanding

DRAFT
ENVIRONMENTAL ASSESSMENT
FOR A 20-YEAR
DREDGED MATERIAL MANAGEMENT PLAN
FOR THE
ATLANTIC INTRACOASTAL WATERWAY
PORT ROYAL SOUND, SOUTH CAROLINA TO CUMBERLAND SOUND, GEORGIA

EXECUTIVE SUMMARY

The Atlantic Intracoastal Waterway (AIWW) is a 739-mile inland waterway system between Norfolk, Virginia, and St. John's River, Florida, which enables continuous sheltered passage for waterborne vessels between these two destinations. The portion of the AIWW maintained by the US Army Corps of Engineers (USACE) Savannah District is located between miles 552 and 713 of the AIWW. Roughly, this area falls between Port Royal Sound, South Carolina on the north and Cumberland Sound, Georgia on the south, which is located at the Georgia-Florida border. Savannah District's portion of the waterway constitutes approximately 22 percent of the AIWW. The 161-mile section of the AIWW within Savannah District is divided into 36 operational reaches and comprises a 24-mile section in the State of South Carolina with the remaining 137 miles located in the State of Georgia. The US Navy dredges the southernmost reach of the AIWW in Georgia, located near the Kings Bay Naval Submarine Base. Consequently, no USACE actions in the southernmost reach are evaluated in this Environmental Assessment (EA).

In 1937, the first piece of legislation that created the waterway with the currently authorized dimensions was passed. The River and Harbor Act of 1937 authorized a 7-foot protected route around St. Andrew Sound, Georgia and for a 12-foot channel between Beaufort, South Carolina and Savannah, Georgia. In 1938, a 12-foot channel between Savannah, Georgia, and Fernandina, Florida was authorized. The widths of the AIWW were authorized as 90 feet in land cuts and narrow streams and 150 feet in open waters. Dredging of the 12-foot channel between Beaufort, South Carolina, and Fernandina, Florida, was initiated in 1940 and completed in 1941.

The purpose of the authorized AIWW project is to provide a continuous sheltered route for shallow-draft vessels along the Atlantic coast. The purpose of the proposed Dredged Material Management Plan (DMMP) being analyzed in this EA is to ensure that the Savannah District portion of the AIWW has sufficient dredged material disposal capacity for a minimum of 20 years as required by the USACE Planning Guidance Notebook (ER1105-2-100). Since the last EIS (1976) and DMMP (1983), 13 out of 36 operational reaches within the Savannah District’s portion of the AIWW lack sufficient 20-yr disposal area capacity; therefore, the Savannah District has prepared this EA and associated DMMP update to address the capacity deficiencies.

Historical data show that many of the Savannah District AIWW reaches do not require dredging. From 1942 to 1980, dredging occurred infrequently for some reaches and more frequently for others. Several of the reaches such as the Skidaway Narrows, Old Teakettle Creek, and the Frederica River only required dredging during the 1940s when the authorized channel was constructed. Previous DMMP data show maintenance dredging occurred frequently in the Wilmington River, Hells Gate, South River, Little Mud River, Altamaha Sound, Buttermilk Sound, and Jekyll Creek reaches.

Based on historical dredging data, the Savannah District dredged the Fields Cut, Hells Gate, Creighton Narrows, South River, Little Mud River, Altamaha Sound, Buttermilk Sound, Jekyll Creek, and Cumberland Sound reaches numerous times from 1941 to 2009 (the last year dredging occurred). During this period, dredging occurred more frequently in the Hells Gate, Little Mud River, and Buttermilk Sound reaches. The Little Mud River, Buttermilk Sound, and Jekyll Creek reaches contained the largest shoaling volumes.

Operational reaches were developed based on dredged material quality and the projection of future dredging quantities. Using historical maintenance dredging records and hydrographic survey data, 20-year maintenance dredging projections and dredging frequencies were developed for the Savannah District section of the AIWW. The results of the future dredging projections, quantities, and frequencies suggested logical divisions of management reaches.

The Savannah District portion of the AIWW consists of 36 operational reaches (i.e., SAV-1 to SAV-36). The 20-yr maintenance and storage data show:

a. Of the 161 miles of Savannah operational AIWW, 61.6 miles require maintenance dredging, 93.4 miles do not require dredging, and the Navy dredges 6.0 miles.
b. Sixteen of the operational reaches do not require dredging on a regular basis; four of these reaches have not been dredged since initial construction of the AIWW in 1941.
c. Ten operational reaches require dredging once every 1 to 4 years.
d. Three operational reaches require dredging once every 5 to 9 years.
e. Six operational reaches require dredging once every 10 to 20 years.
f. The Navy maintains the SAV-36 operational reach; therefore, Savannah District is not responsible for this reach.
g. Operational reach SAV-33 has the largest per-event volume (461,500 million cubic yards) and the largest 20-yr dredging and storage volume of all the Savannah operational reaches (15.9 million cubic yards).
h. Thirteen of the Savannah operational reaches lack sufficient placement area capacity or lack an existing placement area and thus are unable to meet the 20-yr volume requirement.

The 13 Savannah operational reaches that lack sufficient 20-yr placement area capacity drove the requirement for Savannah District to prepare an update to its 1983 DMMP.

The new DMMP and its associated environmental impacts are evaluated in this EA. Dredging and sediment placement activities prior to 1976 were addressed in the 1976 AIWW EIS (USACE 1976).

Historically, Savannah District AIWW dredging relied heavily on unconfined placement into saltmarsh tracts located adjacent to the reaches being dredged. The only confined placement sites on the AIWW are Tracts 2-B/3-A located along the Wilmington River, a 26-acre dredged materials containment area (DMCA) located in the western end of Tract 9-A at Thunderbolt, and Tract 1700-L at Kings Bay in Camden County; DMCA 14-B in Savannah Harbor overlaps part of AIWW disposal Tract SC-1 in South Carolina and has been used since the late 1970s. Unconfined open water placement of sediments occurred at several sites adjacent to the AIWW. One AIWW reach (Ramshorn Creek, South Carolina) contains sandy sediments suitable for beneficial use, particularly beach re-nourishment.

Unconfined saltmarsh placement is no longer permitted in South Carolina, and the Georgia Department of Natural Resources has requested that the Corps reduce or eliminate the practice in Georgia. The major hurdle in eliminating unconfined saltmarsh placement is the fine-grained, silty consistency of much of the material dredged from the Savannah District portion of the AIWW. The DMMP accompanying this EA includes alternative methods of placement of fine-grained dredged sediments, the impacts of which are evaluated in this document. All these impacts are discussed in detail in this EA, along with measures to avoid, minimize, or mitigate the impacts as described. Mitigation is proposed for unavoidable impacts to significant resources such as tidal wetlands (saltmarsh) resulting from placement of dredged materials.

If the proposed new DMMP is implemented, dredged sediments would be placed in existing DMCAs, open water sites and existing disposal tracts in Ossabaw and Buttermilk sounds, or in existing and new ocean dredged material disposal sites.

Implementation of the proposed new DMMP and mitigation plan would not result in significant adverse impacts to environmental and human resources such as geology and sediments, water resources, air quality, marine and estuarine resources (including fisheries, shellfish harvest areas, and marine and estuarine sanctuaries), essential fish habitat, terrestrial resources (including conservation lands, migratory birds and other wildlife), wetlands and floodplains, threatened and endangered species, archaeological and historic resources, esthetics, recreational and commercial marine traffic, socio-economic resources (including population, employment, economic infrastructure, and low-income populations).

Impacts to approximately 37.5 acres of previously impacted estuarine emergent wetlands would occur in the future from implementing the proposed new DMMP. Compensatory mitigation would be provided by payment to a land trust or state agency of $375,000 (37.5 acres at $10,000 per acre). These funds would be for the purpose of purchase and preservation/restoration of tidal wetlands (saltmarsh). With this compensatory mitigation in place, the implementation of the proposed new DMMP would not result in a net loss of wetlands.

List of Acronyms and Abbreviations

AIWW	Atlantic Intracoastal Waterway
APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act
BATES	Biological Assessment of Threatened and Endangered Species
CESAD	U.S. Army Corps of Engineers South Atlantic Division
Corps	U.S. Army Corps of Engineers
CY	Cubic Yards
CZM	Coastal Zone Management
DEIS	Draft Environmental Impact Statement
District	Savannah District, U.S. Army Corps of Engineers
DMMP	Dredged Material Management Plan
DMCA	Dredged Material Containment Area
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
EWRAP	Estuarine Wetland Rapid Assessment Procedure
FEMA	Federal Emergency Management Agency
FWCAR	Fish and Wildlife Coordination Act Report
GA DNR	Georgia Department of Natural Resources
GA DNR – CRD	Georgia Department of Natural Resources – Coastal Resource Division
GA DNR – EPD	Georgia Department of Natural Resources – Environmental Protection Division
GA DOT	Georgia Department of Transportation
GASF	Georgia Archaeological Site Files
HAPC	Habitat Area of Particular Concern
HUC	Hydrologic Unit Code
LTMS	Long Term Management Strategy
MHL	Mean High Water
MLW	Mean Low Water
MLLW	Mean Low Lowest Water
MMPA	Marine Mammal Protection Act
MPRSA	Marine Protection, Research, and Sanctuaries Act
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Service
NPS	National Park Service
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
O&M	Operations and Maintenance

ODMDS	Ocean Dredged Material Disposal Site
PA	Programmatic Agreement
SAD	US Army Corps of Engineers South Atlantic Division
SAFMC	South Atlantic Fisheries Management Council
SC DHEC	South Carolina Department of Health and Environmental Control
SC DNR	South Atlantic Department of Natural Resources
SFHA	Special Flood Hazard Area
SHEP	Savannah Harbor Expansion Project
SMMP	Site Material Management Plan
SOP	Standard Operating Procedure
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WMA	Wildlife Management Area

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1.0 Purpose and Need for the Action

1.1 Project Area

The Atlantic Intracoastal Waterway (AIWW) is a 739-mile inland waterway system between Norfolk, Virginia, and St. John's River, Florida, which enables continuous sheltered passage for waterborne vessels between these two destinations. The portion of the AIWW maintained by the US Army Corps of Engineers (USACE) Savannah District is located between miles 552 and 713 of the AIWW. Roughly, this area falls between Port Royal Sound, South Carolina on the north and Cumberland Sound, Georgia on the south, which is located at the Georgia-Florida border. Savannah District's portion of the waterway constitutes approximately 22 percent of the AIWW. The 161-mile section of the AIWW within Savannah District is divided into 36 operational reaches and comprises a 24-mile section in the State of South Carolina with the remaining 137 miles located in the State of Georgia. The US Navy dredges the southernmost reach of the AIWW in Georgia, located near the Kings Bay Naval Submarine Base. Consequently, no USACE actions in the southernmost reach are evaluated in this Environmental Assessment (EA).

1.2 Purpose and Need

The purpose of the authorized AIWW project is to provide a continuous sheltered route for shallow-draft vessels along the Atlantic coast. The purpose of the proposed Dredged Material Management Plan (DMMP) is to ensure that the Savannah District portion of the AIWW has sufficient dredged material disposal capacity for a minimum of 20 years as required by the USACE Planning Guidance Notebook (ER1105-2-100). Since completion of the last Environmental Impact Statement (EIS) in 1976 and DMMP in 1983, 13 out of 36 operational reaches within the Savannah District’s portion of the AIWW lack sufficient 20-yr disposal area capacity; therefore, the Savannah District has prepared a new DMMP and associated EA to address the capacity deficiencies (Taylor Engineering 2011). The decision documents provide an updated 20-year maintenance plan for the AIWW within Savannah District that allows continued use of the waterway and minimizes adverse environmental impacts associated with the dredging and sediment disposal.

The proposed new DMMP outlines a 20-year maintenance plan that identifies dredged material disposal options and evaluates problems associated with the maintenance of the AIWW. Based on the analysis of studies and collaboration with other agencies, a recommended plan (the proposed DMMP) was developed that allows continued use of the waterway and minimizes adverse environmental impacts.

Figure 1-1: Atlantic Intracoastal Waterway from mile 552 to 557

Figure 1-2: Atlantic Intracoastal Waterway from mile 575 to 605

Figure 1-3: Atlantic Intracoastal Waterway from mile 605 to 630

Figure 1-4: Atlantic Intracoastal Waterway from mile 630 to 655

Figure 1-5: Atlantic Intracoastal Waterway from mile 680 to 705

Figure 1-6: Atlantic Intracoastal Waterway from mile 700 to 710

Figure 1-7: Atlantic Intracoastal Waterway from mile 590 to 605

1.3 Project Authorization and Construction

The construction and maintenance AIWW between Savannah, Georgia, and Fernandina, Florida, was initially authorized by the River and Harbor Act of 2 August 1882, House Document 19,46th Congress, which provided modifications in portions of the waterway. Additional sections of the AIWW that were not included in the 1882 Act were incorporated into the project in 1892. The River and Harbor Act of 13 July1892, House Document 41, 52nd Congress, 1st Session, provided for a 7-foot channel between Savannah and Fernandina. The AIWW between Beaufort, South Carolina, and Savannah, Georgia, was originally authorized by the River and Harbor Act of 3 June 1896, House Document 295, 53rd Congress, 3rd Session. It also provided for a 7-foot channel. After authorization and construction, several other Acts modified the route of the waterway to abandon old sections and include new ones which were either more convenient to traffic or easier to maintain. In 1936, the authorized project consisted of a channel 7 feet deep at Mean Low Water (MLW) with a width of 75-feet between Beaufort, South Carolina, and Savannah, Georgia, and a width of 150-feet between Savannah, Georgia, and Fernandina, Florida.

In 1937 the first piece of legislation that created the waterway with the dimensions authorized today was passed. The River and Harbor Act of August 26, 1937, provided for a 7-foot protected route around St. Andrew Sound (Senate Committee Print, 74th Congress, 1st Sess.) and for a 12-foot channel between Beaufort, South Carolina, and Savannah, Georgia (Rivers and Harbors Committee Doc. No. 6, 75th Congress, 1st Sess.). On 20 June 1938, a 12-foot channel was authorized between Savannah, Georgia, and Fernandina, Florida. The authorization included various cut-offs, and an anchorage basin at Thunderbolt (House Doc. No. 6liB, 75th Congress, 3rd Sess.). The widths of the AIWW were authorized as 90 feet in land cuts and narrow streams and 150 feet in open waters. Dredging of the 12-foot channel between Beaufort, South Carolina, and Fernandina, Florida, was initiated in 1940 with the excavation of 507,275 cubic yards (CY) and it was completed in 1941 with the removal of 6,168,556 CY.

In addition to the main route and the protected route around St. Andrews, the project provides for two other alternate channels. An alternate and more protected route of 7 feet deep MLW from Doboy Sound to Brunswick, Georgia, was incorporated into the project in 1912. The River and Harbor Act of March 2, 1945, approved an alternate route 9 feet deep and 150 feet wide in Frederica River. This alternate route did not require dredging since it had been the main route prior to its abandonment in 1938 for a new route via Mackay River. Although all three of these routes are part of the AIWW project today, maintenance is only performed in the protected route around St. Andrews Sound.

In addition to providing for the 12-foot deep channel between Beaufort, South Carolina, and Fernandina, Florida, the River and Harbor Acts of 1937 and 1938 mandated all lands, easements, rights-of-way and, spoil disposal areas needed for the project be furnished free of cost to the Federal Government.

Titles to all lands and easements needed for the 7-foot protected route around St. Andrews Sound were accepted as satisfactory by the Chief of Engineers on March 28, 1939. Titles to all

necessary rights-of-way and spoil-disposal areas for the 12-foot channel between Savannah, Georgia, and Beaufort, South Carolina, were accepted as satisfactory on March 27, 1939. Rights-of-way and disposal areas needed for initial work and for subsequent maintenance of the 12-foot channel between Savannah, Georgia, and Fernandina, Florida, were approved by the Chief of Engineers on April 4, 1940.

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

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

Table 1-2 Relationship of Proposed Action to Environmental Requirements

Federal Law	Recommended Action
Abandoned Shipwreck Act of 1987	Not Applicable
Anadromous Fish Conservation Act	Compliance, see 3.4, 3.5, 4.4, 4.5
Clean Air Act of 1972, as amended	Compliance, see 3.3, 4.3
Clean Water Act of 1972, as amended	Compliance, see 3.2, 3.8, 4.2, 4.8, 4.15, and Appendix E
Coastal Barrier Improvement Act of 1990	Compliance, see 4.18
Coastal Barrier Resources Act of 1982	Compliance, see 4.18
Coastal Zone Management Act of 1972, as amended	Compliance, see 4-19, 5-12, and Appendices C, D
Endangered Species Act of 1973, as amended	Compliance, see 3.9, 4.9, 5.4, and Appendix B
Estuary Protection Act of 1968	Compliance, see 4.18
Fish and Wildlife Coordination Act of 1934, as amended	Compliance, see 4.9, 5.5, and Appendix G
Land and Water Conservation Act of 1964, as amended	Not Applicable
Magnuson-Stevens Fishery Conservation and Management Act of 1976	Compliance, see 3.5, 4.5, 5.3, and Appendix F
Marine Mammal Protection Act of 1972, as amended	Compliance, see 3.9, 4.9, 5.4, 5.05, 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 3.4, 4.4, 4.5, 5.2, and 5.3
Migratory Bird Treaty Act of 1918 as amended	Compliance, see 3.7, 4.7
National Environmental Policy Act of 1969, as amended	Compliance, see EA
National Historic Preservation Act of 1966, as amended	Compliance, see 3.10, 4.10, 5.6, and Appendix K

Table 2-2 Relationship of Proposed Action to Environmental Requirements

Federal Law	Recommended Action
Prime and Unique Farmland	Not Applicable

Resource Conservation and Recovery Act, as amended (Hazardous Waste Issues)	Compliance, see 3.1, 4.20
River and Harbor Act of 1970, Public Law 91-611, Section 122	Compliance, see 2.0
Safe Drinking Water Act of 1974, as amended	Not Applicable
Sunken Military Craft Act	Compliance, see 3.10, 4-10, 5.6, and Appendix K
Executive Order	Recommended Action
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 EA, including 4.15
Watershed Protection and Flood Prevention Act of 1954, as amended	Not Applicable
Wild and Scenic Rivers Act of 1968, as amended	Not Applicable
EO 11988, Floodplain Management	Compliance, see 4.8, 5.7
EO 13112, Invasive Species	Compliance, see 4.6, 4.16
EO 11990, Protection of Wetlands	Compliance, see 4.6, 4.16
EO 11593, Protection and Enhancement of the Cultural Environment	Compliance, see 4.11, and Appendix K
EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	Compliance, see 4.15
EO 13045, Protection of Children From Environmental Health Risks and Safety Risks	Compliance, see 4.15
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds	Compliance, see 3.7, 4.7
Coastal Zone Management (CZM) Programs Georgia and South Carolina	Compliance, see 3.2, 4.2, and Appendices C, D
Clean Water Act Section 401 Water Quality Certifications from Georgia and South Carolina	Compliance, see 3.2.4.2, 4.8, 5.1, and Appendix E

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

1.5 Previous Corps of Engineers Reports Related to the AIWW

Dredging and disposal methods for the AIWW have been addressed in previous environmental documents.

US Army Corps of Engineers, Savannah District. 1976. Final Environmental Impact Statement, maintenance Dredging, Atlantic Intracoastal Waterway (Port Royal Sound, South Carolina, to Cumberland Sound, Florida. This document described AIWW maintenance dredging and disposal from initial construction of the waterway beginning in 1938 through November 1975. The EIS evaluated alternatives for disposal of dredged sediments: 1) ocean disposal, 2) use of bottom scow, 3) use of diked disposal areas, 4) upland and ocean pipeline disposal, and 5) creation of intertidal islands. The proposed action was to continue the ongoing practice of placement of dredged sediments into a combination of previously used disposal sites: 1) existing unconfined saltmarsh sites, 2) existing open water sites, and 3) existing confined disposal sites depending on location and the type of sediments to be dredged. The EIS concluded that the proposed action would have short-term adverse effects on water quality and benthic organisms, would continue existing impacts to saltmarsh in the previously used disposal sites, but would not have "any appreciable long-term impacts on the existing marshlands…" and would "keep the impacts on the ecology of the saltmarshes to a minimum." This EIS was finalized and was circulated for public and environmental agency review.

US Army Corps of Engineers, Savannah District. 1983. Atlantic Intracoastal Waterway (AIWW) Maintenance Disposal Study. This study was conducted to formulate a 50-year maintenance plan and identified and evaluated problems associated with the maintenance of the Savannah District portion of the AIWW, focusing on the maintenance of the AIWW during the period 1942 – 1980. Although not specifically identified as such, this report is effectively a Dredged Material Management Plan (DMMP) and will be referred to in this EA as the 1983 DMMP. The study identified 20 shoaling areas that had required removal of over 50 million cubic yards of dredged material since completion of the 12-ft channel in 1941. Georgia Department of Natural Resources – Coastal Resources Division participated in the study and, using infrared photography and site visits, determined that approximately 1,548 acres out of a total of 4,636 acres of saltmarsh in the actively used disposal easements had been impacted by placement of dredged material. This study evaluated alternatives to unconfined saltmarsh tracts: 1) construction of dikes within existing disposal easements, 2) construction of dikes at new upland sites, 3) open water disposal, 4) open water disposal intended to provide substrate for new saltmarsh development, 4) beneficial use of dredged sediments, 5) continued undiked disposal into existing saltmarsh tracts, and 6) elimination of the use of some active disposal tracts by concentrating the material into disposal tracts that are the most adversely impacted. This study concluded that continued placement of dredged material into existing deposits in disposal tracts adjacent to the AIWW was the recommended alternative for most of the 20 shoaling areas identified. This practice would continue the observed gradual encroachment of dredged material into wetlands (saltmarsh) within the disposal easements, but was considered to be less damaging than some of the other alternatives, particularly constructing dikes to enclose existing saltmarsh disposal tracts.

US Army Corps of Engineers, Savannah District. 1998. Draft Section 1135 Ecosystem Restoration Report and Draft Environmental Impact Statement, Latham River/Jekyll Creek, Glynn County, Georgia. This document examined a plan to modify the AIWW project to restore the environment under Section 1135 of the 1986 Water Resources Development Act. The report presented a plan that included dredging portions of Latham River to restore historic tidal flushing, construction of a bridge on the Jekyll Island Causeway to reconnect two portions of the river with were separated by construction of the Jekyll Island Causeway, and closure of a man-made cut which was constructed to drain the lower portion of Latham River. The Draft EIS concluded that the environmental impacts on the local estuarine ecosystem would be important in scope, extensive in size, long lasting in duration, and very positive in nature. This Draft EIS was circulated for public and environmental agency review. However, during the review of the Draft EIS, it became apparent that the proposed restoration of flows in Latham River would require that two bridges be constructed, and the project was not pursued further due to construction infeasibility and cost constraints.

2.0 Alternatives Including the Proposed Action

2.1 Dredges Used on the AIWW in Savannah District

Hydraulic cutterhead dredges have historically performed the dredging work on the AIWW, since the placement sites were located next to the reaches being dredged. This dredge type is the most efficient for placing material in upland (or saltmarsh) placement sites. Typically, material is pumped through a 16 inch pipeline to the placement site. The Savannah District would continue to use this method of dredging for the proposed action. Mechanical dredges with scows would be used to dredge reaches where the placement site is located farther (> 6 miles) than a cutterhead dredge can efficiently pump the material. Small hopper dredges would be used where the dredge material is suitable for beneficial use and for near shore beach renourishment. Hopper dredges and mechanical dredges would be used when dredged material is to be transported to Ocean Dredged Material Placement Sites.

2.2 Dredged Material Management Strategy

The following description of dredged material management strategies is sourced from the Atlantic Intracoastal Waterway, Initial Plan Development, Dredged Materials Management Plan prepared for Wilmington District, Corps of Engineers (USACE 2011):

2.2.1 Confined Placement

Confined placement refers to the use of a diked containment area (overlying open water, marsh, or an upland area) with appropriate outflow control structures. Under this approach, a hydraulic dredge pumps the dredged material as sediment-water slurry to one end of the Dredged Material Containment Area (DMCA) containment area. The containment area serves as a settling basin within which the dredged sediment settles out of the transporting water. The basin or DMCA outlet structure and pipeline then return the residual, clarified water to the AIWW. The dewatered sediment remains in the diked containment area until, after multiple maintenance operations, the DMCA nears its design capacity. Ideally, given enough available acreage, each DMCA's design will provide sufficient capacity for the entire 20-year projected storage requirement for the operational reach each DMCA serves.

Confined open water and marsh placement, in some cases resulting in wetland or island creation, was perhaps the most widely used approach before the growth of today's environmental regulatory programs that address wetland and benthic habitat protection. USACE District staff and regulatory agency representatives have indicated that confined open water and marsh placement within the AIWW carries unavoidable and, in most cases, unacceptable environmental impacts. Additionally, these management strategies will not provide a permanent infrastructure of placement sites that can support the long-term maintenance of the AIWW. Consequently, confined open water or marsh placement strategies remain an option only for those reaches with no other placement option.

Conversely, the confined upland placement management strategy option, given an appropriate location and site design, may provide an infrastructure of DMCA sites that (1) provide relatively

close (preferably less than one mile) proximity to the AIWW; (2) provide a capacity necessary to meet the 20-year storage requirement; and (3) offer a one-time avoidance, minimization and mitigation, if required, for any natural resources during site permitting and construction.

2.2.2 Unconfined Placement

Unconfined placement of dredged material refers to either open water or marsh placement with no confining or outflow control structures. At present, and only when the material is predominantly sandy in nature, unconfined open water placement occurs in both the Charleston and Savannah Districts. Historically, unconfined marsh placement was the predominant method of dredged material placement for the Savannah District.

2.2.3 Ocean Placement

Ocean placement of dredged material requires transport of dredged material from a dredging site to an authorized ODMDS. The dredge (hydraulic or mechanical) must first load the material into a hopper barge capable of transiting the relatively shallow depths of the AIWW. The channel's controlling depth places limitations on the barge's draft and may decrease the barge's effective capacity. Regulatory restrictions on overflowing the barge and possible vessel speed restrictions may further limit its effectiveness. Once the barge is filled to its (draft-limited) capacity, the contractor must haul the barge to an appropriate point and transfer the material to a deep-draft seagoing barge, which will transport the material to an authorized offshore placement site.

2.2.4 Beneficial Use

The beneficial use of the material dredged from the AIWW channel will complement, but not replace, the need to secure and develop dedicated, permanent upland sites. Typically beneficial use, consisting mainly of beach placement and potential construction purposes, provides for only a single deposition of the material and typically requires dewatering and drying of the material before use. Beach placement — that is, placing material compatible with the native beach sands within a designated placement site — constitutes an approach that benefits both the AIWW and receiving beaches. In most cases, beach quality sediments accumulate as shoals form, primarily when waves and tides drive sand through inlets to adjacent areas. Unfortunately, analysis of the geotechnical borings indicates fine-grained sediments constitute most of the AIWW sediments. Because fine-grained materials are incompatible with native beach sediments, beach placement remains a limited option throughout most of the AIWW. Potential construction purposes of the dredged material include fill to build or expand land for airports, ports, residential, or commercial development. Other examples of one-time beneficial use options include shoreline stabilization and environmental enhancement by the creation or restoration of wetland, marsh, or upland habitat (earlier identified as unconfined open water placement).

2.2.5 Savannah District AIWW Dredged Material Management Strategy

Historically, Savannah District AIWW dredging relied heavily on unconfined placement into saltmarsh tracts located adjacent to the reaches being dredged. The only confined placement sites on the AIWW are Tracts 2-B/3-A (AIWW mile 579.5), a 26-acre DMCA located in the western end of Tract 9-A (AIWW mile 584.0), and Tract 1700-L (AIWW mile 705.0); DMCA

14-B overlaps part of SC Tract 1 and has been used since the late 1970s. Unconfined open water placement occurred at several sites adjacent to the AIWW. Two reaches (Ramshorn Creek, SC (SAV-2); Walls Cut, South Carolina (SAV-3) contain sandy sediments suitable for beneficial uses (dike construction, beach re-nourishment).

Unconfined saltmarsh placement is no longer permitted in South Carolina, and the Georgia Department of Natural Resources has requested that the Corps reduce or eliminate the practice in Georgia. The major hurdle in eliminating unconfined saltmarsh placement is the fine-grained, silty consistency of much of the material dredged from the AIWW in Savannah District. The DMMP accompanying this EA includes alternative methods of placement of fine-grained dredged sediments, the impacts of which are evaluated in this document.

2.3 Dredging Quantities and Placement Requirements by Reach

Historical data shows that many of the reaches of Savannah District's portion of the AIWW do not require dredging. From 1942 to 1980, District records reveal that it performed maintenance dredging regularly on some reaches and only sporadically on other reaches. Several reaches -- such as the Skidaway River and Narrows, Old Teakettle Creek, and the Mackay River -- only required dredging during the 1940s. Previous DMMP data shows maintenance dredging occurred frequently in the Wilmington River, Hells Gate, South River, Little Mud River, Altamaha Sound, Buttermilk Sound, and Jekyll Creek reaches. Due to heavy shoaling at its mouth, the Jekyll Creek reach requires more maintenance dredging than any other reach in the Savannah District.

Based on historic dredging data, Savannah District dredged the Fields Cut, Hells Gate, Creighton Narrows, South River, Little Mud River, Altamaha Sound, Buttermilk Sound, Jekyll Creek, and Cumberland Sound reaches several times from 1991 – 2009. During that period, dredging occurred more frequently in the Hells Gate, Little Mud River, and Buttermilk Sound reaches. The Little Mud River, Buttermilk Sound, and Jekyll Creek reaches contained the largest shoaling volumes.

Operational reaches were developed based on dredged material quality and the projection of future dredging quantities. Using historical maintenance dredging records and hydrographic survey data, the District developed 20-year maintenance dredging projections and dredging frequencies for the Savannah District portion of the AIWW. The results of the future dredging projections, quantities, and frequencies suggested logical divisions of management reaches. The Savannah District portion of the AIWW consists of 36 operational reaches (i.e., SAV-1 – SAV-36). The 20-yr maintenance and storage data show:

a. Of the 161 miles of Savannah operational AIWW, 61.6 miles require maintenance dredging, 93.4 miles have not historically required dredging, and the Navy dredges 6.0 miles.
b. Sixteen of the operational reaches do not require dredging on a regular basis; four of these reaches have not been dredged since initial construction of the AIWW in 1941.
c. Ten operational reaches require dredging once every 1 to 4 years.

d. Three operational reaches require dredging once every 5 to 9 years.
e. Six operational reaches require dredging once every 10 to 20 years.
f. The Navy maintains the SAV-36 operational reach; therefore, Savannah District is not responsible for this operational reach.
g. Operational reach SAV-33 has the largest per-event volume (461,500 million cubic yards) and the largest 20-yr dredging and storage volume of all the Savannah operational reaches (15.9 million cubic yards).
h. Thirteen of the Savannah operational reaches lack sufficient placement area capacity or lack an existing placement area and thus are unable to meet the 20-yr volume requirement.

The 13 Savannah operational reaches that lack sufficient 20-yr placement area capacity drove the requirement for Savannah District to prepare an update to its 1983 Maintenance Program Evaluation Study (USACE 1983). This 1983 study was functionally a DMMP although that term is not used in the report. This EA evaluates anticipated impacts associated with the updated DMMP. Dredging and sediment placement activities prior to 1976 were addressed in the 1976 AIWW EIS (USACE 1976). Tables 2-1 and 2-2 summarize the Operational Reaches, including their location on the AIWW, 20-yr dredging and storage volume requirement, the type of maintenance sediments, and the placement area storage capacity for each operational reach.

Table 2-1: AIWW Operation Reaches – Dredging Requirements and Current Status

Dredging Reach	Operational Reach	AIWW Mileage	Dredging Interval (years)	Volume Per Event (CY)	20-yr Maintenance Volume (CY)	Required 20-yr Storage Volume (CY)[1]	Last Dredging Event	Sediment Type	Required 20-yr Storage Capacity Met?
Port Royal to Ramshorn Creek	SAV-1	552 - 568.5	no dredging required[3]						
Ramshorn Creek, SC	SAV-2	568.5 - 569.9	14	34,000	48,600	72,900	1980	sand	No
New River	SAV-3	569.9 - 572.2	no dredging required[3]						
Walls Cut	SAV-4	572.2 - 572.6	19	22,000	23,200	34,800	2001	sand	No
Fields Cut, SC	SAV-5	572.6 - 575.3	5	58,000	232,00	298,350	2009	fine silt	Yes (DMCA 14-B)
Elba Cut - McQueens Cut	SAV-6	575.3 - 577.4	9	89,500	198,900	298,350	1987	fine silt	Yes (DMCA 14-B)
St. Augustine Creek	SAV-7	577.4 - 578.2	2	119,000	1,190,000	1,785,000	1972	mud, silt	Yes (DMCA 14-B)
Wilmington River	SAV-8	578.2 - 585.5	4	46,000	230,000	345,000	1992	mud, silt	Yes (DMCA 14-B and 9-A)
Skidaway River	SAV-9	585.5 - 591	no dredging required[3]				1992[2]	mud, silt	No
Skidaway Narrows	SAV-10	591 - 594	no dredging required[3]						
Burnside River to Hells Gate	SAV-11	594 - 600.8	no dredging required[3]						
Hells Gate	SAV-12	600.8 - 602.4	3	154,000	1,026,700	1,540,050	2009	sand, silt, clay	No (for silt, clay)
Hells Gate to Florida Passage	SAV-13	602.4 - 605.9	no dredging required[3]						
Florida Passage	SAV-14	605.9 - 608.5	11	35,000	63,600	95,400	2009	mud, silt	No
Bear River	SAV-15	608.5 - 617.5	15	39,500	52,700	79,050	1977	mud, silt	No
St. Catherines Sound – N. Newport River	SAV-16	617.5 - 620.5	no dredging required[3]						
North Newport River	SAV-17	620.5 - 623.9	no dredging required[3]						
Johnson Creek	SAV-18	623.9 - 629.3	30	51,000	34,000	51,000	1973	silts, clays	No
Sapelo Sound - Front River	SAV-19	629.3 - 639	no dredging required[3]						
Front River	SAV-20	639 - 640	no dredging required[3]						
Creighton Narrows	SAV-21	640 - 642.9	4	181,500	907,500	1,361,250	1999	silts, clays	No
Old Teakettle Creek	SAV-22	642.9 - 648.2	no dredging required[3]						

Table 2-2: AIWW Operation Reaches – Dredging Requirements and Current Status (continued)

Dredging Reach	Operational Reach	AIWW Mileage	Dredging Interval (years)	Volume Per Event (CY)	20-yr Maintenance Volume (CY)	Required 20-yr Storage Volume (CY)[1]	Last Dredged Event	Sediment Type	Required Storage Capacity Met?
Doboy Sound	SAV-23	648.2 - 649.5	no dredging required[3]				1978	Mud, Silt	No
North River Crossing	SAV-24	649.5 - 651.4	4	64,000	320,000	480,000	1980	Mud	No
Rockedundy River	SAV-25	651.4 - 652.7	5	58,500	234,000	351,000	1996	Mud	No
South River	SAV-26	652.7 - 653.5	2	58,000	580,000	870,000	1999	Mud, Silt	No
Little Mud River	SAV-27	653.5 - 656.4	2	260,500	2,605,000	3,907,500	2001	Mud, Silt	No
Altamaha Sound	SAV-28	656.4 - 660.1	3	108,000	720,000	1,080,000	2009	Sand, Silt	No
Buttermilk Sound	SAV-29	660.1 - 664.5	3	217,000	1,446,700	2,170,050	2009	Sand, Silt	No
Mackay River	SAV-30	664.5 - 674	no dredging required[3]						
Frederica River	SAV-31	674 - 677	no dredging required[3]						
St. Simon Sound	SAV-32	677 - 680.8	no dredging required[3]				1969	Silts, Clays	Yes (Andrews Island DMCA)
Jekyll Creek[4]	SAV-33	680.9 - 685.9	2	461,500	4,615,000	9,230,000	1999	Silts, Clays	No
Jekyll Creek to Cumberland River	SAV-34	685.9 - 692	no dredging required[3]						
Cumberland River to Cumberland Sound	SAV-35	692 - 707	18	46,500	51,700	77,500	2001	Sand, Silt	Yes (1700-L)
Cumberland River to Cumberland Sound	SAV-36	707 - 713	Dredged by the Navy						

[1] Bulking factor of 1.5 was applied to 20-yr maintenance volumes to determine the required 20-yr. storage volume; [2] One time shoaling event removed in 1992 no other maintenance dredging has occurred; [3] No future dredging required as reaches are naturally maintaining the authorized depth; [4]Bulking factor of 2.0 was used for this reach because volume being almost twice that of any other reach, short return periods, and type of material.

2.4 Past Dredging and Placement Activities

Since the 1976 EIS, USACE has dredged 19 of the 36 reaches of the AIWW in Savannah District. One of these reaches was dredged only once since 1976, and no future dredging in this reach is anticipated. The remaining 18 reaches were dredged on average every 2 - 19 years. Dredged materials were placed in a variety of placement sites: 1) existing DMCAs, 2) existing undiked saltmarsh placement areas, and 3) approved open-water placement sites.

Tables 2-3 and 2-4 summarizes dredging activity and placement methods used for the Savannah District AIWW reaches since the 1976 EIS.

Table 2-3: AIWW Dredging and Placement Activity 1976-2011

Dredging Reach	Operational Reach	AIWW Mileage	Placement Site	Average Dredging Frequency (yrs)	Dredged Since 1976 EIS?
Port Royal to Ramshorn Creek, SC	SAV-1	552 - 568.5	no dredging required		No
Ramshorn Creek, SC	SAV-2	568.5 - 569.9	SC Tract 3	14	Yes
New River, SC	SAV-3	569.9 - 572.2	no dredging required		No
Walls Cut, SC	SAV-4	572.2 - 572.6	SC Tract 2	19	Yes
Fields Cut, SC	SAV-5	572.6 - 575.3	SC Tract 1/DMCA 14-B	5	Yes
Elba Cut - McQueens Cut	SAV-6	575.3 - 577.4	undiked Tract 1-A-1	9	Yes
St. Augustine Creek	SAV-7	577.4 - 578.2	undiked Tract 2-A; diked Tracts 2-B/3-A		No
Wilmington River	SAV-8	578.2 - 585.5	diked Tracts 2-B/3-A, 9-A; undiked Tracts 1-A, 5-A, 5-B, 7-A, 8-A, 9-B, 10-C	7	Yes
Skidaway River	SAV-9	585.5 - 591	undiked Tract 11-K	once (1992); no future dredging expected	Yes
Skidaway Narrows	SAV-10	591 - 594	no dredging required		No
Burnside River to Hells Gate	SAV-11	594 - 600.8	no dredging required		No
Hells Gate	SAV-12	600.8 - 602.4	open water (coarse); undiked Tracts 15-A and 15-B (fines)	3	Yes
Hells Gate to Florida Passage	SAV-13	602.4 - 605.9	no dredging required		No
Florida Passage	SAV-14	605.9 - 608.5	undiked Tract 16-A	13	Yes
Bear River	SAV-15	608.5 - 617.5	undiked Tract 17-A	15	Yes
St. Catherines Sound - North Newport River	SAV-16	617.5 - 620.5	no dredging required		No
North Newport River	SAV-17	620.5 - 623.9	undiked Tract 19-A	1964 Only	No
Johnson Creek	SAV-18	623.9 - 629.3	undiked Tract 19-A	1973 Only	No
Sapelo Sound - Front River	SAV-19	629.3 - 639	no dredging required		No
Front River	SAV-20	639 - 640	no dredging required		No

Table 2-4: AIWW Dredging and Placement Activity 1976-2011 (continued)

Dredging Reach	Operational Reach	AIWW Mileage	Placement Site	Average Dredging Frequency (yrs)	Dredged Since 1976 EIS?
Creighton Narrows	SAV-21	640 - 642.9	undiked Tracts 24-A, 25-A, 25-C, 25-E	3	Yes
Old Teakettle Creek	SAV-22	642.9 - 648.2	no dredging required		No
Doboy Sound	SAV-23	648.2 - 649.5	open water N side Commodore Island	3	Yes
North River Crossing	SAV-24	649.5 - 651.4	undiked Tracts 29-B, 30-A	4	Yes
Rockedundy River	SAV-25	651.4 - 652.7	undiked Tracts 29-B, 30-A	5	Yes
South River	SAV-26	652.7 - 653.5	undiked Tract 30-A	2	Yes
Little Mud River	SAV-27	653.5 - 656.4	undiked Tract 30-B, 32-A	2	Yes
Altamaha Sound	SAV-28	656.4 - 660.1	open water (coarse), undiked Tracts 34-A, 36-A (fines)	3	Yes
Buttermilk Sound	SAV-29	660.1 - 664.5	open water (coarse), undiked Tracts 42-B-, 42-C, 43-B (fines)	3	Yes
Mackay River	SAV-30	664.5 - 674	no dredging required		No
Frederica River	SAV-31	674 - 677	no dredging required		No
St. Simon Sound	SAV-32	677-680.8	open water site 51	1943, 1963, 1969	No
Jekyll Creek	SAV-33	680.9 - 685.9	undiked Tracts 52-A, 52-B, 53-A	2	Yes
Jekyll Creek to Cumberland River	SAV-34	685.9 - 692	no dredging required		No
Cumberland River to Cumberland Sound	SAV-35	692 - 707	DMCA 1700-L (Big Crab Island)	18	Yes
Cumberland River to Cumberland Sound	SAV-36	707 - 713	dredged by the Navy	N/A	N/A

2.5 Alternative Plans

The term “project” used throughout this EA refers to implementing a new DMMP. It does not refer to the AIWW itself or to performing maintenance dredging on the AIWW; the AIWW, including maintenance dredging, is an existing authorized Federal project. This EA compares the No Action/Without Project Condition and several alternative scenarios based on placement options in the proposed DMMP. Refer to the associated DMMP for detailed treatment of alternatives considered. Section 4.0 of this EA contains information that allows the reader to compare the anticipated environmental impacts of these alternatives, including the No Action plan.

It should be noted that the current operational practices under which the Savannah District maintains the AIWW, were once deemed acceptable to the resource agencies as evidenced by completion of the 1983 DMMP and 1976 EIS. Since that time, however, the state resource agencies have identified impacts associated with those practices (e.g. unconfined placement of dredged material) and no longer deem them acceptable. While the states, particularly GA DNR-CRD, have allowed the plan to remain in place until new environmental clearances are obtained, it should be noted that GA DNR-CRD has indicated intention to revoke the Section 401 water quality certification should the Corps continue to place material unconfined into saltmarsh areas. As such, identification and approval of the proposed actions contained in these documents will

result new clearances under which the Corps would operate in the future. Upon gaining approvals and clearances outlined in this document, the Corps intends to operate using the practices identified herein as the Future Without Project Condition (placement of dredged material in previously approved DMCAs 14-B, 9-A, and Crab Island) while other clearances that require further study are obtained in the future, namely EPA approval of material placement in existing ODMDSs and designation of two new ODMDSs.

2.5.1 No Action Alternative/Without Project Condition

The No Action alternative serves as the baseline from which potential project impacts are measured. This plan is also the Without Project Condition; those actions that would occur even if the alternative proposed in this EA (a new DMMP) is not implemented; it is not to forego maintenance of the Savannah District AIWW. The No Action/Without Project plan represents the most likely future condition without a new DMMP and continues present practices modified to incorporate State resource agency recommended placement methods where practicable. This EA compares the alternatives for dredged material placement presented in the DMMP with the Without Project conditions.

Under the No Action Alternative/Without Project Condition, dredged material would be placed in existing DMCAs 14-B (Savannah Harbor), the DMCA in Tract 9-A, and DMCA Crab Island (AIWW and Kings Bay Naval Submarine Base).

Table 2-5 shows the No Action/Without Project conditions for each of the 36 Savannah District AIWW reaches. Figure 2-1 shows the placement sites that would be used under the No Action/Without Project Condition.

GA DNR-CRD has stated their intention to revoke the Water Quality Certification for maintenance of the AIWW if the Corps continues unconfined placement continues in salt marshes. This requires the Corps to only place sediments in saltmarsh tracts that were completely diked before 2013. There are many sediment placement sites on the AIWW where the project has placement rights, but only three of these sites were completely diked before 2013. These three sites are Savannah Harbor's Dredged Material Containment Area (DMCA) 14B, DMCA 9A along Wilmington River at Thunderbolt, and DMCA 1700L (Crab Island) near Cumberland Sound.

Two of these three DMCAs (Crab Island and DMCA 9A), have limited capacity and neither can be used by multiple reaches or reaches with large volumes of sediment over the 20-year period of the new DMMP. Therefore, sediment from most of the channel reaches would have to be transported to DMCA 14B.

2.5.2 No Action Alternative/Without Project (A)

This alternative is the No Action Alternative/Without Project Condition as described in Section 2.5.1 without mitigation for expected future impacts.

2.5.3 No Action Alternative/Without Project (B)

This alternative is the No Action Alternative/Without Project Condition as described in Section 2.5.1 with mitigation proposed for expected future impacts. The action alternatives proposed in the DMMP will be compared to this No Action/Without Project plan.

Table 2-5 : No Action/Without Project Condition

Dredging Reach	Operational Reach	AIWW Mileage	Without Project Placement Site	Dredging Interval (yrs)
Port Royal to Ramshorn Creek	SAV-1	552 - 568.5	DMCA 14B	
Ramshorn Creek, SC	SAV-2	568.5 - 569.9	DMCA 14B	14
New River	SAV-3	569.9 - 572.2	DMCA 14B	
Walls Cut	SAV-4	572.2 - 572.6	DMCA 14B	19
Fields Cut, SC	SAV-5	572.6 - 575.3	DMCA 14B	5
Elba Cut - McQueens Cut	SAV-6	575.3 - 577.4	DMCA 14B	9
St. Augustine Creek	SAV-7	577.4 - 578.2	DMCA 14B	2
Wilmington River	SAV-8	578.2 - 585.5	DMCA 14B	4
Skidaway River	SAV-9	585.5 - 591	DMCA 9A	
Skidaway Narrows	SAV-10	591 - 594	DMCA 9A	
Burnside River to Hells Gate	SAV-11	594 - 600.8	DMCA 9A	
Hells Gate	SAV-12	600.8 - 602.4	DMCA 14B	3
Hells Gate to Florida Passage	SAV-13	602.4 - 605.9	DMCA 14B	
Florida Passage	SAV-14	605.9 - 608.5	DMCA 14B	11
Bear River	SAV-15	608.5 - 617.5	DMCA 14B	15
St. Catherine's Sound - North Newport River	SAV-16	617.5 - 620.5	DMCA 14B	
North Newport River	SAV-17	620.5 - 623.9	DMCA 14B	
Johnson Creek	SAV-18	623.9 - 629.3	DMCA 14B	30
Sapelo Sound - Front River	SAV-19	629.3 - 639	DMCA 14B	
Front River	SAV-20	639 - 640	DMCA 14B	
Creighton Narrows	SAV-21	640 - 642.9	DMCA 14B	4
Old Teakettle Creek	SAV-22	642.9 - 648.2	DMCA 14B	
Doboy Sound	SAV-23	648.2 - 649.5	DMCA 14B	
North River Crossing	SAV-24	649.5 - 651.4	DMCA 14B	4
Rockedundy River	SAV-25	651.4 - 652.7	DMCA 14B	5
South River	SAV-26	652.7 - 653.5	DMCA 14B	2
Little Mud River	SAV-27	653.5 - 656.4	DMCA 14B	2
Altamaha Sound	SAV-28	656.4 - 660.1	DMCA 14B	3
Buttermilk Sound	SAV-29	660.1 - 664.5	DMCA 14B	3
Mackay River	SAV-30	664.5 - 674	DMCA 14B	
Frederica River	SAV-31	674 - 677	DMCA 14B	
St. Simon Sound	SAV-32	677 - 680.8	DMCA 14B	
Jekyll Creek	SAV-33	680.9 - 685.9	DMCA 14B	2
Jekyll Creek to Cumberland River	SAV-34	685.9 - 692	DMCA Crab Island	
Cumberland River to Cumberland Sound	SAV-35	692 - 707	DMCA Crab Island	18
Cumberland River to Cumberland Sound	SAV-36	707 - 713	Maintained by U.S. Navy	

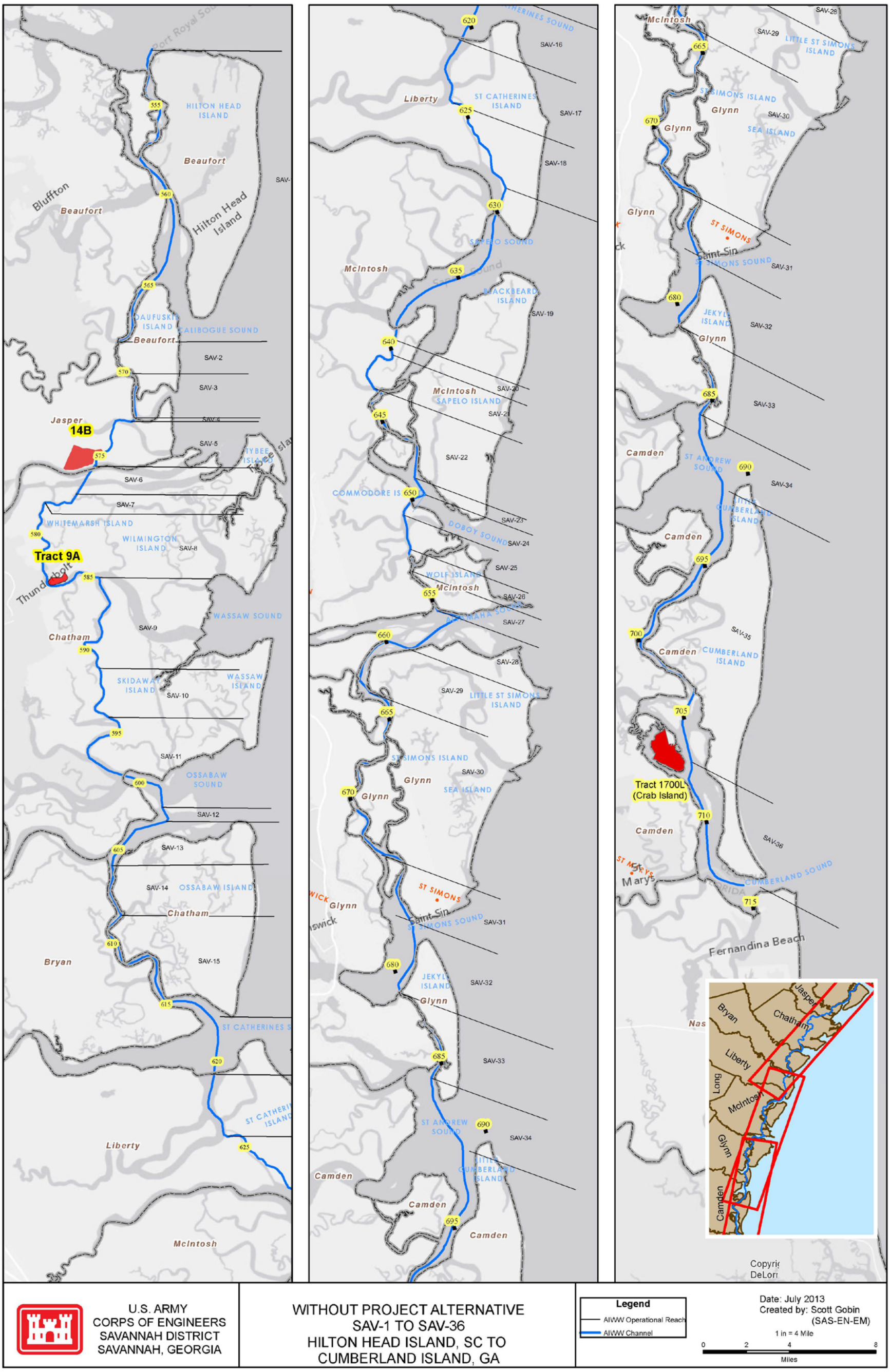


Figure 2-1: No Action Alternative/Future Without Project Condition

2.6 Formulation of Dredged Material Placement Alternatives

Previous studies, such as the 1983 Maintenance Program Evaluation Study (USACE 1983), determined and implemented the future without-project condition's methods of dredged sediment placement. Thus, additional development and construction costs would not be incurred on the future without-project condition. Consequently, if a reach's future without-project condition met both the requirements of environmental acceptability and sufficient 20-year storage capacity, then no other alternatives were considered for that reach.

The dredged material placement alternatives analyzed in this EA represent options presented in the DMMP – continued maintenance dredging of particular reaches of the AIWW as needed; dredged materials would be placed in a variety of placement sites: 1) existing DMCAs, 2) new upland DMCAs, 3) new saltmarsh DCMAs, 4) existing undiked saltmarsh placement areas, 5) approved open-water placement sites, 6) existing ODMDSs, 7) new ODMDSs, 8) beneficial use – renourishing an eroding beach. Some of these options are the same as those of the No Action/Without Project alternative; others (new upland DCMAs, new saltmarsh DMCAs, new ODMDS) represent options of the With Project Condition. The Preferred Alternative will likely include features of several of these options based on practicability and expected environmental impacts.

2.7 Alternatives Considered but Eliminated from Further Evaluation

The objective of the new DMMP is to identify the best maintenance scheme that allows continued use of the waterway and minimizes adverse environmental impacts associated with the dredging and sediment placement while complying with the National Environmental Policy Act (NEPA) and the appropriate environmental laws and regulations. The selected sites are required to provide capacity for 20 years of storage for a fully maintained channel, and the method of storage are required to be environmentally acceptable. Some of the reaches' future without project condition failed to meet one of these objectives and so were removed from consideration.

2.7.1 Unconfined Placement of Fine-grained Dredged Sediments

Based on the letters from GA-DNR dated 21 August 2007 and 25 February 2008, and a letter from SC –DNR dated 21 May 2012 (see Appendix A of this EA) it is no longer environmentally acceptable to place material in this manner. As such, this practice fails to meet the objective of the DMMP.

2.7.2 Construction of New Upland DMCAs

Details of the potential sites evaluated for constructing new upland DMCAs can be found in the Real Estate Appendix of the associated DMMP. Only two potential upland sites were deemed feasible and carried through cost and environmental impact analysis.

2.7.2.1 **Bryan County Site, Operational Reaches SAV-14 and SAV-15**

A newly established residential development (WaterWays Township) was removed from further evaluation due to its lack of feasibility. This site has a total of 3,000 housing units planned, and some houses and infrastructure are already constructed. It was determined that because this site

is adjacent to two other parcels that could be used for material placement, it would be removed from further evaluation.

Two tracts of land directly south of the residential development may be suitable for dredged material placement and were carried through initial cost analysis in the DMMP. Consequently, the "100-acre Bryan county site" referred to in this EA refers to either of these two sites being used as a new upland DMCA. The real estate data and rough order of magnitude wetland mitigation calculation for the WaterWays Township parcel were used as a close approximation to the neighboring tracts.

2.7.2.2 **Liberty County Site, Operational Reach SAV-18**

The Liberty County Site was removed from further evaluation in the alternative analysis or costing because Johnson Creek and the adjacent reaches are not anticipated to require future dredging. The absence of road access further complicates any possible construction efforts.

2.7.2.3 **Sapelo Island Site, Operational Reaches SAV-23 and SAV-24**

The Sapelo Island Site was removed from further evaluation in the alternative analysis because the site is located directly adjacent to Hog Hammock, a historic African-American community. In addition, the site occupies a portion of the Sapelo National Estuarine Research Reserve, and there is no road access to the site or island, complicating construction efforts.

2.7.2.4 **Darien, GA Site, Operational Reaches SAV-25 and SAV-26**

The Darien, GA Site was removed from further evaluation in the alternative analysis because the site is located to the west of the town and would require either running a pipe over several north/south bound streets or constructing a pipeline under those streets to reach the DMCA. In the case of a pipeline being constructed under the street it is assumed the costs for that effort and the maintenance of that effort would be as great as the construction and maintenance of the site. The street directly east of the site is State Highway 99.

2.7.2.5 **Glynn County Site, Operational Reaches SAV-28 and SAV-29**

The Glynn County Site was removed from further evaluation in the alternative analysis because it is anticipated that it will be protected through a pending conservation easement.

2.7.3 Jekyll Creek Use of Andrews Island DMCA

A large quantity of material (4.6 Million CY over 20 years) that is anticipated to accumulate in Jekyll Creek. Placement of all of this material in Brunswick Harbor's Andrews Island DMCA would significantly reduce the capacity of that area. This impact would require a study to determine the projected impact to the DMCA's life and remuneration, in the form of payment to the local sponsor, for the lost capacity.

2.8 Alternatives Fully Evaluated in the EA

Savannah District identified and evaluated the management measures available to address the project objectives and constraints. The District deleted the ones that were not technically sound from further consideration. The ones that showed potential promise were developed into

alternative plans and are evaluated in this section of the EA and associated DMMP. In the DMMP each alternative was evaluated for the extent to which it meets the project objectives, constraints, and its cost effectiveness. All the alternatives had a designated placement site for sediments from every reach of the AIWW and would be environmentally acceptable.

2.8.1 Alternative 1 (Previously-Approved Sites, Geo-Tubes, or Open Water Sites)

Alternative 1 meets the project objective of having the requisite sediment storage for each channel reach. It does this through the use of four diked upland sites; DMCA 14-B, 9-A, Andrews Island, and Crab Island. DMCA 14-B does not have a maximum dike height and can store the sediment material anticipated from the eight reaches that would use it under this alternative. DMCA 9-A and Andrews Island are only designated for three channel reaches, none of which have a high likelihood of being dredged in the next 20 years. Therefore, the 130,000 CY in DMCA 9-A (as well Andrews Island if needed) will be sufficient to accommodate the anticipated required O&M materials. Crab Island already has the sediment storage capacity for reach SAV-36 because this is also required by the Navy who maintain that reach of the AIWW. Sediments from reach SAV-35 is already placed in Crab Island by the Navy and is included in their capacity analysis of that placement site.

Open water placement is part of this alternative. Suitable sediments would be deposited at current AIWW open water sites, the existing Savannah Harbor ODMDS, the existing Brunswick Harbor ODMDS, a new ODMDS near Sapelo Sound, and a new ODMDS near Altamaha Sound are part of this alternative. All open water placement sites will have to follow the requirements in the Section 404(b)(1) Evaluation and the conditions stated in Sections 2.8.9 and 2.8.10 of this EA. These all have sufficient capacity to handle the anticipated required O&M materials.

In conjunction with the AIWW open water sites, this alternative would use geo-tube confined placement. This placement would only be for sediments from portions of specific reaches that do not meet the requirements for open water placement. The geo-tubes would be used to confine the O&M materials to impacted portions of the placement site. This would be performed to avoid or minimize future impacts to both the marsh and possible cultural resources found on the sites.

Alternative 1 would not result in impacts to possible cultural resources because all of the sediment materials will be placed in already impacted portions of sites, or ODMDSs. The management measures used in this alternative were suggested by GA DNR and are considered environmentally acceptable. This alternative provides the required sediment storage for all channel reaches.

2.8.2 Alternative 2 (Upland and Geo-Tubes, Previously-Approved, or Open Water Sites)

Alternative 2 meets the project objective of having the requisite sediment storage for each channel reach. It does this through the use of four diked upland sites; DMCA 14-B, 9-A, Andrews Island, and Crab Island. DMCA 14-B does not have a maximum dike height and can store the O&M material anticipated from the eight channel reaches identified for its use. DMCA

9-A and Andrews Island are designated for three reaches, none of which have a high likelihood of being dredged in the next 20 years. Therefore, the 130,000 CY in DMCA 9-A (as well as the use of Andrews Island if needed) will be sufficient to accommodate the anticipated required O&M material. Crab Island already has the capacity for sediments from reach SAV-36 because this is also required by the Navy who maintain that reach of the AIWW. SAV-35 is also placed in Crab Island and the Navy includes that reach in their capacity analysis of that site.

The new confined upland sites would have no impacts to salt marsh along the AIWW. Development of these sites could have other environmental impacts and an Environmental Assessment would need to be prepared for the Creighton Island and Bryan County sites. These lands would need to be obtained by the local sponsor should this alternative be selected. Placing O&M materials on these sites would impact 44-acres of freshwater wetlands.

Open water placement is part of this alternative. Suitable sediments would be deposited at current AIWW open water sites, the existing Brunswick Harbor ODMDS, and a new ODMDS near Sapelo Sound. All open water placement sites will have to follow the requirements in the Section 404(b)(1) Evaluation and the conditions stated in Sections 2.8.9 and 2.8.10 of this EA.. These all have sufficient capacity to handle the anticipated required material.

In conjunction with the AIWW open water sites, this alternative would use geo-tube confined placement. This placement technique would only be for sediments from portions of specific reaches that do not meet the requirements for open water placement. The geo-tubes would be used to confine the O&M materials to impacted areas of the placement site. This would be performed to avoid future impacts to both the marsh and any possible cultural resources on the sites. Placing O&M materials on these easements could impact the function of up to 71 acres of salt marsh.

Alternative 2 has no known impacts to cultural resources because all of the sediment material will be placed in impacted portions of sites, or in ODMDSs. The upland sites will require an assessment for cultural resources before construction. However, the two sites identified are the least likely of all new upland sites to have cultural impacts. The management measures used in this alternative were suggested by GA DNR and are considered environmentally acceptable. This alternative provides the required sediment storage for all reaches.

2.8.3 Alternative 3 (Previously-Approved, Diking Marsh Tracts, or Open Water Sites)

Alternative 3 meets the project objective of having the requisite sediment storage for each channel reach. It does this through the use of four diked upland sites; DMCA 14-B, 9-A, Andrews Island, and Crab Island. DMCA 14-B does not have a maximum dike height and can store the sediment material anticipated from the six reaches identified for its use. DMCA 9-A and Andrews Island are only designated for three reaches, none of which have a high likelihood of being dredged in the next 20 years. Therefore, the 130,000 CY in DMCA 9-A (as well as the use of Andrews Island if needed) will be sufficient to accommodate the anticipated required material. Crab Island already has the capacity for sediments from reach SAV-36 because this is also required by the Navy who maintain that reach of the AIWW. Sediments from reach SAV-35 is already is placed there and the Navy includes that reach in their capacity analysis.

New marsh DMCAs will be constructed to enclose an entire existing sediment placement easement. Enclosing these easements will impact a total of 1174 acres of salt marsh. This method of placement has the most environmental impacts of all the alternatives due to its removal of that salt marsh from the tidal system.

Open water placement is part of this alternative. Suitable sediment would be deposited at current AIWW open water sites, the existing Savannah Harbor ODMDS, and a new ODMDS near Altamaha Sound. All open water placement sites will have to follow the requirements in the Section 404(b)(1) Evaluation and the conditions stated in Sections 2.8.9 and 2.8.10 of this EA.. These all have sufficient capacity to handle the anticipated required O&M materials.

In conjunction with the AIWW open water sites, this alternative would use geo-tube confined placement. This placement would only occur for O&M materials from portions of specific reaches that do not meet the requirements for open water placement. The geo-tubes would be used to confine the O&M material to impacted portions of the placement site. This would be performed to avoid future impacts to both the marsh and any cultural resources located on the sites. Placing O&M material on these easements would continue to impact the function of 38 acres of salt marsh that have previously been impacted.

Alternative 3 could result in impacts to cultural resources because sediment materials will be placed across an entire sediment placement easement. The marsh sites will require an assessment for cultural resources before construction. The management measures used in this alternative were suggested by GA DNR and are considered environmentally acceptable. This alternative does provide the required storage for all reaches.

2.8.4 Alternative 4 (Previously-Approved, or Closest Impacted Site)

Alternative 4 meets the project objective of having the requisite sediment storage for each channel reach. It does this through the use of three diked upland sites; DMCA 14-B, 9-A, and Crab Island. DMCA 14-B does not have a maximum dike height and can store the material anticipated from the seven reaches identified for its use. DMCA 9-A and Andrews Island are only designated for three reaches, none of which have a high likelihood of being dredged in the next 20 years. Therefore, the 130,000 CY in DMCA 9-A will be sufficient to accommodate the anticipated required material. Crab Island already has the capacity for sediments from reach SAV-36 because this is also required by the Navy who maintain that reach of the AIWW. Sediments from reach SAV-35 is already is placed there and the Navy includes that reach in their capacity analysis. Sediments from reach SAV-34 is not likely to be dredged, so if needed those sediments could go to Crab Island with no significant impact to its operation and useful life.

Undiked sediment placement on marsh sites could impact the entire placement easement. However, that approach would impact less wetlands in the short term than enclosing the entire easement with a dike. Placing O&M materials on these easements could impact the function of up to 497 acres of salt marsh over the long term.

Open water placement would occur at current AIWW open water sites. All open water placement sites will have to follow the requirements in the Section 404(b)(1) Evaluation. These sites all have sufficient capacity to handle the anticipated required O&M materials.

Alternative 4 could result in impacts to cultural resources because O&M material will be placed on the entire easement area. The marsh sites will require an assessment for cultural resources before construction. The management measures used in this alternative may not considered environmentally acceptable, but this alternative was used as a baseline to identify the change in costs from the current practices. This alternative provides the required sediment storage for all channel reaches.

Table 2-6 shows the DMMP tentative preferred option and the feasible alternative options for placement of dredged materials from the Savannah District portion of the AIWW DMMP. Figures 2-6 through 2-12 show the locations of the alternative placement options (management measures) considered.

Table 2-6: Alternatives Fully Considered by Reach

Dredging Reach Name	Operational Name	20-yr Capacity Required	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Port Royal to Ramshorn Creek	SAV-1	0	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B
Ramshorn Creek, SC	SAV-2	72,900	Sav Harbor DMCA14-B	Beach Placement	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B
New River	SAV-3	0	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B
Walls Cut	SAV-4	34,800	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B
Fields Cut, SC	SAV-5	348,000	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B
Elba/McQueens Cut	SAV-6	298,350	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B
St. Augustine Creek	SAV-7	1,785,000	Sav Harbor DMCA14-B	Sav Harbor DMCA14-B	DMCA 3-A and 9-A[1]	Sav Harbor DMCA14-B
Wilmington River	SAV-8	345,000	Sav Harbor DMCA 14-B	Sav Harbor DMCA 14-B	DMCA 3-A and DMCA in Tract 9-A[1]	Partially diked Tract 3-A and DMCA in Tract 9-A[1]
Skidaway River	SAV-9	0	DMCA in Tract 9-A	DMCA in Tract 9-A	DMCA in Tract 9-A	DMCA in Tract 9-A
Skidaway Narrows	SAV-10	0	DMCA in Tract 9-A	DMCA in Tract 9-A	DMCA in Tract 9-A	DMCA in Tract 9-A
Burnside River to Hells Gate	SAV-11	0	DMCA in Tract 9-A	DMCA in Tract 9-A	DMCA in Tract 9-A	DMCA in Tract 9-A
Hells Gate	SAV-12	1,540,050	Open Water (coarse); confined Tracts 15-A and 15-B (fines)	Open Water (coarse); confined Tracts 15-A and 15-B (fines)	Savannah ODMDS	Open water (coarse); Undiked Tract 15-A (silt)
Hells Gate to Florida Passage	SAV-13	0	Savannah ODMDS	New 100-acre Upland DMCA	Dike Tract 16-A (New DMCA)	Undiked Tracts 15-A and 16-A[1]
Florida Passage	SAV-14	95,400	New ODMDS @ Sapelo Sound	New 100-acre Upland DMCA	Dike Tract 16-A (New DMCA)	Undiked Tract 16-A
Bear River	SAV-15	79,050	New ODMDS @ Sapelo Sound	New 100-acre Upland DMCA	Dike 17-A (New DMCA)	Undiked Tract 17-A
St. Catherines Sound - North Newport River	SAV-16	0	New ODMDS @ Sapelo Sound	New ODMDS @ Sapelo Sound	Dike Tract 19-A if Needed (New DMCA)	Undiked Tract 19-A
North Newport River	SAV-17	0	New ODMDS @ Sapelo Sound	New ODMDS @ Sapelo Sound	Dike Tract 19-A if Needed (New DMCA)	Undiked Tract 19-A
Johnson Creek	SAV-18	0	New ODMDS @ Sapelo Sound	New ODMDS @ Sapelo Sound	Dike Tract 19-A if Needed (New DMCA)	Undiked Tract 19-A
Sapelo Sound - Front River	SAV-19	0	New ODMDS @ Sapelo Sound	New 350-acre Upland DMCA	New DMCAs on 24-A	Undiked Tract 24-A
Front River	SAV-20	0	New ODMDS @ Sapelo Sound	New 350-acre Upland DMCA	New DMCAs on 24-A	Undiked Tract 24-A
Creighton Narrows	SAV-21	1,361,250	New ODMDS @ Sapelo Sound	New 350-acre Upland DMCA	New DMCAs on 24-A, 25-C, 25-E[2]	Undiked Tract 24-A, 25-C, and 25-E[2]
Old Teakettle Creek	SAV-22	0	New ODMDS @ Sapelo Sound	New 350-acre Upland DMCA	New DMCAs on 25-E	Undiked Tract 25-E
Doboy Sound	SAV-23	0	New ODMDS @ Altamaha Sound	New 350-acre Upland DMCA	New ODMDS @ Altamaha Sound	Open Water North Side Commodore Island
North River	SAV-24	480,000	New ODMDS @ Altamaha Sound	Brunswick ODMDS	New ODMDS @ Altamaha Sound	Undiked Tract 29-B and 30-A
Rockedundy River	SAV-25	351,000	New ODMDS @ Altamaha Sound	Brunswick ODMDS	New ODMDS @ Altamaha Sound	Undiked Tract 29-B and 30-A
South River	SAV-26	870,000	New ODMDS @ Altamaha Sound	Brunswick ODMDS	New DMCA on Tract 30-A	Undiked Tract 30-A
Little Mud River	SAV-27	3,907,500	New ODMDS @ Altamaha Sound	Brunswick ODMDS	Dike Tract 32-A (New DMCA)	Undiked Tract 32-A
Altamaha Sound	SAV-28	1,080,000	New ODMDS @ Altamaha Sound	Open Water Sites 32 and 34 (coarse); confined Tracts 34-A and 36-A (fines)	Open Water Sites 32 and 34 (coarse); confined Tracts 34-A and 36-A (fines)	Open water (coarse); Undiked Tract 36-A (silt)
Buttermilk Sound	SAV-29	2,170,050	Open Water Sites 43and 44 (coarse); confined Tracts 42-B	Open Water Sites 43and 44 (coarse); confined Tracts 42-B	New ODMDS @ Altamaha Sound	Open water (coarse); Undiked Tract 42-B (silt)
Mackay River	SAV-30	0	Andrews Island DMCA	Andrews Island DMCA	Andrews Island DMCA	Undiked Tracts 46-A and 48-A[1]
Frederica River	SAV-31	0	Andrews Island DMCA	Andrews Island DMCA	Andrews Island DMCA	Undiked Tract 48-A
St. Simons Sound	SAV-32	0	Andrews Island DMCA	Andrews Island DMCA	Andrews Island DMCA	Andrews Island DMCA
Jekyll Creek	SAV-33	9,230,000	Brunswick ODMDS	Brunswick ODMDS	Dike Tract 52-A[3]	Undiked Tract 52-A[3]
Jekyll Creek to Cumberland River	SAV-34	0	Brunswick ODMDS	Brunswick ODMDS	Dike Tract 52-A	Diked Disposal in tract 1700L (Crab Island)
Cumberland River to Cumberland Sound	SAV-35	77,550	Diked Disposal in tract 1700L (Crab Island)	Diked Disposal in tract 1700L (Crab Island)	Diked Disposal in tract 1700L (Crab Island)	Diked Disposal in tract 1700L (Crab Island)
Cumberland River to Cumberland Sound	SAV-36	0	Diked Disposal in tract 1700L (Crab Island) Maintained by U.S. Navy	Diked Disposal in tract 1700L (Crab Island) Maintained by U.S. Navy	Diked Disposal in tract 1700L (Crab Island) Maintained by U.S. Navy	Diked Disposal in tract 1700L (Crab Island) Maintained by U.S. Navy

[1]Placement will be in the site closest to the portion of the reach being dredged.
[2]All three tracts will be needed to handle the anticipated volumes to be dredged from Creighton Narrows (SAV-21)
[3]Tract 52-A would be used on a temporary basis while a long term solution is investigated for Jekyll Creek (SAV-33)

Figure 2-2: Placement Alternatives Considered by Reach – Map 1 of 7

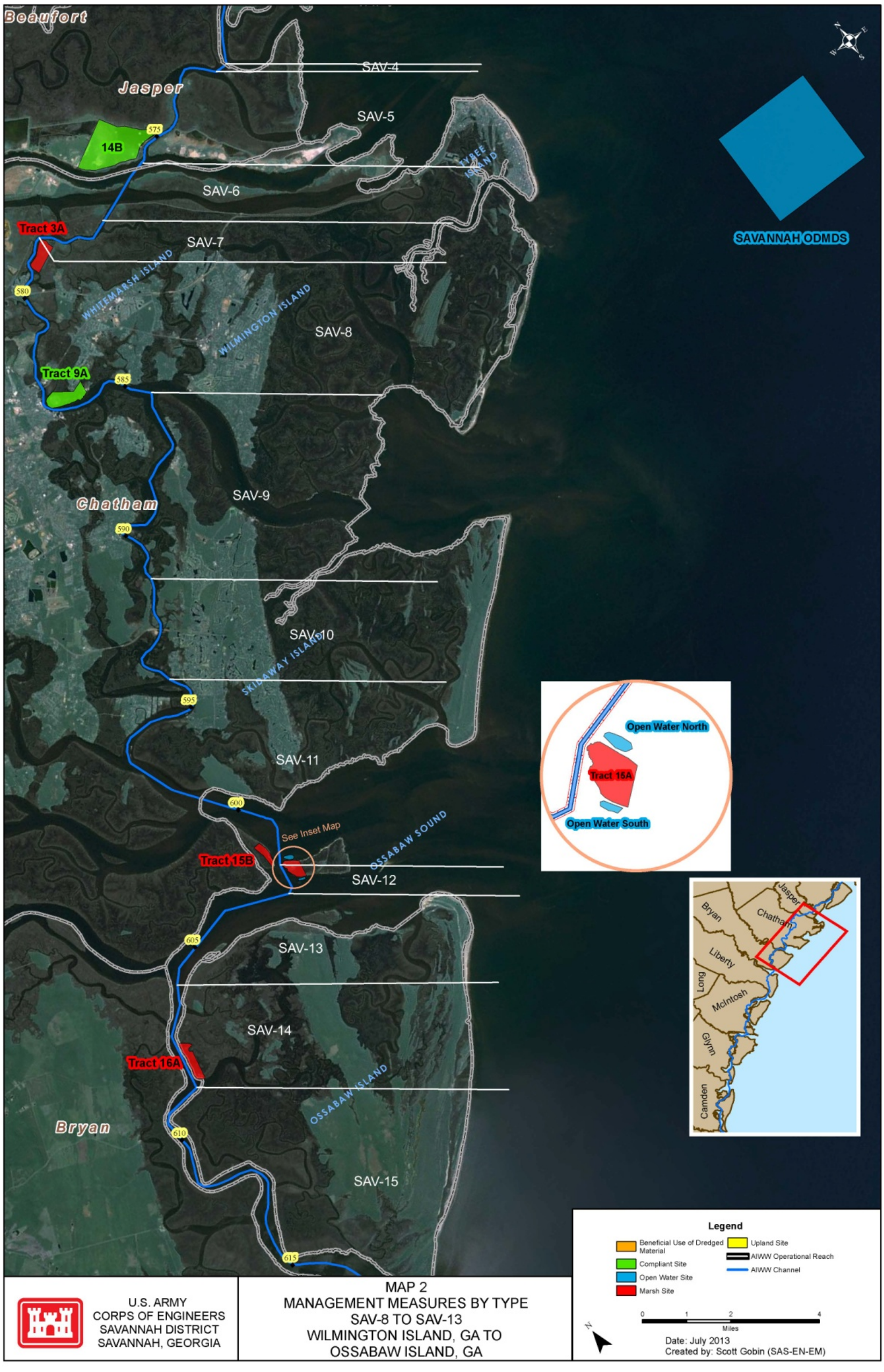


Figure 2-3: Placement Alternatives Considered by Reach – Map 2 of 7

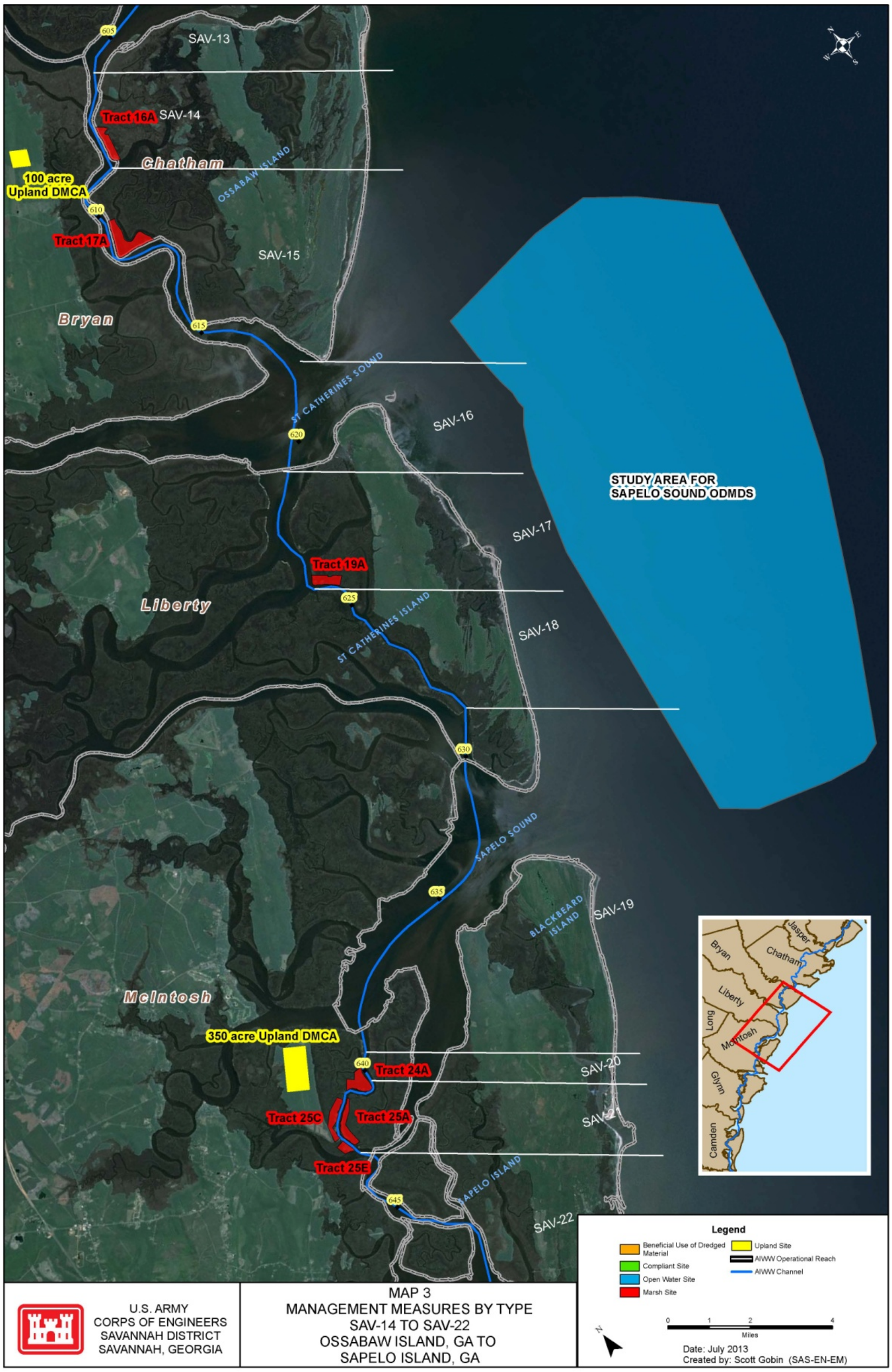


Figure 2-4: Placement Alternatives Considered by Reach – Map 3 of 7

Figure 2-5: Placement Alternatives Considered by Reach – Map 4 of 7

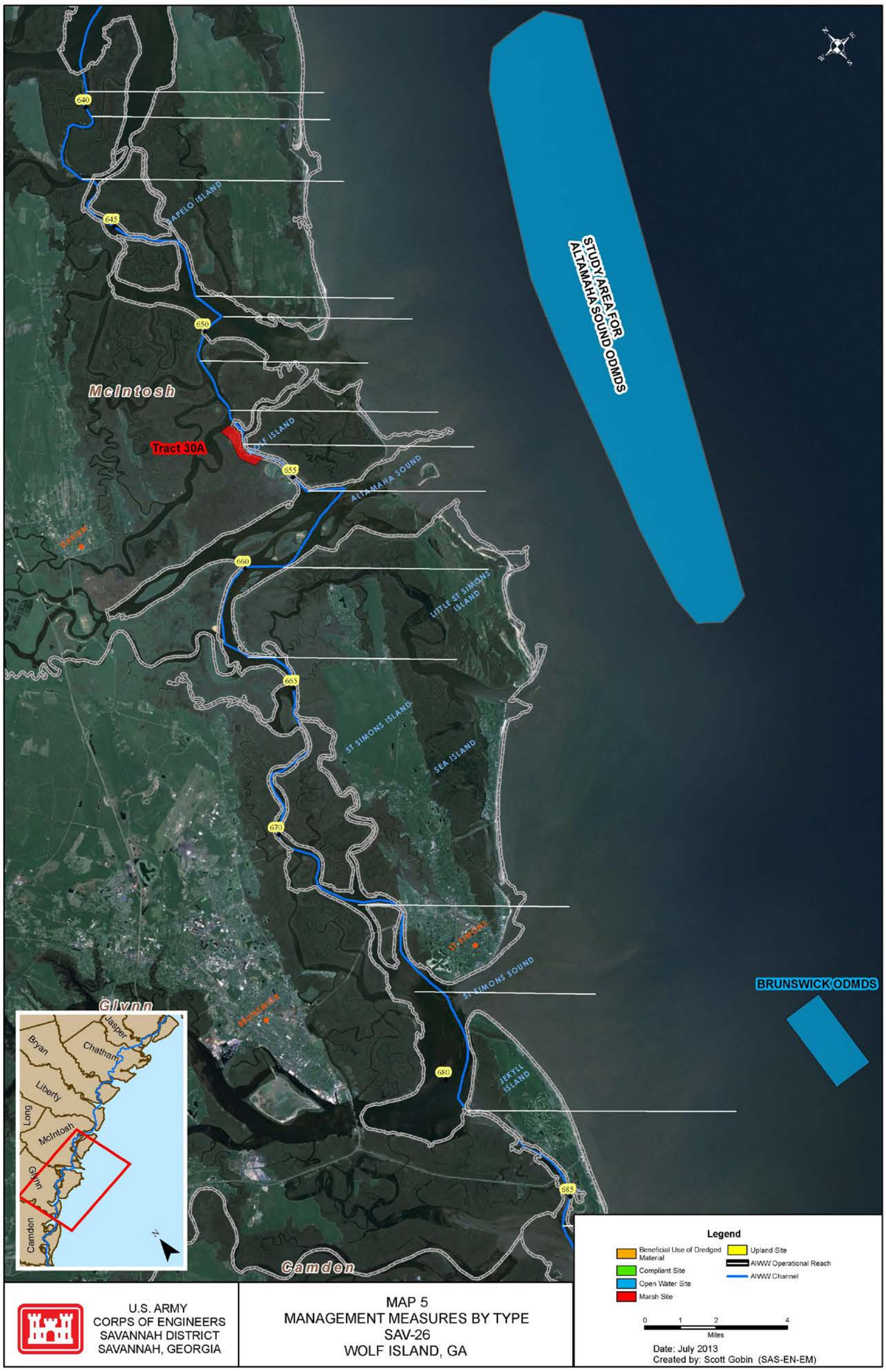


Figure 2-6: Placement Alternatives Considered by Reach – Map 5 of 7

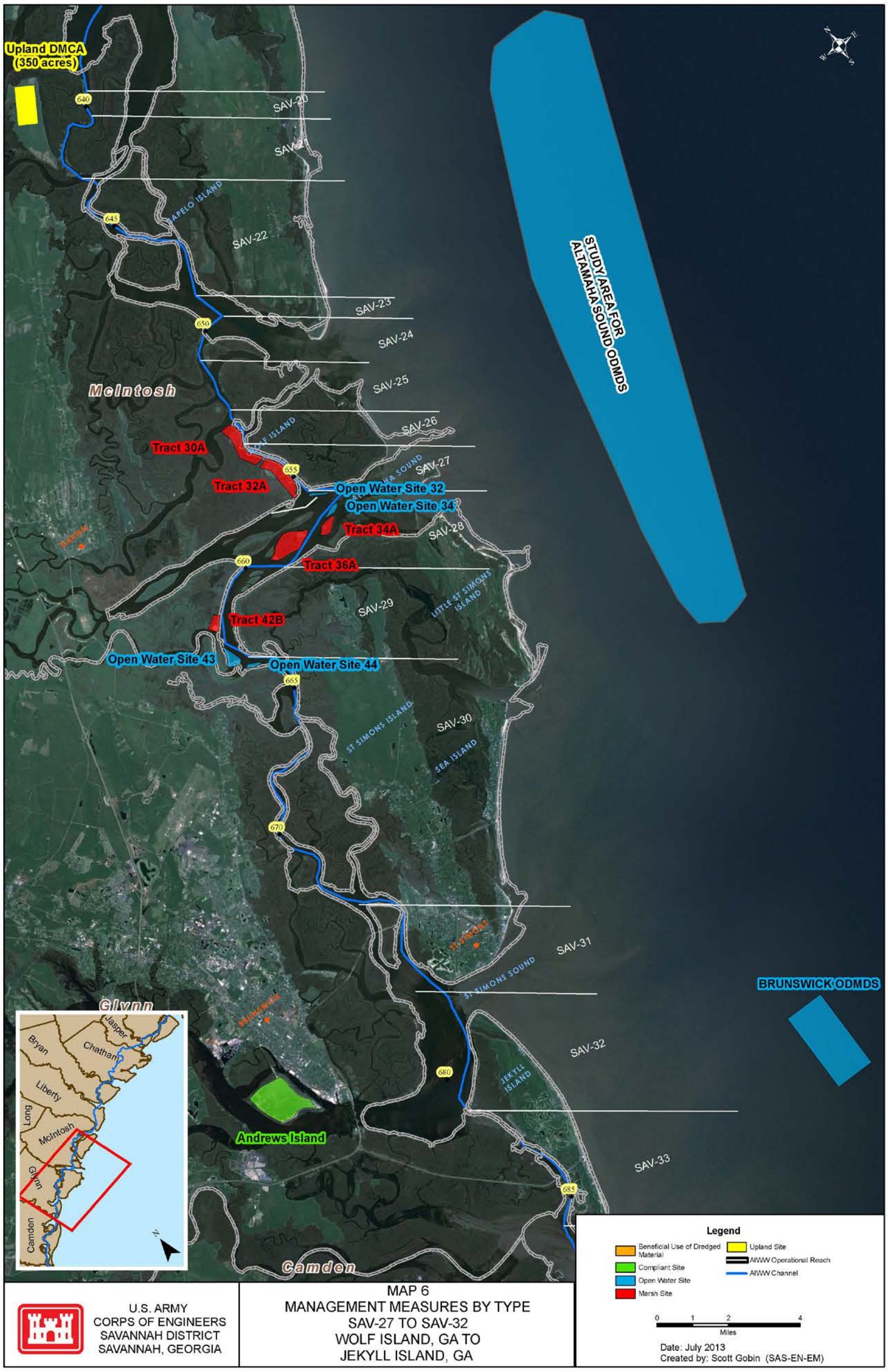


Figure 2-7: Placement Alternatives Considered by Reach – Map 6 of 7

Figure 2-8: Placement Alternatives by Reach – Map 7 of 7

2.8.5 Use Existing Dredged Material Containment Areas

The DMMP identifies several reaches for which placement of dredged material into existing DCMAs is the preferred option. DCMA 14-B is part of the Savannah Harbor Federal Navigation Project. Under the DMMP tentative preferred alternative, dredged material from Port Royal Sound – Ramshorn Creek SC (SAV-1), Ramshorn Creek SC (SAV-2), New River SC (SAV-3), Walls Cut SC (SAV-4), Fields Cut SC (SAV-5), Elba/McQueens Cut (SAV-6), and St. Augustine Creek (SAV-7) would be placed in DMCA 14-B. In addition, material from the upper portion of Wilmington River (SAV-8) would also be placed in DMCA 14-B. Figure 2-3 shows the location of DMCA 14-B.

The diked portion of 9-A (26 acres) is used by marinas in Thunderbolt but must maintain 130,000 CY of placement capacity for the Federal project. Dredged material from four reaches would be placed in the existing diked portion of placement area 9-A: lower portions of Wilmington River (SAV-8), Skidaway River (SAV-(9), Skidaway Narrows (SAV-10), and Burnside River to Hells Gate (SAV-11). Figure 2-3 shows the location of Tract 9-A (the diked portion of this tract is not shown but is located in the westernmost portion adjacent to the AIWW channel).

St. Simons Sound (SAV-32) does not require dredging but any material that would be dredged in the future would be placed in the Andrews Island DMCA in Brunswick Harbor. Figure 2-7 shows the location of the Andrews Island DMCA.

Material dredged in the Cumberland River to Cumberland Sound reach (SAV-35) is placed in ‘ DMCA Crab Island under terms of a license between the Corps and the Navy. This tract is referred to as Parcel B2-3 in the 1976 EIS.

2.8.6 Construct New Upland Dredged Material Containment Areas

The DMMP identifies reaches for which dredging is needed and where construction of an upland DCMA would be one course of action. For upland sites, Savannah District’s contractor (Taylor Engineering, Inc.) reviewed aerial photographs of the Savannah District portion AIWW and proposed sites that appeared to be open high ground in the vicinity of the AIWW and provided sufficient capacity if the property were purchased and used for construction of a DCMA. Two potential upland sites were deemed feasible for evaluation in this EA. Figure 2-4 shows the locations of these two sites.

2.8.7 Construct Saltmarsh Dredged Material Containment Areas

The Savannah District developed preliminary estimates of creating DMCAs by building dikes on some existing saltmarsh disposal easements. Constructing DCMAs on existing saltmarsh disposal easements would necessarily involve placement of fill into existing saltmarsh, requiring mitigation per Section 404 of the Clean Water Act and cultural resources surveys of the unimpacted portions of the tracts per Section 106 of the National Historic Preservation Act.

Tract 3-A was diked along its perimeter in the 1940s when Elba and McQueen cuts were constructed. This tract has not been used since 1989, and the condition of the dikes needs to be determined and repairs made before this tract is used again. Because the dikes have eroded in places, allowing flooding on spring tides, tidal wetlands have re-established within the dikes. Repair of the dikes and use of Tract 3-A for placement of dredged sediments in the future would require wetland mitigation to compensate for the loss of these re-established wetlands. Figure 2-3 shows the location of Tract 3-A.

Construction methodology and costs for the two-phased construction (an initial 6-foot raising and then raising to the target height) of dredged material containment areas on previously used marsh placement sites 5-A, 16-A, 17-A, 19-A, 25-E, 30A, 32-A, and 52-A were developed by GeoSyntec Consultants; costs for placement sites 24-A and 25-C were developed by Savannah District Engineering Division. The size of the site was based on using the entire easement area for the placement site, and the costs to place the dredged sediment on the site were developed based on the latest completed dredging contracts for the AIWW in a reach closest to that placement area which included both the cost per cubic yard to dispose of the sediments and the mobilization and demobilization costs. Details of costs to construct and use new saltmarsh DMCAs are found in the associated DMMP.

2.8.8 Use Open Water Placement Sites

The three reaches where sediment characteristics permit open water placement are shown in Table 2-7 and their locations are shown in Figures 2-7 (Hells Gate) and 2-9 (Altamaha Sound and Buttermilk Sound). Sediment analyses would be performed to determine sediment characteristics. Any reach for which open water placement is the preferred method would have a grain size analysis preformed before each dredging event to verify that it meets the requirements of the appropriate State.

For the reaches in South Carolina there would be no open water placement of dredged material except in approved ODMDS or for re-nourishing “seriously eroded beaches.” Also material from the South Carolina reaches may use open water placement for other beneficial uses where appropriate with approval by the State.

Reaches in Georgia that have 80% or greater sand content would use open water placement and reaches with 51% to 79% sand will be considered on a case-by-case basis. For anything less than 51% sand a non-open water placement method will have to be used. Fine-grained sediments would be placed into undiked placement tracts with measures taken to confine the material to the portion of the tracts already impacted by placement of dredged materials. Volumes presented in Table 2-7 represent the total of fine-grained and coarse-grained sediments; the actual volumes to be placed in open water and confined sites would depend on results of the grain size analyses for each of the three reaches.

Table 2-6: Open Water Placement Sites

Dredging Reach	Reach	AIWW Mileage	Material Type	Volume Per Event (CY)	20-yr Maintenance Vol (CY)	20-yr Sediment Storage Vol (CY)	Last Dredged	Material Placement Options
Hells Gate	SAV-12	601.8	Sand, Silt, Clay	52,500	1,044,330	1,566,495	2009	open water - N and S sides Raccoon Key (coarse); confined placement on tracts 15-A, 15-B (fines)
Altamaha Sound	SAV-28	658.3	Sand, Silt	108,000	2,400,000	3,600,000	2009	open water - Dump Area 32 and 34 (coarse); confined placement on tracts 34-A, 36-A (fines)
Buttermilk Sound	SAV-29	662.6	Sand, Silt	217,500	4,278,000	6,417,000	2009	open water - adjacent to Tract 42-C, Dump Area 43, 44 (coarse); confined placement on Tract 42-B (fines)

2.8.9 Use of Existing Ocean Dredged Material Placement Sites

Savannah District has 2 approved ODMDSs: Savannah ODMDS (4.26 sq nautical mi) and Brunswick ODMDS (2.00 sq nautical mi). Currently, the Site Monitoring and Management Plans (SMMP) for the Savannah ODMDS and Brunswick ODMDS limit them to material from Savannah Harbor and Brunswick Harbor, respectively. Placement of dredged sediments from the AIWW into existing ODMDS would require modifications to the SMMP and EPA approval for both the Savannah and Brunswick ODMDS.

Evaluation of dredged material for possible ocean placement follows specific guidelines to ensure that coastal waters are protected from adverse placement effects as specified under Section 103 of the Marine Protection Research and Sanctuaries Act (MPRSA). Requirements for applications for ocean dumping are found in 40 CFR 221.

A Section 103 evaluation was performed for Jekyll Creek (SAV-33) in 2003 and the sediment was found to meet EPA standards for ocean placement, although the reach was not dredged and no material went to the ODMDS. The Corps believes that the AIWW sediments proposed in the DMMP for placement in the Savannah and Brunswick ODMDS are suitable for ocean placement and prior to such placement it would perform sediment testing and prepare a Section 103 Evaluation that would require EPA approval. Similar evaluations would be required for other reaches for which ocean placement is proposed.

2.8.10 Designation of New Ocean Dredged Materials Disposal Sites

Procedures for designating a new ODMDS are found in 40 CFR 228. The designation of a new ODMDS requires preparation of an EIS and extensive supporting studies to characterize the proposed site. Because of the distances from some of the AIWW reaches, two new ODMDSs are proposed, one off Sapelo Sound and one off Altamaha Sound. The process of designating a new ODMDS would take up to 3 years, including the time to perform required investigations, prepare an EIS, and prepare a Site Materials Management Plan (SMMP) for each new ODMDS. Chemical testing of sediments proposed for placement in the new ODMDS and the

corresponding MPRSA Section 103 Evaluations would be required for each reach proposed to use ODMDS placement. A Section 103 Evaluation is good for 3 years, so most of the reaches with material going to the ODMDS would require sampling prior to each dredging event.

Figure 2-9 shows the possible locations of two new ODMDSs off Sapelo Sound and Altamaha Sound. The polygons shown illustrate the limits of where the new ODMDSs would be located but are not meant to indicate the size of the sites. These new ODMDSs are expected to be approximately the size of the existing Savannah ODMDS.

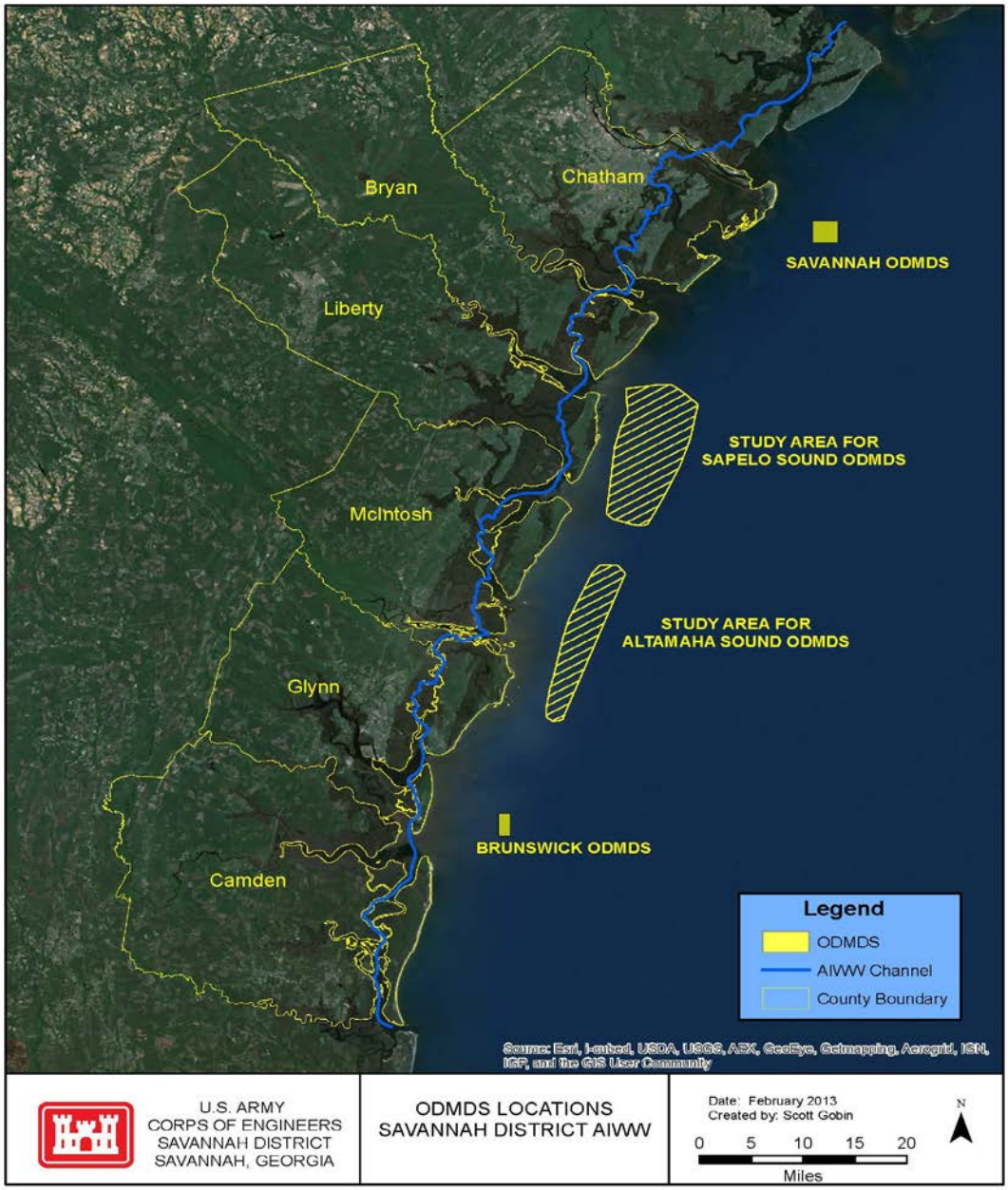


Figure 2-9: Location of Savannah and Brunswick ODMDSs and Potential Locations of New ODMDSs

2.9 Preferred Alternative/With Project Condition

The Corps developed and evaluated up to three placement options for each operational reach of the AIWW in Savannah District, based on practicability, including cost. This EA evaluates the environmental impact of these placement alternatives independent of cost. The selected plan provides for continued maintenance of the AIWW while avoiding, minimizing, or compensating for adverse environmental impacts associated with the project.

Tables 2-8 and 2-9 show features of the tentatively selected sediment placement alternative from the Draft DMMP that represents the With Project Condition. This alternative proposes to place dredged sediments into existing DMCAs, previously used unconfined saltmarsh tracts with measures to limit the material to existing impacted portions of the tracts, open water placement of coarse sediments, and existing and proposed new ODMDSs.

Table 2-7: DMMP Tentative Preferred Alternative

Dredging Reach	Operational Reach	Preferred Placement Site
Port Royal to Ramshorn Creek	SAV-1	No Dredging Required; DMCA 14-B if needed
Ramshorn Creek, SC	SAV-2	DMCA 14-B
New River	SAV-3	No Dredging Required; DMCA 14-B if needed
Walls Cut	SAV-4	DMCA14-B
Fields Cut, SC	SAV-5	DMCA14-B
Elba Cut - McQueens Cut	SAV-6	DMCA14-B
St. Augustine Creek	SAV-7	DMCA14-B
Wilmington River	SAV-8	DMCA14-B
Skidaway River	SAV-9	No Dredging Required; Diked portion of Tract 9-A if needed
Skidaway Narrows	SAV-10	No Dredging Required; Diked portion of Tract 9-A if needed
Burnside River to Hells Gate	SAV-11	No Dredging Required; Diked portion of Tract 9-A if needed
Hells Gate	SAV-12	Open Water (coarse); confined Placement in Tracts 15-A and 15-B (fines)
Hells Gate to Florida Passage	SAV-13	No Dredging Required; Savannah ODMDS if needed
Florida Passage	SAV-14	Proposed ODMDS @ Sapelo Sound
Bear River	SAV-15	Proposed ODMDS @ Sapelo Sound
St. Catherines Sound - North Newport River	SAV-16	No Dredging Required; Proposed ODMDS @ Sapelo Sound if needed
North Newport River	SAV-17	No Dredging Required; Proposed ODMDS @ Sapelo Sound if needed
Johnson Creek	SAV-18	Proposed ODMDS @ Sapelo Sound
Sapelo Sound - Front River	SAV-19	Proposed ODMDS @ Sapelo Sound
Front River	SAV-20	Proposed ODMDS @ Sapelo Sound
Creighton Narrows	SAV-21	Proposed ODMDS @ Sapelo Sound
Old Teakettle Creek	SAV-22	No Dredging Required; Proposed ODMDS @ Sapelo Sound if needed
Doboy Sound	SAV-23	Proposed ODMDS @ Altamaha Sound
North River Crossing	SAV-24	Proposed ODMDS @ Altamaha Sound
Rockedundy River	SAV-25	Proposed ODMDS @ Altamaha Sound
South River	SAV-26	Proposed ODMDS @ Altamaha Sound

Table 2-8: DMMP Tentative Preferred Alternative (continued)

Dredging Reach	Operational Reach	Preferred Placement Site
Little Mud River	SAV-27	Proposed ODMDS @ Altamaha Sound
Altamaha Sound	SAV-28	Proposed ODMDS @ Altamaha Sound
Buttermilk Sound	SAV-29	Open Water Sites 43and 44 (coarse); confined Placement in Tract 42-B (fines)
Mackay River	SAV-30	No Dredging Required; Andrews Island DMCA if Needed
Frederica River	SAV-31	No Dredging Required; Andrews Island DMCA if Needed
St. Simon Sound	SAV-32	No Dredging Required; Andrews Island DMCA if Needed
Jekyll Creek	SAV-33	Brunswick ODMDS (interim solution)
Jekyll Creek to Cumberland River	SAV-34	No Dredging Required; Brunswick ODMDS if needed
Cumberland River to Cumberland Sound	SAV-35	Diked Placement in Tract 1700-L (Crab Island)
Cumberland River to Cumberland Sound	SAV-36	Dredged by the Navy

2.10 Comparison of No Action/Without Project Condition and the Preferred Alternative

One objective of the proposed new DMMP is to identify a placement site for each of the 36 reaches regardless of dredging history. It identifies a potential placement site for the reaches with no previous dredging requirement, should these reaches require dredging in the future. Out of the 36 operational reaches covered by this DMMP, 15 reaches have no previous required dredging that now have determined placement if needed. Another six reaches have the same placement option for the without project condition and for the preferred alternative. For the other 15 reaches the differences were as follows (Table 2-10).

Table 2-9: Without Project Condition versus Preferred Alternative

Dredging Reach	Ops Reach	Without Project Condition	Dredging Interval (yrs)	Preferred Alternative
Port Royal to Ramshorn Creek	SAV-1	No Dredging Required; DMCA 14-B if needed		No Dredging Required; DMCA 14-B if needed
Ramshorn Creek, SC	SAV-2	DMCA 14-B	14	DMCA 14-B
New River	SAV-3	No Dredging Required; DMCA 14-B if needed		No Dredging Required; DMCA 14-B if needed
Walls Cut	SAV-4	DMCA14-B	19	DMCA14-B
Fields Cut, SC	SAV-5	DMCA14-B	5	DMCA14-B
Elba Cut - McQueens Cut	SAV-6	DMCA14-B	9	DMCA14-B
St. Augustine Creek	SAV-7	DMCA14-B	2	DMCA14-B
Wilmington River	SAV-8	DMCA14-B	4	DMCA14-B
Skidaway River	SAV-9	No Dredging Required; Diked portion of Tract 9-A if needed		No Dredging Required; Diked portion of Tract 9-A if needed
Skidaway Narrows	SAV-10	No Dredging Required; Diked portion of Tract 9-A if needed		No Dredging Required; Diked portion of Tract 9-A if needed
Burnside River to Hells Gate	SAV-11	No Dredging Required; Diked portion of Tract 9-A if needed		No Dredging Required; Diked portion of Tract 9-A if needed
Hells Gate	SAV-12	DMCA 14B	3	Open Water (coarse); confined placement in Tracts 15-A and 15-B (fines)
Hells Gate to Florida Passage	SAV-13	DMCA 14B		No Dredging Required; Savannah ODMDS if needed
Florida Passage	SAV-14	DMCA 14B	11	Proposed ODMDS @ Sapelo Sound
Bear River	SAV-15	DMCA 14B	15	Proposed ODMDS @ Sapelo Sound
St. Catherines Sound - North Newport River	SAV-16	DMCA 14B		No Dredging Required; Proposed ODMDS @ Sapelo Sound if needed
North Newport River	SAV-17	DMCA 14B		No Dredging Required; Proposed ODMDS @ Sapelo Sound if needed
Johnson Creek	SAV-18	DMCA 14B	30	Proposed ODMDS @ Sapelo Sound
Sapelo Sound - Front River	SAV-19	DMCA 14B		No Dredging Required; Proposed ODMDS @ Sapelo Sound if needed
Front River	SAV-20	DMCA 14B		No Dredging Required; Proposed ODMDS @ Sapelo Sound if needed
Creighton Narrows	SAV-21	DMCA 14B	4	Proposed ODMDS @ Sapelo Sound
Old Teakettle Creek	SAV-22	DMCA 14B		No Dredging Required; Proposed ODMDS @ Sapelo Sound if needed
Doboy Sound	SAV-23	DMCA 14B		Proposed ODMDS @ Altamaha Sound
North River Crossing	SAV-24	DMCA 14B	4	Proposed ODMDS @ Altamaha Sound

Table 2-10: Without Project Condition versus Preferred Alternative (continued)

Dredging Reach	Ops Reach	Without Project Condition	Dredging Interval (yrs)	Preferred Alternative
Rockedundy River	SAV-25	DMCA 14B	5	Proposed ODMDS @ Altamaha Sound
South River	SAV-26	DMCA 14B	2	Proposed ODMDS @ Altamaha Sound
Little Mud River	SAV-27	DMCA 14B	2	Proposed ODMDS @ Altamaha Sound
Altamaha Sound	SAV-28	DMCA 14B	3	Proposed ODMDS @ Altamaha Sound
Buttermilk Sound	SAV-29	DMCA 14B	3	Open Water Sites 43 and 44 (coarse), confined placement in Tract 42-B (fines)
Mackay River	SAV-30	DMCA 14B		No Dredging Required; Andrews Island DMCA if Needed
Frederica River	SAV-31	DMCA 14B		No Dredging Required; Andrews Island DMCA if Needed
St. Simon Sound	SAV-32	DMCA 14B		No Dredging Required; Andrews Island DMCA if Needed
Jekyll Creek	SAV-33	DMCA 14B	2	Brunswick ODMDS (interim solution)
Jekyll Creek to Cumberland River	SAV-34	DMCA Crab Island		No Dredging Required; Brunswick ODMDS if needed
Cumberland River to Cumberland Sound	SAV-35	DMCA Crab Island	18	Diked Placement in Tract 1700-L (Crab Island)
Cumberland River to Cumberland Sound	SAV-36	Maintained by U.S. Navy		Dredged by the Navy

2.10.1 Operational Reaches SAV-1 through SAV-8

The preferred disposal alternative for SAV-1 through SAV-8 is to place the material in Savannah Harbor DMCA 14-B. Placement in the DMCA 14-B is also future without project condition for SAV-1 through SAV-8.

2.10.2 Operational Reaches SAV-9 through SAV-11

The preferred disposal alternative for SAV-9 through SAV-11 is to place the material in the DMCA in Tract 9-A. After 130,000 CY of remaining capacity is used in DMCA 9-A then a new DMMP will need to be developed for these reaches.

2.10.3 Operational Reach SAV-12

The preferred disposal alternative for SAV-12 is to place all coarse material in open water sites while confining the fines to the existing impacted portions of tracts 15-A and 15-B. Confining measures such as geo-tubes or some equivalent method would be used to confine the fine sediment disposal to previously impacted areas of the tracts. If future dredging requires more capacity than what can be provided by the impacted area then those environmental impacts will

need to be addressed. If this method of confinement cannot confine the fine material than the material would need to be placed in the Savannah ODMDS. Placement of material in DMCA 14-B is the future without project condition for this reach.

Prior to placing material from this reach in the Savannah ODMDS a MPRSA Section 103 sediment analysis and EPA approval would be required, and a modification to the site material management plan (SMMP) would need to be completed and approved by EPA. These studies would need to be done within three years of using the Savannah ODMDS.

2.10.4 Operational Reach SAV-13

The preferred disposal alternative for SAV-13 is to place the material in the Savannah ODMDS. Placement of material in DMCA 14-B is the future without project condition for this reach.

Prior to placing material from this reach in the Savannah ODMDS a MPRSA Section 103 sediment analysis and EPA approval would be required, and a modification to the site material management plan (SMMP) would need to be completed and approved by EPA. These studies would need to be done within three years of using the Savannah ODMDS.

2.10.5 Operational Reaches SAV-14 through SAV-22

The preferred alternative for SAV-14 through SAV-22 is to place the material in the proposed ODMDS near Sapelo Sound. Placement of material in DMCA 14-B is the future without project condition for these reaches.

Prior to placing material from these reaches in the proposed Sapelo ODMDS a MPRSA Section 103 sediment analysis would need to be completed on each reach. This along with an SMMP would be part of the study and EIS documentation to designate a site near Sapelo Sound for an ODMDS. USEPA must approve this designation. These studies would need to be done within three years of using the proposed ODMDS.

2.10.6 Operational Reaches SAV-23 through SAV-27

The preferred alternative for SAV-23 through SAV-27 is to place the material in the proposed ODMDS near Altamaha Sound. Placement of material in DMCA 14-B is the future without project condition for thes ereaches.

Prior to placing material from these reaches in the proposed Altamaha Sound ODMDS a Section103 sediment analysis would need to be completed on each reach. This along with an SMMP would be part of the study and EIS documentation to designate a site near Altamaha Sound for an ODMDS. USEPA must approve this designation. These studies would need to be done within three years of using the proposed ODMDS.

2.10.7 Operational Reach SAV-28

The preferred alternative for SAV-28 is to place the material in the proposed Altamaha ODMDS. Placement in DMCA 14-B is the future without-project condition for this reach.

Prior to placing material from these reaches in the proposed Altamaha Sound ODMDS a Section103 sediment analysis would need to be completed on each reach. This along with an SMMP would be part of the study and EIS documentation to designate a site near Altamaha Sound for an ODMDS. USEPA must approve this designation. These studies would need to be done within three years of using the proposed ODMDS.

2.10.8 Operational Reach SAV-29

The preferred alternative for SAV-29 is to place all the coarse material in open water sites 43 and 44 while confining the fines to the existing impacted portion of Tract 42-B. Confining measures such as geo-tubes or some equivalent method would be used to confine the fine sediment disposal to previously impacted areas of the tracts. If future dredging requires more capacity than can be provided by the impacted area then those environmental impacts will need to be addressed. If this method of confinement cannot confine the fine material then the material would need to be placed in the proposed Altamaha ODMDS Placement of material in DMCA 14-B is the future without project condition for this reach.

Prior to placing material from these reaches in the proposed Altamaha Sound ODMDS a Section103 sediment analysis would need to be completed on each reach. This along with an SMMP would be part of the study and EIS documentation to designate a site near Altamaha Sound for an ODMDS. USEPA must approve this designation. These studies would need to be done within three years of using the proposed ODMDS.

2.10.9 Operational Reaches SAV-30 through SAV-32

The preferred alternative for SAV-30 through SAV-32 is to place the material in the Andrews Island DMCA. Prior to using the Andrews Island DMCA a capacity loss analysis would need to be performed and Georgia DOT would need to approve the use of the site. Placement of material in DMCA 14-B is the future without project condition for these reaches.

2.10.10 Operational Reaches SAV-33

The preferred alternative for SAV-33 through SAV-34 is to place the material in the Brunswick ODMDS. This is an interim alternative for SAV-33 because the source of the shoaling must be addressed and the shoaling rates reduced if this portion of the waterway is to be maintained. Placement in DMCA 14-B is the without project condition for SAV-33 with no future plans for addressing the source of the shoaling.

Prior to placing material from this reach in the Brunswick ODMDS a MPRSA Section 103 sediment analysis, and a change in the SMMP would need to be completed. These studies would need to be done within three years of using the Brunswick ODMDS. Also, to develop a feasible

long term placement strategy for SAV-33, further study of the shoaling patterns and potential hydrologic alterations, including a hydraulic model, must be developed to reduce shoaling in Jekyll Creek.

2.10.11 Operational Reaches SAV-34 and SAV-35

The preferred alternative for SAV-35 is to place the material in diked Tract 1700L, also known as Big Crab Island. Placement in the Big Crab Island DMCA is also the without project condition for these reaches.

2.10.12 Operational Reach SAV-36

The Navy maintains this reach as part of the Naval Submarine Base Kings Bay.

2.11 Beneficial Use of Dredged Sediment

Because fine-grained materials are incompatible with native beach sediments, beach placement remains a limited option throughout most of the AIWW. Potential construction purposes of the dredged material include fill to build or expand land for airports, ports, residential, or commercial development. Other examples of one-time beneficial use options include shoreline stabilization and environmental enhancement by the creation or restoration of wetland, marsh, or upland habitat (earlier identified as unconfined open water placement).

Only one reach within Savannah District's AIWW, Ramshorn Creek SC (SAV-2), contains beach-quality sand. This could be made available for renourishment of nearby beaches (Hilton Head Island and Daufuskie Island). Pipeline distances to these beaches would be 4.1 miles and 2.75 miles, respectively, if laid over marsh and uplands; a floating pipeline would need to be routed through New River to Daufuskie Island or through Cooper River to Hilton Head Island, increasing the pumping distance to 7.0 miles and 4.3 miles, respectively. The anticipated 20-yr requirement is 88,000 CY, a relatively small amount to be considered for beach renourishment. The historic dredging frequency for this reach is every 14 years. Only one alternative to beach renourishment was presented in the Draft DMMP – placement in DMCA 14-B. The Corps would coordinate with the appropriate natural resource agencies prior to placement in an area other than DMCA 14-B.

2.12 Comparison of Impacts of Alternatives

Table 2-11 compares project-related impacts (without mitigation) of the seven dredged materials placement options evaluated in this EA. A more detailed impact analysis for these options is presented in Section 4.0 of this EA – Environmental Consequences and in the Mitigation Plan in Section 4.15.

Table 2-10: Summary of Impacts without Mitigation by Placement Method

Resource	Placement Method						
	Existing Upland DMCA[1]	**New Upland DMCA[1]**	**New Saltmarsh DMCA[1]**	**Unconfined Saltmarsh Placement[2,3]**	**Confined Placement on Saltmarsh Tracts (silt/mud)[1]**	**Open Water Placement (sand)**	**ODMDS**
Geology and Sediments	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Water Quality	Minimal	Minimal	Minimal	Moderate	Minimal	Minimal	Minimal
Air Quality	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Marine and Estuarine Resources	None	None	Substantial	Moderate	Minimal	Minimal	Minimal
Essential Fish Habitat	None	None	Substantial	Moderate	Minimal	Minimal	Minimal
Invasive Species	Minimal	Minimal	Minimal	Minimal	Minimal	None	None
Terrestrial Resources	Minimal	Minimal	Moderate	Moderate	Moderate	None	None
Wetlands and Floodplains	None	Moderate	Substantial	Moderate	Minimal	Minimal	Minimal
Protected Species	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Cultural Resources	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal
Esthetics	None	Minimal	Moderate	Moderate	Minimal	None	None
Socio-economics	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal	Minimal

[1]Effluent must meet established water quality standards; [2]Due to loss of functioning saltmarsh; [3]Due to loss of functioning saltmarsh and non-compliance with water quality standards.

2.13 Relationship of the Proposed Action to Other Federal Projects

The northern portion of the proposed action (reaches SAV-5, -6, and -7) would occur in the general vicinity of the proposed Savannah Harbor Expansion Project (SHEP), and this EA assumes that SHEP as well as the features associated with the Long Term Management Strategy (LTMS) (USACE 1996), namely Bank Protection for DMCAs 13-A, 13-B, 14-A, and 14-B have been completed.

3.0 Affected Environment

3.1 Geology and Sediments

3.1.1 Geology

The AIWW in South Carolina and Georgia is located in the Lower Atlantic Coastal Plain Physiographic Province. The majority of soils primarily have a sandy surface layer over loamy or sandy subsoil or underlying layers. These soils are nearly level or gently sloping and occur as broad, smooth areas drained by wet depressions. They generally are seasonally wet or almost always wet, except for the better drained soils on the slight ridges and dune-like relief. A band of marshes parallels the coastline and extends inland along the major streams. Limestones of tertiary and quaternary age underlying the Coastal Plain form one of the most productive aquifer systems in the country.

The chain of barrier islands extending from South Carolina into northern Florida was formed during the last 10,000 years, probably as a result of dune ridges and sea level drop; they formed at low sea stands and were inundated when sea level rose again. Barrier beaches formed on the islands from littoral sands. Wind-blown sand from the beaches became trapped by pioneering vegetation to form the dune ridges which were ultimately stabilized by salt-tolerant vegetation. The lagoonal systems behind the barrier island became filled with sediments to form saltmarshes. Deposition on the marsh continues as waters spill onto the marsh at high tide, but increases in marsh elevation are nearly offset by rising sea levels (Johnson et al 1974).

The Savannah District AIWW runs generally behind the barrier islands within the broad expanse of saltmarsh between the barrier islands and the mainland.

3.1.2 Sediments

Information in this section is from a report to Wilmington District USACE entitled *Atlantic Intracoastal Waterway, Initial Plan Development, Dredged Material Management Plan* (Taylor Engineering 2011):

The maintenance sediments dredged on an annual basis from the Savannah District AIWW is a mixture of sands, silts, and clays. Sand is defined as grain size between 0.07 and 5.0 mm in diameter, while silt and clay measures less than 0.07 mm in diameter. The Savannah District has geotechnical borings (collected in 1998 and 2002) for the Jekyll Creek area and additional grain size information (collected in 1999) for areas within the AIWW (i.e., Floyds Creek, Umbrella Creek, Umbrella Cut [alternate route around St. Andrews Sound]; Cedar Hammock [in St. Simon Sound], Buttermilk Sound, Altamaha Sound, Little Mud, South River, Rockdedundy, Creighton Narrows, Hells Gate, and Ramshorn Creek). In general, the 1998 Jekyll Creek samples comprised between 5 and 20% sand, between 35 and 40% silt, with clay material rounding out the remaining balance. Similarly, the 2002 sediment samples yielded comparative results with fine material (silts and clays) exceeding 80% in nearly all samples.

The reported physical characteristics for the 1999 data varied widely depending on sample locations. Based on one sediment sample per location, data generally indicated the presence of sandy material in Floyds Creek, Cedar Hammock, Altamaha Sound, and Ramshorn Creek, and indicated finer material in Little Mud, Umbrella Creek, Umbrella Cut, Buttermilk Sound, and the Hells Gate locations. Data from the 1999 geotechnical investigation indicated muck in South River, Creighton Narrows, and Rockdedundy. Muck is defined as comprising a minimum of 60% silts and clays, 50% water, and 10% organic matter.

Of the 36 defined operational reaches, only two (SAV-32 and SAV-33) contain borings to generally characterize the dredged material quality profiles within these reaches. Table 3-1 provides a summary of each geotechnical boring and a general description (by operational reach). Available geotechnical information contained neither the elevation of the collected borings nor the Unified Soil Classification System (USCS) classification.

3.1.2.1 SAV-32

One geotechnical boring, identified as JC-North, characterizes the sediment in operational reach SAV-32 (located near St. Simons Island). The collected boring contained roughly 33.9% solids with an average particle size of 23.1 microns.

3.1.2.2 SAV-33

Six geotechnical borings, identified as JKREF, JCNORTH 1 and 2, and JCSOUTH 1 – 3, characterize the sediment in operational reach SAV-33 (located near Jekyll Creek). The borings contained widely varied solid concentrations ranging from 30.5 to 50.4% solids with an average particle size between 6.2 and 73.5 microns.

This limited physical data for the Jekyll Creek area suggest a large percentage of fine-grained, organic-carbon rich sediments (commonly called muck). Dredging and disposing of these sediments — given their known effects on water quality and benthic communities, and their tendency to accumulate pollutants — will likely present permitting challenges. Those challenges aside, fine sediments also impose physical constraints on dredged material handling and containment basin design. Because pollutants have an affinity for fine sediments, their presence also raises concerns about possible chemical contamination.

The Savannah District has 2003 chemical analytical data - elutriate chemistry, whole sediment toxicity, suspended phase toxicity, 28-day bioassay and bioaccumulation, and tissue chemistry - for the Jekyll Creek area. Sediment samples collected for the 2003 project suggest that sediment contained in the Jekyll Creek area contain limited quantities of contaminants. The 2003 USACE *Jekyll Creek O&M Sediment Evaluation Report* describes the field sampling and analytical methods, field effort, and subsequent results in detail. Depending on the method of placement (likely an upland containment area or, in some instances, open water placement), regulatory agencies may require additional chemical testing of sediments targeted for dredging. Based on the information above, the presence of these fine-grained strata in the Jekyll Creek area eliminates channel sediment within SAV-33 as a beach placement option under Georgia permitting criteria. The remaining 34 reaches may require (per Georgia-specific regulatory and permitting requirements) future physical and chemical analysis of sediments targeted for dredging.

Table 3-1: Summary of Available Geotechnical Borings by Operational Reach

PREVIOUSLY DEFINED REACHES AND AREAS	REACH DESCRIPTION			GEOTECHNICAL BORING DESCRIPTION		
	OPERATIONAL REACH	CUTS	AIWW MILEAGE	BORING ID[1]	AIWW MILEAGE	SOIL DESCRIPTION
St. Simon Sound	SAV-32	SB 270, BKB 1	677.0-680-9	JC-North	681.1	33.9% solids; Specific Gravity: 2.33; Average particle size: 23.1 um
Jekyll Creek	SAV-33	BKB 2-BKB 19	680.9-685.9	JKREF	N/A	50.4% solids; Specific Gravity: 2.37; Average particle size: 73.5 um
				JC South 1	685.2	32.2% solids; Specific Gravity: 2.55; Average particle size: 6.8 um
				JC South 2	684.6	51.9% solids; Specific Gravity: 2.50; Average particle size: 44.3 um
				JC-North 1	683.9	32.3% solids; Specific Gravity: 2.50; Average particle size: 18.9 um
				JC-North 2	683.2	30.5% solids; Specific Gravity: 2.53; Average particle size: 19.4 um
				JC-North 3	682.2	33.0% solids; Specific Gravity: 2.41; Average particle size: 6.2 um

NOTE: [1] Northing and easting coordinates were not provided.

3.2 Water Resources

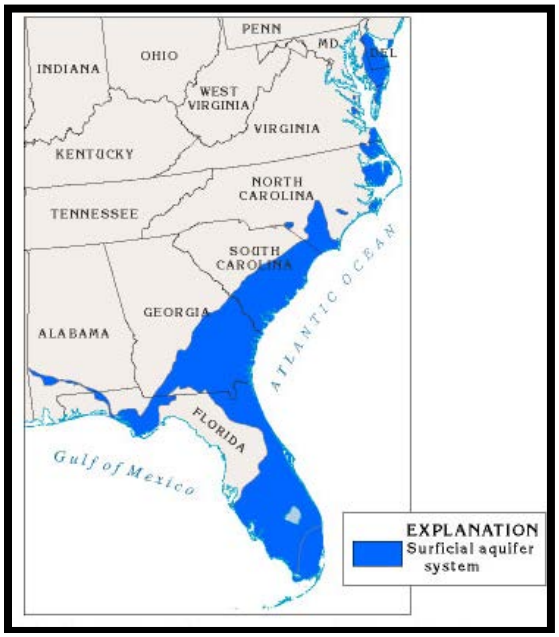
3.2.1 Groundwater

The principal aquifers directly underlying the AIWW area are, in order of depth beneath the surface: 1) the surficial aquifer, and 2) the Upper Floridan aquifer.

3.2.1.1 Surficial Aquifer System

The surficial aquifer system includes any otherwise undefined aquifers that are present at the land surface. The aquifer consists mostly of beds of unconsolidated sand, shelly sand, and shell. In Georgia and South Carolina, unnamed, sandy marine terrace deposits of Pleistocene age and sand of Holocene age comprise the aquifer system. The thickness of the surficial aquifer system

is typically less than 50 feet, becoming as much as 60 feet thick in southeastern Georgia. In places, some water leaks upward from the underlying Floridan aquifer system through the clayey confining unit separating the Floridan and surficial systems. In other places, where the hydraulic head of the Floridan is lower than the water table of the surficial aquifer, leakage can occur in the opposite direction. Because the surficial aquifer system extends seaward under the Atlantic Ocean, saltwater can encroach into the aquifer in coastal areas. Encroachment is more extensive during droughts because there is less freshwater available in the surficial aquifer system to keep the saltwater from moving inland (http://pubs.usgs.gov/ha/ha730/ch_g/G-surficial.html). Because the AIWW channel is only dredged to a maximum depth of 12 feet plus 2 feet of overdepth, the surficial aquifer is the only aquifer system likely to be affected by maintenance dredging of the project. Figure 3-1 shows the extent of the surficial aquifer.



Source: http://pubs.usgs.gov/ha/ha730/ch_g/G-text2.html

Figure 3-1: Extent of the Surficial Aquifer System

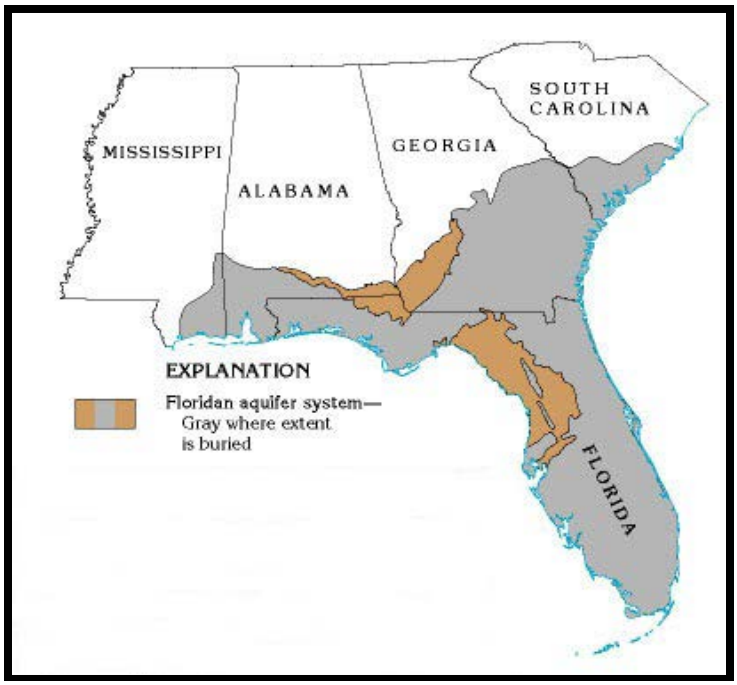
3.2.1.2 Floridan Aquifer System

The Floridan aquifer system is one of the most productive aquifers in the world. This aquifer system underlies an area of about 100,000 square miles in southern Alabama, southeastern Georgia, southern South Carolina, and all of Florida. The Floridan aquifer system provides water for several large cities, including Savannah and Brunswick in Georgia; and Jacksonville, Tallahassee, Orlando, and St. Petersburg in Florida. In addition, the aquifer system provides water for hundreds of thousands of people in smaller communities and rural areas. Locally, the Floridan is intensively pumped for industrial and irrigation supplies.

A thick sequence of carbonate rocks (limestone and dolomite) of Tertiary age comprise the Floridan aquifer system. Locally, in south-central Georgia and northern peninsular Florida, evaporite minerals have filled the pore spaces in upper Eocene rocks, and these low-permeability beds comprise the base of the system. In the Savannah District AIWW area, the upper confining

layer of the Upper Floridan aquifer system is generally greater than 100 feet thick and unbreached (http://pubs.usgs.gov/ha/ha730/ch_g/G-text6.html).

Figure 3-2 shows the extent above and below ground of the Floridan aquifer system.



Source: http://coastgis.marsci.uga.edu/summit/aquifers_fla.htm

Figure 3-2: Extent of the Floridan aquifer system

3.3 Air Quality

The Georgia Department of Natural Resources, Environmental Protection Division, Air Protection Branch (GA DNR-EPD, APB) and the South Carolina Department of Health and Environmental Control, Bureau of Air Quality (SC DHEC, BAQ), have air quality jurisdiction for the project area for Georgia and South Carolina, respectively. The ambient air quality for Chatham, Bryan, Liberty, McIntosh, Glynn, and Camden counties, Georgia; and Beaufort and Jasper counties, South Carolina has been determined to be in compliance with the National Ambient Air Quality Standards, and all counties have been designated as attainment areas. (http://www.dot.state.ga.us/informationcenter/programs/environment/airquality/maps/Pages/default.aspx) (http://www.epa.gov/oaqps001/greenbk/ancl.html).

All of the Savannah District AIWW area is considered by EPA to be in an attainment area since it meets the National Ambient Air Quality Standards (NAAQS), which are shown below:

Table 3-2: Air Quality Standards

Pollutant	Primary Standard	Secondary Standard

PM_{10}	150 ug/m3 (daily)	Same
$PM_{2.5}$	12 ug/m3 (annual) 35 ug/m3 (daily)	15 ug/m3 (annual) 35 ug/m3 (daily)
NO_x	53 ppb (annual) 100 ppb (1-hour)	53 ppb (annual)
SO_2	75 ppb (1-hour)	0.5 ppm (3-hour)
CO	9 ppm (8-hour) 35 ppm (1-hour)	None
Lead	0.15 ug/m3 (3-month average)	Same
Ozone	0.075 ppm (8-hour)	Same

The State Implementation Plan (SIP) identifies how the State will attain and maintain the primary and secondary NAAQS. Each State is required to have a SIP which contains control measures and strategies which demonstrate how each state will attain and maintain the NAAQS. Georgia and South Carolina each have a State Implementation Plan approved or promulgated under Section 110 of the Clean Air Act. Part D of title I of the Act specifies additional requirements applicable to nonattainment areas, Section 110 and part D describe the elements of a SIP and include, among other things, emission inventories, a monitoring network, an air quality analysis, modeling, attainment demonstrations, enforcement mechanisms, and regulations which have been adopted by the State to attain or maintain NAAQS. EPA has adopted regulatory requirements which spell out the procedures for preparing, adopting and submitting SIPs and SIP revisions that are codified in 40 CFR Part 51.

Under Clean Air Act Section 176(c), certain Federal actions must be analyzed to determine whether they conform with the applicable SIP(s). However, a Conformity Determination is not required for the AIWW under Section 176(c) because 40 CFR Section 93.153 (b) provides: "For Federal actions not covered by paragraph (a) of this section, a conformity determination is required for each pollutant where the total of direct and indirect emissions in a non-attainment or maintenance area (emphasis added by the writer) caused by a Federal action would equal or exceed any of the rates in paragraphs (b)(1) or (2) of this section." Since all eight counties in the project area have been designated by the States as attainment areas, a Conformity Determination is not required.

3.4 Marine and Estuarine Resources

A comprehensive source of information on the marine and estuarine resources of the Georgia coast (applicable also to the southern South Carolina coast) is Johnson et al. 1974, available on the US National Park Service website at:
http://www.nps.gov/history/history/online_books/science/3/index.htm.

3.4.1 Fish and Shellfish Resources

3.4.1.1 Fish. The following information (in italics) that characterizes fishery resources in the project area was taken from Johnson et al (1974): "*The waters off the coast of Georgia support a variety of fishes related to the diversity of habitat. Some estuarine species enter fresh water to spawn and a few freshwater species enter the brackish estuaries. Some species are restricted to the estuaries and inshore waters and some are restricted to the waters of the continental shelf. But many species migrate between these habitats at various stages in their life*

cycles, and the estuaries are vitally important as nursery grounds and spawning grounds for many commercially important species harvested on the continental shelf. Stroud (1971) listed the species that are dependent upon the estuaries during some stage in their lives and reported that they comprised 63% of the Atlantic catch. He calculated that, for the Atlantic coast generally, each acre of estuarine habitat produces a yield of 535 lb on the continental shelf.

The continental shelf off Georgia generally is composed of shifting sediments and does not provide good fish habitat. However, a coral reef, or live bottom, recently has been discovered 16 miles due east of Cabretta Inlet on Sapelo Island [Note: the live bottom referred to here is now Gray's Reef National Marine Sanctuary]. *Such reefs provide a stable surface for the attachment of organisms important in the food chain. Artificial reefs also are being established by the Georgia Game and Fish Commission.*

There has been relatively little work on the ecology of fishes of the Atlantic coast of the southeastern United States. Tagatz and Dudley (1961) studied the seasonality of fishes in four coastal habitats near Beaufort, N.C., and Tagatz (1968) and McLane (1955) surveyed the fishes of the St. Johns River, Fla.

Some pertinent work has been done off the Georgia coast. Anderson (1968) surveyed the fishes caught by shrimp trawling from South Carolina to north eastern Florida from 1931 to 1935. Miller and Jorgenson (1969) studied the seasonal abundance and length frequencies of fishes collected in two habitats and presented a list of fishes collected at a freshwater station in the Altamaha River. They made thorough surveys by seining at a beach habitat on St. Simons Island and two high marsh stations, one near Jekyll Island and one near Meridian, Ga. Dahlberg and Heard (1969) surveyed the common inshore elasmobranchs of the Georgia coast. Dahlberg and Odum (1970) sampled fish populations in St. Catherines and Sapelo sounds by trawling at 3-week intervals for 13 months. Struhsaker (1969) presented a list of fishes taken during 5 years of exploratory trawling on the continental shelf off Georgia and other southeastern states.

3.4.1.2 The following information (in italics) that characterizes commercial invertebrate resources in the project area was taken from Johnson et al (1974): "*Most invertebrates of commercial importance (e.g., crabs, oysters, and shrimp) have been extensively studied. Following is a brief discussion of blue crabs, oysters, and brown and white shrimp.*

Studies by Durant (1970) indicate that in Georgia, oysters (Crassostrea virginica) begin to spawn when the temperature is about 73° F. Spawning was observed to begin in May and to continue until October, with peak periods in July, August, and September (Durant 1970). Larval stages last for 2-3 weeks (Wallace 1966), after which the young attach to some substrate. Galtsoff (1964) states that only soft mud and shifting sand are totally unsuitable. However oysters may convert a mud bottom to a more suitable habitat if a few settle on a hard object and themselves become objects of attachment. Galtsoff describes the soft mud bottom of the South Atlantic as being only marginally suitable for oysters. He further states that oysters need a free exchange of water salinities of 5-30 parts per thousand (ppt), and temperatures from 34°F to

86°F. Conditions are ideal for feeding when the water, free of pollution and containing a low concentration of small diatoms and dinoflagellates, moves over the bottom in a nonturbulent flow.

The negative factors influencing oyster production are described by Wallace (1966) as "pollution, predators, and people." He reports that oyster production is inversely proportional to human population growth in New England and the mid-Atlantic states. Only in the southeastern and Gulf states does oyster production even approach that of 20 years ago. Wallace (1966) concludes that pollution is the primary cause of the decline of the oyster industry. Sewage is detrimental because it covers the bottom with sludge that smothers oysters and reduces oxygen (Galtsoff 1964). When Escherichia coli, bacteria associated with fecal matter and used as an index for pollution, reach certain numbers, the oyster grounds are closed for health reasons. Industrial wastes also affect oysters. Galtsoff (1964) reports that red liquor and black liquor, both wastes from pulp mills, reduce the length of time the oyster shell remains open, thereby reducing the time available for feeding. Butler (1966) found that shell deposition is decreased in the presence of chlorinated hydrocarbon insecticides (e.g., DDT, DDD, and DDE) at concentrations as low as 10 parts per billion (ppb). Oysters are especially susceptible to pollution because of their stationary mode of existence and their ability to concentrate pollutants in their tissues. Predators include flatworms, mollusks, echinoderms, crustaceans, fish, birds, and mammals (Galtsoff 1964).

The predominant species of marine shrimp occurring in Georgia waters are the white shrimp (Penaeus setiferus) and the brown shrimp (P. aztecus), both of which are important commercially. The life cycles of white and brown shrimp are basically similar. The bottom-dwelling (benthic) adults release their eggs freely into the waters offshore. Within a short time, the eggs hatch into planktonic larvae. After passing through several intermediate stages, the young shrimp (postlarvae) move into the estuary and adopt a benthic existence (Anderson 1955). After very rapid growth, they assume the adult form. Marking studies indicate that after migrating offshore the shrimp do not move into deep water but make seasonal migrations parallel to the shoreline (Anderson 1955). White shrimp penetrate the estuary to a greater degree, arrives later, and stays for a longer period of time than the brown. Salinity optima for young penaeid shrimp are in the range of 5-20 ppt, although shrimp can tolerate salinities from 1 to 600 ppt (Kutkuhn 1966). A complex interaction of factors including circulation, temperature, salinity, and fertility of waters and type of vegetation and substratum determines distribution, survival, and growth of young shrimp (Kutkuhn 1966). Optimum conditions are approached in the nursery grounds of the marsh-estuary complex.

Nichols and Keney (1963) report that the identity and distribution of crabs of the genus Callinectes on the southeastern coast of the United States is uncertain. Rathbun (1930) reported two species, C. sapidus and C. ornatus, occurring between New Jersey and Indian River Inlet, Fla. Lunz (1958) found that only 30% of the crabs caught by trawlers in South Carolina were C. sapidus. The two species are not recognized as such by fishermen and are combined as blue crabs in catch data reported for coastal Georgia.
Van Engel (1958) reports that in the Chesapeake Bay area Callinectes sapidus begins mating early in May and continues into October. Females probably mate only once, at the time of the last molt. Sperm live in the female receptacles for at least a year and may be used as often as the

female spawns (two or more times). The females migrate to saltier waters after mating, some passing out of the bay and into the ocean. Spawning is delayed at least 2 months after mating. When laid, the eggs are attached to the abdomen of the female where they remain about 2 weeks until hatching. Van Engel (1958) reports that there are two larval stages, four or five zonal stages, and the megalops. These stages are passed through in about 1 month, after which the first crab stage is reached. Costlow and Bookout (1959) observed seven zonal stages in laboratory-reared animals. Nichols and Keney (1963), based on the occurrence of early stage larvae, believe that spawning occurs throughout the year. Peak numbers of first-stage larvae were found in Georgia waters during July, August, and September, and large numbers of first and second stage zoeae were found near the beaches with progression to advanced stage zoeae 20-40 miles offshore. Van Engel (1958) reported that early in August many crabs reach the "first crab" stage and begin migrating into waters of lower salinity. Male crabs remain in less saline waters year round.

Thus blue crabs are a part of both the benthic and planktonic communities, and they use both inshore and offshore waters."

According to SC DNR and GA DNR-CRD, there are a number of shellfish growing and harvesting areas near the project area. Figure 3-3 shows the designated shellfish areas in relation to the AIWW (Source: Draft Fish and Wildlife Coordination Act Report).

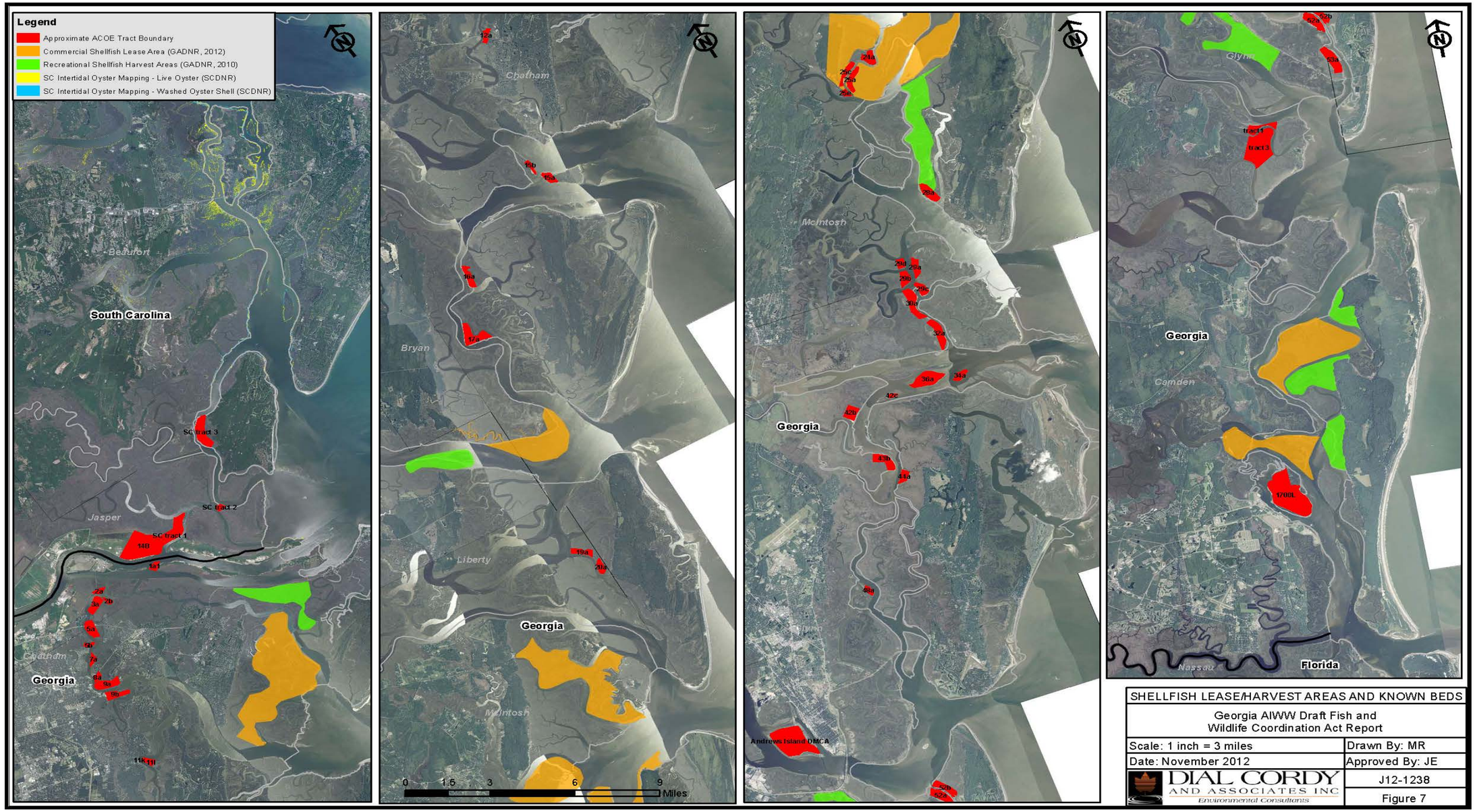


Figure 3-3: Shellfish Lease/Harvest Areas and Known Beds Located Along the Savannah District AIWW

3.5 Essential Fish Habitat

The Magnuson-Stevens Act's final rule, mandating the management of fishery resources and their habitats, was released on 17 January 2002. The National Marine Fisheries Service (NMFS) and its affiliate, the South Atlantic Fishery Management Council (SAFMC), oversee managed species and their respective Essential Fish Habitats (EFHs) found in the project area. The EFH for a given species can include multiple habitats to support reproduction, juvenile and adult development, feeding, protection, and shelter during species' various life stages. This EFH assessment describes the habitat(s) and managed fishery resource(s) that would potentially be present within the potential project footprint. If any activities could potentially affect EFHs, then applicable federal permitting agencies must consult with the NMFS to ensure the potential action considers the effects on managed species/habitats and supports the management of sustainable marine fisheries.

Essential fish habitats in estuarine areas that are managed by the SAFMC and likely reside within the project area are listed in Table 3-3 (NMFS 2008).

Table 3-3: AIWW Essential Fish Habitat Categories

Essential Fish Habitats	Potential Presence	Potential Effects
	Within Project Area	On-site Dredging or Filling
Estuarine Emergent Wetlands	Yes	Yes
Intertidal Flats	Yes	Yes
Estuarine Water Column	Yes	Yes
Oyster Reef/Shell Bank	Yes	No
Marine Water Column	Yes	Yes

3.5.1 Estuarine Emergent Marshes

Estuarine emergent marshes protect shorelines from erosion, produce detritus, filter overland runoff, and function as a vital nursery area for various fish and many other species. A coastal marsh is typically characterized by its vegetation. Depending on marsh salinity and other environmental variables, marsh vegetation may include the following: smooth cordgrass (*Spartina alterniflora*), black needlerush (*Juncus roemerianus*), saltmeadow grass (*Spartina patens)*, big cordgrass (*Spartina cynosuroides*), saltworts (*Salicornia* sp.), salt grass (*Distichlis spicata*), salt-marsh aster (*Aster tenuifolius*), sea lavender (*Limonium* sp.), bulrush (*Scirpus* sp.), sawgrass (*Cladium jamaicense*), and narrowleaf cattail (*Typha angustifolia*). Communities comprising these and other vegetation types provide critical functions, such as refugia and forage for various fish. However, most juvenile managed fish found in the riparian salt/brackish marsh nurseries are spawned offshore and transported into the estuary through tidal inlets. Many commercial and managed species such as shrimp and summer flounder (*Paralichthys dentatus*) inhabit the tidal saltmarsh edge, while adult spotted seatrout (*Cynoscion nebulosus*), flounder, and red drum (*Sciaenops ocellatus*) forage the grass line for shrimp and other prey. Nursery areas can include soft bottom areas surrounded by salt/brackish marsh as well. Hence, the estuarine marshes are essential habitat to many managed species and serve multiple functions to various fish life-stages (Street et al. 2005). This salt/brackish marsh EFH is found along the AIWW throughout the project length.

3.5.2 Intertidal Flats

The distribution and individual characteristics of intertidal flats are dynamic features of an estuarine system. An intertidal flat's shape and size varies by changing erosion and depositional rates influenced by tide ranges, coastal geology, freshwater inflow, weather patterns, and anthropogenic factors. Intertidal flat locations with minor tide variations are primarily influenced by wind and waves unless located near a tidal inlet or river mouth discharge. Tidal flats within systems of larger tidal fluctuations are principally formed and fashioned by the area's tidal action. Sediment size interacting with wind, wave, and tidal forces shape and manage intertidal flat development and movement. As the distance from an inlet increases, the intertidal flats' substrates become finer and more susceptible to wind fetch influences (SAFMC 1998).

Intertidal flats serve various functions for many species' life stages, as described in Table 3-4. Estuarine flats serve as a feeding ground, refuge, and nursery area for many mobile species, as well as the microalgal community that can function as a nutrient (nitrogen and phosphorus) stabilizer between the substrate and water column. The benthic community of an intertidal flat can include polychaetes, decapods, bivalves, and gastropods. This tidally influenced, constantly changing EFH provides feeding grounds for predators, refuge and feeding grounds for juvenile and forage fish species, as well as nursery grounds for estuarine-dependant benthic species (SAFMC 1998).

Table 3-4: Common Fish and Sellfish Species Utilizing Intertidal Flats (Source: SAFMC 1998)

Common Name	Scientific Name	Function	Life Stage Use(s)
Atlantic menhaden	*Brevoortia tyrannus*	Refuge	Juvenile
Bay anchovy	*Anchoa mitchilli*	Refuge	Juvenile, Adult
Inshore lizardfish	*Synodus foetens*	Forage	Juvenile, Adult
Atlantic silverside	*Menidia menidia*	Refuge	Juvenile, Adult
Black sea bass	*Centropristis striata*	Refuge	Juvenile
Pinfish	*Lagodon rhomboides*	Refuge, Forage	Juvenile, Adult
Summer flounder	*Paralichthys dentatus*	Refuge, Forage	Post-larval, Juvenile, Adult
Blue crab	*Callinectes sapidus*	Refuge, Forage	Juvenile, Adult
Brown shrimp	*Farfantepenaeus aztecus*	Refuge, Forage	Post-larval, Juvenile, Adult
Hard clam	*Mercenaria mercenaria*	Forage	Post-larval, Juvenile, Adult

Species that move from a pelagic larval to a benthic juvenile existence make use of flats during development. These flats can provide a comparatively low energy area with tidal phases that allow species the use of shallow water habitat as well as relatively deeper water within small spatial areas. Species such as summer flounder, red drum, spotted seatrout, striped mullet (*Mugil cephalus*), gray snapper, blue crab (*Callinectes sapidus*), and shrimp use this EFH as a nursery. These flats also serve as refuge areas for species avoiding predators, which use the tidal cycles to gain access to estuarine feeding grounds. In addition, these habitats are important for both migration routes and foraging for managed species such as red drum. Frequently, nursery areas can include unvegetated

soft bottom areas surrounded by salt/brackish emergent marsh (Street et al. 2005). This intertidal flat EFH is found within the AIWW project area.

3.5.3 Estuarine Water Column

The transient boundaries of the estuarine water column are variable due to wind- and tide- driven inlet sea water mixing with upland freshwater sources and land surface runoff. With these mixing attributes, salinity levels vary within this estuarine EFH. Typically, the salinity groups include four ranges: oligohaline [< 8 parts per thousand (ppt)], mesohaline (8 to 18 ppt), polyhaline (18 to 30 ppt), and euryhaline (>30 ppt). The salt water tidal action and freshwater inflows are primary factors in estuarine circulation and nutrient/waste removal. Strong wind events and freshwater tributaries can increase turbidity, reducing light penetration, and adversely effecting submerged vegetation and phytoplankton photosynthesis. Freshwater rivers and stream inflows provide this EFH organic matter, nutrients, and finer grained sediments; whereas, ocean-driven tides provide coarser sediments and a transport mechanism for estuarine-dependent species. The ocean waters within this EFH act as a temperature stabilizer offsetting seasonal temperature extremes that would reduce productivity and diversity in the shallow upstream waters. Salinity, temperature, dissolved organic matter, dissolved inorganic nitrogen, and oxygen are components normally used to characterize the estuarine water column. Other descriptors, such as adjacent structures (shoals, channels, and marshes), water depth, available fetch, and turbidity are used to further describe this EFH. The estuarine water column provides both migrating and residential species of varying life stages the opportunity to survive in a productive, active, unpredictable, and at times strenuous environment. As the transport medium for nutrients and organisms between the ocean and the Savannah River, the Wright River, and inland freshwater systems; the estuarine water column is as essential a habitat as any marsh, seagrass bed, or reef (SAFMC 1998).

3.5.4 Habitats Areas of Particular Concern

Habitat Areas of Particular Concern (HAPC) are EFHs that are considered atypical, particularly ecologically important, susceptible to anthropogenic degradation, or located in environmentally challenged or stressed areas. HAPCs may include areas used for migration, reproduction, and development. HAPCs can include intertidal and estuarine habitats. The Magnuson-Stevens Act does not provide any additional regulatory protection to HAPCs. However, if HAPCs are potentially adversely affected, additional inquiries and conservation guidance may result during the NMFS EFH consultation (NMFS 2008).

The SAFMC has designated coastal inlets and state-designated overwintering areas of Georgia and South Carolina as HAPCs for white shrimp and brown shrimp. The Atlantic States Marine Fisheries Commission considers Georgia and South Carolina's coastal inlets HAPCs for red drum. Also, oyster/shell bottom and coastal inlets of Georgia and South Carolina are considered HAPCs for the species of the snapper-grouper complex. Finally, HAPCs for the migratory pelagic species of king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*S. maculates*), and cobia (*Rachycentron canadum*) include any Atlantic coast estuary with high numbers of these species (SAFMC 1998, NMFS 2008). State-designated areas of Importance of Managed Species including Primary Nursery Areas (PNA) are also considered HAPCs.

3.5.5 Managed Species and Essential Habitat Use

Table 3-5 shows managed species that potentially occur in the estuarine emergent marsh and estuarine water column EFHs by life stage in the project area.

Table 3-5: Managed Species Potentially Occurring in Estuarine EFHs in the Project Area

Common Name [1]	Scientific Name	Management Plan Agency [2]	Fishery Management Plan (FMP) [4]	Life State in Estuarine EFH [3]
Brown shrimp	*Farfantepenaeus aztecus*	SAFMC	Shrimp	P,J,A
White shrimp	*Litopenanaeus setiferus*	SAFMC	Shrimp	P,J,S
Pink shrimp	*Farfantepenaeus duorarum*	SAFMC	Shrimp	P, J, S
(HAPC FOR SHRIMPS: Tidal inlets, state-designated nursery and overwintering habitats) [5]				
Gray snapper	*Lutjanus griseus*	SAFMC	Snapper Grouper	P,J,A
Lane snapper	*Lutjanus synagris*	SAFMC	Snapper Grouper	J
(HAPC FOR SNAPPERS: Oyster/shell habitat, state-designated nursery areas, coastal inlets) [5]				
Cobia	*Rachycentron canadum*	SAFMC	CMP	L,P,J,A
Spanish mackerel	*Scomberomorus maculatus*	SAFMC	CMP	J
Bluefish	*Pomatomus saltatrix*	MAFMC	Bluefish	J,A
Summer flounder	*Paralichthys dentatus*	MAFMC	Summer Flounder	L,J,A
American shad	*Alosa sapidissima*	SAFMC	[no FMP]	E,L,P,J,S
Hickory shad	*Alosa mediocris*	SAFMC	[no FMP]	E,L,P,J,S
Blueback herring	*Alosa aestivalis*	SAFMC	[no FMP]	E,L,P,J,S
Striped bass	*Morone saxatilis*	SAFMC	[no FMP]	E,L,P,J,S
Shortnose sturgeon	*Acipenser brevirostrum*	SAFMC	[no FMP]	E,L,P,J,S
Atlantic sturgeon	*Acipenser oxyrinchus*	SAFMC	[no FMP]	E,L,P,J,S
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*	NMFS	HMS	J
Blacknose shark	*Carcharhinus acronotus*	NMFS	HMS	J
Bonnethead shark	*Sphyrna tiburo*	NMFS	HMS	J
Bull shark	*Carcharhinus leucas*	NMFS	HMS	J
Dusky shark	*Carcharinus obscurus*	NMFS	HMS	J
Finetooth shark	*Carcharhinus isodon*	NMFS	HMS	J,A
Lemon shark	*Negaprion brevirostris*	NMFS	HMS	J,A
Sandbar shark	*Carcharhinus plumbeus*	NMFS	HMS	J
Sand tiger shark	*Odontaspis taurus*	NMFS	HMS	N
Scalloped hammerhead shark	*Sphyrna lewini*	NMFS	HMS	J
Spinner shark	*Charcharhinus brevipinna*	NMFS	HMS	J,A

Notes:
[1]. These EFH species were based on species lists from SAFMC 2008. [2]. Fishery Management Plan (FMP) Agencies: SAFMC = South Atlantic Management Council; MAFMC = Mid-Atlantic Fishery Management Council; NMFS = National Marine Fisheries Service. [3.] Life stages include: E = Eggs, L = Larvae, N = Neonate, P = Post-Larvae, J = Juveniles, S = Sub-Adults, A = Adults. [4]. Fishery Management Plans: CMP = Coastal [5.] HAPC = Habitat Areas of Particular Concern; if not listed for certain fishery management plans, appropriate HAPC for respective species is not found in the project area or vicinity.

3.6 Invasive Species

The introduction of non-native or invasive species can have detrimental effects on an ecosystem. As defined by Executive Order 13112 (February 3, 1999) an invasive species is an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive species may be spread through several pathways including ballast water, aquaria release, boat hulls, accidental release from aquaculture or research facilities, bait dumping, and intentional introduction for biological controls (GA DNR 2009). E.O. 13112 charges the Federal government with not authorizing, funding, or carrying out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

3.6.1 Locally Occurring Invasive Species

Three invasive species have been documented to occur on Tybee Island, the green porcelain crab (*Petrolisthes armatus),*the green mussel (*Perna viridis)* and the titan acorn barnacle (*Megabalanus coccopoma)* (USACE 2012). The green mussel is a native of the Indo-Pacific region. It was first documented in Tampa Bay, Florida in 1999 with ballast water being the most likely means of introduction (Power et. al. 2004). In 2003, it was recorded in Jacksonville Beach, Florida and in the offshore waters of Brunswick, GA (Power et. al. 2004). The first green mussel was found on Tybee in November 2003 (Power et. al. 2004). It is believed the mussel was introduced to Georgia from boats and equipments being transferred between coasts without adequate cleaning of attached organisms and draining of bilge water (Power et. al. 2004).

Invasive species known to occur in DMCAs and undiked disposal tracts along the Savannah District AIWW include ten plants, three mammals, and one insect. The green porcelain crab, green mussel, and titan acorn barnacle can be expected to occur in creeks and rivers along the AIWW, at least in the vicinity of the Savannah and Brunswick harbor shipping channels.

Ballast water is a major source for introducing non-native species into aquatic ecosystems where they would not otherwise be present (Georgia DNR 2009). Invasive species are characterized by high reproduction rates, long life spans, broad diets, and the ability to withstand a wide range of environmental factors (Power et al 2008). If the non-native species become established, they can adversely impact the economy or the environment, or cause harm to human health (Power et al 2008). Ballast water is a significant threat to the environment in and around major harbors dealing with international shipping, such as Savannah and Brunswick harbors. However, dredges that would be used on the AIWW are not ocean-going vessels and would not be likely to bring in invasive aquatic organisms in ballast water.

Other pathways for invasive species to enter the Savannah and Brunswick harbors through vessel operations include insects in pallets and plants, and seeds in soil on/in containers. Various measures are undertaken to minimize the spread of invasive species through these avenues. The Animal and Plant Health Inspection Service-Plant Protection and Quarantine (APHIS- PPQ) of

the US Department of Agriculture inspects container cargo agricultural products for invasive species, as well as places monitoring traps around the port environment for early detection of new species. The APHIS-PPQ also develops and implements response plans, along with state cooperators, for eradicating, controlling or managing new invasive species when they are discovered (Georgia Invasive Species Strategy 2009).

Table 3-6 lists invasive species that are known to occur in or near the AIWW and its DMCAs and disposal easements. Occurrence data from USACE (S. Calver, pers. comm.) and Tidewater Environmental Services (2011). State designations from publications by the respective state natural resources agencies (Georgia DNR-WRD 2009, South Carolina DNR 2008).

Table 3-6: Invasive Species Known to Occur In or Near the Savannah District AIWW and Its Placement Sites

Common Name	Scientific Name	Terrestrial (T) or Aquatic (A)	State(s) Designating the Species as Invasive
Plants			
Chinese privet	*Ligustrum sinense*	T	GA, SC
Chinese tallow	*Sapium sebifera* (=*Triadica sebifera*)	T	GA, SC
Mimosa	*Albizia julibrissin*	T	GA, SC
White Mulberry	*Morus alba*	T	GA
Sericea lespedeza	*Lespedeza cuneata*	T	GA
Giant reed	*Arundo donax*	A	GA, SC
Common reed	*Phragmites australis*	A	GA, SC
Chinaberry tree	*Melia azedarach*	T	GA, SC
Tamarisk/Saltcedar	*Tamarix* spp.	T	GA, SC
Japanese honeysuckle	*Lonicera japonica*	T	GA
Mammals			
Coyote	*Canis latrans*	T	GA
Nine-banded armadillo	*Dasypus novemcinctus*	T	GA
Feral swine	*Sus scrofa*	T	GA
Molluscs			
Green mussel	*Perna viridis*	A	GA, SC
Charrua mussel	*Mytella charruaua*	A	GA,SC
Crustaceans			
Titan acorn barnacle	*Megabalanus coccopoma*	A	GA, SC
Green porcelain crab	*Petrolisthes armatus*	A	GA, SC
Spiny hands crab	*Charybdis hellerii*	A	SC
Insects			
Red imported fire ant	*Solenopsis victa*	T	GA, SC

3.7 Terrestrial Resources

Terrestrial resources along the Savannah District AIWW discussed in this section include protected lands and wildlife using the waterway and the DMCAs and disposal tracts associated with the waterway. A number of protected lands and undeveloped areas exist within the project area from Port Royal south through Cumberland Sound. Figure 3-3 shows the locations of conservation lands in and near the Savannah District AIWW (Source: Draft Fish and Wildlife Coordination Act Report).

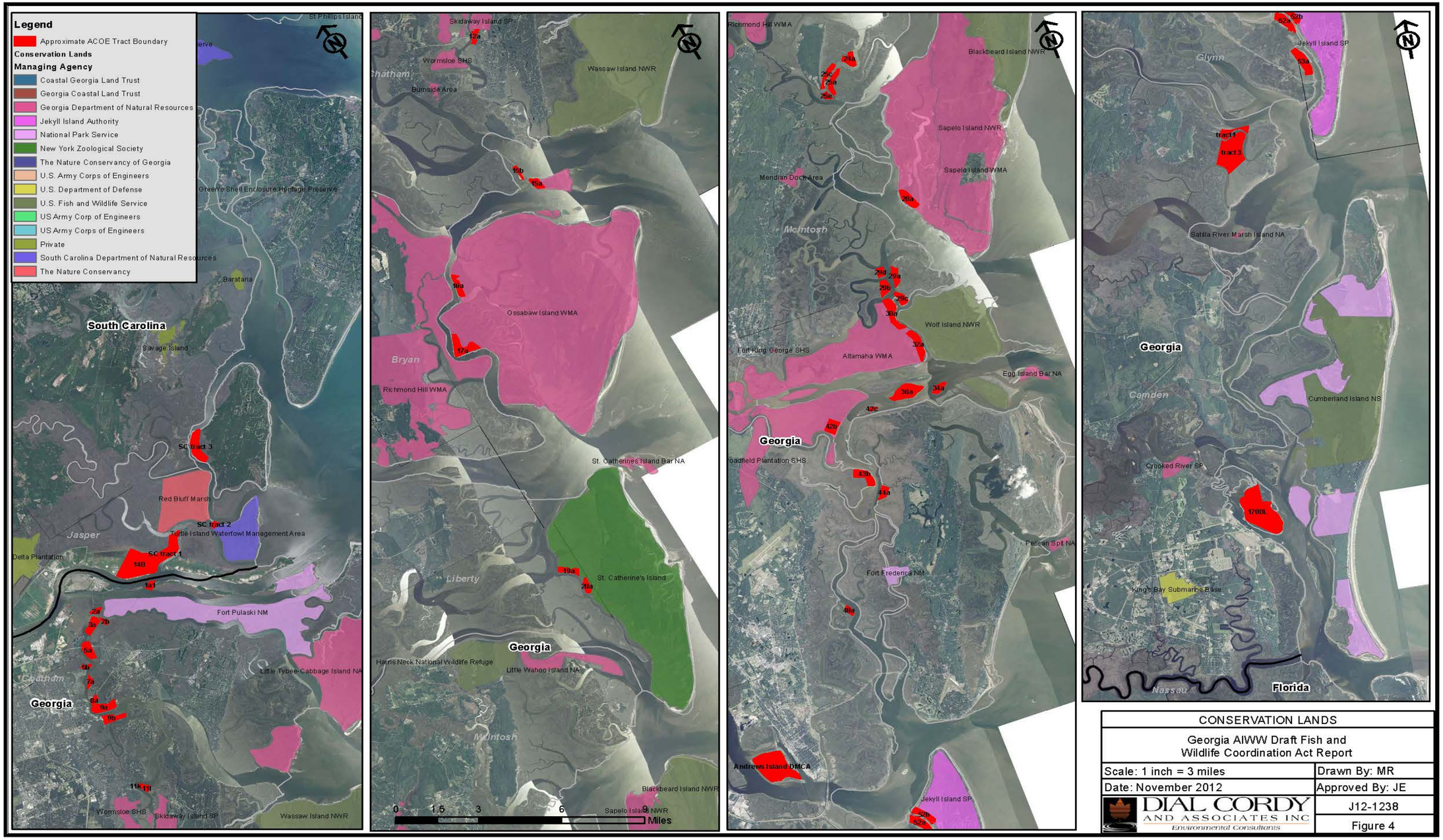


Figure 3-4: Conservation Lands Located Along the Savannah District AIWW

In general, the eastern side of the AIWW in Savannah District is a chain of barrier islands, many of which are protected natural areas. The western side of the AIWW is mainland coastal marsh and coastal residential or municipal property. Protected and natural lands within the project area fall under a number of different Federal, state, local and private jurisdictions/ownership, such as US Fish and Wildlife Service (USFWS), National Park Service, New York Zoological Society, The Nature Conservancy of Georgia, Coastal Georgia Land Trust, Georgia Department of Natural Resources, and South Carolina Department of Natural Resources. The largest of these areas and those closest to potential placement sites, are described below (via direct transcription of text from the parent entity's website).

There are seven National Wildlife Refuges (NWRs) (see details below) administered by the Savannah Coastal Refuges Complex. This chain of national wildlife refuges extends from Pinckney Island NWR near Hilton Head Island, South Carolina, to Wolf Island NWR near Darien, Georgia. Between these lie Savannah (the largest unit in the complex), Wassaw, Tybee, Harris Neck, and Blackbeard Island refuges. Together they span a 100-mile coastline and total over 56,000 acres. The Savannah Coastal Refuges are administered from headquarters located in Savannah, Georgia.

3.7.1 Pinckney Island NWR

The 4,053 acre refuge includes Pinckney Island, Corn Island, Big and Little Harry Islands, Buzzard Island and numerous small hammocks. Pinckney is the largest of the islands and the only one open to public use. Nearly 67% of the refuge consists of saltmarsh and tidal creeks. A wide variety of land types are found on Pinckney Island alone: saltmarsh, forestland, brushland, fallow field and freshwater ponds. In combination, these habitats support a diversity of bird and plant life. Wildlife commonly observed on Pinckney Island include waterfowl, shorebirds, wading birds, raptors, neo-tropical migrants, white-tailed deer and American alligators, with large concentrations of white ibis, herons, and egrets (http://www.fws.gov/refuges/profiles/index.cfm?id=41629). The AIWW runs between Pinkney Island NWR and Hilton Head Island but this reach is naturally deep and no placement areas are located there.

3.7.2 Turtle Island Wildlife Management Area (WMA)

Administered by South Carolina DNR, Turtle Island WMA is located between Savannah, Georgia and Daufuskie Island, South Carolina. It encompasses 1,700 acres of saltmarsh, maritime forest and barrier beach (http://www.southcarolinalowcountry.com/visitors/nature-tourism/wildlife-preserves-and-nature-trails.html). The western end of Turtle Island is a 57-acre disposal easement used until 1980 for placement of dredged material from the AIWW.

3.7.3 Tybee NWR

Tybee NWR was established on May 9, 1938, by an executive order of President Franklin D. Roosevelt, as a breeding area for migratory birds and other wildlife. Located in the mouth of the Savannah River, the 100-acre refuge began as a one-acre oyster shoal, Oysterbed Island, used by the Corps as a spoil placement site to support their mandated harbor dredging activity. As a

result, the majority of the refuge is now covered with sand deposits. The more stable portions of the island are densely covered with such woody species as eastern red cedar, wax myrtle, and groundsel. Saltmarsh borders parts of the island.

The refuge is an important resting and feeding area for migratory birds including gulls, terns, neotropical migratory songbirds, and shorebirds. Least terns, black skimmers, Wilson's plovers, and several other shorebird species have nested on the spoil deposits on Tybee. During all seasons, the refuge's shoreline and open spoil deposits are used as resting sites for brown pelicans, gulls, and terns. Endangered species, including piping plovers and wood storks, have been observed on the refuge land, while shortnose sturgeon and manatees have been found in the waters bordering Tybee. The site is closed to public use (http://www.fws.gov/refuges/profiles/index.cfm?id=41624).

3.7.4 Wassaw Island NWR

Wassaw Island, one of Georgia's coastal barrier islands, was designated a National Wildlife Refuge on October 20, 1969. Unlike many of Georgia's Golden Isles, little development and few management practices have modified Wassaw's primitive character. The 10,053-acre refuge includes beaches with rolling dunes, maritime forest, and vast saltmarshes. The refuge is bordered by the Wilmington River and Wassaw Sound on the north, the Vernon River and Ossabaw Sound on the South, and the Atlantic Ocean on the east. Saltmarsh and tidal creeks separate the refuge from the mainland and Skidaway Island to the west.

Refuge visitors may enjoy recreational activities such as birdwatching, beachcombing, hiking and general nature studies. The 20 miles of dirt roads on Wassaw Island and seven miles of beach provides an ideal wildlife trail system for hikers. Bird watching is particularly fruitful during the spring and fall migrations. The island supports rookeries for egrets and herons, and a variety of wading birds are abundant in the summer months. In summer, telltale tracks on Wassaw's beach attest to nocturnal visits by the threatened loggerhead sea turtles which come ashore for egg laying and then return secretively to the sea (http://www.fws.gov/refuges/profiles/index.cfm?id=41628).

3.7.5 Harris Neck NWR

Harris Neck NWR was established in 1962 by transfer of Federal lands formerly managed by the Federal Aviation Administration as a WWII Army airfield. Located in McIntosh County, Georgia, the refuge serves as an important link in the chain of refuges along the Atlantic seaboard, and is the inland base for two neighboring barrier island refuges, Blackbeard Island and Wolf Island refuges, both located southeast of Harris Neck.

Harris Neck's 2,762 acres consists of saltwater marsh, grassland, mixed deciduous woods, and cropland. Because of this great variety in habitat, many different species of birds are attracted to the refuge throughout the year. In the summer, thousands of egrets and herons nest in the swamps, while in the winter, large concentrations of ducks (especially mallards, gadwall and teal) gather in the marshland and freshwater pools.

Over 15 miles of paved roads and trails provide the visitor easy access to the many different habitats. Chosen for its accessibility and bird diversity, Harris Neck is one of 18 sites forming the Colonial Coast Birding Trail, inaugurated in 2000 (http://www.fws.gov/refuges/profiles/index.cfm?id=41627).

3.7.6 Blackbeard Island NWR

Blackbeard Island was acquired by the Navy Department at public auction in 1800 as a source of live oak timber for ship building. In 1924 the island was placed under the jurisdiction of the Bureau of Biological Survey to be maintained as a preserve and breeding ground for native wildlife and migratory birds. A presidential proclamation in 1940 changed its designation from Blackbeard Island Reservation to Blackbeard Island National Wildlife Refuge. In 1975, three thousand acres of the refuge were set aside as National Wilderness. Blackbeard Island was named for Edward Teach, alias Blackbeard the Pirate. Rumors of Blackbeard's buried treasure still flourish, but no evidence of his fortune has ever been discovered.

The island is comprised of interconnecting linear dunes thickly covered by oak/palmetto vegetation. There are approximately 1,163 acres of open freshwater or freshwater marsh, 2,000 acres of regularly flooded saltmarsh, 2,115 acres of maritime forest, and 340 acres of sandy beach.

The primary objectives of the refuge are to provide wintering habitat and protection for migratory birds; provide protection and habitat to promote resident and migratory wildlife diversity; and to provide protection and management for endangered and threatened species (loggerhead sea turtle, American bald eagle, wood stork, piping plover). Notable concentrations of waterfowl, wading birds, shorebirds, songbirds, raptors, deer, and alligators can be seen at various times of the year (http://www.fws.gov/refuges/profiles/index.cfm?id=41626).

3.7.7 Wolf Island NWR

Wolf Island NWR, which includes Egg Island and Little Egg Island, was established on April 3, 1930 as a migratory bird sanctuary. The refuge consists of a long narrow strip of oceanfront beach backed by a broad band of saltmarsh. Over 75% of the refuge's 5,126 acres are composed of saltwater marshes. It is located in McIntosh County, Georgia, 12 miles east of Darien (by boat).

Wolf Island was designated a National Wilderness Area in 1975, therefore no public use facilities exist or are planned on the refuge. Though the refuge's saltwaters are open to a variety of recreational activities, all beach, marsh, and upland areas are closed to the public. Visitors must make their own arrangements to reach the refuge. Marinas in the Darien, Georgia area may offer transportation to the refuge (http://www.fws.gov/wolfisland/).

3.7.8 Fort Pulaski National Monument

Fort Pulaski National Monument is located in Chatham County, Georgia along the Savannah River only a few miles from its junction with the Atlantic Ocean. With the exception of

approximately 250 acres on Cockspur Island and 200 acres on McQueens Island, the 5,400 acre park consists of tidal marshes and mud flats that are subject to daily inundation of a six to ten foot tide. These two islands that make up the site were, before human intervention, primarily saltmarsh. The Monument is administered by the National Park Service.

For much of the 19th century, masonry fortifications were the United States' main defense against overseas enemies. However, during the Civil War, new technology proved its superiority to these forts. The Union army used rifled cannon and compelled the Confederate garrison inside Fort Pulaski to surrender. The siege was a landmark experiment in the history of military science and invention. After the Civil War, Fort Pulaski was unoccupied and neglected. The War Department finally made Fort Pulaski a national monument in 1924 by presidential proclamation of Calvin Coolidge. The 1930s saw new activity on the island with the arrival of the Civilian Conservation Corps (CCC) who worked to rehabilitate Fort Pulaski and the surrounding landscape (http://www.nps.gov/fopu/index.htm). One reach of the AIWW, Elba – McQueens Cut, passes through the western end of the national monument property.

3.7.9 Cumberland Island National Seashore

Cumberland Island is the largest and southernmost barrier island in Georgia. Cumberland Island is 17.5 miles long and totals 36,415 acres of which 16,850 are marsh, mud flats, and tidal creeks. In addition to its natural features, the national seashore includes some historic properties, such as the ruins of Dungeness and the Plum Orchard estate. It is well known for its sea turtles, wild turkeys, wild horses, armadillos, abundant shore birds, dune fields, maritime forests, saltmarshes, historic structures, and is home to 9,886 acres of congressionally designated wilderness. The national seashore was authorized by Congress in 1972 and is administered by the National Park Service. The wilderness area was designated in 1982 (http://www.nps.gov/cuis/index.htm).

3.7.10 Gray's Reef National Marine Reserve

Gray's Reef National Marine Sanctuary is located about 17 miles off Sapelo Island, Georgia, and is one of the largest near-shore "live-bottom" reefs of the southeastern United States. It is currently the only protected natural reef area on the continental shelf off the Georgia coast. The reserve encompasses approximately 22 square miles (about 14,000 acres).

"Live bottom" is a term used to refer to hard or rocky seafloor that typically supports high numbers of large invertebrates such as sponges, corals and sea squirts. These spineless creatures thrive in rocky areas, as many are able to attach themselves more firmly to the hard substrate, as compared to sandy or muddy "soft" bottom habitats. Within the Gray's Reef National Marine Sanctuary there are rocky ledges with sponge and coral live bottom communities, as well as sandy bottom areas that are more typical of the seafloor off the southeastern U.S. coast (http://graysreef.noaa.gov/about/welcome.html). Two proposed new ocean placement sites for the AIWW could be located about four miles offshore off Sapelo Sound and Altamaha Sound within 15 – 20 miles of the sanctuary.

3.7.11 Sapelo Island National Estuarine Research Reserve

Sapelo Island, Georgia's fourth largest barrier island, is located midway on the Georgia coastline and is separated from the mainland by 5 miles of marsh and tidal waterways. A total of 16,500 acres make up Sapelo Island, of which, nearly 5,600 acres are tidal saltmarsh. The Sapelo Island National Estuarine Research Reserve occupies just over one-third of Sapelo and comprises 2,100 upland acres and 4,000 acres of tidal saltmarsh; it is administered by National Oceanic and Atmospheric Administration (NOAA) and managed by Georgia DNR Wildlife Resources Division. The Reserve lies in the midst of an estuary where the currents of Doboy Sound and the Duplin River converge. The Reserve encompasses ecologies typical of the Carolinian biogeographic region which spans the south Atlantic coastline of the United States from North Carolina to Northern Florida. This region is characterized by vast expanses of tidal saltmarshes protected by a buffer of barrier islands (http://www.sapelonerr.org/index.htm). Two reaches of the AIWW border the reserve, but neither reach requires dredging and no disposal easements are located there. Two proposed new ocean placement sites for the AIWW could be located about four miles offshore off Sapelo Sound and Altamaha Sound within 15 – 20 miles of the reserve.

3.7.12 Skidaway Island State Park

Skidaway Island State Park is a 588-acre state park along Skidaway Narrows, part of the AIWW. The park is part of the Colonial Coast Birding Trail. Trails wind through maritime forest and past saltmarsh, leading to a boardwalk and observation tower. Visitors can watch for deer, fiddler crabs, raccoon, egrets and other wildlife. Inside the park's interpretive center, birders will find binoculars, reference books and a window where they can look for migrating species such as Painted Buntings. Children will especially enjoy seeing the towering, 20-foot Giant Ground Sloth replica and reptile room. A scenic campground is nestled under live oaks and Spanish moss, while groups can enjoy privacy in their own pioneer campgrounds. Open-air picnic shelters and an enclosed group shelter are popular spots for parties, reunions and other celebrations (http://www.gastateparks.org/SkidawayIsland).

3.7.13 Jekyll Island State Park

Jekyll Island is one of only four Georgia barrier islands accessible by road. It encompasses 5,700 acres and measures 7 miles long by 1.5 miles wide and has 8 miles of beaches. Georgia law designates Jekyll Island as a State Park, meaning that the land and its flora and fauna belong to all citizens of Georgia. Jekyll Island belongs to a special category of State Parks, since it is not managed by the Georgia Department of Natural Resources and is therefore not subsidized by the State's taxpayers. Rather, the Jekyll Island - State Park Authority (JIA) is authorized as the Island's governing body and required to operate the Park as a financially self-sufficient entity. The Jekyll Island Conservation Plan recognizes the need for income-yielding, developed portions of the Island respecting the statutory limit of 35% of the Island's uplands as determined in the Jekyll Island Master Plan, and provides direction for less-restrictive protection of wildlife habitat in these zones, in addition to providing for strong protection of the undeveloped areas of the Island (http://www.jekyllislandauthority.org). Jekyll Creek along the western side of the island is part of the AIWW and several disposal easements are located there.

3.7.14 Ossabaw Island Wildlife Management Area (WMA)

Ossabaw Island is the third largest of Georgia's Sea Islands and lies along the Atlantic Ocean about 20 miles south of Savannah. The island encompasses over 16,000 acres of tidal marshes and 9,000 acres of high ground. Ponds, salt water creeks, one river and many sloughs, inlets, and beaches make the high ground of Ossabaw a complex of small islands. Broad flat ridges and shallow depressions comprise the western part of Ossabaw (Pleistocene soils), while steep, parallel dune ridges mark the eastern part (Holocene soils).

After passing through many private owners, the State of Georgia acquired Ossabaw in 1978 through a gift/sale agreement from the Torrey family and the efforts of Eleanor Torrey West. At the time of the sale, it was stated under an Executive Order by governor Busbee "that Ossabaw Island be dedicated as a Heritage Preserve to protect, conserve, and preserve the natural and cultural resources of this Island for the benefit of present and future generations, and that Ossabaw Island shall only be used for natural, scientific, and cultural study, research and education, and environmentally sound preservation, conservation, and management of the Island's ecosystem, under conditions carefully monitored and controlled by the Department of Natural Resources" (http://www.georgiawildlife.org/node/509).

3.7.15 Richmond Hill WMA

Richmond Hill WMA is approximately 7,400 acres in several tracts, some of which border Kilkenny Creek, a tributary of Bear River on the AIWW (http://www.georgiaoutdoors.com/hunting/WMAmaps/RichmondHillWMA.pdf).

3.7.16 Altamaha WMA

The Altamaha Waterfowl Management Area at Altamaha WMA consists of 3,154 acres of managed waterfowl impoundments and some 27,000 acres of bottomland hardwoods and cypress-tupelo swamps (http://www.georgiawildlife.com/node/1406).

3.7.17 St. Catherines Island

St. Catherines Island is an undeveloped semi-tropical barrier island 35 miles South of Savannah, Georgia. It includes 7,000 acres of high land, 7,000 acres of saltmarsh, and a wide variety of forest habitats. The island is ten miles long by two miles wide. St. Catherines Island is bounded on the north by St. Catherines Sound and on the south by Sapelo Sound; both of which are tidal estuaries with no significant input of fresh water or fluvial sediment from the mainland. St. Catherines Island's Sea Turtle Conservation Program is engaged in nesting sea turtle conservation, research, and education. Other conservation activites on the island include the Wildlife Survival Center, an archaeology program of the American Museum of natural History, The St. Catherines Island Sea Turtle Conservation Program, and many scientific, educational, and conservation projects. St. Catherines is now administered by the St. Catherines Island Foundation, Inc. Research activities are administered by the American Museum of Natural History through the Edward John Noble Foundation. The island is a National Historic Landmark (http://www.scistp.org/habitat/history.php).

3.7.18 Savannah Harbor DMCAs

The AIWW has used DMCA 14-B for placement of dredged material, and would do so in the future as part of the proposed DMMP. The recent EIS for the Savannah Harbor Expansion Project (SHEP) discussed in detail the environmental aspects of the use and management of the Savannah harbor DMCAs and their importance as wildlife habitat. Much of the information presented in this section is summarized from the SHEP EIS (USACE 2012).

As a result of dredged sediment deposition, these DMCAs are expected to continue to support mixed early successional stage plant communities within diked areas. These communities will probably continue to be dominated by common reed (*Phragmites communis*), groundsel (*Baccharis halimifolia*), and *Tamarisk* species.

3.7.18.1 Fauna

These DMCAs, including 14-B, are also inhabited by numerous species of wildlife similar to those found at the Savannah NWR and surrounding areas. Nesting terns and plovers can be found on the more sandy areas during spring and summer. Along the canals and inner ditches, wading birds and shore birds congregate and feed. Depending on the amount of water available and time of year, large numbers of waterfowl can be found in the impounded DMCAs. A portion of one nearby DMCA extends onto the Tybee National Wildlife Refuge. Reptiles and amphibians that inhabit the area include toads, green tree frogs, moles, various turtles, various snakes including rat snakes, diamond-backed rattlesnakes, water moccasins, banded watersnakes, black racers, king snakes, and rough green snakes. Feral hogs, deer, raccoons, bobcats, armadillos, opossums, otters, mink, coyote, rodents, and other mammals are also found in the areas.

3.7.18.2 Migratory Birds

Many species of migratory birds use the Corps' DMCAs, including DMCA 14-B used by both the Savannah Harbor and AIWW for placement of dredged material. A variety of species of birds are regularly observed in the scrub/brush habitat that surrounds the confined sediment placement facilities. That habitat is present to some degree on other uplands throughout Chatham and Jasper Counties. However, the existing DMCAs provide unique habitat in the harbor area for certain species of migratory birds. The sediment placement areas provide nesting habitat for only a limited number of migratory bird species; but, those species include some of special concern such as least tern, black-necked stilt, and Wilson's plover. Many other species of birds use the DMCAs outside the breeding season, some in high numbers.

Avian use of the DMCAs can be viewed in several ways. First, the DMCAs provide important nesting habitat for a number of waterbirds, and birds associated with beaches and bare ground (referred to by the general term "shore birds"). This group is broken down below into those species that are currently common nesters and those that either nest infrequently or in low numbers. Many other species of birds nest within the DMCAs. Survey efforts have not concentrated on these species. Only their names are provided below.

The DMCAs also provide feeding habitat for a large number of waterfowl and shorebirds. High counts for these species are provided below. Survey efforts on shorebird and waterfowl use are continuing.

3.7.18.3 Common Nesting Waterbirds/Shorebirds

This group consists of those birds which are known to breed in the DMCAs on a regular basis.

Least tern. The nest for Least terns is a shallow depression, usually in sand.

A. Nesting habitat: High, open sandy areas, especially with scattered pebbles and small shells. Generally nest on gradual hillside slopes. Areas usually have sparse scattered vegetation and other wood debris. Nesting area should be available April 10 to August 31.

B. Feeding habitat: Open water. Often seen feeding in the Wright River area. Have also been seen feeding in deep water within the DMCAs.

C. Resting habitat (after nesting is complete): Open flats and bars associated with shallow water.

Black-necked stilt. Nests are usually loose collections of decaying plant stems. These may be formed of loose collections of shell and clay fragments.

A. Nesting habitat: This species has been observed to nest in several different habitats within the DMCAs: (1) sandy ridges with scattered vegetation close to open water ditches, (2) silt/clay substrates, (3) bare mounds in rough broken terrain within 50 yards of open shallow water; mounds are generally 1 to 4 feet in diameter and raised 1 to 2 feet above the surrounding dirt, (4) small (no more than 1 by 2 foot) slightly elevated bare mounds surrounded by open shallow water, (5) open flats, and (6) in scattered vegetation at the foot of dikes where water is being held. Nests may also be built on mounds with scattered vegetation. Howe (1989) lists the following nesting sites as being typical for this species:

1. Open flats or the edge of short grassy vegetation, usually where visibility is excellent in all directions.
2. Clustered nesting (semi-colonial) rather than evenly distributed in suitable habitat. "Interest distance" may be 10 to 100 feet, as the birds adjust nest density to habitat conditions.
3. Small islands in large pools are particularly favored nest sites.

B. Feeding habitat: Open shallow water and water edges within the DMCAs. Adults have also been seen feeding at low tide on mud flats along Wright River.

C. Resting habitat (after nesting is complete): Open flats, bars, open shallow water, water edges, gently sloping grass hillsides (late in season).

Wilson's plover. The nest is a shallow depression in sand, often associated with wood debris and sometimes lined with small pebbles.

A. Nesting habitat: Similar to the least tern, but may include areas with taller vegetation and more debris.

B. Feeding habitat: Seen foraging in nesting habitat. Also seen foraging in open damp areas adjacent to open shallow water.

C. Resting habitat (after nesting is complete): Generally the same as the feeding habitat. Most often seen resting on open flats and flats with scattered vegetation.

Willet. The nest is made of grasses and placed on the ground in open grassed areas or open areas with scattered grass and herbs, usually under overhanging grass stems.

A. Nesting habitat: Nests within the DMCAs in tall grass areas (1 to 2 feet tall) where the grass grows in clumps, usually nests on road shoulders and sometimes in open flat sandy areas with scattered herbs and grass clumps.

B. Feeding habitat: Within the DMCAs, feeds on damp and wet flats with or without scattered vegetation. The birds were also seen feeding along edge of water.

C. Resting habitat (after nesting is complete): Generally the same as the feeding habitat. Most often seen resting on open flats and flats with scattered vegetation.

Nighthawk.

A. Nesting habitat: Adults are seen on sand hills and flat sandy areas with scattered wood debris. Young chicks are found in open sandy area near wood debris and scattered weeds. Nesting habitat should be available April 14 to about August 5.

B. Feeding habitat: Open air. Catches insects while flying. Feeds in open areas or above woods.

C. Resting habitat: Seen resting on wood debris in open areas with sparse vegetation. Will also rest in trees with open branches and on bare ground.

Killdeer. The nest is an open depression lined with pebbles or shell fragments.

A. Nesting habitat: Nests in open areas. Areas may or may not contain scattered to moderate grasses and weeds.

B. Feeding habitat: Seen feeding in nesting habitat. Also frequents damp flats and edges of water, with or without scattered short vegetation.

C. Resting habitat: Same as feeding habitat.

Common moorhen (common gallinule). Reported Nesting habitat consists of damp and wet areas with tall vegetation. Found mostly in areas that stay wet for a long time. Feeding and resting areas would be the same.

Mottled duck. Few nests have been found within the DMCAs. These birds are generally thought to be descendants of released birds. Nesting habitat consists of damp and wet areas with tall vegetation. This species is found mostly in areas that stay wet for a long time. Feeding and resting areas would be the same. Occasionally seen resting on grassed dike shoulders.

Mallard. The status of the wild population has become unclear with the appearance since 1997 and 1998 of apparently released birds. USFWS collected 7 dead and dying ducks in the Areas, all banded with SCWA bands, on June 28, 1999.

3.7.18.4 Sporadic/Uncommon Nesters

This group consists of those birds which are known to breed in the DMCAs, but not on a regular basis: gull-billed tern, black skimmer, least bittern, pied-billed grebe, black-bellied whistling duck, double-crested cormorant, anhinga, great egret, snowy egret, little blue heron, tricolored heron, cattle egret, green heron, black-crowned night heron, yellow-crowned night heron, white ibis, glossy ibis, purple gallinule, coot, blue-winged teal, ruddy duck, laughing gull.

3.7.18.5 Other Nesting Birds

Several other species nest in vegetation within the DMCAs. Many other species nest within older vegetation existing along the outside of the dikes. A list of confirmed nesting species is shown below. Those found nesting inside the DMCAs are marked with an asterisk: Pied-billed grebe*, Double-crested cormorant*, Anhinga*, Least bittern*, Great egret*, Snowy egret*, Little blue heron*, Tricolored heron*, Cattle egret*, Green heron*, Black-crowned night heron*, Yellow-crowned night heron*, White ibis*, Glossy ibis*, Turkey vulture*, Canada goose*, Black-bellied whistling duck*, Mottled duck*, Blue-winged teal*, Wood duck*, Ruddy duck*, Osprey, Redtail Hawk, Bobwhite, Purple gallinule*, Common gallinule*, Coot*, Wilson's plover*, Killdeer*, Black-necked stilt*, Avocet* (eggs found, but did not nest successfully), Willet*, Laughing gull*, Gull-billed tern*, Least tern*, Black skimmer*, Mourning dove*, Yellow-billed cuckoo, Nighthawk*, Chuck-wills-widow, Red-bellied woodpecker, Eastern kingbird, Rough-winged swallow, Fish crow, Carolina wren, Blue-gray gnatcatcher, White-eyed vireo*, Common Yellowthroat*, Yellow-breasted chat*, Catbird*, Mockingbird, Brown thrasher*, Cardinal*, Blue grosbeak*, Indigo bunting*, Painted bunting*, Towhee*, Red-winged blackbird*, Boat-tailed grackle*, Brown-headed cowbird*, Common grackle, Orchard oriole*.

It is highly likely, because they are seen commonly throughout the summer, but confirmed nesting has not been documented (2): Ground Dove* pair (old nests found) June 2007, Marsh Wren* agitated, many empty nests, Downy Woodpecker, Carolina Chickadee.

3.7.18.6 Non-breeding Birds

This group consists of non-breeding birds that have been observed in the DMCAs.

Shorebirds. At least 37 species of shorebirds have been recorded in the DMCAs in recent years. Peak spring migratory periods for the southeast are reported as late March to late May (Helmers, 1992) and mid-April to late May (Howe, 1989). Peak fall migration is reported as August to early November (Helmers, 1992) and mid-July to mid-September (Howe, 1989). The highest numbers of migrating shorebirds in the DMCAs have recently been observed to occur between late April to early June (highest in May) and early July to early November (highest from July to September). The highest number of species usually occurs in late April, May, and July. Bird counts often exceed 20,000 to 30,000 birds during peak migration. Highest counts of wintering shorebirds occur from December to February, including stilt sandpipers.

The DMCAs are well known for attracting large numbers of migrating shorebirds, with several species being recorded there in larger numbers than anywhere else in South Carolina. Post and Gauthreaux (1989) list the harbor's DMCAs as the location for the highest counts of avocets (450) and black-necked stilts (450). Recently (July 16, 1993), 976 black-necked stilts were observed in the DMCAs. Other shorebird species have recently been recorded in the DMCAs in numbers that exceed the maximums listed for South Carolina in Post and Gauthreaux (1989). The species for which this has occurred are as follows: Black-bellied plover, Wilson’s plover, semipalmated plover, killdeer, black-necked stilt, avocet, solitary sandpiper, greater yellowlegs, lesser yellowlegs, semipalmated sandpiper, western sandpiper, least sandpiper, white-rumped

sandpiper, pectoral sandpiper, dunlin, stilt sandpiper, buff-breasted sandpiper, long-billed dowitcher, common snipe, Wilson's phalarope.

Waterfowl (ducks, geese, and swans). Thirty-four species of waterfowl have been recorded in the DMCAs. Dominant species migrating or wintering in the areas are blue-winged teal, northern shoveler, green-winged teal, ring-necked duck , lesser scaup, hooded merganser, and ruddy duck.

Herons, egrets, ibis, and wood stork. Most species, except the cattle egret and wood stork can be expected to occur in the DMCAs throughout the year, but more commonly during the summer months. Highest numbers are usually encountered from May to June and September to October. Cattle egrets are most likely to be seen during the summer, while wood storks are most likely to occur from August to October. High counts for wood stork is 415 on October 17, 2008.

Gulls and terns. Various gulls feed near the head section discharge pipe when sediment placement operations are underway, primarily laughing gull, ring-billed gull, and a few herring gulls. Open flat areas, usually near water, serve as resting areas for many species throughout the year. With the exception of least terns gull-billed terns, black skimmers, and laughing gulls, which nest in the DMCAs, other species of gulls and terns feed and rest on open flats and bars at various times throughout the year. Twenty-three species of gulls and terns have been recorded in the DMCAs.

Other birds. The woodlands and grassy areas bordering the DMCAs contain a large variety of birds, with the species composition and numbers dependent on the time of the year. Large numbers of tree swallows feed at the DMCAs at certain times of the year (over 10,000 individuals have been seen feeding over the DMCAs in October, and 140,000 in April), and the northern waterthrush has been observed in the winter.

The scrub areas inside and outside the DMCAs provide important habitat for a number of neotropical migrants including catbird, yellow warbler, prairie warbler, palm warbler , northern waterthrush and common yellowthroat. In addition, small numbers of many uncommon species have been sighted in the areas from time to time.

Several distinct areas constitute the existing major bird habitat features at the middle harbor DMCAs. Sandy areas at the head sections are generally available and used for nesting by least terns and other species. None of the areas are isolated from predators and some nesting islands surrounded by water are generally available each year. Least terns, gull-billed terns, and black skimmers have nested on these islands successfully. Savannah District has produced approximately 14.6 acres of successful ground nesting habitat in the past five years. At least 3 acres of successful sandy nesting area have been present each year. An additional area of at least 50 acres of black-necked stilt habitat is generally available, although it is usually subject to drying and nesting failures. At least 100 acres of spring and fall migrant shorebird feeding habitat has been available, and probably the same amount of winter waterfowl/shorebird habitat. Analyses were performed to identify the amount of acreage of various bird habitats which occur for some period of time within each middle harbor DMCAs. Those analyses are summarized in Table 3-7.

Table 3-7: Approximate Acreage of Bird Habitat Middle and Lower Harbor Confined Placement Facilities (in acre-years)

Placement Area	Usable Size	Bare Ground Nesting	Wetland Nesting	Shorebird Feeding	Waterfowl Feeding
12-A	1,100.0	8.0	0.0	500.0	500.0
13-A	1,324.0	4.0	35.0	600.0	600.0
13-B	550.0	0.0	40.0	200.0	200.0
14-A	630.0	4.0	0.0	10.0	10.0
14-B	70.00	4.0	0.0	5.0	0.0
J/O	740.0	0.0	0.0	0.0	0.0
TOTAL	5,044.0	20.0	75.0	1,315.0	1,310.0

NOTE: Figures are based on 2013 data.

The estuarine marshes which line the Savannah River at locations along its entire length are also areas which support wildlife. Cormorants, seagulls, mergansers, hawks, herons, egrets, ibis, rails and terns can be found resting and feeding in many of these areas. Diamondback terrapins and occasionally alligators also inhabit these estuarine wetlands, along with such mammals as otters, raccoons and minks.

3.7.19 Brunswick Harbor DMCA (Andrews Island)

Historically birds (both shorebird and waterfowl) have utilized Andrews Island during times when water was being held as a result of dredging events. The past two years a University of Georgia Graduate Student observed least tern nesting activity at various locations on the island. The student conducted contaminant studies as well as fledging success calculations. Fish Crow decoys were deployed as well as a permitted lethal take permit for crows due to predation of the tern nests. The Corps has coordinated water release/holding, placement of dredge head section, and borrow activities to minimize disturbance or other adverse impacts to birds utilizing the area for nesting, foraging, or loafing.

3.7.20 Tract 1700-L (Big Crab Island) DMCA

This tract is owned by the U.S. Navy and the Corps is allowed to place AIWW sediments here under terms of a license agreement. The Navy is responsible for this DMCA and its management is covered under the Integrated Natural Resources Management Plan for Kings Bay Naval Submarine Base.

3.7.21 Undiked Saltmarsh Disposal Tracts

The Corps holds easements on 56 saltmarsh tracts for placement of dredged sediments from the AIWW – three in South Carolina and 53 in Georgia. South Carolina easements total 568.6 acres; Georgia easements total 7,163.8 acres. Most of these tracts are undiked but some have a toe dike along the front (waterway) side to keep dredged sediments from re-entering the waterway. Eighteen of the easements have never been used for placement and remain as pristine saltmarsh. Nine easements have only been used in the early 1940s for construction of the 12-foot AIWW channel. Ten easements were used for maintenance of the channel from the mid-1940s until

1980. Nineteen easements have been used after 1980, some as recently as 2009. See Appendix E, Section 404 (b) (1) Evaluation for a detailed discussion of past use of these easements.

3.7.21.1 Flora

Those tracts that have not been used since the 1940s and, to a lesser extent, those not used since 1980 have spoil islands (created uplands) that are now vegetated with a variety of upland trees, shrubs, and vines that are commonly found on natural islands in the saltmarsh referred to as "hammocks." Red cedar (*Juniperus virginiana*), cabbage palm (*Sabal palmetto*), loblolly pine (*Pinus taeda*), and live oak (*Quercus virginiana*) are common on the oldest upland islands on these tracts. Some such tracts (SC-2, SC-1, 1-A-1, 2-A, 2-B, 3-A, 5-A) have the invasive Chinese tallow tree (*Triadica sebifera*) present. This species is the dominant woody plant on Tracts 2-B and 3-A. Tracts farther south may have the invasive French tamarisk (*Tamarix gallica*) present. Shrubs on these upland islands commonly include yaupon (*Ilex vomitoria*), groundsel (*Baccharis halmifolia*), and wax myrtle (*Morella cerifera*). Where the upland islands meet surrounding saltmarsh, grasses commonly found include big cordgrass (*Spartina cynosuroides*), black needlerush (*Juncus roemerianus*), and smooth cordgrass (*Spartina alterniflora*).

Tracts that have been used since 1980 have upland islands that have been subjected to more recent disturbance by having dredged sediments placed on them, some as recently as 2009. Trees present include red cedar, French tamarisk, sugarberry (*Celtis laevigata*), chinaberry (*Melia azedarach*), and loblolly pine. A few tracts have Chinese tallow tree present. Shrubs commonly include groundsel, sea ox-eye (*Borrichia frutescens*) and pokeweed (*Phytolacca Americana*). Grasses include big cordgrass, smooth cordgrass, black needlerush, and salt-grass (*Distichlis spicata*).

3.7.21.2 Fauna

Evidence of wildlife use of these disposal tracts included tracks, scat, other sign, bird song, and direct observation. The tracts were visited in October 2010 (Tidewater Environmental Services 2011).

Mammals using the tracts included white-tailed deer, raccoon, feral hog, armadillo, coyote, marsh rabbit, eastern cottontail. Horses and cows were found on Tract 25-E, and cows and goats have heavily impacted Tract 36-A. Other mammals expected to be present but not observed include mink and river otter.

Reptiles using the tracts include diamondback terrapin, American alligator, and unidentified lizards and snakes. Species expected to occur but not observed include eastern diamondback rattlesnake, yellow rat snake, corn snake, southeastern five-line skink, and green anole.
No amphibians were recorded on the disposal tracts. Only two tracts (SC-1 and 3-A) have freshwater wetlands. Amphibians that might be present in these freshwater wetlands include green treefrog and squirrel treefrog. No salamanders would be expected.

Invertebrates observed were American oyster horseshoe crab, various fiddler crabs, periwinkle, painted lady butterfly, and imported fire ant.

Birds using the tracts included various unidentified songbirds, chickadee, blue jay, phoebe, boat-tailed grackle, red-bellied woodpecker, downy woodpecker, mourning dove, yellow-rumped warbler, yellow-throated warbler, black vulture, osprey, Cooper's hawk, harrier, bald eagle, kingfisher, cormorant, great egret, little blue heron, great blue heron, oystercatcher, royal tern, white ibis, clapper rail, willet, unidentified sandpipers, and wood stork. On several tracts, songbird nests were observed.

3.7.22 Migratory Birds

Many protected (and unprotected) areas throughout the project area are important for migratory birds. These sites are preferred due to both the availability of grounds for nest creation as well as forage, i.e., small fish for supplying the chicks. Typical bird species using these sites include Black Skimmers, Brown Pelicans, Willet, Wilson's Plover, and various Tern species (Sandwich, Least, Royal, Common, Foresters, and Gull-billed).

Although the above-noted areas are known to provide necessary habitats for migratory bird species, many other species frequent the sanctuaries and other areas/habitats within and near the project area. Such birds roost and forage in surrounding coastal environments such as tidal flats, mud flats, and beaches during the winter months. Species likely to occur are listed in Table 3-8, along with their associated habitats. Many of the important bird-supporting sites noted above are not only used by bird species, but also by other vertebrate species that are associated with birds (in many cases preying on eggs, chicks, and fledglings).

Migratory bird species using sand/beach and mudflat habitats for nesting adjacent to navigational channels such as the AIWW may be particularly sensitive to human disturbance. During such times, disturbance could cause unsuccessful nesting and/or death to chicks. Terns, Pelicans, Willet, and Skimmers typically nest from April through July, while Wood Storks and Plovers nest from April through August.

Table 3-8: Migratory Birds Likely to Occur in the Savannah District AIWW Project Area

Common Name	Scientific Name	Sand/Beach	Mud-flat	Pond	Salt-Marsh	Open Water
American Avocet	*Recurvirostra americana*		X	X		
American Bittern	*Botaurus lentiginosus*				X	
American Coot	*Fulica americana*			X		
American Oystercatcher	*Haematopus palliatus*		X	X	X	
Bald Eagle	*Haliaeetus leucoephalus*			X		X
Belted Kingfisher	*Ceryle alcyon*			X		X
Black Rail	*Laterallus jamaicensis*				X	
Black Skimmer	*Rynchops niger*	X		X		X
Black-backed Gull	*Larus marinus*	X	X	X		X
Black-bellied Plover	*Pluvialis squatarola*	X	X			
Black-crowned Night Heron	*Nyticorax nycticorax*			X	X	
Black-necked Stilt	*Himantopus mexicanus*	X	X	X		
Brown Pelican	*Pelecanus occidentalis*				X	X
Clapper Rail	*Fallus longirostris*				X	
Common Moorhen	*Gallinula chloropus*			X		X
Common Tern	*Sterna hirundo*	X		X	X	X
Double-Crested Cormorant	*Phalacrocorax auritus*			X		X
Dunlin	*Calidris alpina*	X	X			
Foresters Tern	*Sterna forsteri*	X		X	X	X
Glossy Ibis	*Plegadis falcinellus*		X	X	X	
Great Blue Heron	*Ardea herodias*			X	X	
Great Egret	*Ardea alba*			X	X	
Greater Yellowlegs	*Tringa melamoleuca*		X	X	X	
Gull-billed Tern	*Sterna nilotica*	X		X		X
King Rail	*Rallus elegans*				X	
Laughing Gull	*Larus atricilla*	X	X	X		X
Least Tern	*Sterna antillarum*	X		X		X
Little Blue Heron	*Egretta caerulea*		X	X		
Long-billed Dowitcher	*Limnodromus scolopaceus*		X	X		
Osprey	*Pandion haliateus*			X		X
Piping Plover	*Charadrius melodus*	X	X			
Red Knot	*Calidris canutus*	X	X		X	
Ring-billed Gull	*Larus delawarensis*	X	X	X	X	X
Royal Tern	*Sterna maxima*	X		X		X
Ruddy Turnstone	*Arenaria interpres*	X	X			
Sanderling	*Recurvirostra americana*		X	X		
Sandwich Tern	*Sterna sandvicensis*	X		X		X
Semipalmated Plover	*Charadrius semipalmatus*	X	X			
Snowy Egret	*Egretta thula*		X	X		
Sora	*Porzana carolina*				X	
Spotted Sandpiper	*Actitis macularia*	X	X			
Tricolored Heron	*Egretta tricolor*			X	X	
Virginia Rail	*Rallus limicola*				X	
Whimbrel	*Numenius phaeopus*	X	X		X	
White Ibis	*Eudocimus albus*		X	X		
Willet	*Catoptrophorus semipalmatus*	X	X			
Wilson's Plover	*Charadrius wilsonia*	X	X			
Wood Stork	*Mycteria americana*			X		X
Yellow Rail	*Coturnicops noveboracensis*				X	
Yellow-crowned Night Heron	*Nyctanassa violacea*			X		X

Source: SHEP EIS (USACE 2012)

3.8 Wetlands and Floodplains

3.8.1 Wetlands

Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions (33 C.F.R. § 328.3). Wetlands possess three essential characteristics: hydrophytic vegetation, hydric soils, and wetland hydrology. There are four predominant wetland types along the AIWW within the study area. These are the low marsh wetlands, the high marsh wetlands, the shrub zone wetlands, and freshwater forested/shrub wetlands.

The low marsh wetland type is regularly flooded by high tides and is generally found below the mean high water (mhw) line. This community is dominated nearly pure stands of smooth cordgrass (*Spartina alterniflora*). Smooth cordgrass marshes are considered to be the most productive type of the saltmarsh communities. This community occurs throughout the tidal lands along the AIWW. The upper margin of this community grades into the high marsh community. In areas with less tidal action or in areas with high evaporation rates (thus high salt concentrations) the smooth cordgrass is shorter and less productive and other plant species also occur. In salt pan areas short-form smooth cordgrass is found with glasswort (*Salicornia* sp.) dominant.

The high marsh wetland type, beginning at the marsh/land line is regularly flooded by spring tides and is infrequently flooded during abnormal high tides. The dominant vegetation in this zone consists of saltmeadow cordgrass (*Spartina patens*) and saltgrass (*Distichlis spicata*). The high marsh zone often has several intermixed plant communities, including the salt panne association and stands of black needle rush (*Juncus roemarianus*), sea lavender (*Limonium nashii*) and salt bulrush (*Scirpus robustus*). In the high marsh zone areas which are only occasionally flooded, shrub zone type vegetation is frequently present and forms an ecotone or transitional community.

The shrub wetland type, which is located at elevations which are only occasionally flooded by high spring tides or abnormally high storm tides, forms the border between the high marsh zone and the terrestrial vegetation. This zone contains a variety of herbaceous and woody plant species with shrubs being dominant. The characteristic shrub vegetation present in this zone includes marsh elder (*Iva frutescens*), sea ox-eye (*Borrichia frutescens*), groundsel bush (*Baccharis halimifolia*), Florida privet (*Forestiera porulosa)*, wax myrtle (*Myrica cerifera*) and yaupon (*Ilex vomitoria*). Herbaceous vegetation occurring in this zone consists of black needle rush, saltmeadow cordgrass, saltgrass and sea lavender.

Freshwater forested/shrub wetlands are rarely found along the AIWW, but a few examples are present within saltmarsh disposal tracts that have received dredged material that has created low-lying areas not subject to tidal inundation. The largest example is found inside the old dike lines at Tract 3-A in the Wilmington River. This wetland, encompassing 29 acres, supports a nearly monotypic stand of Chinese tallow tree (*Triadica sebifera*), an exotic invasive species.

Other freshwater wetlands (forested/shrub and emergent) are found on barrier islands, back-barrier islands, hammocks, and the mainland adjacent to the AIWW. Many of these wetlands occur in inter-dune swales on islands and in relic shoreline features on the mainland. Both potential high ground DMCA sites considered in the proposed DMMP contain these freshwater wetlands.

Some wetlands along the AIWW have been altered by maintenance dredging of the channel. The vegetative changes which have resulted are varied depending upon placement techniques and the material dredged. In unconfined sediment disposal tracts where the elevation has not precluded tidal action, smooth cordgrass has revegetated the area. However, small upland islands locally known as hammocks have formed in disposal tracts that have been used often enough to build up the elevation above the mean high water level. Vegetation on hammock areas is similar to high marshland shrub marsh zones previously discussed, depending on elevation and the sediments dredged. Along the edge of the hammocks, where flooding duration is about one hour each day, vegetation commonly found consists of glasswort, saltgrass and sea ox-eye. In areas with higher elevations, wax myrtles, marsh elder and southern red cedars have become established. In some areas where the dredged material consists mostly of sterile sands with little organic material, the area is unable to support any vegetation. Recently diked disposal tracts form hammocks similar to high and shrub marsh zones; however, some old diked disposal tracts which do not undergo the shrub marsh phase are occasionally revegetated with broomsedge (*Andropogon* sp.), prickly pear cactus (*Opuntia* sp.) and other upland type vegetation. In most instances, diked disposal tracts form a shrub zone and may later develop into an oak-juniper-palm forest community. This type of community is usually found in areas with an elevation above five feet. The benefits of these created uplands are discussed in both the Fish and Wildlife Coordination Act Report (Appendix G) and Section 3.6 of this EA.

Maintenance of the AIWW requires the periodic removal of sediments that have accumulated in the navigation channel and reduced its depth. Savannah District's practice has been to remove those sediments when the depths are less than that authorized for navigation (12 feet since the 1930s). The District deposits those sediments in a variety a places, depending on the site of the dredging. Typically the District has used the closest site for which it has legal authority to deposit the sediments. For the AIWW, the sediment placement sites have included open water, unconfined saltmarsh, and confined upland tracts. The 1976 EIS for the project identified what sites would be used and described the effects expected from such use. That document stated that sediments would be deposited in 36 unconfined saltmarsh sites and that deposition would not result in permanent adverse impacts to wetlands. Through the 1976 EIS, the Corps received environmental approvals for the maintenance operations and impacts identified in that document.

Over time, the Corps became aware that its sediment deposition on some of the AIWW unconfined saltmarsh disposal tracts had converted previously intact and functional *Spartina alterniflora* saltmarsh to other types of marsh or to upland. Many of the sediment disposal tracts have not been used since the 1976 EIS and *Spartina alterniflora* saltmarsh have recovered after placement of dredged material ceased. The Corps identified and calculated the net wetland loss that has occurred since the 1976 EIS. The Corps used a 1983 wetland assessment (USACE 1983) as the baseline datum because it contains the most detailed information about the types and distribution of wetland vegetation on the unconfined saltmarsh sites used for sediment

disposal. The District obtained an updated assessment of the distribution of wetland vegetation on the sites in 2011 through Tidewater Environmental Services. The 2011 assessments reflect all dredging events from 1983 to the present, since the last unconfined sediment placement occurred in 2009. The District then calculated the change in wetland acreage at each sediment disposal tract (both positive and negative) between the 1983 and 2011 wetland assessment and/or interpretation of aerial photography.

The tracts that experienced little or no sediment deposition since 1983 recovered wetlands through partial recovery of saltmarsh. Tracts that were consistently used for deposition since 1983 experienced a loss of wetland acreage from that sediment deposition. In total, the AIWW sediment disposal tracts experienced a net loss of 192.4 acres of estuarine emergent wetlands between 1983 and 2011. Table 3-9 shows changes in impacts within disposal tracts between the 1983 and 2011 studies. Tracts used for placement of dredged materials since 1983 exhibited greater impacts than those recorded in the 1983 study (indicated in Table 3-9 as positive values in the far right-hand column; areas not used since 1983 exhibited varying degrees of saltmarsh recovery (indicated by values in parentheses in the far right-hand column). Some tracts that were not used since the 1983 study did not have adequate baseline information to allow a comparison with results of the 2011 study; in these cases, since no recovery of saltmarsh could be demonstrated, the value in the Net Increase/Decrease in Impact column in Table 3-9 was arbitrarily set at 0.00 acres.

Table 3-9: Net Wetland Impacts for the AIWW 1983-2011

Tract	Last Used	Impacts in 1983 (acres)	Impacts in 2011 (acres)	Net Increase/Decrease in Impact (acres)
SC-3	1980	107.50	107.50	0.00[1]
SC-2	1980	22.45	22.45	0.00[1]
SC-1 outside DMCA14-B dikes	1980	203.00	203.00	0.00[1]
1-A-1	1987	38.70	30.49	0.00
2-A	1965	45.00	39.77	(5.23)
2-B	1972	49.90	35.31	(14.59)
3-A	1992	136.10	121.21	(14.89)
5-A	1972	105.70	105.70	0.00
5-B	1965	6.62	6.62	0.00 [1]
7-A	1965	41.10	37.31	(3.79)
8-A	1972	17.20	16.10	(1.10)
9-A undiked portion	1980	90.70	88.80	(1.90)[2]
9-B	1943	6.33	6.33	0.00
11-B	1974	5.15	5.15	0.00[1,2]
11-H	1943	1.90	1.90	0.00[1,2]
11-K	1943	14.40	7.42	(6.98)
11-L	1943	6.00	1.83	(4.17)
12-A	1974	21.20	11.87	(9.33)
13-A	1943	7.24	7.24	0.00[1,2]
15-A	2009	49.60	57.95	8.35
15-B	2009	25.00	30.86	5.86
16-A	2009	15.40	17.43	2.03
17-A	1977	24.10	7.75	(16.35)
19-A	1973	25.70	12.78	(12.92)
20-A	1973	13.20	10.35	(2.85)
24-A	1999	9.50	14.54	5.04
25-A	1943	42.60	32.72	(9.88)
25-C	1977	55.50	33.97	(21.53)
25-E	1999	31.60	31.39	(0.21)
26-A	1943	7.42	7.42	0.00[1,2]
27-B	1943	2.36	2.36	0.00[1,2]
29-A	1943	19.20	11.94	(7.26)
29-B	1996	35.90	47.83	11.93
29-C	1970	53.50	46.76	(6.74)
30-A	2001	88.90	163.81	74.91
32-A	2001	58.30	195.52	137.22
34-A	1978	28.90	28.77	(0.13)
36-A	2009	60.10	107.19	47.09
42-B	2009	26.70	42.04	15.34
43-B	2009	7.50	14.05	6.55
44-A	1943	22.70	22.51	(0.19)
45-B	1943	14.00	14.00	0.00[1,2]
46-A	1943	0.77	0.77	0.00[1,2]
47-A	1943	6.06	6.06	0.00[1,2]
48-A	1943	3.31	3.31	0.00[1]
52-A	1999	105.40	127.70	22.30
52-B	1999	95.00	95.00	0.00[2]
53-A	1978	107.10	97.02	(10.08)
COE-1	2001	5.50	9.32	3.82
COE-3	2001	65.50	75.83	10.33
Totals		**2,032.51**	**2,224.95**	**192.44**

[1]No 1983 baseline; [2]Aerial photography interpretation used to estimate 2011 impacts.

3.8.2 Floodplains

The 100-year floodplain is established by the Federal Emergency Management Agency (FEMA) and is identified on Federal Insurance Rate Maps. Base flood elevations for flood zones and velocity zones are also identified by FEMA, as are designated floodways.

All of the Savannah District AIWW reaches and associated disposal tracts lie within the 100-year floodplain in Special Flood Hazard Area (SFHA) VE - coastal flood zone with velocity hazard (wave action). Alternatives considered in developing the proposed DMMP included potential construction of high ground DMCAs in Bryan County (100-acre DMCA) and McIntosh County (350-acre DMCA). The majority of both of these potential DMCA sites lie within the 100-year floodplain (SFHA VE). Small portions of both sites are in the 500-year floodplain (http://map.georgiadfirm.com/).

3.9 Threatened and Endangered Species

The Georgia/South Carolina AIWW study area supports a number of endangered and threatened species listed under the Endangered Species Act (ESA) of 1973 and the Marine Mammal Protection Act (MMPA) of 1972. Lists of Federally Threatened and Endangered species for the project area were obtained from NMFS (Southeast Regional Office, St. Petersburg, FL) and the USFWS (Field Offices in Charleston, SC; and Brunswick, GA). These were combined to develop the following composite list for the coastal counties in Georgia and South Carolina that contain the AIWW. The list shows the Federally-listed species that could be present in the project area based upon their geographic range (see Table 3-10).

Table 3-10: Federally Threatened and Endangered Species Potentially Present in the following SC and GA Counties: Jasper, Beaufort, Chatham, Bryan, Liberty, Long, Glynn, and Camden

Species Common Names	Scientific Name	Federal Status
Marine Turtles		
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Loggerhead sea turtle	*Caretta caretta*	Threatened
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered
Green sea turtle	*Chelonia mydas*	Threatened[1]
Mammals		
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Blue whale	*Balaena musculus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
Finback whale	*Balaenoptera physalus*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
West Indian mantee	*Trichechus manatus*	Endangered
Anadromous and Marine Fish		
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered
Atlantic sturgeon	*Acipenser oxyrinchus oxyrhincus*	Endangered
Molluscs		
Altamaha spinymussel	*Elliptio spinosa*	Endangered
Birds		
Kirtland's warbler	*Dendroica kirtlandii*	Endangered
Bachman's warbler	*Vermivora bachmanii*	Endangered
Piping Plover	*Charadrius melodus*	Endangered
Red-cockaded woodpecker	*Picoides borealis*	Threatened
Wood stork	*Mycteria americana*	Endangered
Reptiles and Amphibians		
Eastern indigo snake	*Drymarchon corais couperi*	Threatened
Gopher tortoise	*Gopherus polyphemus*	Candidate
Flatwoods salamander	*Ambystoma cingulatum*	Threatened
Vascular Plants		
Pondberry	*Lindera melissifolia*	Endangered
Chaffseed	*Schwalbea americana*	Endangered
Canby's dropwort	*Oxypolis canbyi*	Endangered

[1]Green turtles are listed as threatened, except for breeding populations in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

KEY:

Endangered - A taxon "in danger of extinction throughout all or a significant portion of its range."

Threatened - A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

Savannah District prepared a Biological Assessment for Threatened and Endangered Species (BATES) (see Appendix B) to evaluate the potential impacts of the proposed action on Federally threatened and endangered species. This document is being coordinated with the USFWS and NMFS pursuant to Section 7 of the Endangered Species Act of 1973, as amended. The BATES concluded that the proposed action would have no effect on the following nine federally listed species:

- Red-cockaded woodpecker *Picoides borealis*
- American Chaffseed *Schwalbea americana*
- Pondberry *Lindera melissifolia*
- Canby's dropwort *Oxypolis canbyi*
- Kirtland's warbler *Dendroica kirtlandii*
- Bachman's warbler *Vermivora bachmanii*
- Eastern indigo snake *Drymarchon corais couperi*
- Altamaha spinymussel *Elliptio spinosa*
- Flatwoods salamander *Ambystoma cingulatum*

The BATES also concluded that the proposed action may affect but is not likely to adversely affect the following 13 federally listed species:

- Leatherback sea turtle *Dermochelys coriacea*
- Loggerhead sea turtle *Caretta caretta*
- Kemp's ridley sea turtle *Lepidochelys kempii*
- Hawksbill sea turtle *Eretmochelys imbricata*
- Green sea turtle *Chelonia mydas*
- North Atlantic right whale *Eubaleana glacialis*
- Humpback whale *Megaptera novaeangliae*
- Sperm whale *Physeter macrocephalus*
- West Indian Manatee *Trichechus manatus*
- Atlantic sturgeon *Acipenser oxyrinchus*
- Shortnose sturgeon *Acipenser brevirostrum*
- Altamaha spinymussel *Elliptio spinosa*
- Piping plover *Charadrius melodus*
- Wood stork *Mycteria americana*

The BATES also concluded that the proposed action would not adversely affect critical habitat for any listed species.

Table 3-11 below is a list of Georgia's known occurrences of special concern animals and plants near the AIWW. The list was obtained from the Georgia Department of Natural Resources, Wildlife Resources Division, http://www.georgiawildlife.com/node/1370.

Table 3-9: Georgia's Known Occurrences of Special Concern Animals and Plants On or Near the AIWW, Chatham, Bryan, Liberty, McIntosh, Glynn, and Camden Counties Georgia

Status[1]	Species Scientific Name	Species Common Name
Animals		
US	*Acipenser brevirostrum*	Shortnose Sturgeon
US	*Acipenser oxyrinchus oxyrinchus*	Atlantic Sturgeon
US	*Caretta caretta*	Loggerhead
GA	*Clemmys guttata*	Spotted turtle
US	*Eubalaena glacialis*	Northern Right whale
GA	*Haematopus palliates*	American oystercatcher
GA	*Haliaeetus leucocephalus*	Bald eagle
	Himantopus mexicanus	Black-necked stilt
	Nycticorax nycticorax	Black-crowned Night heron
	Passerina ciris	Painted bunting
	Pseudacris brimleyi	Brimley's Chorus frog
	Pseudorca crassidens	False Killer whale
GA	*Rynchops niger*	Black skimmer
GA	*Sterna antillarum*	Least tern
GA	*Tyrannus dominicensis*	Gray kingbird
US	*Trichechus manatus*	West Indian manatee
	Ammodramus maritimus	Seaside sparrow
GA	*Charadrius wilsonia*	Wilson's plover
	Crotalus adamanteus	Eastern Diamond-backed rattlesnake
GA	*Gopherus polyphemus*	Gopher tortoise
GA	*Moxostoma robustum*	Robust redhorse
	Nyctanassa violacea	Yellow-crowned Night heron
Status[1]	**Species Scientific Name**	**Species Common Name**
Animals		
GA	*Passerina ciris*	Painted bunting
GA	*Rana capito*	Gopher frog
	Stereochilus marginatus	Many-lined salamander
	Umbra pygmaea	Eastern mud minnow
Plants		
GA	*Forestiera segregata*	Florida Wild privet
	Physostegia leptophylla	Narrowleaf Obedient plant
GA	*Sarracenia minor*	Hooded pitcherplant
GA	*Sageretia minutiflora*	Climbing buckthorn
GA	*Sapindus marginatus*	Soapberry
	Scutellaria mellichampii	Mellichamp's skullcap
	Sporobolus pinetorum	Pineland dropseed

[1] "US" indicates species with federal status (Protected, Candidate or Partial Status). Species that are federally protected in Georgia are also state protected. "GA" indicates Georgia protected species. All other are "species of concern" in Georgia.

Table 3-12 shown below present a list of South Carolina's Rare, Threatened, and Endangered Species of Jasper County. The list was obtained from the South Carolina Department of Natural Resources website at the following website: https://www.dnr.sc.gov/pls/heritage/county_species.select_county_map.

Table 3-12: South Carolina's Rare, Threatened, and Endangered Species of Jasper County

Legal Status	Global Rank	State Rank	Scientific Name	Common Name
Vertebrate Animals				
FE/SE	G3	S3	*Acipenser brevirostrum*	Shortnose sturgeon
SC	G3	S3	*Aimophila aestivalis*	Bachman's sparrow
FT/SE	G2G3	S1	*Ambystoma cingulatum*	Flatwoods salamander
ST	G5	S5	*Clemmys guttata*	Spotted turtle
SE	G3G4	S2?	*Corynorhinus rafinesquii*	Rafinesque's Big-eared bat
SC	G4	S3	*Crotalus adamateus*	Eastern Diamondback rattlesnake
SC	G2G3	S?	*Elassama okatie*	Bluebarred Pigmy sunfish
SE	G3	S1	*Gopherus polyphemus*	Gopher tortoise
SE	G4	S2	*Haliaeetus leucocephalus*	Bald eagle
SC	G2	S?	*Heterodon simus*	Southern Hognose snake
SC	G5	S5	*Hyla avivoca*	Bird-voiced treefog
SC	G5	S?	*Kinosternon baurii*	Striped mud turtle
SC	G4	SA	*Kogia breviceps*	Pygmy Sperm whale
FE/SE	G4	S1S2	*Mycteria americana*	Wood stork
SC	G5	S3S4	*Neotoma floridana*	Eastern woodrat
SC	G5T5	S3S4	*Neotoma floridana floridana*	Eastern woodrat
Vertebrate Animals				
SC	G3	S?	*Ophisaurus mimicus*	Mimic Glass lizard
FE/SE	G3	S2	*Picoides borealis*	Red-cockaded woodpecker
SC	G4T3?	S2	*Pituophis melanoleucus mugitus*	Florida Pine snake
ST	G5	S2	*Pseudobranchus striatus*	Dwarf siren
SC	G5T4	S3S4	*Pseudotriton montanus flavissimus*	Gulf Coast mud salamander
SC	G5	S4	*Sciurus niger*	Eastern Fox squirrel
SC	G5	S?	*Seminatrix pygaea*	Black Swamp snake
ST	*G4*	*S3*	*Sterna antillarum*	Least tern
Invertebrate Animals				
SC	G4	S?	*Anodonta couperiana*	Barrel floater
SC	G4	S?	*Elliptio congaraea*	Carolina slabshell
SC	G3G4	S?	*Lampsilis cariosa*	Yellow lampmussel
SC	G3	S?	*Lampsilis splendida*	Rayed Pink fatmucket
SC	G5	S?	*Pyganodon cataracta*	Eastern floater
SC	G5	S?	*Utterbackia imbecillis*	Paper pondshell
SC	G4	S?	*Villosa delumbis*	Eastern creekshell
Plants				
SC	G4?	S?	*Agalinis linifolia*	Flax Leaf false-foxglove
SC	G4G5	S1	*Agarista populifolia*	Carolina dog-hobble
SC	G4G5	S?	*Aletris obovata*	White colicroot
SC	G4	?	*Andropogon brachystachyus*	Short-spike bluestem
SC	G4Q	S1	*Andropogon gyrans* var. *stenophyllus*	Elliott's bluestem
SC	G5	S?	*Anthaenantia rufa*	Purple silkyscale
SC	G4?	S?	*Aristida condensata*	Piedmont Three-awned grass
SC	G3G5	S1	*Bacopa cyclophylla*	Coastal-plain water-hyssop
SC	G4	S?	*Balduina uniflora*	One-flower balduina
SC	G4?	S4	*Canna flaccida*	Bandana-of-the-everglades
SC	G5	S?	*Carex amphibola*	Narrowleaf sedge
SC	G4	S?	*Cayaponia boykinii*	Cay aponia
SC	G4G5	S?	*Cliftonia monophylla*	Buckwheat-tree

Table 3-10 : South Carolina's Rare, Threatened, and Endangered Species of Jasper County (continued)

Legal Status	Global Rank	State Rank	Scientific Name	Common Name
Plants				
SC	G3G5	S?	*Coreopsis gladiata*	Southeastern tickseed
SC	G5	S?	*Crotonopsis linearis*	Narrowleaf tickseed
SC	G4	S?	*Cyperus tetragonus*	Piedmont flatsedge
SC	G4G5	S1	*Dicerandra odoratissima*	Rose balm
SC	G4G5	S?	*Dichanthelium aciculare*	Broomsedge
SC	G2G3	SR	*Eupatorium anomalum*	Florida thorough-wort
SC	G4	S1	*Forestiera segregata*	Southern privet
SC	G5	S1	*Halesia diptera*	Two-wing silverbell
SC	G?	S?	*Halesia parviflora*	Small-flowered silverbell-tree
RC	G2G3	S1	*Hypericum adpresum*	Creeping St. John's wort
SC	G4G5	S?	*Lepuropetalon spathulatum*	Southern lepuropetalon
SC	G4G5	S?	*Licania michauxii*	Gopher-apple
SC	G4	S?	*Listera austalis*	Southern twayblade
SC	G3	S3	*Listea aestivalis*	Pondspice
SC	G5	S1	*Lyonia ferruginea*	Rusty lyonia
SC	G5	S1	*Lysimiachia hurida*	Land-leaf loosestrife
SC	G2G3	S?	*Macbridea caroliniana*	Carolina bird-in-a-nest
SC	G4G5	S	*Nyssa ogeche*	Ogeechee tupelo
SC	G3G4	S?	*Orbexilum lupinellum*	Sampson snakeroot; scurf pea
SC	G5?	SR	*Panicum neuranthum*	Needleleaf rosette grass
SC	G4?	SNR	*Physostegia leptophylla*	Slender-leaved dragon-head
SC	G4	S1	*Pinkneya pubens*	Hairy fever-tree
SC	G3	S?	*Plantago sparsiflora*	Pineland plantain
SC	G3G4	S2	*Platanthera integra*	Yellow Fringeless orchid
SC	G3	S1	*Polygala hookeri*	Milkwort
SC	G5	S1S2	*Polygala nana*	Dwarf milkwort
SC	G5	S?	*Potamogeton foliosus*	Leafy pondweed
SC	G2	S2	*Pteroglossaspis ecristata*	Crestless plum orchid
SC	G5?	S?	*Pycnanthemum nudum*	Pinelands mountain mint
SC	G5	S?	*Quercus myrtifolia*	Myrtle-leaf oak
SC	G3G5	S1	*Rudbeckia mollis*	Soft-hair coneflower
SC	G4	S2	*Sageretia minutiflora*	Tiny-leaved buckthorn
SC	G5T2	S?	*Sagittaria graminea* var. *weatherbiana*	Grassleaf arrowhead
FESE	G2	S2	*Schwalbea americana*	Chaffseed
SC	G4	S1S2	*Scleria baldwinii*	Baldwin nutrush
SC	G3	S?	*Spiranthes langilabris*	Giant Spiral ladies' tresses
SC	G3	SR	*Sporobolus floridanus*	Florida dropseed
SC	G4	S?	*Thalia dealbata*	Powdery thalia
SC	G5T4T5	SR	*Xyris difformis* var. *floridana*	Florida yellow-eyed grass
SC	G3G4	SR	*Xyris serotina*	Acid-swampy yellow-eyed grass

Table 3-13 and 3-14 shown below present a list of South Carolina's Rare, Threatened, and Endangered Species of Beaufort County. The list was obtained from the South Carolina Department of Natural Resources website at the following website: https://www.dnr.sc.gov/pls/heritage/county_species.select_county_map.

Table 3-11: South Carolina's Rare, Threatened, and Endangered Species of Beaufort County

Legal Status	Global Rank	State Rank	Scientific Name	Common Name
Vertebrate Animals				
FE/SE	G3	S3	*Acipenser brevirostrum*	Shortnose sturgeon
FT/ST	G3	S3	*Caretta caretta*	Loggerhead sea turtle
SE	G4	S2	*Haliaeetus leucocephalus*	Bald eagle
SC	G2	S?	*Heterodon simus*	Southern Hognose snake
SC	G5	S5	*Hyla avivoca*	Bird-voiced treefog
SC	G5	S?	*Kinosternon baurii*	Striped mud turtle
SC	G4G5	SNR	*Lasiurus intermedius*	Northern yellow bat
SC	G4	S4	*Limnothlypis swainsonii*	Swainson's warbler
FE/SE	G4	S1S2	*Mycteria americana*	Wood stork
Legal Status	**Global Rank**	**State Rank**	**Scientific Name**	**Common Name**
Vertebrate Animals				
SC	G3G4	S1	*Myotis austroriparius*	Southeastern bat
SC	G5	S3?	*Myotis lucifugus*	Little brown myotis
SC	G5	S3S4	*Neotoma floridana*	Eastern woodrat
SC	G5T5	S3S4	*Neotoma floridana floridana*	Eastern woodrat
SC	G4	S1S2	*Pelecanus occidentalis*	Brown pelican
SC	G5	SNA	*Phoca vitulina*	Harbor seal
SC	G5T4	S3S4	*Pseudotriton montanus flavissimus*	Gulf Coast mud salamander
SC	G5	S4	*Sciurus niger*	Eastern Fox squirrel
ST	G4	S3	*Sterna antillarum*	Least tern
FE/SE	G2	S1S2	*Trichechus manatus*	Florida manatee
Plants				
SC	G4G5	S1	*Aletris obovata*	White colicroot
SC	G4?	S1	*Asclepius connivens*	Large-flower milkweed
SC	G4	S2	*Asclepius pedicellata*	Savannah milkweed
SC	G4?	S4	*Canna flaccida*	Bandana-of-the-everglades
SC	G5	S2	*Carex basiantha*	Widow sedge
SC	G4G5	S2	*Carex hyalinolepis*	Shoreline sedge
SC	G4	S2	*Carya myristiciformis*	Nutmeg hickory
SC	G4	S1	*Cynanchum scoparium*	Leafless swallow-wort
SC	G4	S1	*Cyperus distinctus*	Marshland flatsedge
SC	G4	S1	*Cyperus tetragonus*	Piedmont flatsedge
SC	G4	S3?	*Epidendrium conopseum*	Green-fly orchid
SC	G3G4	S1	*Eriochloa michauxii*	Longleaf cutgrass
SC	G3G5	S1	*Eupatorium scabridum*	Rough thoroughwort
SC	G2	S1	*Forestiera godfreyi*	Godfrey's privet
SC	G4	S2	*Helianthemum georgianum*	Georgia frostweed
RC	G3G5	S1	*Ipomoea macrorhiza*	Large-stem morning-glory
FE	G2G3	S2	*Lindera melissifolia*	Pondberry
SC	G5	S2	*Lipocarpa micrantha*	Dwarf bulrush
SC	G3	S3	*Listea aestivalis*	Pondspice
SC	G5	S1	*Lyonia ferruginea*	Rusty lyonia
SC	G5?Q	S3S4	*Muhlenbergia filipes*	Bentgrass
SC	G4G5	S1	*Nyssa ogeche*	Ogeechee tupelo
SC	GNR	SNR	*Panicum webberianum*	A panicgrass

Table 3-12: South Carolina's Rare, Threatened, and Endangered Species of Beaufort County (continued)

Legal Status	Global Rank	State Rank	Scientific Name	Common Name
Plants				
SC	G4	S1	*Pinkneya pubens*	Hairy fever-tree
SC	G5	S1	*Psilotum nudum*	Whisk fern
SC	G4?	S1	*Quercus austrina*	Bluff oak
SC	G4	S1	*Rhapidophyllum hystrix*	Needle palm
SC	G5	S1S2	*Ruellia carolinensis* ssp. *Ciliosa*	Sandhills wild petunia
SC	G4	S2	*Sageretia minutiflora*	Tiny-leaved buckthorn
SC	G4	S?	*Thalia dealbata*	Powdery thalia
SC	G5T4T5	SR	*Xyris brevifolia*	Short-leaved yellow-eyed grass

KEY:

G RANK: The Nature Conservancy rating of degree of global endangerment:
G1 - Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction
G2 - Imperiled globally because of rarity or factor(s) making it vulnerable
G3 - Either very rare throughout its range or found locally in a restricted range, or having factors making it vulnerable
G4 - Apparently secure globally, though it may be rare in parts of its range
G5 - Demonstrably secure globally, though it may be rare in parts of its range
GH - Of historical occurrence throughout its range, with possibility of rediscovery
GX - Extinct throughout its range
G? - Status unknown
T# - Status of infraspecific taxa (subspecies or varieties). Rankings similar to G#.

S RANK: The Nature Conservancy rating of degree of state endangerment:
S1 - Critically imperiled state-wide because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation
S2 - Imperiled state-wide because of rarity or factor(s) making it vulnerable
S3 - Rare or uncommon in state, found only in a restricted range, or factors making it vulnerable
S4 - Apparently secure in state: Uncommon but not rare, and usually widespread
S5 - Secure: Common, widespread, and abundant
SA - Accidental in state (usually birds or butterflies that are far outside normal range)
SE - Exotic established in state
SH - Of historical occurrence in state, with possibility of rediscovery
SN - Regularly occurring in state, but in a migratory, non-breeding form
SR - Reported in state, but without good documentation
SX - Extirpated from state
S? - Rank not yet assessed.
Other Qualifiers:
B - Breeding
N - Non-breeding
? - Denotes inexact or uncertain numeric rank

LEGAL STATUS:
FE - Federal Endangered
FT - Federal Threatened
NC - Of Concern, National (unofficial - plants only)
RC - Of Concern, Regional (unofficial - plants only)
SE - State Endangered (official state list - animals only)
ST - State Threatened (official state list - animals only)
SC - Of Concern, State
SX - State Extirpated
DM - Delisted Taxon, Recovered, Being Monitored First Five Years
PE/PT/C- Proposed or candidate for federal listing

3.9.1 Floodplains

The 100-year floodplain is established by the Federal Emergency Management Agency (FEMA) and is identified on Federal Insurance Rate Maps. Base flood elevations for flood zones and velocity zones are also identified by FEMA, as are designated floodways.

All of the Savannah District AIWW reaches and associated disposal tracts lie within the 100-year floodplain in Special Flood Hazard Area (SFHA) VE - coastal flood zone with velocity hazard (wave action). Alternatives considered in developing the proposed DMMP included potential construction of high ground DMCAs in Bryan County (100-acre DMCA) and McIntosh County (350-acre DMCA). The majority of both of these potential DMCA sites lie within the 100-year floodplain (SFHA VE). Small portions of both sites are in the 500-year floodplain (http://map.georgiadfirm.com/).

3.10 Threatened and Endangered Species

The Georgia/South Carolina AIWW study area supports a number of endangered and threatened species listed under the Endangered Species Act (ESA) of 1973 and the Marine Mammal Protection Act (MMPA) of 1972. Lists of Federally Threatened and Endangered species for the project area were obtained from NMFS (Southeast Regional Office, St. Petersburg, FL) and the USFWS (Field Offices in Charleston, SC; and Brunswick, GA). These were combined to develop the following composite list for the coastal counties in Georgia and South Carolina that contain the AIWW. The list shows the Federally-listed species that could be present in the project area based upon their geographic range (see Table 3-9).

Table 3-13: Federally Threatened and Endangered Species Potentially Present in the following SC and GA Counties: Jasper, Beaufort, Chatham, Bryan, Liberty, Long, Glynn, and Camden

Species Common Names	Scientific Name	Federal Status
Marine Turtles		
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Loggerhead sea turtle	*Caretta caretta*	Threatened
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered
Green sea turtle	*Chelonia mydas*	Threatened[1]
Mammals		
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Blue whale	*Balaena musculus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
Finback whale	*Balaenoptera physalus*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
West Indian mantee	*Trichechus manatus*	Endangered
Anadromous and Marine Fish		
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered
Atlantic sturgeon	*Acipenser oxyrinchus oxyrhincus*	Endangered
Molluscs		
Altamaha spinymussel	*Elliptio spinosa*	Endangered
Birds		

Kirtland's warbler	*Dendroica kirtlandii*	Endangered
Bachman's warbler	*Vermivora bachmanii*	Endangered
Piping Plover	*Charadrius melodus*	Endangered
Red-cockaded woodpecker	*Picoides borealis*	Threatened
Wood stork	*Mycteria americana*	Endangered
Reptiles and Amphibians		
Eastern indigo snake	*Drymarchon corais couperi*	Threatened
Gopher tortoise	*Gopherus polyphemus*	Candidate
Flatwoods salamander	*Ambystoma cingulatum*	Threatened
Vascular Plants		
Pondberry	*Lindera melissifolia*	Endangered
Chaffseed	*Schwalbea americana*	Endangered
Canby's dropwort	*Oxypolis canbyi*	Endangered

[1]Green turtles are listed as threatened, except for breeding populations in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

KEY:

Endangered - A taxon "in danger of extinction throughout all or a significant portion of its range."

Threatened - A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

Savannah District prepared a Biological Assessment for Threatened and Endangered Species (BATES) (see Appendix B) to evaluate the potential impacts of the proposed action on Federally threatened and endangered species. This document is being coordinated with the USFWS and NMFS pursuant to Section 7 of the Endangered Species Act of 1973, as amended. The BATES concluded that the proposed action would have no effect on the following nine federally listed species:

- Red-cockaded woodpecker *Picoides borealis*
- American Chaffseed *Schwalbea americana*
- Pondberry *Lindera melissifolia*
- Canby's dropwort *Oxypolis canbyi*
- Kirtland's warbler *Dendroica kirtlandii*
- Bachman's warbler *Vermivora bachmanii*
- Eastern indigo snake *Drymarchon corais couperi*
- Altamaha spinymussel *Elliptio spinosa*
- Flatwoods salamander *Ambystoma cingulatum*

The BATES also concluded that the proposed action may affect but is not likely to adversely affect the following 13 federally listed species:

- Leatherback sea turtle *Dermochelys coriacea*
- Loggerhead sea turtle *Caretta caretta*
- Kemp's ridley sea turtle *Lepidochelys kempii*
- Hawksbill sea turtle *Eretmochelys imbricata*
- Green sea turtle *Chelonia mydas*
- North Atlantic right whale *Eubaleana glacialis*
- Humpback whale *Megaptera novaeangliae*
- Sperm whale *Physeter macrocephalus*
- West Indian Manatee *Trichechus manatus*
- Atlantic sturgeon *Acipenser oxyrinchus*
- Shortnose sturgeon *Acipenser brevirostrum*
- Altamaha spinymussel *Elliptio spinosa*
- Piping plover *Charadrius melodus*
- Wood stork *Mycteria americana*

The BATES also concluded that the proposed action would not adversely affect critical habitat for any listed species.

Table 3-10 below is a list of Georgia's known occurrences of special concern animals and plants near the AIWW. The list was obtained from the Georgia Department of Natural Resources, Wildlife Resources Division, http://www.georgiawildlife.com/node/1370.

Table 3-14: Georgia's Known Occurrences of Special Concern Animals and Plants On or Near the AIWW, Chatham, Bryan, Liberty, McIntosh, Glynn, and Camden Counties Georgia

Status[1]	Species Scientific Name	Species Common Name
Animals		
US	*Acipenser brevirostrum*	Shortnose Sturgeon
US	*Acipenser oxyrinchus oxyrinchus*	Atlantic Sturgeon
US	*Caretta caretta*	Loggerhead
GA	*Clemmys guttata*	Spotted turtle
US	*Eubalaena glacialis*	Northern Right whale
GA	*Haematopus palliates*	American oystercatcher
GA	*Haliaeetus leucocephalus*	Bald eagle
	Himantopus mexicanus	Black-necked stilt
	Nycticorax nycticorax	Black-crowned Night heron
	Passerina ciris	Painted bunting
	Pseudacris brimleyi	Brimley's Chorus frog
	Pseudorca crassidens	False Killer whale
GA	*Rynchops niger*	Black skimmer
GA	*Sterna antillarum*	Least tern
GA	*Tyrannus dominicensis*	Gray kingbird
US	*Trichechus manatus*	West Indian manatee
	Ammodramus maritimus	Seaside sparrow
GA	*Charadrius wilsonia*	Wilson's plover
	Crotalus adamanteus	Eastern Diamond-backed rattlesnake
GA	*Gopherus polyphemus*	Gopher tortoise
GA	*Moxostoma robustum*	Robust redhorse
	Nyctanassa violacea	Yellow-crowned Night heron
Status[1]	**Species Scientific Name**	**Species Common Name**
Animals		
GA	*Passerina ciris*	Painted bunting
GA	*Rana capito*	Gopher frog
	Stereochilus marginatus	Many-lined salamander
	Umbra pygmaea	Eastern mud minnow
Plants		
GA	*Forestiera segregata*	Florida Wild privet
	Physostegia leptophylla	Narrowleaf Obedient plant
GA	*Sarracenia minor*	Hooded pitcherplant
GA	*Sageretia minutiflora*	Climbing buckthorn
GA	*Sapindus marginatus*	Soapberry
	Scutellaria mellichampii	Mellichamp's skullcap
	Sporobolus pinetorum	Pineland dropseed

[1] "US" indicates species with federal status (Protected, Candidate or Partial Status). Species that are federally protected in Georgia are also state protected. "GA" indicates Georgia protected species. All other are "species of concern" in Georgia.

Table 3-11 and 3-12 shown below present a list of South Carolina's Rare, Threatened, and Endangered Species of Jasper County. The list was obtained from the South Carolina Department of Natural Resources website at the following website: https://www.dnr.sc.gov/pls/heritage/county_species.select_county_map.

Table 3-15: South Carolina's Rare, Threatened, and Endangered Species of Jasper County

Legal Status	Global Rank	State Rank	Scientific Name	Common Name
Vertebrate Animals				
FE/SE	G3	S3	*Acipenser brevirostrum*	Shortnose sturgeon
SC	G3	S3	*Aimophila aestivalis*	Bachman's sparrow
FT/SE	G2G3	S1	*Ambystoma cingulatum*	Flatwoods salamander
ST	G5	S5	*Clemmys guttata*	Spotted turtle
SE	G3G4	S2?	*Corynorhinus rafinesquii*	Rafinesque's Big-eared bat
SC	G4	S3	*Crotalus adamateus*	Eastern Diamondback rattlesnake
SC	G2G3	S?	*Elassama okatie*	Bluebarred Pigmy sunfish
SE	G3	S1	*Gopherus polyphemus*	Gopher tortoise
SE	G4	S2	*Haliaeetus leucocephalus*	Bald eagle
SC	G2	S?	*Heterodon simus*	Southern Hognose snake
SC	G5	S5	*Hyla avivoca*	Bird-voiced treefog
SC	G5	S?	*Kinosternon baurii*	Striped mud turtle
SC	G4	SA	*Kogia breviceps*	Pygmy Sperm whale
FE/SE	G4	S1S2	*Mycteria americana*	Wood stork
SC	G5	S3S4	*Neotoma floridana*	Eastern woodrat
SC	G5T5	S3S4	*Neotoma floridana floridana*	Eastern woodrat
Vertebrate Animals				
SC	G3	S?	*Ophisaurus mimicus*	Mimic Glass lizard
FE/SE	G3	S2	*Picoides borealis*	Red-cockaded woodpecker
SC	G4T3?	S2	*Pituophis melanoleucus mugitus*	Florida Pine snake
ST	G5	S2	*Pseudobranchus striatus*	Dwarf siren
SC	G5T4	S3S4	*Pseudotriton montanus flavissimus*	Gulf Coast mud salamander
SC	G5	S4	*Sciurus niger*	Eastern Fox squirrel
SC	G5	S?	*Seminatrix pygaea*	Black Swamp snake
ST	*G4*	*S3*	*Sterna antillarum*	Least tern
Invertebrate Animals				
SC	G4	S?	*Anodonta couperiana*	Barrel floater
SC	G4	S?	*Elliptio congaraea*	Carolina slabshell
SC	G3G4	S?	*Lampsilis cariosa*	Yellow lampmussel
SC	G3	S?	*Lampsilis splendida*	Rayed Pink fatmucket
SC	G5	S?	*Pyganodon cataracta*	Eastern floater
SC	G5	S?	*Utterbackia imbecillis*	Paper pondshell
SC	G4	S?	*Villosa delumbis*	Eastern creekshell
Plants				
SC	G4?	S?	*Agalinis linifolia*	Flax Leaf false-foxglove
SC	G4G5	S1	*Agarista populifolia*	Carolina dog-hobble
SC	G4G5	S?	*Aletris obovata*	White colicroot
SC	G4	?	*Andropogon brachystachyus*	Short-spike bluestem
SC	G4Q	S1	*Andropogon gyrans* var. *stenophyllus*	Elliott's bluestem
SC	G5	S?	*Anthaenantia rufa*	Purple silkyscale
SC	G4?	S?	*Aristida condensata*	Piedmont Three-awned grass
SC	G3G5	S1	*Bacopa cyclophylla*	Coastal-plain water-hyssop
SC	G4	S?	*Balduina uniflora*	One-flower balduina
SC	G4?	S4	*Canna flaccida*	Bandana-of-the-everglades
SC	G5	S?	*Carex amphibola*	Narrowleaf sedge
SC	G4	S?	*Cayaponia boykinii*	Cay aponia
SC	G4G5	S?	*Cliftonia monophylla*	Buckwheat-tree

Table 3-16 : South Carolina's Rare, Threatened, and Endangered Species of Jasper County (continued)

Legal Status	Global Rank	State Rank	Scientific Name	Common Name
Plants				
SC	G3G5	S?	*Coreopsis gladiata*	Southeastern tickseed
SC	G5	S?	*Crotonopsis linearis*	Narrowleaf tickseed
SC	G4	S?	*Cyperus tetragonus*	Piedmont flatsedge
SC	G4G5	S1	*Dicerandra odoratissima*	Rose balm
SC	G4G5	S?	*Dichanthelium aciculare*	Broomsedge
SC	G2G3	SR	*Eupatorium anomalum*	Florida thorough-wort
SC	G4	S1	*Forestiera segregata*	Southern privet
SC	G5	S1	*Halesia diptera*	Two-wing silverbell
SC	G?	S?	*Halesia parviflora*	Small-flowered silverbell-tree
RC	G2G3	S1	*Hypericum adpresum*	Creeping St. John's wort
SC	G4G5	S?	*Lepuropetalon spathulatum*	Southern lepuropetalon
SC	G4G5	S?	*Licania michauxii*	Gopher-apple
SC	G4	S?	*Listera austalis*	Southern twayblade
SC	G3	S3	*Listea aestivalis*	Pondspice
SC	G5	S1	*Lyonia ferruginea*	Rusty lyonia
SC	G5	S1	*Lysimiachia hurida*	Land-leaf loosestrife
SC	G2G3	S?	*Macbridea caroliniana*	Carolina bird-in-a-nest
SC	G4G5	S	*Nyssa ogeche*	Ogeechee tupelo
SC	G3G4	S?	*Orbexilum lupinellum*	Sampson snakeroot; scurf pea
SC	G5?	SR	*Panicum neuranthum*	Needleleaf rosette grass
SC	G4?	SNR	*Physostegia leptophylla*	Slender-leaved dragon-head
SC	G4	S1	*Pinkneya pubens*	Hairy fever-tree
SC	G3	S?	*Plantago sparsiflora*	Pineland plantain
SC	G3G4	S2	*Platanthera integra*	Yellow Fringeless orchid
SC	G3	S1	*Polygala hookeri*	Milkwort
SC	G5	S1S2	*Polygala nana*	Dwarf milkwort
SC	G5	S?	*Potamogeton foliosus*	Leafy pondweed
SC	G2	S2	*Pteroglossaspis ecristata*	Crestless plum orchid
SC	G5?	S?	*Pycnanthemum nudum*	Pinelands mountain mint
SC	G5	S?	*Quercus myrtifolia*	Myrtle-leaf oak
SC	G3G5	S1	*Rudbeckia mollis*	Soft-hair coneflower
SC	G4	S2	*Sageretia minutiflora*	Tiny-leaved buckthorn
SC	G5T2	S?	*Sagittaria graminea* var. *weatherbiana*	Grassleaf arrowhead
FESE	G2	S2	*Schwalbea americana*	Chaffseed
SC	G4	S1S2	*Scleria baldwinii*	Baldwin nutrush
SC	G3	S?	*Spiranthes langilabris*	Giant Spiral ladies' tresses
SC	G3	SR	*Sporobolus floridanus*	Florida dropseed
SC	G4	S?	*Thalia dealbata*	Powdery thalia
SC	G5T4T5	SR	*Xyris difformis* var. *floridana*	Florida yellow-eyed grass
SC	G3G4	SR	*Xyris serotina*	Acid-swampy yellow-eyed grass

Table 3-13 and 3-14 shown below present a list of South Carolina's Rare, Threatened, and Endangered Species of Beaufort County. The list was obtained from the South Carolina Department of Natural Resources website at the following website: https://www.dnr.sc.gov/pls/heritage/county_species.select_county_map.

Table 3-17: South Carolina's Rare, Threatened, and Endangered Species of Beaufort County

Legal Status	Global Rank	State Rank	Scientific Name	Common Name
Vertebrate Animals				
FE/SE	G3	S3	*Acipenser brevirostrum*	Shortnose sturgeon
FT/ST	G3	S3	*Caretta caretta*	Loggerhead sea turtle
SE	G4	S2	*Haliaeetus leucocephalus*	Bald eagle
SC	G2	S?	*Heterodon simus*	Southern Hognose snake
SC	G5	S5	*Hyla avivoca*	Bird-voiced treefog
SC	G5	S?	*Kinosternon baurii*	Striped mud turtle
SC	G4G5	SNR	*Lasiurus intermedius*	Northern yellow bat
SC	G4	S4	*Limnothlypis swainsonii*	Swainson's warbler
FE/SE	G4	S1S2	*Mycteria americana*	Wood stork
Legal Status	**Global Rank**	**State Rank**	**Scientific Name**	**Common Name**
Vertebrate Animals				
SC	G3G4	S1	*Myotis austroriparius*	Southeastern bat
SC	G5	S3?	*Myotis lucifugus*	Little brown myotis
SC	G5	S3S4	*Neotoma floridana*	Eastern woodrat
SC	G5T5	S3S4	*Neotoma floridana floridana*	Eastern woodrat
SC	G4	S1S2	*Pelecanus occidentalis*	Brown pelican
SC	G5	SNA	*Phoca vitulina*	Harbor seal
SC	G5T4	S3S4	*Pseudotriton montanus flavissimus*	Gulf Coast mud salamander
SC	G5	S4	*Sciurus niger*	Eastern Fox squirrel
ST	G4	S3	*Sterna antillarum*	Least tern
FE/SE	G2	S1S2	*Trichechus manatus*	Florida manatee
Plants				
SC	G4G5	S1	*Aletris obovata*	White colicroot
SC	G4?	S1	*Asclepius connivens*	Large-flower milkweed
SC	G4	S2	*Asclepius pedicellata*	Savannah milkweed
SC	G4?	S4	*Canna flaccida*	Bandana-of-the-everglades
SC	G5	S2	*Carex basiantha*	Widow sedge
SC	G4G5	S2	*Carex hyalinolepis*	Shoreline sedge
SC	G4	S2	*Carya myristiciformis*	Nutmeg hickory
SC	G4	S1	*Cynanchum scoparium*	Leafless swallow-wort
SC	G4	S1	*Cyperus distinctus*	Marshland flatsedge
SC	G4	S1	*Cyperus tetragonus*	Piedmont flatsedge
SC	G4	S3?	*Epidendrium conopseum*	Green-fly orchid
SC	G3G4	S1	*Eriochloa michauxii*	Longleaf cutgrass
SC	G3G5	S1	*Eupatorium scabridum*	Rough thoroughwort
SC	G2	S1	*Forestiera godfreyi*	Godfrey's privet
SC	G4	S2	*Helianthemum georgianum*	Georgia frostweed
RC	G3G5	S1	*Ipomoea macrorhiza*	Large-stem morning-glory
FE	G2G3	S2	*Lindera melissifolia*	Pondberry
SC	G5	S2	*Lipocarpa micrantha*	Dwarf bulrush
SC	G3	S3	*Listea aestivalis*	Pondspice
SC	G5	S1	*Lyonia ferruginea*	Rusty lyonia
SC	G5?Q	S3S4	*Muhlenbergia filipes*	Bentgrass
SC	G4G5	S1	*Nyssa ogeche*	Ogeechee tupelo
SC	GNR	SNR	*Panicum webberianum*	A panicgrass

Table 3-18: South Carolina's Rare, Threatened, and Endangered Species of Beaufort County (continued)

Legal Status	Global Rank	State Rank	Scientific Name	Common Name
Plants				
SC	G4	S1	*Pinkneya pubens*	Hairy fever-tree
SC	G5	S1	*Psilotum nudum*	Whisk fern
SC	G4?	S1	*Quercus austrina*	Bluff oak
SC	G4	S1	*Rhapidophyllum hystrix*	Needle palm
SC	G5	S1S2	*Ruellia carolinensis* ssp. *Ciliosa*	Sandhills wild petunia
SC	G4	S2	*Sageretia minutiflora*	Tiny-leaved buckthorn
SC	G4	S?	*Thalia dealbata*	Powdery thalia
SC	G5T4T5	SR	*Xyris brevifolia*	Short-leaved yellow-eyed grass

KEY:

G RANK: The Nature Conservancy rating of degree of global endangerment:
G1 - Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction
G2 - Imperiled globally because of rarity or factor(s) making it vulnerable
G3 - Either very rare throughout its range or found locally in a restricted range, or having factors making it vulnerable
G4 - Apparently secure globally, though it may be rare in parts of its range
G5 - Demonstrably secure globally, though it may be rare in parts of its range
GH - Of historical occurrence throughout its range, with possibility of rediscovery
GX - Extinct throughout its range
G? - Status unknown
T# - Status of infraspecific taxa (subspecies or varieties). Rankings similar to G#.

S RANK: The Nature Conservancy rating of degree of state endangerment:
S1 - Critically imperiled state-wide because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation
S2 - Imperiled state-wide because of rarity or factor(s) making it vulnerable
S3 - Rare or uncommon in state, found only in a restricted range, or factors making it vulnerable
S4 - Apparently secure in state: Uncommon but not rare, and usually widespread
S5 - Secure: Common, widespread, and abundant
SA - Accidental in state (usually birds or butterflies that are far outside normal range)
SE - Exotic established in state
SH - Of historical occurrence in state, with possibility of rediscovery
SN - Regularly occurring in state, but in a migratory, non-breeding form
SR - Reported in state, but without good documentation
SX - Extirpated from state
S? - Rank not yet assessed.
Other Qualifiers:
B - Breeding
N - Non-breeding
? - Denotes inexact or uncertain numeric rank

LEGAL STATUS:
FE - Federal Endangered
FT - Federal Threatened
NC - Of Concern, National (unofficial - plants only)
RC - Of Concern, Regional (unofficial - plants only)
SE - State Endangered (official state list - animals only)
ST - State Threatened (official state list - animals only)
SC - Of Concern, State
SX - State Extirpated
DM - Delisted Taxon, Recovered, Being Monitored First Five Years
PE/PT/C- Proposed or candidate for federal listing

3.11 Cultural Resources

3.11.1 Definition of Resources

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, objects, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Cultural resources can be divided into two major categories: Prehistoric and Historic resources, and American Indian resources. Prehistoric and Historic resources include archaeological resources (prehistoric and historic) and architectural resources. American Indian resources are also known as traditional cultural properties.

Archaeological resources include any material remains of past human life or activities that are 100 years old or more and capable of providing scientific or humanistic understandings of past human behavior and cultural adaptation through the application of scientific or scholarly techniques (Archaeological Resources Protection Act (ARPA) of 1979, Section 3(I) 16 U.S.C. 470bb). For example, archaeological resources consist of sites, arrowheads, pottery sherds, or bottles. Architectural resources include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance (NPS 2002). Traditional cultural resources can include archaeological resources, buildings, neighborhoods, prominent topographic features, habitats, plants, animals, or traditional hunting and gathering areas that American Indians or others consider essential for the continuance of traditional cultures (NPS 1998). Savannah District is not aware of any identified traditional cultural properties located within the navigation channel or the dredged material disposal tracts; therefore, this category will not be discussed further in this EA.

Under the National Historic Preservation Act (NHPA) as amended, only cultural resources included in or eligible for inclusion on the National Register of Historic Places (NRHP), defined as ‘historic properties’, warrant consideration with regard to adverse impacts from a proposed action. Historic properties generally must be more than 50 years old to be considered for protection under the NHPA. To be considered eligible for the NRHP, cultural resources must meet one or more criteria as defined in 36 CFR 60.4 for inclusion on the NRHP. These criteria include association with an important event, association with a famous person, embodiment of the distinctive characteristics of a type, period, or method of construction, or the ability to contribute to scientific research. Resources must also possess integrity (i.e., its important historic features must be present and recognizable). Historic properties may be buildings, structures, historic districts, or objects.

Several other Federal laws and regulations have been established to manage cultural resources, including the Archaeological and Historic Resources Preservation Act of 1974, the ARPA of 1979, and the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990. In addition, coordination and consultation with Tribes must occur in accordance with the above laws and implementing regulations as well as the American Indian Religious Freedom Act (1978), Executive Order (EO) 13007, Sacred Sites; and EO 13175, Consultation and Coordination with Indian Tribal Governments.

3.11.2 Affected Environment

The area of potential effect (APE) for cultural resources includes areas located within Savannah District's portion of the AIWW where the proposed DMMP actions would occur. This would include activities such as dredging of navigation channels, actions related to the placement of the dredged material and construction of new access roads, construction staging areas and any other ground disturbing activities.

3.11.3 Prehistoric and Historic Resources

In order to provide a regional context and to assess whether resources could be encountered during implementation of the proposed DMMP actions, the prehistory and history of the South Carolina and Georgia coastal areas along with cultural resources that are known to occur in the general area are discussed briefly in the following section.

3.11.3.1 Paleoindian (12,000-8,000 BC)

Modern South Carolina and Georgia have been inhabited by humans since the end of the Pleistocene era nearly 12,000 years ago. The earliest known inhabitants are referred to as Paleoindians who were thought to be nomadic hunter-gathers organized at the band level of society. The Paleoindian artifact assemblage consists of fluted, lanceolate projectile points such as the Suwannee, Cumberland, Clovis and Quad. These points are typically made from quartz, quartzite, metavolcanic rock, Ridge and Valley chert, and Coastal Plain chert.

Paleoindian sites are more commonly found in the South Carolina interior regions; however, Paleoindian sites have been recorded in Beaufort County. Most of the sites in Beaufort County are located in river drainages or creeks with large floodplains. Paleoindian sites are generally found in Georgia's interior region.

3.11.3.2 Archaic Period (8,000 – 1,000 BC)

The Archaic is the most extended period of human occupation in South Carolina and Georgia. The period is divided into three distinct phases: Early (8,000 – 6,000 BC), Middle (6,000 – 4,000 BC) and Late (4,000 – 1,000 BC). Lifeways during the Archaic period were likely influenced by climate changes as groups adapted to changing sea levels and temperatures. The Archaic sub-periods are distinguished based upon projectile point typologies. Stone tools such as axes and adzes for woodworking, and mortars and grinding stones for food preparation, appear in the archaeological record. Ceramics do not appear until the Late Archaic period.

Early and Middle Archaic period sites are poorly represented in the South Carolina with Late Archaic sites being the most abundantly representative of this period. Stallings Island fiber-tempered ceramics and sand-tempered Thom's Creek are found in association with shell middens or rings as well as at non-midden sites.

Archaeological evidence of the earliest human occupation of the Georgia Coast and the barrier islands dates to about 4,000 years ago to the Late Archaic period (Alexander et al. 2008). Archaic populations exploited estuarine resources, particularly the Eastern oyster (*Crassostrea virginica*), and large shell-bearing sites, known as 'shell rings,' are commonly found dating to

this period. The single most diagnostic Late Archaic artifact is St. Simon's fiber-tempered ceramics in which plant material was added to the clay. Other common diagnostic artifacts include Savannah River stemmed points, net sinkers, steatite vessels, and shell ornaments.

3.11.3.3 Woodland Period (1,000 BC – AD 1,000)

During the Woodland period, many of the Late Archaic lifeways such as reliance on hunting and gathering activities and exploitation of estuarine resources, continued. As the period progressed, reliance on cultivation, especially corn, increased and burial practices became more elaborate especially in inland locations. In South Carolina settlements tended to be located in river valleys and marsh edges with sporadic occupation of the coastal areas. By the start of the Early Woodland period (1,000 - 300 BC), sea levels had dropped, possibly as much as 4 meters below present mean sea level. Many of the larger barrier islands of Georgia were not occupied or occupied less intensively than during the Late Archaic (Thompson and Turck 2010). Diagnostic lithic artifacts of the Early Woodland period include stemmed and triangular types and ceramics are represented by Refuge and Deptford pottery types which are sand-tempered rather than fiber-tempered.

In South Carolina coastal areas, Refuge and Deptford ceramic types continue into the Middle Woodland phase (400 BC – AD 500) and are commonly found in association with sand burial mounds. The archaeological record, as evidenced by large shell middens, indicates humans exploited the coastal and estuarine environment. Small, thin shell middens are found near shore while larger sites are often located near fresh water sloughs or marshes. Population on the larger barrier islands of Georgia increased during this period (Thompson and Turck 2010).

On the southeast Atlantic seaboard the Late Woodland (AD 500-1000) is considered to be a transitional period to the Early Mississippian. That may be a result of the fact that Late Woodland sites tend to be sparse. Grog-tempered ceramic wares such as Wilmington and St. Catherines phases and small straight-sided triangular points appear, the result of the invention of the bow and arrow, are commonly found at Late Woodland sites.

The practice of sand burial mounds is continued during the Late Woodland along the South Carolina coastal areas. In the Port Royal Sound area many Woodland period sites consist of relatively small shell middens composed almost entirely of oyster shell. Floral remains are absent, but Wilmington ceramic wares are often present. The sites are often found on marsh hammocks.

3.11.3.4 Mississippian Period (AD 1000 - 1550)

During the Mississippian Period more permanent settlements developed, and the material culture inventory and ethnographic accounts indicate a significant increase in social and religious practices. On the mainland of South Carolina and Georgia, the Mississippian Period is characterized by the construction of large temple mounds inside fortified villages. On the barrier islands, villages with smaller mound complexes are more commonly found (Alexander et al. 2008). At the Kenan Field site (9MC90), located on Sapelo Island, archaeologists located several mounds in addition to the remains of structures and a plaza. This archaeological evidence attests to a relatively high level of socio-political organization on the barrier island (Crook 1986).

Ceramic types found during the period are St. Catherine's (AD 1000-1150), similar to Wilmington ceramics, with smaller grog pieces as temper, Savannah (AD 1150- 1300) and Irene Phase (AD 1300-1550). Savannah Phase ceramics are similar to the earlier Catherine's ceramics, but are tempered with grit instead of grog. The Irene Phase represents the end of the late prehistoric period on the South Carolina and Georgia coasts. Ceramics are exclusively grit-tempered, but the decorative surface treatments change from the earlier Savannah Phase. Vessel rims can be quite ornate, with incising, burnishing, and complicated stamping all appearing on the vessel walls.

Site 39B927, located at the Marine Corps Air Station Beaufort, contained remains of the late Savannah phase (AD1000-1300) through Irene phase (AD1300-1550) and also included pits, and possible structures. Floral and faunal remains consisted of maize, hickory, acorn, shellfish, and sea catfish, which suggested summer through fall occupations as well as the use of cultivated and wild foods (Loubser et al. 2000).

Archaeological evidence from Sapelo Island, Georgia has shown that Irene Phase ceramics continued into the early historic period.

3.11.3.5 Historic Period (AD 1550 – present)

The Exploratory period in South Carolina begins with the arrival of Europeans in what is now South Carolina. The first Europeans to make contact with the aboriginal populations were the Spanish in 1526. The French made contact around 1562 and established Charlesfort on present day Parris Island. Contact with Europeans influenced Native American culture, especially pottery styles, and also introduced diseases and illnesses to the aboriginals.

During the Contact/Early Historic period in Georgia, aboriginal groups, namely the Guale, experienced first contact with European explorers and missionaries. The Spanish established missions along the coast near the Guale towns in an attempt to covert the native population to Christianity. Several coastal Guale towns were evacuated or abandoned as conflicts escalated between the Spanish and the English in the late 1600s. By the end of the seventeenth century all of these missions had been abandoned as the Spanish focused their attentions on Florida.

3.11.3.5.1 **South Carolina**

The Port Royal Sound area of modern day South Carolina was explored as early as the 1660s by William Hilton. His positive reports of the area encouraged the settlement of the area by a group of Scottish who established Stuart's Town on Port Royal Island in 1684. The town was wiped out by the Spanish within two years of settlement. At the same time, the Spanish drove the Yamasee from the Port Royal area.

In the 1690s both the English and Yamasee showed interest in colonizing the area around modern-day Beaufort and a charter for the town was received in 1711. After over a decade of fighting, the British finally drove the Yamasee out of the South Carolina region and eventually forced them to disperse and resettle with other tribes, namely the Seminole in Florida. The removal of the tribe increased English colonization efforts and in 1768 Beaufort District, one of seven judicial districts, was established. In 1785 the district was divided into four counties:

Granville, Hilton, Lincoln and Shrewsbury. Granville County included the present day counties of Beaufort, Hampton and Jasper. Agricultural staples of rice and cotton made the Beaufort District one of the wealthiest in the nation prior to the outbreak of the Civil War.

After the Civil War the economy in the Beaufort area shifted from cotton production to truck farming, timber and seafood. The twentieth century brought the creation of the Marine Corps Recruit Depot on Parris Island in 1915 and Naval Air Station (now Marine Corps Air Station) near Beaufort in 1946. Today the region is highly dependent on the tourist industry. Hilton Head and the City of Beaufort and surrounding areas are home to a large number of retirees.

3.11.3.5.2 **Georgia**

In 1733, James Oglethorpe arrived in what is now Savannah, to establish the Georgia colony for Great Britain. In May 1733, the Indians ceded all lands between the Savannah and Altamaha Rivers with the exceptions of Ossabaw, St. Catherines and Sapelo Islands and a small tract near Savannah to the Trustees of Georgia by means of the Articles of Friendship and Commerce Treaty. Shortly thereafter more colonists arrived and founded the town of Frederica on St. Simons Island. In addition to the town a defensive fortification, Fort Frederica, was constructed on the island to help protect against Spanish invaders from Florida.

Most of the land granted to the Georgia colonists during the 1750s and 1760s was located along the coast, either on the mainland or islands as plantations and farms were established to produce rice and other cash crops such as indigo and hemp. By 1760 all of the good coastal land between the Savannah and Altamaha rivers had been granted as far inland as the Indian boundary and more land was obtained from the Creek Indians to accommodate more settlers. In 1763 the Creeks ceded approximately 2,400,000 acres, which freed up coastal areas between the Altamaha and the St. Mary's rivers, plus some additional land behind the original coastal Indian cession. Sea Island cotton, first introduced to Georgia in 1786 grew best on the Sea Islands and on the interior mainland within 30 miles of the coast. Sea Island cotton was replaced by rice as the staple crop after the price of cotton declined in the 1820s. After the Civil War, industry and manufacture, particularly cotton mills in interior Georgia, and the turpentine industry near the coast, surpassed the production of cotton. Today tourism is one of the leading industries in coastal Georgia and the Sea Islands.

3.11.3.6 Status of Cultural Resource Inventories

As stated previously, the AIWW within Savannah District is situated between Port Royal Sound, South Carolina on the north and Cumberland Sound on the south, which is located on the Georgia/Florida border. The AIWW includes the counties of Beaufort in South Carolina and Chatham, Bryan, Liberty, McIntosh, Glynn, and Camden Counties, Georgia. The 161-mile section consists of a 24-mile section in South Carolina and 137 miles in Georgia. In addition to maintaining the navigation channel, the District has been deeded easements or rights-of way for 71dredged material disposal tracts of varying acreage totaling approximately 14,251 acres along the waterway. Approximately 817 acres (3 tracts) are located in South Carolina. Nearly 13,434 acres (68 tracts) are in Georgia.

Section 110 of the NHPA requires all federal agencies to inventory lands under their jurisdiction or control for cultural resources so the resources can be managed effectively. Savannah District

has conducted a reconnaissance level survey of selected portions of the AIWW channel and disposal tracts (Garrison and Tribble 1981). The survey identified 17 new and previously identified archaeological sites in South Carolina and Georgia. No state site forms were completed for the 17 locations and no official state site numbers were acquired for any of the locations. Eight of the site locations are unassociated with disposal tracts; three locations are noted as redeposited material (CRL-10-AIWW, CRL-11-AIWW and CRL-12-IWW), and two sites (CRL-01-AIWW and CRL-02-AIWW) are listed as within tract SC-3 (Beaufort Co, SC), but are actually located just north and east of the tract boundary. Only two locations, CLR-04-AIWW and CRL-16-AIWW, are located within disposal tracts. Tract 11-C, located near Skidaway Island, Georgia, is acquired through a land cut easement and no dredge material can be placed on the tract. Site CLR-04-AIWW is within Parcel B4, on Cumberland Island, Georgia. Additionally, the researchers conducted limited remote sensing in some of the reaches and identified targets that may be related to historic shipwrecks. No further investigations were conducted to determine National Register eligibility of these sites nor were any recommendations for investigations implemented.

The Savannah District portion of the AIWW consists of 36 operational reaches. Savannah District contracted with Panamerican Consultants, Inc. in 2012 to conduct a remote sensing survey of the navigation channel in 12 dredging reaches located in Georgia (James 2012). The reaches selected for investigation were those that have been and are most likely to be dredged.

The reaches included:

- St. Augustine Creek (AIWW Mile 577.4-578.2)
- Wilmington River (AIWW Mile 578.2-585.5)
- Hells Gate (AIWW Mile 600.8-602.4)
- Creighton Narrows (AIWW Mile 640-642.9)
- Doboy Sound (AIWW Mile 648.2-649.5)
- North River Crossing (AIWW Mile 649.5-651.4)
- Rockedundy River (AIWW Mile 651.4-652.7)
- South River (AIWW Mile 652.7-653.5)
- Little Mud River (AIWW Mile 653.5-656.4)
- Altamaha Sound (AIWW Mile 656.4-660.1)
- Buttermilk Sound (AIWW Mile 660.1-664.5)
- Jekyll Creek (AIWW Mile 680.9-685.9).

A total of 473 magnetic anomalies, 575 side scan sonar contacts and 156 subbottom features were identified during the survey. After review of the survey data combined with archival research, five anomaly clusters were considered to potentially represent significant historic cultural resources and four sonar contacts and two subbottom features were considered to potentially represent significant prehistoric cultural resources (Table 3-15).

Table 3-19: Potential Cultural Resources Selected for Diving Investigations

Target #	Location	Potential Target Type
M-378, M459, 494	St. Augustine Creek	Shipwreck/historic
SS Contact 200	Creighton Narrows	Shipwreck/historic
M244, 246, 250, SS-175	Doboy Sound	Shipwreck/historic
M150, 176	Altamaha Sound	Shipwreck/historic
M126, 53, 54, 96	Jekyll Creek	Shipwreck/historic
SS Contact 282	St Augustine Creek	Prehistoric
SS Contact 57	St Augustine Creek	Prehistoric
SS Contact 23	Creighton Narrows	Prehistoric
SB feature 7 and 20	Rockedundy, South and Little Mud River	Prehistoric
SB feature 49	Rockedundy, South and Little Mud River	Prehistoric
SS contact 41	Jekyll Creek	Prehistoric

The above targets were investigated by divers in June 2012. Magnetic anomaly cluster M-378, M-459, and M-494 correlated on maps with the location of a Civil War obstruction. Investigation of the cluster, however, revealed a large area of miscellaneous debris that included a solid 1ft ^{2} x 3 ft long piece of iron, a 3 ft x 3 ft metal plate, an iron rebar-reinforced concrete block and a large coil of wire rope. There was no evidence of a Civil War obstruction. The investigation of the remaining magnetic anomalies thought to represent shipwrecks or other historic sites were determined to be modern debris, were not relocated as the target source had been removed, or represented the hard clay bottom.

Four sonar contacts and two subbottom features were considered to potentially represent significant prehistoric cultural resources. Side scan Sonar Contacts 282 and 57 appear to be large paleolandscapes. Tree stump samples collected from the targets in the Wilmington River resulted in a date of 7300 +/-40 YBP (Years Before Present). No prehistoric cultural material was observed during diver investigation. Subbuttom Feature 7/20 was found to be a mound of several layers of oyster shell and gray clayey-silt. Sub-bottom feature 49 is similar to SB 7/20 but deeper and less complex. The features are located in Rockedundy and South Rivers. Side scan Contacts 23 was determined to be a large cluster of live oysters surrounded by mud and Side scan contact 41 were determined to modern dredging debris.

Archaeological Sites. A review of the GASF indicates that there is 1 recorded archaeological site located on the disposal tracts currently managed by Savannah District for dredged material placement in Georgia. The site is located within Parcel 4, which is on the southwest portion of Cumberland Island, Camden County, Georgia. There are several recorded sites within a .5 mile radius of tracts located in Chatham County, Camden County, McIntosh County, and Glynn County, but they will not be impacted by any proposed actions relating to the AIWW management. No recorded sites are recorded within the navigation channel in Georgia.

No NRHP listed archaeological sites are recorded for the tracts or navigation channel in South Carolina. Tract SC-3 lies within the boundary of the Daufuskie Island Historic District, which was amended in 1985 to include prehistoric and historic archaeological sites. Fourteen prehistoric sites and ten historic sites were considered to have potential to yield significant information about the past. None of the archaeological resources are located within SC-3.

A review of a comprehensive shipwreck inventory for the AIWW which is maintained by Ms. Judy Wood, US Army Corps of Engineers Archaeologist, retired, lists numerous shipwrecks lost within the waterway. No sites shipwreck sites from the inventory or from the GASF were recorded within the 12 dredging reaches that have been surveyed for cultural resources.
Architectural Resources. There are no recorded architectural resources such as buildings, structures or objects that have been determined eligible or of unknown NRHP status within the disposal tracts or the navigation channel in Georgia.

No NRHP listed sites are recorded for the tracts or navigation channel in South Carolina; however, Daufuskie Island Historic District, which encompasses the geographic entity of the island, includes SC-3. The historic district consists of 241 contributing properties comprised of folk houses, lighthouses and wooded tracts as well as other types of structures. Most of the structures were constructed between 1890 and 1930. The district was listed in the National Register in 1982 and is considered significant for architecture, military history, black history, and local history and illustrates a nearly three-century long history (1700-1930). There are no recorded historic properties within disposal tract SC-3.

American Indian Resources. An ethnographic overview study identified federally-recognized Tribes that are potentially associated with the Savannah District's Civil Works boundary, which consists of the Savannah River drainage (Coco 2009). These American Indian Tribes include: the Alabama-Coushatta Tribe of Texas, the Alabama-Quassarte Tribal Town of the Creek Nation of Oklahoma, the Catawba Indian Nation, the Cherokee Nation of Oklahoma, the Coushatta Tribe of Louisiana, the Eastern Band of Cherokee Indians, the Kialegee Tribal Town of the Creek Nation of Oklahoma, the Muscogee (Creek) Nation of Oklahoma, the Poarch Band of Creek Indians, the Seminole Tribe of Florida, the Seminole Nation of Oklahoma, the Thlopthlocco Tribal Town, and the United Keetoowah Band of Cherokee Indians of Oklahoma (Coco 2009). Currently, no Tribe has identified a property of traditional religious or cultural importance to Savannah District that may be located on any of the dredged material disposal tracts or in the navigation channel.

3.12 Esthetics

One of the most important attributes to Georgia residents is the relatively undisturbed scenic vista that is viewed when looking across Georgia's 400,000 acres of coastal marshes. Broad expanses of saltmarsh exist between developed high ground areas and the barrier islands. This broad vista is one of the highly enjoyed features of living in coastal South Carolina and Georgia. The tidal creeks that wind through those marshes also provide avenues for recreational users for the coastal area. Kayaking in these creeks has grown into a recreational activity that is enjoyed by many residents and visitors. Recreational power boating is another major activity in these waterways, and is discussed further in Sections 3.13 of this EA. Recreational fishing and shellfish harvesting is discussed in Sections 3.4.

Many of the formerly used disposal tracts along the Savannah District AIWW support a maritime forest-like plant community on the created uplands resulting from placement of dredged material in the past. The tracts that have not been used since the construction of the 12-foot channel in

the early 1940s support vegetation resembling that of the natural hammocks in the area. Tracts that have continued to receive dredged material until 1980 also support hammock-like vegetation on the created uplands. Tracts that are still used periodically for placement of dredged material do not support the same vegetation as the other tracts since deposition of dredged sediments and salt water kills back any terrestrial vegetation that might occur there.

Although the unconfined placement of dredged sediments has had adverse effects on saltmarsh tracts, the effects of building dikes around the perimeter of a disposal tract would have been significantly worse from an aesthetic point of view. Earthen dikes around a DMCA are kept bare of woody vegetation since tree roots would compromise the stability of the dikes. One respondent to the public scoping period for this EA expressed his organization's opposition, in part for aesthetic reasons, to constructing dikes around AIWW disposal tracts near the National Historic District on Jekyll Island (e-mail from B. Carswell, Jekyll Island Authority, May 21, 2012). The new DMMP would make maximum use of existing DMCAs, open water and ocean placement, and minimal use of existing saltmarsh tracts using geo-tubes (or other equivalent method) and would not proposed building dikes on saltmarsh tracts where there currently are none.

3.13 Recreational and Commercial Marine Traffic

3.13.1 Commercial Traffic

Data from the Waterborne Commerce Statistics Center shows commercial traffic on the Savannah District portion of the AIWW has dropped off dramatically since 2003 (Table 3-16). Table 3-17 shows the direction of the traffic using the waterway during those same years. Receipts is traffic that's destination was inside the Savannah District portion while Shipments is the traffic that originated inside the district. Intrawaterway traffic is the traffic that started on the AIWW and went to another waterway system such as the Lower Savannah River. Through traffic travels the entire 161 miles that make up the Savannah district portion of the AIWW.

Table 3-20: Short Tons of AIWW Commercial Traffic by Calendar Year in SAD Districts

District	2003	2004	2005	2006	2007	2008	2009	2010
Wilmington	971,249	1,495,924	1,909,883	1,936,262	1,797,517	2,149,202	1,881,527	2,225,402
Charleston	428,818	423,489	292,250	252,313	217,833	152,309	177,102	178,378
Savannah	303,457	303,859	240,490	159,950	147,158	184,507	150,585	116,663
Jacksonville	290,168	309,509	291,972	232,520	184,022	263,184	141,783	204,565

Table 3-21: Short Tons of AIWW Commercial Traffic by Year and Direction for Savannah District

Year	2003	2004	2005	2006	2007	2008	2009	2010
Receipts	40	0	0	0	0	0	0	0
Shipments	100	1	0	0	0	1,500	0	2,201
Intrawaterway	1,505	2	7,050	0	0	0	357	597
Through	301,812	303,856	233,440	159,950	147,158	183,007	150,228	113,865
All Traffic	303,457	303,859	240,490	159,950	147,158	184,507	150,585	116,663

Based on the 2010 data a total of 113,865 short tons of cargo traveled the entire 161 miles that make up the Savannah District's portion of the AIWW and into other districts portions. This is 18.3 million ton miles of cargo, while at its lowest point for cargo since 2003. In 2004 the AIWW was at its highest for cargo at 303,856 short tons and 48.9 million ton miles of cargo traversing the entire Savannah District.

3.13.2 Recreational Marine Traffic

Commercial and recreational fishing boats make extensive use of the waterway. These vessels, plus touring pleasure craft, make up the overwhelming proportion of waterway users. The total number of vessel trips (includes northbound and southbound movements of vessels) on the Georgia portion of the waterway for 2008 (the most recent year for which recreational use information is available) was 21,000.

The Carl Vinson Institute of Government at the University of Georgia conducted a study (Clarke et al. 2008) to determine the economic benefits of recreational boating on the Georgia portion of the AIWW and to determine the extent of loss that might result from a reduction in recreational boating caused by deterioration of the channel.

In recent years, the channel along the AIWW has deteriorated in many places due to insufficient dredging and maintenance. A summary of the results of data analysis from Clarke et al., 2008 is as follows:

- The AIWW serves as transportation infrastructure for coastal businesses and for the harbors at Savannah and Brunswick, where more than 26.1 million short tons of goods were handled in 2011.
- More than 24,000 commercial vessels use the AIWW between Virginia and Florida each year.
- Approximately 21,000 of Georgia's registered boaters with crafts 16 feet and longer used the Georgia portion of the AIWW in 2008.
- An estimated 1,871 out-of-state boaters used the AIWW in Georgia over the same period.
- Boaters took more than 137,000 outings on the AIWW in 2008.
- Boaters spent an estimated $213.2 million on those outings (2008).
- Boater spending could fall nearly $89 million if the AIWW channel continues to deteriorate.

- The total estimated economic impact of that reduction in spending is $124.5 million annually.
- More than 2,100 jobs with $54 million in personal income could be lost as a result of reduced use of the AIWW.
- Nearly $15 million in state and local government revenue (sales and property taxes and business licenses) could be lost due to reduced spending by boaters.

3.14 Socio-Economic Resources

3.14.1 Population

3.14.1.1 Georgia

Georgia has a population of 9,687,653 based on the 2010 US Census data. This was an increase of 18.3% from the 2000 census population of 8,186,453, which was an increase of 26.4% since the 1990 census. The coastal counties of Georgia (Chatham, Bryan, Liberty, McIntosh, Glynn, and Camden) had an estimated population of 502,986 in 2010, an increase of 14.6% from the 438,884 in 2000.

For the census tracts directly adjacent to the waterway or those the waterway goes through additional analysis was done. This analysis was to determine the makeup of the population near the AIWW using the 2010 American Community Survey 5-year Estimates. The results of this analysis is shown in the below by county and entire project area.

Table 3-22: Population Breakdown by Georgia County

County	Total Population	Minority	Under 18 yr of age	Over 65 yr of age
Bryan	9,483	22%	29%	6%
Camden	10,737	28%	28%	10%
Chatham	28,576	13%	19%	23%
Liberty	5,576	36%	17%	15%
McIntosh	13,817	40%	23%	16%
Glynn	18,127	13%	21%	18%
Project Area GA	86,316	25%	23%	15%

3.14.1.2 South Carolina

South Carolina had a population of 4,625,364 in 2010, increasing by 15.3% from 4,012,012 in 2000. The 2000 population also grew 13.1% since the 1990 census. The counties of Jasper and Beaufort, which are on the Savannah District portion of the AIWW, had a total population of 187,010 in 2010. This is an increase of 32.1% from the 141,615 according to the 2000 Census. For the census tracts directly adjacent to the waterway or those the waterway goes through additional analysis was done. This analysis was to determine the makeup of the population near the AIWW using the 2010 American Community Survey 5-year Estimates. The results of this analysis is shown in the below by county and entire project area.

Table 3-23: Population Breakdown by South Carolina County

County	Total Population	Minority	Under 18 yr of age	Over 65 yr of age
Beaufort	27,467	28%	18%	26%
Jasper	6,986	63%	28%	8%
Project Area SC	34,453	45%	23%	17%

4.0 Environmental Consequences of the Proposed Action

4.1 Geology and Sediments

Implementing the proposed DMMP would require the Corps to conduct sediment analyses prior to using open water and ocean placement of AIWW dredged sediments.

4.1.1 Sediments Proposed for Open Water Placement

The Corps would perform grain size analyses within reaches proposed for open water placement of dredged sediments. Only material that is 80% sand or greater would be placed in open water sites. Sediments that do not meet the 80% sand criterion would be placed within the existing impacted areas of saltmarsh disposal tracts, with geo-tubes or some equivalent confining method used to keep the dredged material from migrating off of the existing impacted area. Should this placement method prove infeasible, all of the material from these reaches would be placed in an ODMDS if MPRSA Section 103 sediment analysis allows.

4.1.2 Sediments Proposed for Placement in an ODMDS

The Corps would perform chemical analysis of any sediments proposed for placement in an ODMDS as required to meet the requirements of Section 103 of the MPRSA. Based on the lack of municipal and industrial development along most of the AIWW, and the results of Section 103 testing of Jekyll Creek sediments in 2003, the Corps believes that the AIWW sediments proposed for ODMDS placement are likely to meet the EPA criteria.

Based on these factors, the Corps believes that implementing the proposed DMMP would not result in major or significant adverse impacts to geology and sediments from placement of dredged sediments.

4.2 Water Resources

4.2.1 Groundwater

The AIWW channel is dredged to a maximum depth of 12 feet plus 2 feet of overdepth, and much of the 161 miles of the waterway in Savannah District is naturally that deep or deeper. In coastal South Carolina and Georgia, the surficial aquifer is generally 50-60 feet thick and the Upper Floridan aquifer upper limit is more than 100 feet below the surface; consequently, continuing to dredge portions of the existing channel is not expected to adversely impact either aquifer.

The existing DMCAs to be used for placement of dredged sediments from the AIWW are not lined, but are constructed on top of the soil substrate that was originally on the site. In most cases, soft organic soils supporting wetland vegetation previously covered the sites. Due to the unlined nature of the facility and the short-term ponding of water within the DMCAs, there is a potential for migration of water down through the soil layers to levels of shallow groundwater. Groundwater can be found at various depths in the project vicinity, while subsurface drinking

water is taken only from depths more than 100 feet below the surface. As described in Section 3.2 of this EA, clay lenses of 40 to 70 feet in thickness separate the various groundwater bearing strata. Those lenses effectively limit the depth to which migration could occur from the DMCAs.

Based on these factors, the Corps believes that implementing the proposed DMMP would not result in major or significant adverse impacts to groundwater from placement of dredged sediments.

4.2.2 Water Column

Effects on the estuarine water column would occur during the project dredging, construction, operation, and maintenance activities. Adverse effects resulting from dredging would potentially include alterations in current flow patterns, increased turbidity, and reductions in dissolved oxygen. The return response time to background turbidity levels would depend on tides, rainfall, and winds.

Results of water quality investigations by the Skidaway Institute of Oceanography (Windom, et al, 1974) indicate that the impacts of maintenance dredging using hydraulic dredges on the water quality in the area have little, if any, long-term detrimental effects. Hydraulic dredging of shoaled areas will cause a temporary increase in suspended solids and turbidity in the immediate vicinity of the dredged area (Biggs, 1967). This activity may cause some temporary impairment to the water quality of the surrounding waters and may cause impacts to the biota inhabiting the area. The increase in turbidity may cause fish and motile invertebrates to avoid the area temporarily.

Maintenance dredging is performed on the AIWW on an annual basis provided the work is funded. To minimize impacts to sea turtles, use of a hopper dredge would be restricted to December 15 – March 31 of any year. No time-of-year restrictions are proposed for using hydraulic cutterhead or mechanical dredges.

The number of times a particular reach is dredged during the 20-year life of the DMMP will depend on the shoaling rate in that reach. Many of the reaches along will only be dredged 1-2 times while other reaches will require no dredging.

Placement of dredged sediments into confined placement areas, whether existing DMCAs or confined geo-tube placement sites, would require the Corps to meet water quality standards for effluent exiting the placement areas.

Placement of dredged sediments into ODMDSs would be subject to EPA approval of the MPRSA Section 103 analyses and the SMMP for the sites.

Based on these factors, the Corps believes that implementing the proposed DMMP would not result in major or significant adverse impacts to either the estuarine or marine water column from placement of dredged sediments.

4.3 Air Quality

The ambient air quality for Chatham, Bryan, Liberty, McIntosh, Glynn, and Camden counties, Georgia; and Beaufort and Jasper counties, South Carolina has been determined to be in compliance with the National Ambient Air Quality Standards, and all counties have been designated as attainment areas (http://www.dot.state.ga.us/informationcenter/programs/environment/airquality/maps/Pages/default.aspx) (http://www.epa.gov/oaqps001/greenbk/ancl.html).

Adverse impacts to air quality stemming from the use of dredging equipment would be minimal in extent, temporary in nature, and distributed over 161 river miles of the AIWW. The total number of vessels using the AIWW would not change from continued maintenance of the AIWW. Since implementing the new DMMP is not expected to significantly increase the number of vessels or total cargo moving along the Savannah District AIWW, no changes to air quality would occur as a result of the action.

Therefore, over the 20-year life of the new DMMP, the proposed plan would not interfere with the area remaining in attainment of the NAAQS under Section 110 of the Clear Air Act.

Based on these factors, the Corps believes that implementing the proposed DMMP would not result in major or significant adverse impacts to air quality from placement of dredged sediments.

4.4 Marine and Estuarine Resources

4.4.1 Dredging Impacts

Dredging has the potential to adversely affect animals and plants in a variety of ways. These include actions of the dredging equipment (i.e., cutting, suction, sediment removal, hydraulic pumping of water and sediment, and noise); physical contact with dredging equipment and vessels (i.e., impact); and physical barriers imposed by the presence of dredging equipment (i.e., pipelines). Potential impacts vary according to the type of equipment used, the time period in relation to life cycles of organisms that could be affected, and the nature of the interaction of a particular species with the dredging activities.

The potential impacts of implementing the proposed DMMP on managed and unmanaged species of fish, shellfish, and invertebrates is discussed in more detail in the Essential Fish Habitat assessment report found in Appendix F of this EA.

4.4.1.1 Entrainment

Pipeline dredging consists of mechanical action of a rotating cutterhead to loosen bottom material and hydraulic action by a pump to transport it to the placement site. The transported sediment consists of a slurry of approximately 15-20 percent solids and 80 percent water, depending on the characteristics of the bottom sediment. The suction-velocity field or entrainment field will extend over only a small area in the vicinity of the cutterhead at the river bottom.

The biological effect of hydraulic entrainment has been a subject of concern for more than a decade, and a number of studies have been conducted nationwide to assess its impact on early life stages of marine resources, including larval oysters (Carriker et al., 1986), post-larval brown shrimp (Van Dolah et al., 1994), striped bass eggs and larvae (Burton et al., 1992), juvenile salmonid fishes (Buell, 1992), and Dungeness crabs (Armstrong et al., 1982). These studies indicate that the primary organisms subject to entrainment by hydraulic dredges are bottom-oriented fishes and shellfishes. The significance of this impact depends upon the species present; the number of organisms entrained; the relationship of the number entrained to local, regional, and total population numbers; and the natural mortality rate for the various life stages of a species.

A hydraulic dredge with a discharge pipe no larger than 30-inch diameter would be capable of transporting about 40,000 cubic yards of sediment per day, pumped as a slurry containing about 15 percent sediment by volume. The volume of water discharged would, thus, be about 226,700 cubic yards per day, or about 70 cubic feet per second (cfs).

Assessment of the significance of entrainment is difficult, but it is believed that the impact is minimal. The reasons for the expected low levels of impact include: (1) the very small volumes of water pumped by dredges relative to the total amount of water in the vicinity, thereby impacting only a small proportion of organisms, and (2) the extremely large numbers of larvae produced by most estuarine-dependent species. Since natural larval mortalities may approach 99 percent (Dew and Hecht, 1994; Cushing, 1988), entrainment by hydraulic dredges operating in the harbor should not pose a significant additional risk in most circumstances. Neither direct quantification studies nor modeling efforts have demonstrated population-level impacts due to larval entrainment by hydraulic dredges (Memorandum dated 8 August 1995 from Douglas Clarke, Ph.D., Coastal Ecology Branch, Waterways Experiment Station, Corps of Engineers, DOTS Request for Assistance).

Phytoplankton and zooplankton could be impacted through entrainment into a dredge. Phytoplankton concentrate near the surface of the water. Dredges typically remove water from the bottom of the channel, so no adverse impacts to phytoplankton are expected from entrainment. Depending on the species, zooplankton are generally scattered throughout the water column. Since they are widely dispersed and not concentrated on the bottom of the channel, no adverse impacts are expected to zooplankton from entrainment.

In light of these factors, implementing the proposed DMMP is not expected to substantially adversely affect impact fish or shellfish through direct entrainment or impacts to their feeding areas.

4.4.1.2 Dredge Plume Turbidity

Studies performed by Dr. D.F. Hayes in 1986 on a hydraulic cutterhead dredge operating in Savannah Harbor indicated that average suspended sediment concentrations within 1,600 feet of the dredge were generally raised less than 200 mg/l in the lower water column and less than 100 mg/l and 50 mg/l in the middle and upper water column, respectively. More recent data indicate that present-day dredging operations are conducted in ways that do not increase suspended sediment concentrations to such an extent. (USACE 2006, USACE 2009, and USACE 2011).

The Corps' 2011 report discussed the effects of maintenance dredging on turbidity and dissolved oxygen. One analysis focused upon data collected in 2007 –2009 when turbidity data were consistently collected both up-current and down-current of the operating dredge. The vast majority of data collected over those three years indentified little net effect of the dredging on suspended sediments in the Savannah River.

Hopper dredges may be used in dredging the AIWW in reaches where the material is to be placed in an ODMDS. Hopper dredge suction arms hydraulically remove sediment from the navigation channel and discharge the material into the storage hoppers on the dredge. In a typical hopper dredge operation, during filling, fine sediments (primarily silt, clays, and fine-sands) are washed overboard to maximize the load of coarse sediments transported to the placement site. This washing and overflow process is a source of turbidity plumes and sedimentation generated by the hopper dredge. The distance that sediment plumes may extend is dependent upon the type of dredge, how it is operated, currents, and the nature of the sediments within the excavation area. Elevated sediment levels from hopper dredge operations have been recorded at about 1,100 feet from an excavation site (Blair *et al*. 1990). Furthermore, according to Neff (1981 and 1985), concentrations of 1000 ppm immediately after discharge decreased to 10 ppm within one hour. The minimal impact of settling particles from hopper dredge turbidity plumes was further supported by a study from Pooptech (1982), which found that the initial hopper dredge overflow concentrations of 3,500 mg/l were reduced to 500 mg/l within 50 meters. Another source of turbidity and sedimentation from hopper dredges is through the deposition of their sediment loads at the placement sites.

Mechanical dredges could be used if hopper dredges are not available or practical. Turbidity would be generated when the full bucket travels through the water column to the surface and is empted into an adjacent barge. There are several shallow draft hopper dredges which could possibly be used in the Savannah District's portion of the AIWW; this type of dredge would allow the material to be taken directly to the ODMDS in lieu of having to use barges and dump scows. Regardless of the type of dredge used, the operator would not be allowed to overflow the vessel while traveling from the AIWW to the ODMDS.

Fish and shellfish species inhabiting the AIWW are adapted to, and highly tolerant of, naturally-elevated suspended sediment concentrations. In reviews of laboratory tests, Hirsch et al. (1978) and Stern and Stickle (1978) found marine and estuarine organisms to be very tolerant of the effects of sediment suspensions. Lethal or sub-lethal effects on larval or adult fish or shellfish occur after longer exposures to higher concentrations of suspended sediment than typically occur in the water column during dredging and sediment placement operations (Peddicord and McFarland 1978; Preist 1981).

The potential for interruption of the movement of estuarine fish and shellfish, particularly anadromous fishes, to and from nursery and spawning areas in the estuaries along the AIWW by the physical presence of dredging equipment or by the physical-chemical water quality alterations associated with dredging is an issue of concern. However, river currents or flows upon which larval organisms depend for transport will not be interrupted or reduced. Dredge-induced water quality conditions will only be short-term and impact a small cross-sectional area of these estuaries. Therefore, the potential for blockage of migration routes would be minimal.

The frequency of maintenance dredging should not be significantly different than what occurred in the AIWW during period when it was being regularly maintained.

In addition to entrainment, phytoplankton and zooplankton can be impacted by increases in suspended sediment concentrations and turbidity. Because of tidal currents, turbidity and suspended sediment caused by dredging will essentially be confined to the waterway down current of the dredge and will dissipate generally within 1,600 feet of the dredge (Payonk et al. 1988, Palermo et al. 1988, and McLellan 1989).

The existing navigation channel side slopes would not change with the maintenance dredging and, therefore, any shellfish harvest areas adjacent to the channel will not be impacted.

In light of these factors, implementing the proposed DMMP is not expected to result in more than minimal adverse impacts as a result of the dredge plume.

4.4.1.3 Dissolved Oxygen Concentrations During Dredging and Placement Process

In addition to the factors outlined above, dissolved oxygen levels in the AIWW are also of concern during the dredging and placement process. The dissolved oxygen regime in the AIWW is characterized by low levels of dissolved oxygen during the summer months. The Corps is required to monitor dissolved oxygen levels in the effluent from its sediment placement areas, as well as in the vicinity of its dredging operations. When dissolved oxygen levels fall to 3.0 mg/liter or less, the Corps is required to cease dredging operations unless a waiver is obtained. If the DMMP is approved and implemented, the terms of the new Section 401 Water Quality Certifications would be in effect. For both Georgia and South Carolina Georgia waters, that would include compliance with the 2009 dissolved oxygen standard.

4.4.1.4 Loss of Benthic Resources During Dredging

Maintenance dredging in the Georgia portion of the AIWW appears to have short-lived impacts on benthic organisms inhabiting the silty-clay sediments (Stickney and Perlmutter, 1974). Complete or near-complete removal of benthos is effected by dredging, although recovery begins within a month following dredging operations. Both diversity and species composition rapidly return to their pre-dredging levels. Since most of the areas to be dredged are composed substantially of silty material, the impacts on benthic infauna at other areas are expected to reflect the above-mentioned phenomena. In areas where overboard placement methods are to be used, the impacts and recovery of benthic organisms are also expected to follow this pattern.

Zooplanktons are primarily filter feeders, and suspended inorganic particles can foul the fine structures associated with the feeding appendages. Zooplankton that feed by ciliary action (e.g., echinoderm larvae) would also be susceptible to mechanical affects of suspended particles (Sullivan and Hancock 1977). Zooplankton mortality is assumed from the physical trauma associated with dredging activities (Reine and Clark 1998), such as changes in water pressure and temperature during the dredging process. Planktonic flora and fauna would be partly restored in the area as tidal and river currents pass through the area.

Benthic fauna most directly affected by dredging would include predominantly invertebrates such as decapod crustaceans, mollusks, shrimps, polychaetes, and bivalves. In locations outside the project

area that are temporarily affected by changes in water quality, adverse effects on the benthic community would be minimal due to the relatively short period of recovery time needed (Culter and Mahadevan 1982, Saloman and Naughton 1984). Recovery periods would potentially be extended if normal hydraulic and dissolved oxygen levels in the vicinity are significantly affected by dredging activities.

Although a temporary loss of benthic communities would result from implementing the proposed DMMP, the long-term effect on this resource would be minimal.

4.4.1.5 Noise Associated with Dredging

The noise generated from a hopper dredge is similar to a cutterhead suction dredge except there is no rotating cutterhead. The majority of the noise is generated from the dragarm sliding along the bottom, the pumps filling the hopper, and operation of the ship engine/propeller. Like the cutterhead suction dredge, the noise ranged from 70 to 1,000 Hz and peaked at 120 to 140 dB (Clarke et al 2002). These results from Clarke et al are preliminary and have not been published.

The noise generated from a mechanical dredge entails lowering the open bucket through the water column, closing the bucket after impact on the bottom, lifting the closed bucket up through the water column, and emptying the bucket into an adjacent barge. Once the barge is full, it would be towed by a tug offshore and emptied into the ODMDS. According to discussions with Doug Clarke and Charles Dickerson, US Army Engineer Research and Development Center the maximum noise spike with mechanical dredges is when the bucket hits the bottom. All other noises from this operation (i.e., winch motor, spuds, etc.) are insignificant. The sediment within the Savannah District AIWW is predominantly sand/silt/mud mixture. No rock, gravel, or cobbles are located within the portion of the navigation channel to be maintained. According to the Clarke et al (2002), the peak amplitude for the bucket hitting the rocky, gravel, cobble bottom at Cook Inlet, Alaska was about 120 dB. Both Doug Clarke and Charles Dickerson, US Army ERDC stated that this peak amplitude of the bucket hitting the existing sand/silt/mud substrate of Savannah Harbor would be significantly less than 120dB. Since the substrate of the AIWW is also a sand/mud/silt mixture, noise levels during dredging with a mechanical dredge is expected to be similar.

In light of these factors, implementing the proposed DMMP is not expected to result in more than minimal adverse impacts as a result of noise.

4.4.1.6 Lighting During Construction

Dredge plants and associated tugs and barges are required to meet Corps, US Coast Guard, and Occupational Safety and Health Administration (OSHA) lighting standards for safety. Because the AIWW is located inshore from barrier island beaches, lights on vessels dredging the AIWW would not disturb nesting sea turtles or hatchlings.

4.4.2 Sediment Placement Impacts

4.4.2.1 Open Water Placement

As requested by the Georgia Department of Natural Resources, material placed in the open water placement sites at Hells Gate and in Altamaha Sound and Buttermilk Sound will have a

sand content of 80% or greater. Material with a high sand content settles very quickly, and consequently, this material would tend to stay in the placement site.

The Corps believes that the placement of sediment in open water sites at Hells Gate and in Altamaha Sound and Buttermilk Sound would not result in any long-term adverse impacts to the benthic communities or the recreational and commercial shellfish harvesting leases in the area.

Effluent Turbidity
The turbidity in effluent from diked sediment placement is controlled by adjustable spillways (aka weirs). The current Water Quality Certification for Savannah Harbor DMCAs requires monitoring of the dewatering discharge weekly when discharge is occurring at a rate of 0.1 cfs or greater. Savannah District imposes a 500 mg/l limit on suspended solids in the diked placement area discharges, and would apply this limit to discharges from the DMCAs at Savannah Harbor 14-B, 9-A, Andrews Island, and the confined placement sites at tracts 15-A, 15-B, and 42-B. This limit is believed to be sufficient to reduce turbidity impacts in the receiving waters to acceptable levels.

Based on this factor, no significant adverse impacts from turbidity during sediment placement operations are expected from implementation of the DMMP.

4.4.2.2 Hardbottoms
Of special concern in the offshore area are hardbottoms, which are localized areas, not covered by unconsolidated sediments where the ocean floor is hard rock. Hardbottoms are also called "live bottoms" because they support a rich diversity of invertebrates such as corals, anemones and sponges, and are refuges for fish and other marine life. They provide valuable habitat for reef fish such as black sea bass, red porgy, and groupers. Hardbottoms are also attractive to pelagic species such as king mackerel, amberjack, and cobia. Hardbottoms are not abundant along the Georgia coast.

Designation of new ODMDSs and expansion of the Brunswick ODMDS to receive sediment from the AIWW would require, among other investigations, a survey of the propose dump site for presence of hardbottoms. Although not expected, should the surveys indicate possible presence of hardbottoms, the Corps will coordinate with NMFS at that time.

Based on these factors, no significant adverse impacts to hardbottom communities are expected from implementation of the proposed DMMP.

4.4.2.3 Artificial Fishing Reefs
GADNR lists 5 artificial reefs in the general vicinity of the Savannah and Brunswick ODMDSs and the potential locations of two new ODMDSs proposed in the DMMP. Turbidity plumes may be produced by placement of the dredged sediment within the existing ODMDSs as fine sediments are washed away by littoral processes. Potential effects of the new ODMDSs on artificial reefs would be assessed in the EISs that would be prepared for these sites.

SCDNR lists no artificial reefs near the Savannah District portion of the AIWW in South Carolina.

4.4.2.4 Gray's Reef National Marine Sanctuary (NMS)

Gray's Reef NMS is located approximately 40 nautical miles southeast of Savannah and 17 nautical miles east of Sapelo Island, in about 60 to 70 feet of water. The two new ODMDSs proposed in the DMMP would be located approximately 5-7 nautical miles offshore, 10-12 nautical miles inshore from Gray's Reef. Designation of new ODMDSs would require preparation of a separate Environmental Impact Statement, which would address potential impacts to Gray's Reef NMS. One requirement of EPA's approval of a new ODMDS is that it not adversely affect a National Marine Sanctuary.

4.4.2.5 Sapelo Island National Estuarine Research Reserve (NERR)

Sapelo Island NERR is located on the western side of Sapelo Island and includes 2,100 acres of upland and 4,000 acres of saltmarsh centered on Duplin River. The Reserve is bordered on the west by a portion of the AIWW (Old Teakettle Creek and Doboy Sound reaches) that does not require dredging. No placement sites proposed for use in the DMMP are located near the Sapelo NERR.

4.5 Essential Fish Habitat

The Corps evaluated the project impacts on Essential Fish Habitat. The Corps believes that with the mitigation plan in place, the proposed action is not expected to cause adverse impacts to Essential Fish Habitat or EFH species, including fish accessibility to habitat. Impacts are expected to be minor on an individual project and cumulative effects basis. The Essential Fish Habitat analysis is found in Appendix F of this EA. The NMFS is reviewing the AIWW EFH evaluation and will provide comments.

4.6 Invasive Species

As discussed in Chapter 3.7, the introduction of non-native or invasive species can have detrimental effects on an ecosystem. Invasive species have been introduced into new areas through the discharge of ballast water from deep-draft vessels. However, the vessels transiting the AIWW and the dredges that would be used to maintain the channel are not ocean-going vessels and would not be expected to introduce aquatic invasive species via ballast water. E.O. 13112, Invasive Species, charges the Federal government with not authorizing, funding, or implementing actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

USACE and the U.S. Department of Agriculture (USDA) have a compliance agreement requiring measures to prevent the spread of certain plant pests that may be present in the soil (ER-110-1-5. 1984. Plant Pest Quarantined Areas and Foreign Soil Samples). Major portions of the southeastern states are in a quarantine area for such pests, including the red imported fire ant (*Solenopsis invicta*). The Savannah District's dredging contracts contain special provisions requiring the contractors to "thoroughly clean construction equipment and tools at the previous job site in a manner that ensures that these implements are free from residual soil, eggs deposits

from plant pests, noxious weeds, and plant seeds." Similar measures would be included in contracts involving the AIWW.

The proposed implementation of a new DMMP is not expected to increase the spread of aquatic invasive species via ballast water. Special conditions in dredging and dike maintenance contracts would reduce the risk of spreading plant pests, noxious weeds, and plant seeds.

4.7 Terrestrial Resources

Several environmental resources exist along or near the Savannah District AIWW which deserve special recognition and are special resources of concern as described in Section 3.7. Actions which could impact those areas may affect multiple resources, such as water quality, wetlands, aquatic species, benthic communities and wildlife. The resources which warrant special concern include the Tybee National Wildlife Refuge, Gray's Reef National Marine Sanctuary, Sapelo Island National Estuarine Research Reserve, and the Savannah Harbor dredged material containment areas.

4.7.1 Tybee National Wildlife Refuge

The Tybee National Wildlife Refuge consists of 400-acres of wetlands and low diked islands. Some of the Jones/Oysterbed Island DMCA is located within this Refuge. AIWW sediments would be deposited within the DMCA if Savannah Harbor DMCA 14-B becomes unavailable. The Jones/Oysterbed Island DMCA is routinely used for the deposition of sediments dredged from Savannah Harbor. No adverse impacts are anticipated.

4.7.2 Gray's Reef National Marine Sanctuary (NMS)

Gray's Reef NMS is located approximately 40 nautical miles southeast of Savannah and 17 nautical miles east of Sapelo Island, in about 60 to 70 feet of water. The two new ODMDSs proposed in the DMMP would be located approximately 4-6 miles offshore, 10-15 miles inshore from Gray's Reef. Designation of new ODMDSs would require preparation of a separate Environmental Impact Statement, which would address potential impacts to Gray's Reef NMS. One requirement of EPA's approval of a new ODMDS is that it not adversely affect a National Marine Sanctuary.

4.7.3 Sapelo Island National Estuarine Research Reserve (NERR)

Sapelo Island NERR is located on the western side of Sapelo Island and includes 2,100 acres of upland and 4,000 acres of saltmarsh centered on Duplin River. The Reserve is bordered on the west by a portion of the AIWW (Old Teakettle Creek and Doboy Sound reaches) that does not require dredging. No placement sites proposed for use in the DMMP are located in these reaches.

4.7.4 Confined Placement of Fine-Grained Sediments

Disposal tracts along the AIWW that have been used for placement of dredged sediments have upland islands consisting of coarse-grained dredged sediments. These created uplands have been subjected to periodic disturbance by having dredged sediments placed on them, some as recently as 2009. These tracts are not as valuable to wildlife as natural hammocks due to this repeated deposition of dredged sediments within the tracts. Trees present include red cedar, the invasive French tamarisk (*Tamarix gallica*), sugarberry (*Celtis laevigata*), chinaberry (*Melia azedarach*), and loblolly pine. A few tracts have the invasive Chinese tallow tree (*Triadica sebifera*) present. Shrubs commonly include groundsel, sea ox-eye (*Borrichia frutescens*) and pokeweed (*Phytolacca americana*). Grasses include big cordgrass, smooth cordgrass, black needlerush, and salt-grass (*Distichlis spicata*).

The proposed action would include placing fine-grained dredged material from the AIWW into undiked saltmarsh disposal tracts but with the material confined to portions of the tracts already impacted by past placement of dredged material. Deposition of sediments within the tracts would adversely impact the created terrestrial habitats within the tracts but not beyond what has occurred as a result of prior deposit of dredged material. Use of these created uplands for dredged material placement would result in the death of upland vegetation in areas affected by dredged material, and consequently the degradation of habitat for wildlife. However, the disposal tracts that would be used should the proposed DMMP be implemented are located near other similar formerly used disposal tracts that would remain unaffected. The overall availability of created uplands as wildlife habitat along the AIWW would not be significantly reduced. In the proposed DMMP, use of confined placement in undiked disposal tracts would result in impacts to approximately 33 acres of created upland, representing 10% of the created uplands in disposal tracts along the AIWW.

4.7.5 Dredged Material Containment Areas (DMCAs)

The proposed action would include placing dredged material from the AIWW into existing DMCAs at Savannah Harbor 14-B, Tract 9-A (Wilmington River at Thunderbolt), Andrews Island (Brunswick Harbor), and the Navy's Tract 1700-L/Big Crab Island. The proposed action would not adversely impact the useful life of the DMCAs. Deposition of sediments within the DMCAs would not adversely impact terrestrial habitats within the DMCAs beyond what has received prior approval.

Within the DMCAs and previously impacted portions of undiked tracts receiving confined placement, expected impacts to flora and fauna would be similar and are as follows:

4.7.5.1 Flora

As a result of dredged sediment deposition, the DMCAs and confined placement sites can be expected to continue to support mixed early-successional stage plant communities within diked or otherwise confined areas. These communities will probably be dominated by the following species, which are common in the diked placement areas in the region today:

A. *Baccharis halimifolia* (Grounsel-tree)
B. Tamarisk (salt cedar)
C. *Phragmites australis* (common reed)
D. *Aster subulatus* (annual saltmarsh aster)
E. *Xanthium sturmarium* (cocklebur)
F. *Heterotheca subaxillaris* (golden aster)

The impacts of dredge pipeline across marsh or other vegetation to reach the placement areas should be short-term and minor. The vegetation should quickly recover following pipeline removal.

When dikes are constructed or rebuilt, heavy equipment such as bulldozers, backhoes and draglines are used. The DMCAs have upland access; therefore, temporary earth loading and unloading ramps from barges would not be needed to get the heavy equipment to the sites.

When geo-tubes or equivalent confinement methods are used in undiked disposal tracts, heavy equipment capable of being barged to the tract would be used to place the geo-tubes where needed. If access to the placement site across wetlands is necessary, measures would be taken (use of movable wooden mats, etc.) to minimize impacts of moving equipment on and off the site. Any unavoidable impacts to saltmarsh would be mitigated.

The Corps will use Best Management Practices as defined by the SC Department of Health and Environmental Control and Georgia Environmental Protection Division to control stormwater and erosion when dikes are raised.

Use of these created uplands for dredged material placement would result in the death of upland vegetation in areas covered by dredged material, and therefore would alter the flora of these sites. The flora in these tracts could recover following a dredging event, but these tracts are located in reaches that would require dredging every 3 years, so recovery would be set back periodically. However, the disposal tracts that would be used should the proposed DMMP be implemented are located near other similar formerly used disposal tracts that would remain unaffected.

Therefore, no long term adverse impacts to the flora on the DMCAs are expected. While the flora on the five undiked tracts proposed for confined placement would be affected, the overall flora of nearby similar tracts would be unaffected.

4.7.5.2 Fauna

The impacts associated with the proposed action on the fauna which inhabit the DMCAs and confined placement sites would be minimized to the maximum extent feasible. The DMCAs that would be used by the AIWW are used in the regular maintenance of the harbors at Savannah, Brunswick, and King's Bay. Work on these DMCAs take place on a recurring basis. The fauna should quickly recover following any dike work or dredging activity. No adverse long-term impacts are anticipated. Undiked disposal tracts that would receive AIWW dredged material have done so in the past, and any fauna inhabiting these tracts should quickly recover following

any dredging activity. The species found to be using these tracts are mobile and could leave the areas during the dredging activity, and could return after the activity ceases.

Dredged sediment placement sites that receive a high percentage of fine materials (silts and clays), have the potential to become mosquito breeding habitat. As the sediment dries and compacts, it forms a network of cracks, extending from the surface down to a depth of nearly one foot. The sides of these cracks are used as attachment sites for mosquito eggs. In the past, there have been several instances of nuisance mosquito outbreaks from the DMCA placement areas located along the northern bank of the Savannah River.

Management recommendations for mosquito surveillance and control on the DMCAs was prepared by Chatham County Georgia and Jasper County, South Carolina, the Georgia Department of Transportation, and the Corps of Engineers (USACE 1996). The recommendations include surveillance, surface water management, and chemical and biological control measures. The Corps has funded mosquito control activities at the DMCAs, and that funding is expected to continue in the future.

4.7.5.3 Migratory Birds

Many species of migratory birds use the Savannah Harbor's confined upland placement sites, including DMCA 14-B. A variety of species of birds are regularly observed in the scrub/brush habitat that surrounds the DMCAs. That habitat is present to some degree on other uplands throughout Chatham and Jasper Counties. However, the existing DMCAs provide unique habitat in the Project area for certain species of migratory birds. These sites provide nesting habitat for a limited number of migratory bird species, but those species include some of special concern such as Least tern, Black-necked stilt, and Wilson's plover. Many other species of birds use the DMCAs outside the breeding season, some in high numbers.

To a much lesser extent, migratory birds are believed to be using the created uplands within the undiked marsh tracts that would receive confined placement of AIWW dredged material. Evidence of roosting and nesting was noted in many of the tracts during 1983 and 2011 assessments (USACE 1983, 2011). Use of these created uplands for dredged material placement would result in the death of upland vegetation in areas affected by dredged material, and consequently the loss of habitat for migratory birds. However, the disposal tracts that would be used should the proposed DMMP be implemented are located near other similar formerly used disposal tracts that would remain unaffected. The overall availability of created uplands as migratory bird habitat along the AIWW would not be significantly reduced. By discontinuing the use of the remaining disposal tracts, the proposed DMMP would allow approximately 296 acres of created upland in 42 tracts along the AIWW to retain their value to migratory birds. In the proposed DMMP, use of confined placement in undiked disposal tracts would result in the loss of up to 33 acres of habitat for migratory birds (created upland), representing 10% of the created uplands in disposal tracts along the AIWW.

These birds using these DMCAs and created uplands within undiked marsh tracts for feeding, loafing, and nesting areas will continue to use them during the sediment placement for the AIWW maintenance. During construction activities, not all of the DMCAs would be used at the same time. The work on these DMCAs will be sequential (one or two at a time, out of the six)

depending on the order of work. With the management approach that Savannah District has adopted, the DMCAs are managed to provide bird habitat during sediment placement operations. `Water is ponded in the DMCAs to provide feeding and loafing areas. The ponded DMCAs are used by shorebirds, waterfowl, herons, egrets, ibis, wood stork, gulls, and terns. The ponded water also isolates the bird nesting islands constructed within the DMCAs. Once a DMCA has temporarily ceased being used for sediment placement, it would be dried and the site would then provide terrestrial habitats for birds. The Corps would continue to implement the measures described above to ensure its use of the harbor DMCAs do not adversely impact migratory birds.

Based on these factors, the Corps believes that implementing the proposed DMMP would not result in major or significant adverse impacts to any of the terrestrial resources identified in Section 3. 7 of this EA.

4.8 Wetlands and Floodplains

4.8.1 Wetlands

4.8.1.1 Impacts

Implementing the new DMMP would result in the future loss of 37.5 acres of saltmarsh as a result of placement of dredged material into existing impacted portions of three disposal easements that have been used in the past. The DMMP proposes to use confining methods to contain dredged material to be placed in five existing impacted saltmarsh tracts. The Corps believes that no additional impacts outside the existing impacted portions of these tracts would result from confined placement there; however, should the confining methods prove to be insufficient and additional impacts do occur, the Corps would provide the appropriate compensatory mitigation.

4.8.1.2 Mitigation

Unavoidable adverse impacts to wetlands could be mitigated through three types of actions: (1) purchase of credits from approved freshwater and saltmarsh wetland banks, (2) use of in-lieu-fee mitigation, and (3) providing funds to preserve and/or restore saltmarsh. An additional action, releasing disposal easements on a number of tracts, would not directly mitigate for wetland impacts, but indirectly would encourage restoration of these tracts by a third party in the future.

At present, there are no approved tidal wetland mitigation banks within the Savannah District that could provide credits for the AIWW. Savannah District does not have an approved in-lieu-fee program.

Under its proposed mitigation plan for the AIWW DMMP, the Corps would provide funds to a land trust or state resource agency for the purpose of restoration of saltmarsh. As with an in-lieu-fee program, the receiving entity would be responsible for selecting, designing, implementing, and monitoring the restoration sites. The Corps would as a result of this plan transfer its obligation to provide compensatory mitigation to the receiving entity. The amount of funds to be provided by the Corps would be calculated at $10,000 per acre for 37.5 acres of saltmarsh in the impacted portions of five undiked marsh disposal tracts for the expected future impacts if the DMMP is implemented. Funds would be provided in the amount of $375,000.

Details of the anticipated wetland impacts and proposed mitigation can be found in Section 4.15 of this EA.

4.8.2 Floodplains

No new dredged material placement areas (except for two new ODMDSs) are being planned for the proposed DMMP and maintenance of the AIWW. All dredged material would be placed either in the existing upland DMCAs, in existing saltmarsh tracts and open water sites, or within offshore EPA-approved ODMDSs.

The proposed project would not adversely impact floodplains in the project area since the Corps is not planning to develop any area within the 100-year floodplain. The height of hurricane storm surges on the floodplains would also not be measurably affected by maintenance of the existing 12-foot AIWW channel.
Therefore, the Corps believes that implementing the proposed DMMP would not significantly increase hurricane storm surges in the project area, and floodplains in the project area will not be adversely impacted.

4.9 Threatened and Endangered Species

USACE, Savannah District prepared a biological assessment (BATES) evaluating the potential impacts of the proposed action on endangered and threatened species. USACE, Savannah District has made a determination based on the biological assessment that the project, as currently proposed, would have "no effect" on the Red-cockaded woodpecker, American chaffseed, Pondberry, Canby's dropwort, Kirtland's warbler, Bachman's warbler, Eastern indigo snake, Altamaha spinymussel, and Flatwoods salamander; "may affect, but is not likely to adversely affect" Wood stork; Piping plover; West Indian manatee; North Atlantic right, humpback, and sperm whales; leatherback, loggerhead, Kemp's ridley, hawksbill, and green sea turtles; Shortnose and Atlantic sturgeons. The District further determined that the action "may affect, but is not likely to adversely affect", critical habitat for Piping plover (Georgia Units 1-16; South Carolina Units 12-15) or North Atlantic right whale (Southeastern United States Critical Habitat Area).

The biological assessment appears in Appendix B, and discusses the relationship of the proposed action to these species.

4.9.1 US Fish and Wildlife Service Findings

[will add USFWS findings when available]

4.9.2 National Marine Fisheries Service Findings

[will add NMFS findings when available]

4.10 Cultural Resources

For cultural resources, the threshold for significant impacts includes any disturbance that cannot be mitigated and affects the integrity of a historic property (i.e., a cultural resource that is eligible for the National Register of Historic Places (NRHP]). The threshold also applies to any cultural resource that has not yet been evaluated for its eligibility to the NRHP or disturbs a resource that has importance to a traditional group under American Indian Religious Freedom Act (AIRFA), EO 13007, and NAGPRA.

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may be the result of physically altering, damaging, or destroying all or part of a resource, altering characteristics of the surrounding environment by introducing visual or audible elements that are out of character for the period the resource represents, or neglecting the resource to the extent that it deteriorates or is destroyed. Indirect impacts are those that may occur as a result of the completed project, such as increased vehicular or pedestrian traffic in the vicinity of the resource.

The Area of Potential Effects (APE) has been defined as the AIWW navigation channel, existing DMCAs, upland containment areas to be acquired, borrow areas, haul routes, access roads, construction staging areas, and open water placement sites and ODMDSs. Actions anticipated within the APE would consist of dredging in the channel; removal of dredged material; placement of dredged material; and construction of new upland DMCAs, dikes on existing DCMAs, roads, and staging areas.

4.10.1 General Effects

The new DMMP examines several types of management strategies including: 1) construction of dikes on existing unconfined marsh disposal tracts; 2) confined placement in impacted portions of existing saltmarsh tracts; 3) construction of new DMCAs; 4) unconfined open water placement; and 5) the use of the Savannah and Brunswick ODMDSs; 6) and the creation of two new ODMDSs. For the new upland and marsh DMCAs, a 10-ft dike would be constructed in two phases.

Some of these options are the same as those of the No Action/Without Project alternative; others represent options of the With Project Condition or alternatives. The Preferred Alternative will likely include features of several of these options based on practicability and expected environmental impacts.

In all alternatives, including the No Action, cultural resources investigations would be required to inventory and evaluate cultural resources under Section 106 of the National Historic Preservation Act. To date only the 12 dredging reaches listed in Section 4.10.2.2.1 and the two existing ODMDSs have been intensively surveyed for cultural resources. None of the disposal tracts have been intensively surveyed, although portions of them have been used, either during the initial construction of the 12-foot channel in the early 1940s, subsequent maintenance of the channel, or both. The draft DMMP identifies existing disposal tracts that would be used for dredged material placement, several of which have unused or unimpacted acreage.

Approximately 2,100 acres of the existing saltmarsh disposal tracts remain unused or unimpacted by previous dredging operations and could potentially be investigated for cultural resources if the tracts remain under perpetual easement. Table 4-1 lists the different draft DMMP options and all cultural resources investigations that would be required for each.

Potential damaging effects to cultural resources are possible under all alternatives, including the No Action Alternative/Without Project A or B. Impacts to cultural resources could result from activities which include:

- Soil Disturbance
- Soil Compaction
- Rut Formation
- Damage to above ground structures and features
- Visual Impacts
- Vandalism and Looting

Soil disturbing activities have the potential to destroy stratigraphy and site integrity which could adversely affect a site's National Register of Historic Places eligibility. Soil disturbing activities associated with the DMMP alternatives and the No Action alternative include actions such as, but not limited to, borrow of material to construct dikes, construction of new roads, construction staging areas, maintenance of existing roads, and vehicular traffic.

Soil compaction caused by placement of dredged material, construction vehicle traffic, dredge pipes and construction of new dikes have the potential to destroy site integrity resulting in adversely affecting the site's potential to yield specific data that addresses important research questions.

Driving heavy machinery and placing dredge pipe on top of archaeological sites could cause ruts to form. Ruts could potentially cause artifacts to become exposed, erode soil and cause overall damaging effects to the site's depositional integrity affecting its potential to yield significant data to build upon the region's history or prehistory.

Damage to above ground structures and features could occur from vehicular traffic associated with construction and dredging, dredge pipe and increased pedestrian traffic related to these activities. Alterations to the features or structures could impact the design and feeling of the site.

Visual impacts caused by creation of dikes, large areas of exposed surface, presence of large-scale equipment, machinery and vehicles, and placement of dredged material have the potential to alter the associated landscape, topography and physical environment which could potentially affect the setting and feeling of sites, especially historic period sites.

Archaeological and historic sites have the potential to be impacted by unauthorized removal of artifacts or vandalism as a result of human access to previously inaccessible areas (resulting in lost opportunities to expand scientific study and educational and interpretive uses of these resources).

The District is in the process of coordinating a Programmatic Agreement (PA) with the Georgia and South Carolina State Historic Preservation Offices (SHPOs), interested federally recognized tribes and the Advisory Council on Historic Preservation to comply with Section 106 of the NHPA. The PA will ensure the District is in compliance with Section 106 of the National Historic Preservation Act as it will address how the AIWW channel and associated placement sites (existing and new) will be surveyed for cultural resources, how sites will be evaluated for the National Register of Historic Places and how determinations of effect will be made. Minimally surveys of the dredging reaches and placement sites that will be used will be necessary. Surveys will be conducted as funding becomes available. Significant cultural resources should be avoided if possible. If that preservation method is not an option then mitigation will be conducted in compliance with 36 CFR Part 800 and the PA.

4.10.2 Specific Effects

4.10.2.1 No Action Alternative/Without Project Condition A and B

Without Project Condition (A) and (B) differ only in that (A) does not include wetland mitigation for impacts that are expected to occur in the future, and (B) does. Continued maintenance of the AIWW under the No Action Alternative/Without Project (A) or No Action Alternative/Without Project (B) has the potential to affect cultural resources that may be located within the channel or in the placement area where material will be placed. The No Action Alternative continues management of the AIWW dredged material in placing the material in previously diked placement areas (existing DMCAs). Also as part of the without project condition the Corps would continue to hold all perpetual easements on the existing tracts.

Surveys conducted in 2012 revealed that even with maintenance dredging which has been ongoing since the 1940s, the potential for the existence of cultural resources in the channel remains. Twelve of the 36 reaches were surveyed for submerged cultural resources resulting in the recordation of a large paleolandform, identified by the presence of tree stumps, in the St. Augustine Creek-Wilmington River reaches and two mounded features with stratified shell deposits in the Rockedundy and South River areas. The landform in the St. Augustine Creek-Wilmington River reaches would have been dry land nearly 7,300 years ago and suitable for human occupation or use . As the landform is located at a depth between 20 and 28 feet, and the AIWW channel dredging would only disturb the bottom to a depth of 14 feet (the authorized channel depth plus 2 feet over-dredging), it should be possible to avoid this area when dredging. In the event that the dredging activities will interfere, additional work would be required to further investigate the landform. Two mounded, stratified features were identified in the Rockedundy and South River areas. If they cannot be avoided, further work will be required. No other cultural resources or areas of concern were identified in the remaining 9 reaches. Cultural resources surveys should be conducted in the remaining 24 reaches to identify and evaluate sites. Once the sites have been evaluated it will be possible to determine the effects of the maintenance activities on the specific resources.

No intensive cultural resources investigations have been conducted of the disposal tracts. While some of the tracts already contain dredged material, many acres remain that have not been

impacted by placement of materials. Consultation with the Georgia and South Carolina SHPOs and any federally interested tribes will be conducted to develop survey strategies for the disposal tracts, assuming they remain under perpetual easement. Significant cultural resources should be avoided if possible. If avoidance is not an option then mitigation will be conducted before the tract can be used in compliance with 36 CFR Part 800.

Placement of dredged material in a previously approved open–water sites will have no effect on cultural resources.

The areas proposed for the creation of two new ODMDSs would be surveyed using remote sensing techniques followed by diver investigation of anomalies, if necessary, to identify and evaluate historic properties. Significant cultural resources should be avoided if possible. If avoidance is not an option then mitigation will be conducted before the tract can be used in compliance with 36 CFR Part 800.

4.10.2.2 Proposed Actions and Alternatives Evaluated in Draft DMMP

As discussed in Chapter 2, dredged materials management strategies evaluated for those reaches that will require dredging include: 1) existing dredged material containment areas (DMCAs), 2) new upland DMCAs, 3) new saltmarsh DMCAs, 4) confined placement in existing undiked saltmarsh disposal tracts, 5) approved open-water placement sites, 6) existing ODMDSs, 7) new ODMDSs. Some of these options are the same as those of the No Action/Without Project alternative; others (new upland DMCAs, new ODMDSs) represent options of the With Project Condition. For the new upland and marsh DMCAs, a 10-ft dike height served as the basis for the proposed acreage needed for the DMCA. For new marsh DMCAs, the 10-ft dike is assumed to be placed around the perimeter of the easement to create the DMCA, unless a different design is specified in the DMMP.

4.10.2.2.1 *Dredging Operational Reaches*

The June 2012 remote sensing survey of 12 operational reaches of the AIWW in Georgia resulted in the recordation of a paleolandform in the St. Augustine Creek dredging reach and stratified mound features in Rockedundy and South Rivers.
Dredging scheduled for the following reaches will have no effects on cultural resources as none were located during the survey.

- Wilmington River (AIWW Mile 578.2 – 585.5)
- Hells Gate (AIWW Mile 600.8-602.4)
- Creighton Narrows (AIWW Mile 640-642.9)
- Doboy Sound (AIWW Mile 648.2-649.5)
- North River Crossing (AIWW Mile 649.5-651.4)
- Little Mud River (AIWW Mile 653.5-656.4)
- Altamaha Sound (AIWW Mile 656.4-660.1)
- Buttermilk Sound (AIWW Mile 660.1-664.5)
- Jekyll Creek (AIWW Mile 680.9-685.9).

The landform discovered at the junction of St. Augustine Creek and Wilmington River contains sediments that could potentially contain evidence of use by prehistoric groups as the landform

would have been exposed, dry land almost 7300 years ago. The landform was identified by the presence of four tree stumps, one measuring almost 3 feet in diameter. A tree root was collected during the dive investigations that provided a radiocarbon date of 7,300 +/- 40 years before present. The feature is located at between 20 feet and 28 feet which indicates it could be avoided by potential project impacts. If the area cannot be avoided additional investigation such as investigation by multi-beam sonar or remotely operated underwater vehicle to search for evidence of human activity would be required.

The mounded features containing stratified shell deposits found in Rockedundy and South Rivers are located at relatively shallow depths on the edge of the channel Right-of-Way and would be impacted if the reach were dredged. Additional investigation such as sampling or dating should be conducted prior to any activities in the area to determine their significance for the National Register of Historic Places.

Should dredging activities occur in any of the 24 operational reaches that have not been surveyed, a cultural resources investigation consisting of archival research, shipwreck database search, remote sensing and diver investigations must be conducted prior to ground disturbing activities. Results from the June 2012 cultural resources investigations have verified that even though many of the operational reaches have been dredged numerous times from 1942 to 1980, historic and prehistoric archaeological site potential still exists in these areas.

4.10.2.2.2 *Use Existing Dredged Material Containment Areas*

The DMMP identifies several reaches for which placement of dredged material into existing DMCAs is the preferred option. DMCA 14-B located in Jasper County, SC, is part of the Savannah Harbor Federal Navigation Project and is proposed to be used for the Savannah Harbor Expansion Project (SHEP). The area has been previously investigated. There would be no effects to cultural resources where this area used for dredged material from the AIWW.

Dredged material from three reaches would be placed in the existing diked portion of Tract 9-A (DMCA 9-A) located in Wilmington River at Thunderbolt in Chatham County, GA. DMCA 9-A (26 acres) is used by marinas in Thunderbolt but must maintain 130,000 cubic yards (CY) of placement capacity for the Federal project. No cultural resources survey of the tract has been conducted to date and no known archaeological sites have been recorded. DMCA 9-A has been completely impacted by placement of dredged material. No cultural resources investigations would be required.

The portion of the AIWW crossing St. Simons Sound is dredged as part of the Brunswick Harbor Federal Navigation Project and placed in the Andrews Island DMCA, which is located in Glynn County, Georgia. No cultural resources survey would be needed of these areas.

Material dredged in the Cumberland River to Cumberland Sound reach will be placed in diked Tract 1700-L (Big Crab Island) under terms of a license between the Corps and the Navy. Navy owns the tract. The tract is located in Glynn County, GA. This tract is referred to as Parcel B2-3 in the 1976 EIS. No survey information has been located regarding this area. As the Navy owns this parcel, if no previous archaeological investigations have occurred and if the tract contains areas that have not been impacted by placement of dredged material, the Corps will

obtain an Archaeological Resources Protection Act (ARPA) permit to survey the area from the Navy. Methods to investigate the area for cultural resources will be developed in consultation with the Georgia SHPO and any interested federally recognized tribes. Should any significant sites be discovered, avoidance would be the preferred preservation method. However, should that not be a feasible option, a mitigation plan would be developed in consultation with the Georgia SHPO and any interested federally recognized tribes.

4.10.2.2.3 *Construction of New Upland Dredged Material Containment Areas (DMCAs)*

Using this placement option would require the acquisition of upland tracts and the creation of upland dredged material containment areas for placement of materials. These DMCAs would require 10-foot high dikes. Two tracts located in Bryan and McIntosh Counties, GA are under evaluation for suitability. The tracts range in size from 100-350 acres, are undeveloped and privately owned with pine as the main vegetation. Cultural resources investigations will be required to locate and evaluate resources if the tracts have not been previously surveyed. Sites located on these tracts could potentially be impacted by soil disturbance and compaction, and formation of ruts.

In addition to the upland tracts, all access roads, construction staging areas and any areas where overland dredge pipe may be laid will require investigation.

4.10.2.2.4 *Construct Saltmarsh Dredged Material Containment Areas*

Some options in the draft DMMP identify several existing dredged material containment areas on previously used marsh disposal tracts that would be diked for use. Modification would entail constructing dikes around the perimeter of the easements an initial 6 feet and then raising to the target height on at least 11 disposal easements. To date no intensive cultural resources investigations have been conducted on any of the disposal tracts. Investigations of the tracts, access roads, and borrow and construction staging areas would be required to identify and evaluate cultural resources. Placement of dredged material on top of a cultural resource would have the potential to adversely impact the resource. In some cases limited portions of the disposal easements have been impacted by previous placement of dredged material, while other tracts have been used extensively. Methods for investigating the areas would be developed in consultation with the Georgia and/or South Carolina SHPO and any interested federally recognized tribes. Avoidance would be the preferred method of preservation for any significant cultural resource; however, if that option were not feasible, mitigation would be required before the disposal tract could be used.

4.10.2.2.5 *Open Water Placement Sites*

Four reaches contain sediments that would be suitable for open water placement of the dredged material. A distinct water placement site would be used for each of the four reaches. Those sediments classified as sand (i.e., coarse) would continue to be dredged using the open water technique while those classified as sand and silts (i.e., fines) would be placed into undiked marsh disposal tracts using geo-tubes or an equivalent technology to confine the dredged material to the existing impacted portion of the tracts.

At present the following areas are being considered for open water placement of coarse material (at least 80% sand):

- Hells Gate: North and South sides of Raccoon Key
- Altamaha Sound: Dump Area 32 and 34
- Buttermilk Sound: Dump areas 43 and 44

No surveys of the previously used open water placement sites would be required. No cultural resources would be impacted if all placement actions occurred within the areas previously used areas.

4.10.2.2.6 *Existing Ocean Dredged Material Disposal Sites*

Savannah District has 2 approved ODMDSs: Savannah ODMDS (4.26 sq nautical mi) and Brunswick ODMDS (2 sq nautical mi). The Savannah ODMDS was approved for use by the EPA in 1983. The Brunswick ODMDS was approved for use by EPA in January 1989. No cultural resources investigations would be necessary if either of these sites was used. No cultural resources would be impacted if all placement actions occurred within the delineated boundary of the respective ODMDS.

4.10.2.2.7 *Designate New Ocean Dredged Material Disposal Sites*

The DMMP proposes the creation of 2 new ODMDSs. One would be located off Sapelo Sound, the other would be situated off Altamaha Sound. Both are expected to cover approximately 3,600 acres and are located in McIntosh and Glynn counties, GA, respectively. Cultural resources investigations would be required to locate and evaluate historic properties in accordance with 36 CFR Part 800. Investigations would likely entail archival research, remote sensing, diver investigation of targets and preparation of a final technical report. Field methods and results would be coordinated with the GA SHPO and any interested federally-recognized tribes. Avoidance of identified resources would be the preferred historic preservation option, however, were that not feasible, mitigation would be conducted before the site became operational.

Table 4-1: Cultural Resources Actions Required by Option

Dredging Reach	Reach Surveyed in 2012 (Y/N)	Placement Site Option 1	Option 1 Cultural Resources Work Required	Placement Site Option 2	Option 2 Cultural Resources Work Required	Placement Site Option 3	Option 3 Cultural Resources Work Required
Port Royal to Ramshorn Creek	N	DMCA 14-B	Survey Reach	N/A	N/A	N/A	N/A
Ramshorn Creek, SC	N	DMCA 14-B	Survey Reach	Beach Placement	Survey Reach and beach if necessary	N/A	N/A
New River	N	No Previous Dredging Required; DMCA 14-B if needed	Survey Reach	N/A	N/A	N/A	N/A
Walls Cut	N	DMCA 14-B	Survey Reach	N/A	N/A	N/A	N/A
Fields Cut, SC	N	DMCA 14-B	Survey Reach	N/A	N/A	N/A	N/A
Elba Cut - McQueens Cut	N	DMCA 14-B	Survey Reach	N/A	N/A	N/A	N/A

Dredging Reach	Reach Surveyed in 2012 (Y/N)	Placement Site Option 1	Option 1 Cultural Resources Work Required	Placement Site Option 2	Option 2 Cultural Resources Work Required	Placement Site Option 3	Option 3 Cultural Resources Work Required
St. Augustine Creek	Y (paleo-landform)	DMCA 14-B	Avoid paleolandform	N/A	N/A	N/A	N/A
Wilmington River	Y (paleo-landform)	DMCA 14-B	Avoid paleolandform;	N/A	N/A	N/A	N/A
Skidaway River	N	No Dredging History; diked portion of Tract 9-A if needed	Survey Dredging Reach	N/A	N/A	N/A	N/A
Skidaway Narrows	N	No Dredging History; diked portion of Tract 9-A if needed	Survey Dredging Reach	N/A	N/A	N/A	N/A
Burnside River to Hells Gate	N	No Dredging History; diked portion of Tract 9-A if needed	Survey Dredging Reach	N/A	N/A	N/A	N/A
Hells Gate	Y	Open Water (coarse); confined tracts 15-A and 15-B (fines)	Survey unused portions of tracts 15-A (approx 51.05 ac) and 15-B (approx 35.14 ac)	Savannah ODMDS	N/A	N/A	N/A
Hells Gate to Florida Passage	N	Savannah ODMDS	N/A	No Previous Dredging Required; Diked Tract 16-A if needed	Survey dredging reach and any unused portions of Tract 16-A	N/A	N/A
Florida Passage	N	New ODMDS @ Sapelo Sound	Survey Dredging Reach and new ODMDS location	New 100-acre Upland DMCA	Survey dredging reach and new tract, haul and access roads, construction staging and borrow areas	Dike Tract 16-A (New DMCA)	Survey dredging reach and unused portions of Tract 16-A
Bear River	N	New ODMDS @ Sapelo Sound	Survey Dredging Reach and new ODMDS location	New 100-acre Upland DMCA	Survey dredging reach and new tract, haul and access roads, construction staging and borrow areas	Dike 17-A (New DMCA)	Survey dredging reach and unused portions of Tract 17-A
St. Catherine's Sound - North Newport River	N	New ODMDS @ Sapelo Sound	Survey Dredging Reach and New ODMDS location	No Previous Dredging Required; Diked Tract 19-A if needed	Survey of dredging reach and unused portions of Tract 19-A (approx. 85.02 ac) and borrow areas, access roads, construction staging areas	N/A	N/A

Dredging Reach	Reach Surveyed in 2012 (Y/N)	Placement Site Option 1	Option 1 Cultural Resources Work Required	Placement Site Option 2	Option 2 Cultural Resources Work Required	Placement Site Option 3	Option 3 Cultural Resources Work Required
North Newport River	N	New ODMDS @ Sapelo Sound	Survey Dredging Reach and New ODMDS location	No Previous Dredging Required; Diked Tract 19-A if needed	Survey of dredging reach and unused portions of Tract 19-A (approx. 85.02 acres) and borrow areas, access roads, construction staging areas	N/A	N/A
Johnson Creek	N	New ODMDS @ Sapelo Sound	Survey Dredging Reach and new ODMDS location	Dike Tract 19-A (new DMCA)	Survey of dredging reach and unused portions of Tract 19-A (approx. 85.02 acres) and borrow areas, access roads, construction staging areas	N/A	N/A
Sapelo Sound - Front River	N	New ODMDS @ Sapelo Sound	Dredging Reach and new ODMDS location	New 350-acre Upland DMCA	Survey dredging reach and new 350- acre tract and access roads, construction staging areas, etc.	New DMCAs on 24-A, 25-C, 25-E	Survey dredging Reach and unused portions of Tracts 24-A (114.06 ac), 25-C (99.83 ac), 25-E (11.71 ac)
Front River	N	New ODMDS @ Sapelo Sound	Survey new ODMDS location	New 350-acre Upland DMCA	Survey dredging reach and new 350- acre tract and access roads, construction staging areas, etc.	New DMCAs on 24-A, 25-C, 25-E	Survey dredging reach and unused portions of Tracts 24-A (114.06 ac), 25-C (99.83 ac), 25-E (11.71 ac)
Creighton Narrows	Y	New ODMDS @ Sapelo Sound	Survey new ODMDS location	New 350-acre Upland DMCA	Survey new upland tract only	New DMCAs on 24-A, 25-C, 25-E	Survey unused portions of tracts 24-A (114.06 ac), , 25-C (99.83 ac), 25-E (11.71 ac)

Dredging Reach	Reach Surveyed in 2012 (Y/N)	Placement Site Option 1	Option 1 Cultural Resources Work Required	Placement Site Option 2	Option 2 Cultural Resources Work Required	Placement Site Option 3	Option 3 Cultural Resources Work Required
Old Teakettle Creek	N	New ODMDS @ Sapelo Sound	Survey dredging reach and new ODMDS location	New 350-acre Upland DMCA	Survey dredging reach and new upland tract	New DMCAs on 24-A, 25-C, 25-E	Survey unused portions of tracts 24-A (114.06 ac), , 25-C (99.83 ac), 25-E (11.71 ac)
Doboy Sound	Y	New ODMDS @ Altamaha Sound	Survey new ODMDS location	New 350-acre Upland DMCA	Survey new upland tract and associated access roads, construction staging and borrow areas	N/A	N/A
North River Crossing	N	New ODMDS @ Altamaha Sound	Survey new ODMDS location	Brunswick ODMDS	N/A	N/A	N/A
Rockedundy River	Y	New ODMDS @ Altamaha Sound	Survey new ODMDS location	Brunswick ODMDS	N/A	N/A	N/A
South River	Y	New ODMDS @ Altamaha Sound	Survey new ODMDS location	Brunswick ODMDS (22 mi)	Survey dredging reach	Dike Tract 30-A (New DMCA)	Survey dredging reach and unused portions of Tract 30-A
Little Mud River	Y	New ODMDS @ Altamaha Sound	Survey new ODMDS location	Brunswick ODMDS	N/A	Dike Tract 32-A (New DMCA)	Survey unused portions of Tract 32-A
Altamaha Sound	Y	New ODMDS @ Altamaha Sound	Survey new ODMDS location	New ODMDS @ Altamaha Sound	Survey new ODMDS location	N/A	N/A
Buttermilk Sound	Y	Open Water Sites 43and 44 (coarse); undiked Tract 42-B	Survey unused portions of Tract 42-B	N/A	N/A	N/A	N/A
Mackay River	Y	No Dredging History; Andrews Island DMCA if needed	Survey of dredging reach	N/A	N/A	N/A	N/A
Frederica River	Y	No Previous Dredging; Andrews Island DMCA if needed	Survey of dredging reach	N/A	N/A	N/A	N/A
St. Simon Sound	N	Dredged as part of Brunswick Harbor Navigation Project		N/A	N/A	N/A	N/A
Jekyll Creek	Y	Brunswick ODMDS	N/A	Dike Tract 52-A	Survey of unused portions of Tract 52-A associated access roads, construction staging and borrow areas	N/A	N/A

Dredging Reach	Reach Surveyed in 2012 (Y/N)	Placement Site Option 1	Option 1 Cultural Resources Work Required	Placement Site Option 2	Option 2 Cultural Resources Work Required	Placement Site Option 3	Option 3 Cultural Resources Work Required
Jekyll Creek to Cumberland River	N	No Previous Dredging Required; Brunswick ODMDS if needed	Survey of dredging reach	N/A	N/A	N/A	N/A
Cumberland River to Cumberland Sound	N	Diked Placement in Tract 1700L (Crab Island)	Survey of dredging reach and Tract 1700L	N/A	N/A	N/A	N/A
Cumberland River to Cumberland Sound	N	Dredged by the Navy	N/A	N/A	N/A	N/A	N/A

4.10.2.2.8 *Relinquishment of Disposal Tract Easements*

In the 1940s the Federal Government obtained perpetual easements from private and public land-owners for the tracts used for dredge material placement in both Georgia and South Carolina. Many of the tracts obtained for dredged material placement have never been used and the DMMP discusses the use of less than half of the current tracts. As there are no plans at this time to utilize the other tracts, Savannah District is considering relinquishing the easements to the owners. The easements would total 2,372.8 acres. Discussions with the Georgia and South Carolina SHPOs have determined that this action would not be considered an undertaking under Section 106 of the National Historic Preservation Act and no cultural resources surveys would be required.

4.11 Esthetics

Broad expanses of saltmarsh exist between developed high ground areas and the barrier islands. This broad vista is one of the highly enjoyed features of living in coastal Georgia. The tidal creeks which wind through those marshes also provide avenues for recreational users for the coastal area. Kayaking in those creeks has grown into an activity that is enjoyed by many residents and coastal visitors. Recreational power boating on the AIWW is discussed in sections 3.12 and 4.12 of this EA. Recreational fishing and shellfish harvest is discussed in sections 3. 4 and 4. 4.

Many of the formerly used disposal tracts along the Savannah District AIWW support a maritime forest-like plant community on the created uplands resulting from placement of dredged material in the past. The tracts that have not been used since the construction of the 12-foot channel in the early 1940s support vegetation resembling that of the natural hammocks in the area. Tracts that have continued to receive dredged material until 1980 also support hammock-like vegetation on the created uplands. Tracts that are still used periodically for placement of dredged material do not support the same vegetation as the other tracts since deposition of dredged sediments and salt water kills back any terrestrial vegetation that might occur there.

Although the unconfined placement of dredged sediments has had adverse effects on saltmarsh tracts, the effects of building dikes around the perimeter of a disposal tract would have been significantly worse from an aesthetic point of view. Earthen dikes around a DMCA are kept bare of woody vegetation since tree roots would compromise the stability of the dikes. One respondent to the public scoping period for this EA expressed his organization's opposition, in part for aesthetic reasons, to constructing dikes around AIWW disposal tracts near the National Historic District on Jekyll Island (e-mail from B. Carswell, Jekyll Island Authority, May 21, 2012).

The new DMMP would make maximum use of existing DMCAs, open water and ocean placement, and minimal use of existing saltmarsh tracts using geo-tubes (or other equivalent method) and would not propose building dikes on saltmarsh tracts where there are none. Based on these factors, the Corps believes that implementing the proposed DMMP would not result in major or significant adverse impacts to esthetics from placement of dredged sediments.

4.12 Recreational and Commercial Marine Traffic

The proposed action for the AIWW projects continued maintenance has no effect on the depth of the channel and therefore should have no impact on the traffic that uses the channel. Based on these factors, the Corps believes that implementing the proposed DMMP would not result in major or significant adverse impacts to recreational and commercial marine traffic from placement of dredged sediments.

4.13 Socio-Economic Resources

The proposed action for the AIWW projects continued maintenance has no effect on the population or economic infrastructure in the project area. The recommended sites either use existing DMCAs, disposal easements, or take the material offshore to designated ocean placement sites. Thus the plan allows for continued full maintenance of the waterway and the impacts thereof.

No adverse effects on employment, tax, and property value are expected from the implementation of the proposed DMMP.

4.14 Environmental Justice and Related Executive Orders

4.14.1.1 Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Implementing the preferred DMMP would affect the entire 161-mile length of the Savannah District AIWW. Any adverse effects would be minimal in scope and relatively evenly distributed along the waterway. Population density along most of the Savannah District AIWW is extremely low, with the exception of Hilton Head Island, SC; Chatham County, GA; and northern Glynn County, GA (2010 US Census data). These areas of higher population density are not disproportionately low-income or minority communities. Minority or low-income populations do not recreate on the AIWW in disproportionate numbers. The proposed new DMMP preferred alternative would not produce adverse effects to property values in low-income or minority communities. The proposed new DMMP only uses existing placement areas and open water and off-shore ocean placement of dredged material. For these reasons, implementing of the new DMMP would not produce disproportionately high and adverse effects on human health or environmental impacts in minority or low-income communities. Therefore, implementing the new DMMP complies with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations".

4.14.1.2 Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks"

Implementing the preferred DMMP would affect the entire 161-mile length of the Savannah District AIWW. Any adverse effects would be minimal in scope and relatively evenly distributed along the waterway. Population density along most of the Savannah District AIWW is extremely low, with the exception of Hilton Head Island, SC; Chatham County, GA; and northern Glynn County, GA (2010 US Census data). The area affected by the DMMP does not include facilities (schools, daycare centers, etc.) where children would congregate. Children do

not recreate on the AIWW in disproportionate numbers. Implementing the new DMMP would not result in a disproportionate risk or environmental impact to children that result from environmental health or safety risks within the meaning of Executive Order 13045; therefore, this alternative complies with Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks".

4.15 Mitigation Planning

4.15.1 Framework

From a broad perspective, mitigation planning consists of the following three major steps:

- Avoid Impacts
- Reduce Impacts
- Replacement/Compensation

The Corps began developing its proposed new DMMP with environmental compliance as a major driver. The expected environmental impacts of the new DMMP were considered as the preferred plan was being developed. These impacts include those resulting from the dredging itself and those resulting from placement of the dredged sediments. Of these two categories, the primary driver was sediment placement. Placement methods considered during the development of the DMMP included 1) use of existing upland DMCAs, 2) purchase of high ground for creation of new upland DMCAs, 3) creation of new upland DMCAs by constructing dikes on existing saltmarsh disposal easements, 4) use of geo-tubes or similar technology to confine dredged sediments to existing impacted portions of saltmarsh disposal easements, 5) open water placement of coarse sediments (sand), use of existing ODMDSs , 6) designation of new ODMDSs, and 7) to continue unconfined saltmarsh placement in places where it might be the least environmentally damaging placement method.

4.15.2 Predicting Impacts

Most impacts that could be expected to occur from the proposed DMMP would result from the placement of the dredged material. Other impacts could also result, such as temporary increases in turbidity and suspended sediments and disturbance of fish and wildlife during dredging events.

Table 4-2 broadly summarizes the major impacts of the placement alternatives evaluated in developing the DMMP for the AIWW.

Table 4-2: Summary of Impacts without Mitigation by Placement Method

Placement Method	Water Quality	Tidal Wetlands	Freshwater Wetlands	Essential Fish Habitat	Threatened – Endangered Species
Existing upland DMCA[1]	Minimal	None	None	None	Minimal
New upland DMCA[1]	Minimal	Minimal	Moderate	Minimal	Unknown
New saltmarsh DMCA[1]	Substantial[2]	Substantial[2]	None	Substantial[2]	Minimal
Confined placement on saltmarsh tracts[1]	Minimal	Moderate	None	Minimal	Minimal
Open water placement (sand)	Minimal	None	None	Minimal	Minimal
ODMDS	Minimal	None	None	None	Minimal
Unconfined saltmarsh placement	Substantial[3]	Moderate	None	Moderate	Minimal

[1]Effluent must meet established water quality standards; [2]Due to loss of functioning saltmarsh; [3]Due to loss of functioning saltmarsh and non-compliance with water quality standards.

4.15.3 Avoiding and Minimizing Impacts

The AIWW is an authorized Federal project requiring periodic maintenance dredging in some reaches in order to maintain the authorized 12-foot depth. Under the proposed new DMMP, the waterway would continue to be dredged as required. The proposed new DMMP would incorporate placement methods and mitigation measures that would minimize the adverse impacts to sensitive resources.

Measures to minimize adverse impacts of the preferred plan include use of existing confined upland DMCAs wherever practicable, confining dredged material placement to existing impacted portions of saltmarsh disposal tracts, sediment grain size restrictions on material to be placed in open water sites, implementing dredging windows and vessel speed restrictions to protect sensitive estuarine and marine resources, and using ocean placement wherever practicable.

4.15.4 Mitigation Plan

Unavoidable adverse impacts to wetlands could be mitigated through two types of actions: (1) purchase of credits from approved freshwater wetland banks and (2) use of in-lieu-fee mitigation, or an equivalent method - providing funds to a third party (land trust or a state resource agency) to preserve and/or restore saltmarsh. An additional action, releasing disposal easements on a number of tracts, would not directly mitigate for wetland impacts, but indirectly would encourage restoration of these tracts by a third party in the future. While the project will appropriately mitigate using the 2008 Mitigation Rule as a guideline, the Corps Regulatory Program will not issue a permit, as the Federal government does not permit itself. Nevertheless, the Corps has attempted in good faith to consider and follow the Mitigation Rule to the extent practicable.

4.15.4.1 Purchase of Credits from a Mitigation Bank

A mitigation bank is "a site, or suite of sites, where resources (e.g., wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for impacts authorized by DA permits. In general, a mitigation bank sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation are governed by a mitigation banking instrument (33 CFR Part 332.2).

Implementing the preferred plan for the new AIWW DMMP would require the Corps to provide compensatory mitigation for loss of tidal wetlands. At present, there are no approved tidal wetland mitigation banks within the Savannah District that could provide credits for the AIWW. Currently, one tidal wetland bank (Salt Creek) is approved but its use is restricted to Chatham County and/or municipal projects to be completed by Chatham County.

There are several freshwater mitigation banks operating in the Ogeechee Coastal watershed that could provide required freshwater credits should the Corps implement development of one or both of the potential new high ground DMCAs in Bryan County and McIntosh County (both are elements of Option 2 of the DMMP, not the preferred alternative).

4.15.4.2 In-Lieu-Fee Program

An in-lieu-fee (ILF) program is a program involving the restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to satisfy compensatory mitigation requirements for DA permits. Similar to a mitigation bank, an in-lieu-fee program sells compensatory mitigation credits to permitees whose obligation to provide compensatory mitigation is then transferred to the in-lieu-fee sponsor. However, the rules governing the operation and use of in-lieu-fee programs are somewhat different from the rules governing operation and use of mitigation banks. The operation and use of an in-lieu-fee program are governed by an in-lieu-fee program instrument (33 CFR Part 332.2).

At present, Savannah District does not have an approved in-lieu-fee program.

4.15.4.3 Provide funds to Third Party for Saltmarsh Restoration

As noted above, Savannah District does not have an approved in-lieu-fee program. Consequently, the Corps proposes to provide funds to a third party (land trust or state agency) sufficient to purchase saltmarsh for preservation equivalent to the acreage of saltmarsh expected to be impacted in the future from implementing the preferred alternative DMMP option (37.5 acres). The amount of funding proposed for this purpose is $375,000 (37.5 acres at $10,000 per acre). As with an in-lieu-fee program, the land trust or state agency would be responsible for selecting, designing, implementing, and monitoring the restoration sites. The Corps would as a result of this plan transfer its obligation to provide compensatory mitigation to the land trust or state agency.

In addition to the proposed action (implementing the new DMMP), the Corps proposes to release its disposal easements on 28 tracts totaling 2,372.8 acres. Most of these tracts are owned by the

states of South Carolina and Georgia. Although the Mitigation Rule would not allow mitigation credits to be generated in this case by releasing disposal easements, the action would have the effect of removing the possibility that the tracts could be used in the future for placement of dredged material. In addition, any of these disposal tracts that were impacted by placement of dredged material in the past would become available as potential restoration sites for either the state natural resources agency or a mitigation bank/in-lieu-fee sponsor. Restoration on these former easements could score favorably for all seven restoration SOP factors (improvement in vegetation, improvement in hydrology, timing of restoration, in-kind vs. out-of-kind mitigation, maintenance requirements, monitoring plan, type of control), making these sites attractive to parties looking for restoration opportunities.

4.15.5 Consideration of the USEPA/USACE Mitigation Rule

The Corps has evaluated the proposed project mitigation with respect to the Mitigation Rule-entitled "Compensatory Mitigation for Losses of Aquatic Resources", 33 CFR Part 332 (and also 40 CFR Part 230) (jointly established by the USEPA and USACE and published in the Federal Register on April 10, 2008) (referred to herein as the Mitigation Rule). The Mitigation Rule applies to Clean Water Act Section 404 permit applications, not Corps civil works projects such as the AIWW. As stated in Section 4.5.4 above, the Corps has attempted in good faith to consider and follow the Mitigation Rule to the extent practicable.

As shown in the following sections, the Corps has determined that the proposed project mitigation conforms to the requirements and intent of the Mitigation Rule, 33 CFR Part 332.

4.15.6 Watershed Characterization

The Savannah District portion of the AIWW includes portions of seven watersheds identified by eight-digit Hydrologic Unit Codes (HUC): Broad-St. Helena (HUC 03050208), Lower Savannah (HUC 03060109), Ogeechee Coastal (HUC 03060204), Altamaha (HUC 03070106), Cumberland-St. Simons (HUC 03070106), and St. Marys (HUC 03070204).

4.15.6.1 Broad-St. Helena Watershed (HUC 03050208)

Located in southeastern South Carolina, this watershed includes portions of 5 South Carolina counties (Allendale, Beaufort, Colleton, Hampton, Jasper) and encompasses 934 square miles. The Broad River/Beaufort River/Port Royal Sound Basin flows through the Coastal Zone region. Of the 597,659 acres, 32.5% is forested land, 20.7% is agricultural land, 19.4% is forested wetland (swamp), 10.7% is water, 10.2% is nonforested wetland (marsh), 6.4% is urban land, and 0.1% is barren land. The urban land percentage is comprised chiefly of a portion of Hilton Head Island and the Beaufort area. There are approximately 1,482 stream miles, 1,129 acres of lake waters, and 54,485 acres of estuarine areas in this basin.
http://www.scdhec.gov/environment/water/shed/salk_broad.htm

4.15.6.2 Lower Savannah River Watershed (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 rates associated with high intensity urbanization within the Lower Savannah Watershed are approximately 260 acres/year, and a predominant amount of these trends has been observed in Chatham and Effingham Counties.
(http://narsal.uga.edu/glut/watershed.php?watershed=27

4.15.6.3 Ogeechee Coastal Watershed (HUC 03060204)

Located in southeast Georgia, the Coastal Ogeechee Watershed encompasses segments of 6 Georgia counties (Bryan, Chatham, Effingham, Liberty, Long, McIntosh). Coastal Ogeechee provides water resources for the cities of Savannah, Thunderbolt, Tybee Island, and south to Darien Georgia. This watershed covers over 1 million acres, roughly a quarter of this acreage (248,767 acres) is open water, the next largest coverage areas are evergreen forest (236,778) and salt based wetlands. In the coastal region of the Ogeechee River basin much of the surface water connections are brackish. The primary source for freshwater is groundwater supplies.
http://narsal.uga.edu/glut/watershed.php?watershed=27

4.15.6.4 Altamaha Watershed (HUC 03070106)

Located in the central portion of southeast Georgia, this watershed encompasses segments of 10 counties (Jeff Davis, Montgomery, Toombs, Appling, Tattnall, Evans, Long, Wayne, McIntosh, Glynn). It covers 960,000 acres. The Lower Altamaha River is the main drainage feature in the basin and does not have a significant drainage area but rather acts like a 'conduit' to convey the combined flows of Ocmulgee, Oconee and Ohoopee Rivers. The Lower Altamaha watershed is characterized by loam; sand, and loamy sand soils. About a third of Georgia's commercial and recreational fisheries are based in the Altamaha.
http://mesl.ce.gatech.edu/RESEARCH/altamaha/watershed.htm

4.15.6.5 Cumberland-St. Simons Watershed (HUC 03070203)

The Cumberland-St. Simons watershed encompasses 175,296 acres in parts of Brantley, Camden, Glynn, and Wayne counties, Georgia. Brunswick is the largest city within this watershed. This watershed includes the lower Satilla River basin.
http://cfpub.epa.gov/surf/huc.cfm?huc_code=03070203

4.15.6.6 St. Marys Watershed (HUC 03070204)

The St. Marys watershed is located on the eastern border between Florida and Georgia. The basin occupies 832,000 acres with approximately 489,600 acres located in Georgia and 342,400 acres located in Florida. The river itself is 130 miles long. Its headwaters originate in the Okefenokee Swamp and the river eventually drains into the Atlantic Ocean at Cumberland Sound. About 86% of the watershed is located in four counties: Camden and Charlton counties in Georgia and Nassau and Baker counties in Florida. Land use in the St. Marys includes wetlands, agriculture, grasslands, forestry, urban development, and open water. Currently, the main human use in the watershed is silviculture.

http://www.law.ufl.edu/_pdf/academics/centers-clinics/clinics/conservation/resources/stmarys.pdf

4.15.7 Assessment of Wetland Impact Areas

4.15.7.1 Indirect Impacts to Wetlands

Indirect impacts associated with placement of dredged material as proposed in the new DMMP would be largely *de minimus* and mainly derive from ending the practice of unconfined placement of dredged material onto saltmarsh tracts. Areas of degraded marsh surrounding uplands created from placement of dredged sediments can recover when periodic placement ceases, as evidenced by the condition of tracts that have not been used since construction of the 12-foot channel in the early 1940s. Many tracts originally used during the maintenance of the AIWW have not been used since the 1980s, and some show signs of recovery of the affected marsh (Tidewater Environmental Services 2011). Examples of tracts demonstrating some recovery of saltmarsh are the following: 1-A-1, 2-A, 7-A, 9-B, 11-K, 11-L, 12-A, 17-A, 19-A, 25-C, 29-C, and 53-A. Should the Corps or another entity seek to undertake restoration of saltmarsh on these partially recovering tracts, additional measures (scraping down created uplands to an elevation that would support *Spartina* marsh, creating or restoring finger streams, etc.) could be used to enhance restoration beyond what is naturally occurring over time.

4.15.7.2 Direct Impacts to Wetlands

Implementing the new DMMP would result in direct impacts to tidal wetlands. Under the preferred plan, use of geo-tubes or some other technology to confine dredged material to existing areas of impacts would occur. Areas of saltmarsh do exist within these impacted disposal tracts and this saltmarsh would be lost through placement of dredged material. Although these marsh areas are already impacted, they do retain a measure of wetland functions and mitigation for their loss is therefore proposed as part of the Corps' mitigation plan for the DMMP.

4.15.8 Calculation of Freshwater Wetland Impacts

For impacts to freshwater wetlands (only relevant for the two potential new upland DMCAs, elements of DMMP Alternative 2); the Corps used the Regulatory Standard Operating Procedures (SOP), which have been adopted by the natural resources agencies in Georgia to evaluate impacts and calculate compensatory mitigation on projects requiring Section 404 permits. Although the SOP was developed by the interagency Mitigation Banking Review Team for actions permitted through the Corps' Regulatory Division, it can also serve as a framework to quantify impacts from civil works projects such as this. In brief, the SOP uses several factors to quantify the ecological impacts and benefits expected from various project actions. For impacts, these factors include the type of impact, the duration of the impact, the type of vegetation being impacted, and the preventability of the impact. The SOP considers several factors in its calculations of the ecological extent of a project's impact. These factors are summarized Table 4-3. Estimated mitigation required should either of the potential new upland DMCA sites be developed is presented in Table 4-4.

Table 4-3: SOP Wetland Mitigation Worksheet Adverse Impact Factors

Factor	**Options**						
Dominant Effect	Fill	Dredge	Impound	Drain	Flood	Clear	Shade
	2	1.8	1.6	1.4	1.2	1	0.5
Duration of Effects	7+ years	5-7 years	3-5 years	1-3 years	< 1 year		
	2	1.5	1	0.5	0.1		
Existing Condition	Class 1	Class 2	Class 3	Class 4	Class 5		
	2	1.5	1	0.5	0.1		
Lost Kind	Kind A	Kind B	Kind C	Kind D	Kind E		
	2	1.5	1	0.5	0.1		
Preventability	High	Moderate	Low	None			
	2	1	0.5	0			
Rarity Ranking	Rare	Uncommon	Common				
	2	0.5	0.1				

† These factors are determined on a case-by-case basis.

Table 4-4: Upland Site Freshwater Wetland Mitigation Required

Potential New Upland DMCA	Operational Reach	Upland Site (acres)	Wetland Impacts (acres)[1]	Wetland Mitigation Credits Needed[1]
Bryan DMCA	SAV-14/SAV-15	100	37.82	344.16
Creighton DMCA	SAV-21 to SAV-23	350	5.79	58.48

[1] Based on using National Wetland Inventory data and the Savannah District SOP for calculating wetland impacts.

The Corps' mitigation plan for constructing the new upland DMCAs identified above would provide compensatory mitigation for unavoidable impacts by purchasing credits from an approved wetland bank. There are several such banks whose service areas include AIWW reaches SAV-14/15 and SAV-21/23.

4.15.9 Calculation of Saltmarsh Impacts

The Corps calculated impacts to saltmarsh on a per-acre basis instead of using the SOP. At present, there is no approved framework within Savannah District for calculating mitigation for saltmarsh impacts using credits derived from using the SOP rather than simply using the number of acres impacted by an activity.

The Corps' mitigation plan for implementing the new DMMP would provide compensatory mitigation for unavoidable impacts to saltmarsh by either 1) purchasing credits from an approved wetland bank or 2) paying into an approved in-lieu-fee program or an equivalent. There are at present no approved saltmarsh mitigation banks and no approved in-lieu-fee program that could provide credits to the AIWW. Therefore, the Corps proposes to provide funds to a land trust or state agency for the purpose of purchasing saltmarsh for preservation and/or restoration.

4.15.10 Wetland Impacts from the DMMP Preferred Plan and Alternatives

Total wetland impacts (losses) resulting from the preferred plan (37.5 acres of saltmarsh) from using confined placement of dredged materials within existing impacted portions of three disposal tracts (15-A, 15-B, and 42-B). Impacts to saltmarsh from Alternative 2 (71.3 acres) would result from similar placement of dredged material in five existing disposal tracts (15-A, 15-B, 34-A, 36-A, and 42-B); in addition, this alternative would require construction of two new upland DMCAs, resulting in the loss of 43.6 acres of freshwater wetlands. Impacts to saltmarsh from Alternative 3 (1,174.0 acres) would result primarily from constructing new DMCAs on nine existing unconfined disposal tracts. Creating a new DMCA on currently undiked disposal tracts would result in the eventual loss of all of the tidal wetlands enclosed by the new dikes. Impacts to saltmarsh from Alternative 4 (497.0 acres) would result primarily from continued unconfined placement of dredged material onto existing undiked saltmarsh disposal tracts as has been the practice in the past. Table 4-6 summarizes the wetland impacts of the preferred plan and alternatives.

Table 4-6: Wetland Impacts and Required Mitigation for Preferred Plan and Alternatives

Plan	Saltmarsh Impacts (acres)	Freshwater Wetland Impacts (acres)	Freshwater Credits Required[1]	Total Wetland Mitigation Cost[2]
Preferred Plan	31.5	0.0	0.0	$375,000
Alternative 2	71.3	43.6	402.6	$1,719,500
Alternative 3	1,174.0	0.0	0.0	$11,740,000
Alternative 4	497.0	0.0	0.0	$4,970,000

[1]Required credits calculated using the Savannah District's SOP (see Section 4.15.8 of this EA).
[2]Freshwater mitigation calculated at $2,500 per credit; saltmarsh mitigation calculated at $10,000 per acre of impact.

4.15.10.1 Tracts 15-A, 15-B, 42-B

The Preferred Plan includes placement of dredged materials onto three existing disposal tracts (15-A, 15-B, and 42-B). At these tracts slated to receive fine-grained dredged material (less than 80% sand) confined with geo-tubes or some equivalent method, the Corps does not anticipate any additional wetland impacts beyond those that exist at present. Confining measures would keep the dredged material within the existing impacted areas of the tracts. Should this prove impracticable, the fine-grained material would be sent to the nearest ODMDS after testing to confirm the material meets MPRSA Section 103 requirements.

If any wetland impacts should occur as a result of dredged material encroaching outside the existing impacted areas, the Corps would mitigate for these impacts.

Figure 4-3 shows the location of Tracts 15-A and 15-B. Figures 4-4 and 4-5 show Tracts 15-A and 15-B, respectively, with existing impacts. Figure 4-6 shows the location of Tract 42-B. Figure 4-7 shows Tract 42-B, with existing impacts.

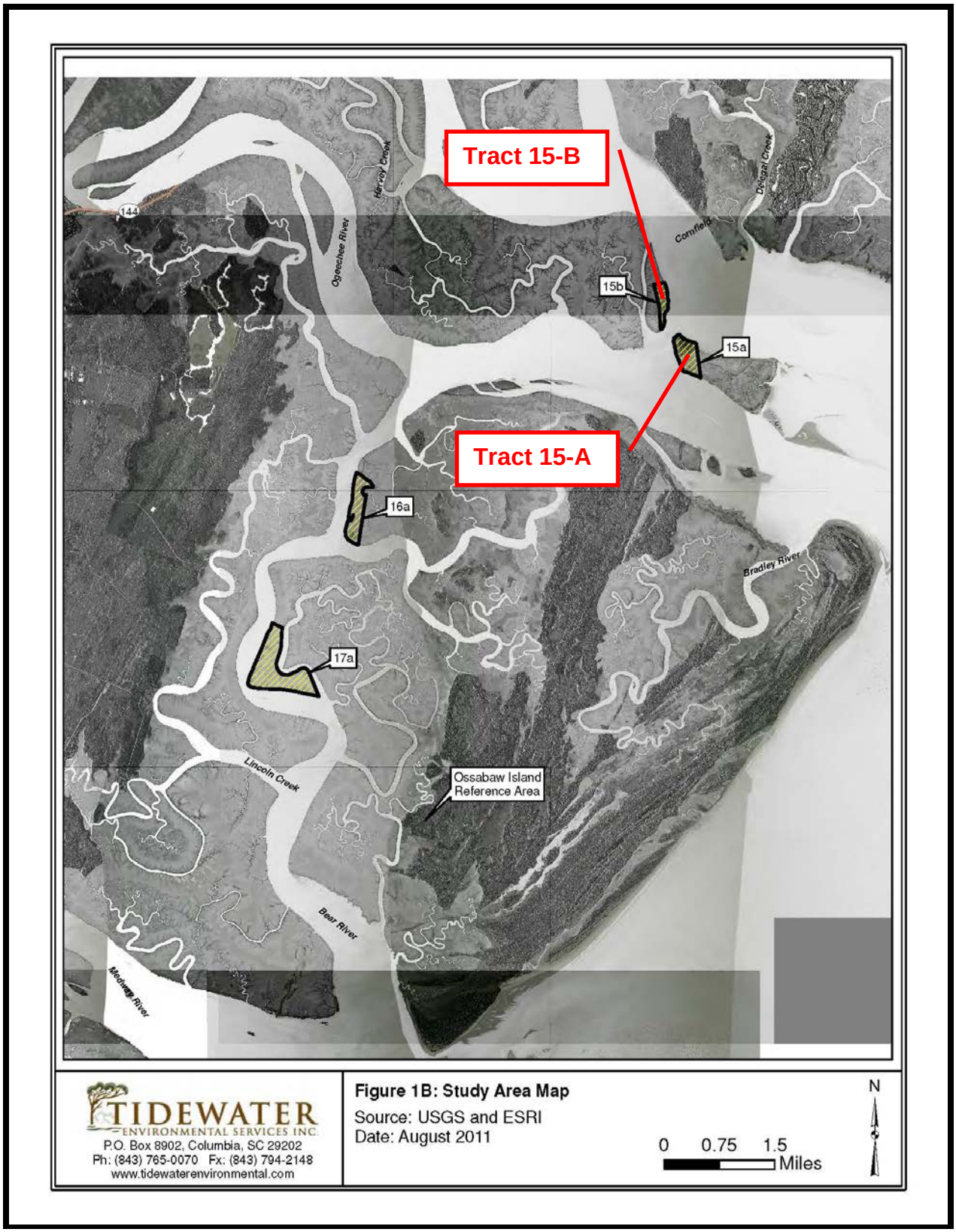


Figure 4-1: Location of Tracts 15-A and 15-B

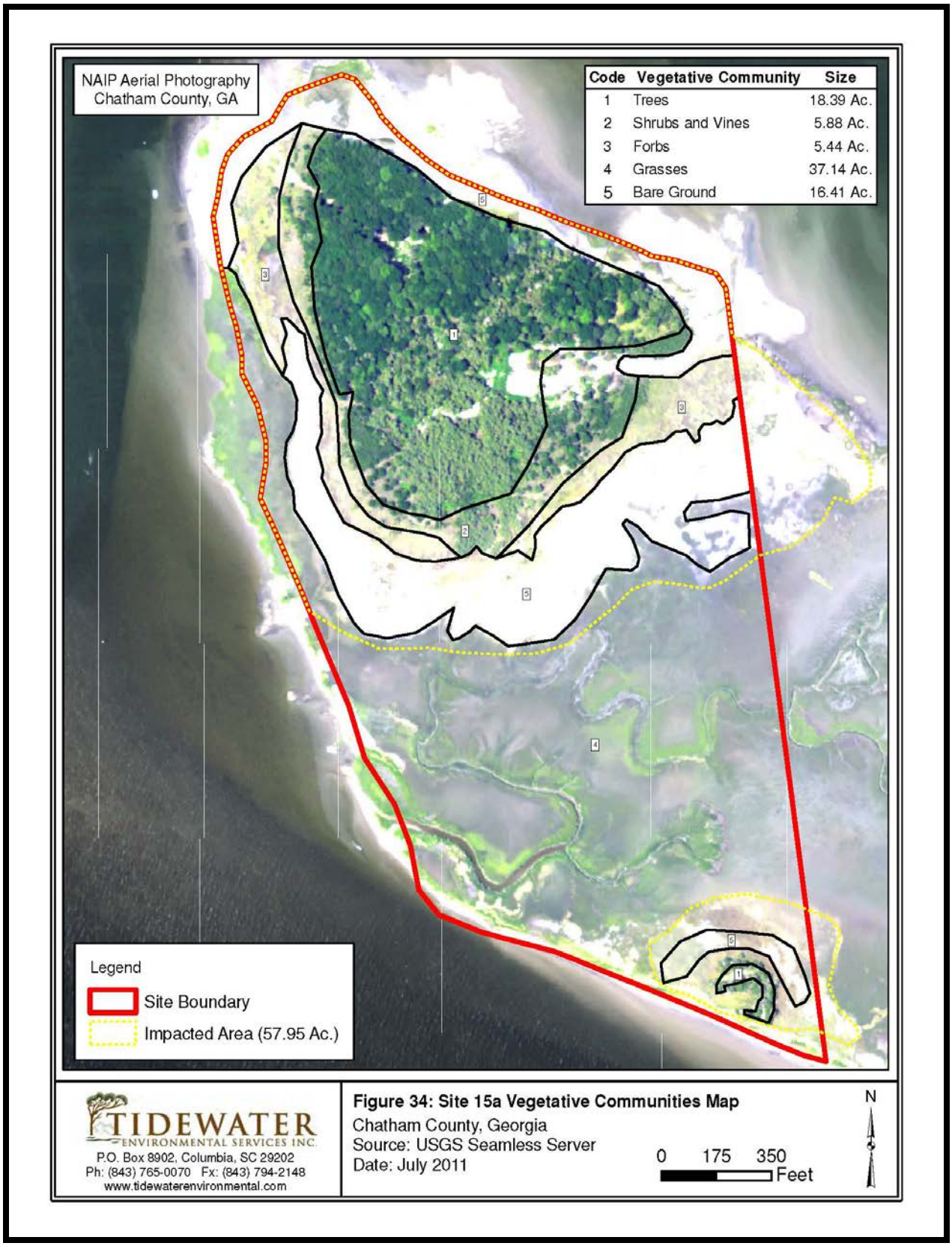


Figure 4-2: Tract 15-A

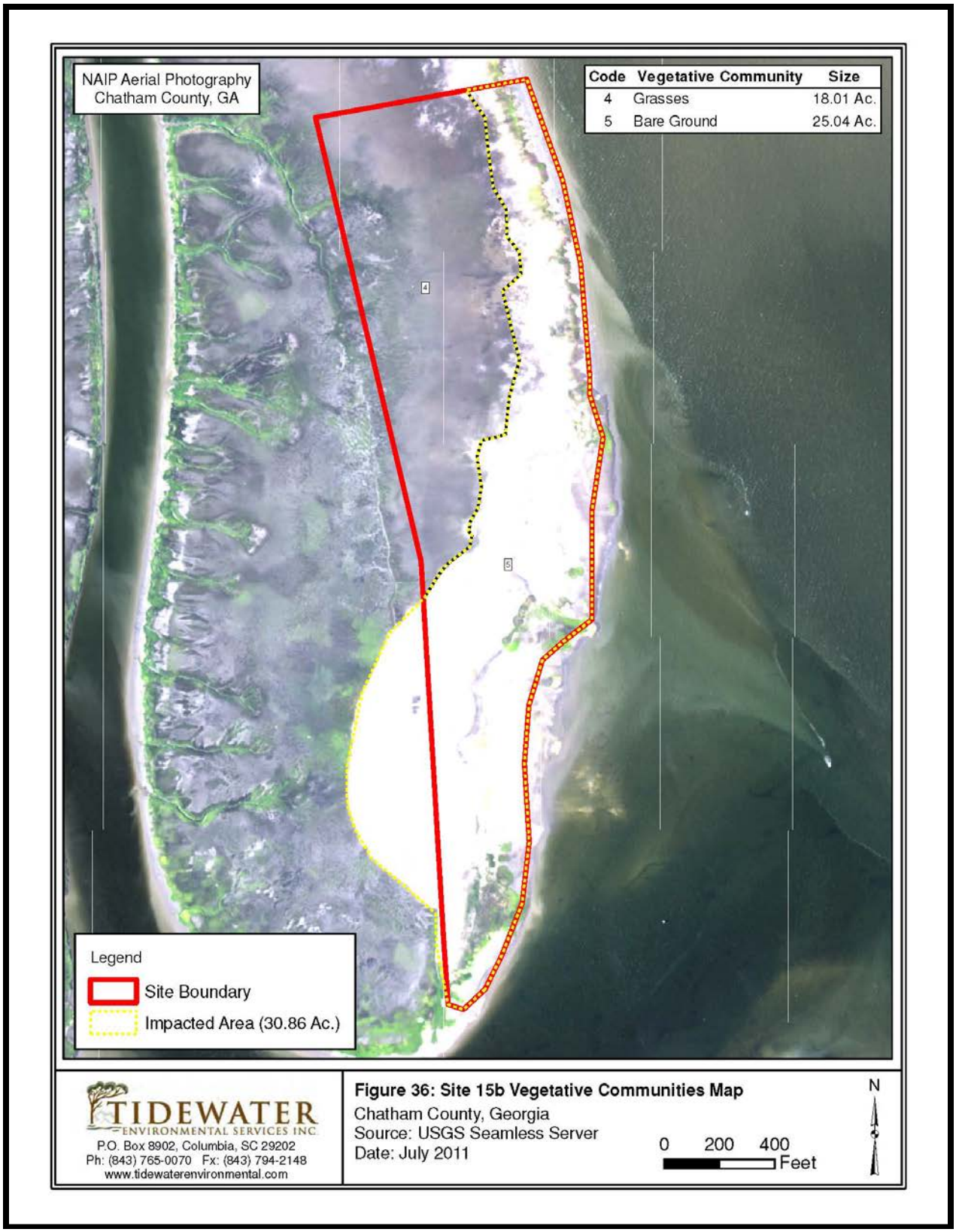


Figure 4-3: Tract 15-B

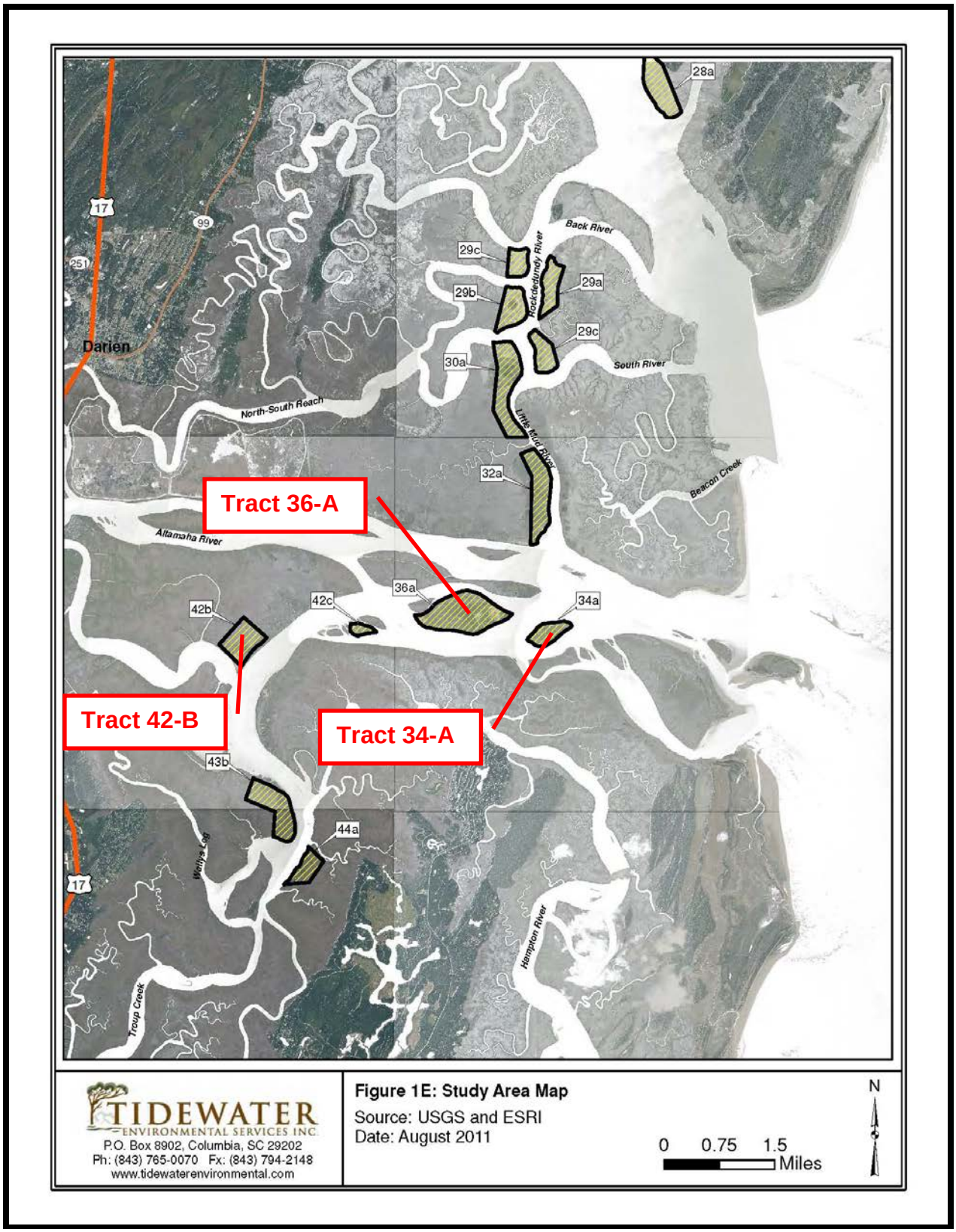


Figure 4-4: Location of Tracts 34-A, 36-A, and 42-B

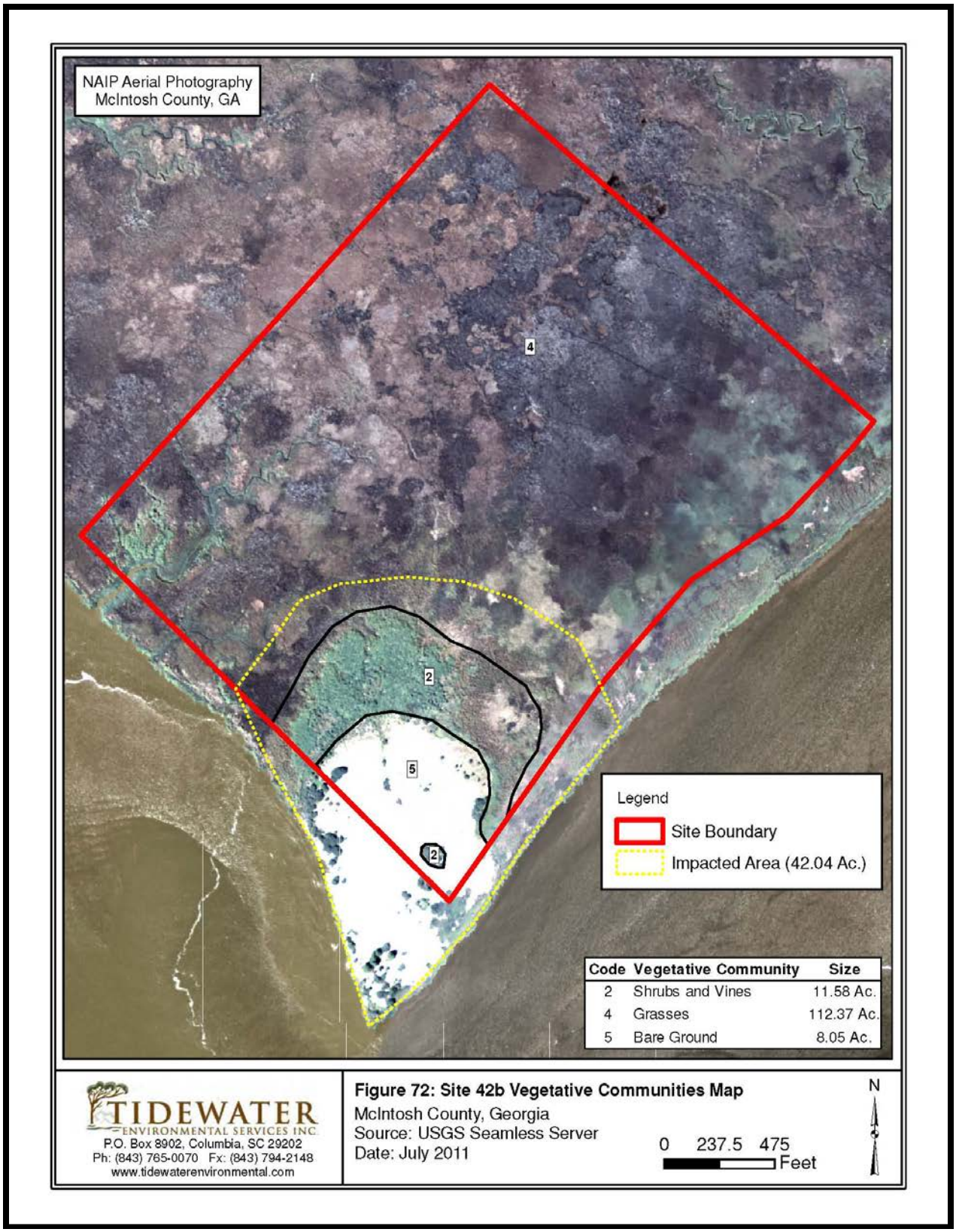


Figure 4-7: Tract 42-B

4.16 Utility Crossings, Structures, and Aids to Navigation

A preliminary analysis indicates that no utilities or structures will be impacted by implementing the proposed new DMMP. If activities associated with implementing the new DMMP inadvertently damage any aids to navigation (i.e., existing beacons, electronic components in the lighted buoys or their hulls), the Corps would work with the Coast Guard to move, repair, and/or replace those navigational markers.

4.17 Coastal Barrier Resources Act

The Georgia-South Carolina coast is typified by coastal barrier islands located in front of expansive estuarine saltmarshes, which in turn front the mainland. The barrier islands which are located within 10 miles of the AIWW are listed from the north as follows: **SC:** Hilton Head, Daufuskie, Turtle, Oysterbed; **GA:** Tybee, Little Tybee, Wassaw, Ossabaw, St. Catherines, Blackbeard, Sapelo, Wolf, Little St. Simons, Sea, St. Simons, Jekyll, Little Cumberland, and Cumberland. This region is unique in its lack of commercial development of its barrier islands. Of the 18 islands listed above, only five are significantly developed -- Hilton Head, Tybee, Sea, St. Simons, and Jekyll Islands. All or part of 18 barrier islands receive special protection from the Federal government by their designation as units in the Coastal Barrier Resources System.

Five other barrier islands are National Wildlife Refuges: Oysterbed Island in South Carolina, and Wassaw, Blackbeard, Wolf, and Egg Islands in Georgia. The islands also receive protection through various state laws or regulations. Turtle Island is owned by the State of South Carolina and is managed as a Wildlife Management Area. Little Tybee and Ossabaw Islands are owned by the State of Georgia and are managed as Heritage Trusts. Tomkins Island, a man-made island located in South Carolina at the entrance to Savannah Harbor, is designated as a Heritage Trust Preserve. Most of Sapelo Island is owned by the State of Georgia, and a portion is designated the Sapelo Island National Estuarine Research Reserve. Wolf and Egg Islands are, in addition to National Wildlife Refuges, designated National Wilderness Areas. Jekyll Island is administered as a State Park, with restrictions on private development. Cumberland Island is designated a National Seashore.

Operation of the AIWW has not resulted in significant adverse effects to these barrier islands. No measurable adverse impacts to the barrier islands shoreline or any nearby ocean shoreline are expected to occur from implementation of the proposed DMMP.

The Coastal Barrier Resources Act (CBRA) of 1982 (PL 97-348) and the Coastal Barrier Improvement Act of 1990 (PL 101-591) restrict federal expenditures in those areas comprising the Coastal Barrier Resources System (CBRS). Designated maps showing all sites included in the system in Georgia and South Carolina show Daufuski (SC Unit M13), Turtle (SC Unit SC-10P), Little Tybee (GA Unit N01), Wassaw (GA Unit N01A and N-1AP), Ossabaw (GA Unit GA-02P), St. Catherines (GA Unit GA-03P), Blackbeard/Sapelo (GA Unit GA-04P), Altamaha/Wolf (GA Unit GA-05P), Little St. Simons (GA Unit N03), Sea (GA Unit N04), Jekyll (GA Unit GA-06P), Little Cumberland (GA Unit N05), and Cumberland (GA Units N06P and N06), islands to be within the Coastal Barrier Resource System and protected under the Coastal Barrier Improvement Act of 1990. The AIWW passes through or near all of the CBRS units.

None would be directly affected by the proposed DMMP. The proposed action is in compliance with CBRA.

4.18 Coastal Zone Management Consistency

The Corps performed an analysis of the proposed project with respect to resources under the purview of Georgia and South Carolina's programs concerning Coastal Zone Management Consistency. The analysis of Coastal Zone Management Consistency for South Carolina and Georgia can be found in Appendix C and Appendix D of this EA, respectively. These Federal Consistency Determinations found that implementation of the proposed DMMP in conjunction with implementation of the various mitigation features was fully consistent with the Coastal Zone Management Programs of both states. The Federal Consistency Determinations will be provided to each State for review during the comment period on the EA.

4.19 Hazardous and Toxic Wastes

None of the sediments that would be excavated during the maintenance dredging of the AIWW and placement in accordance with the proposed new DMMP are considered to be or include hazardous or toxic wastes. Pursuant to ER 1165-2-132, dredged material and sediments beneath navigable waters proposed for dredging qualify as hazardous or toxic wastes only if they are within the boundaries of a site designated by the EPA or a state for a response action (either a removal action or a remedial action) under CERCLA, or if they are a part of a National Priority List (NPL) site under CERCLA. The Savannah District portion of the AIWW has not been designated for a CERLCA (Superfund) response action nor is it listed on the NPL. Dredged material from Corps Civil Works projects is excluded from the definitions of hazardous waste, 40 CFR 261.4 (g); 33 CFR 336.1, 336.2. Potential impacts from excavating such materials would be evaluated in either a Section 404 (Clean Water Act) or Section 103 Evaluation (Marine Protection Research and Sanctuaries Act).

Sediment and elutriate test analyses were performed at sampling locations along the AIWW in 1974. The major constituents considered in this study were mercury, lead, zinc, total Kjeldahl nitrogen, volatile solids and chemical oxygen demand. Bulk analysis of the 10 sediment samples indicated that only 4 of the sampling areas (Site 2 at Thunderbolt, Site 4 near Sapelo Island, Site 6 at Wolf Island and Site 8 at Jekyll Island) contained moderate concentration volatile solids, chemical oxygen demand, total Kjeldahl nitrogen, oil and grease. However, the placement of dredged material in these areas would not be open water placement. In areas where open water placement methods would be used, the sediments contained low concentrations of pollutants. Bulk analyses in all instances indicated that the sediments were relatively free of heavy metals.

Dredged material and sediments beneath the navigable waters proposed for dredging will be tested and evaluated for their suitability for placement in accordance with the appropriate guidelines and criteria adopted pursuant to Section 404 of the Clean Water Act and/or Section 103 of the Marine Protection Research and Sanctuaries Act. The Corps will fulfill the requirements for compliance with the Clean Water Act and will provide its MPRSA Section 103 Evaluation(s) to EPA Region 4 for review and approval prior to initiating dredging.

The proposed action would not result in adverse impacts from hazardous or toxic wastes.

4.20 Cumulative Effects

The assessment of cumulative impacts in NEPA documents is required by Council on Environmental Quality (CEQ) regulations (CEQ 1987). According to the CEQ, a cumulative effect "*is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*"

An assessment of cumulative effects helps one identify the significance of an impact. The assessment sets the stage for determining the importance of the incremental effect produced by a proposed action. When considering significance, one should examine whether the action is related to other actions with individually insignificant, but cumulatively significant impacts. The CEQ regulations state that "significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment." The CEQ produced a handbook titled "Considering Cumulative Effects under the National Environmental Policy Act" to guide agencies in the preparation of cumulative impact analysis.

4.20.1 Three Steps of Cumulative Impacts Analysis

As described in the CEQ handbook, the cumulative impact analysis process involves three basic processes:

1. Scoping for cumulative effects
2. Describing the affected environment
3. Determining the environmental consequences

4.20.2 Scoping For Cumulative Impacts

An analysis of cumulative effects should include past, present, and future actions and encompass all Federal, non-Federal, and private actions. The analysis should focus on each affected resource, ecosystem, and human community, with the study effort focusing on truly meaningful impacts. As directed by the CEQ handbook, the scoping for potential cumulative effects should include:

1. Identifying the significant potential cumulative effects and defining assessment goals.
2. Establishing the geographic scope of the analysis
3. Establishing the time frame for the analysis
4. Identifying other actions affecting the resources, ecosystems and human communities of concern.

4.20.3 Describing the Affected Environment

In describing the affected environment, the CEQ handbook suggests using natural boundaries and focusing on each affected resource, ecosystem, and human community. Consequently this part of the cumulative analysis should include:

1. Characterizing the resources, ecosystems, and human communities identified during scoping in terms of their response to change and capacity to withstand stress
2. Characterizing the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds
3. Defining a baseline condition for the resources, ecosystems and human communities.

4.20.4 Determining the Environmental Consequences of Cumulative Impacts

This portion of the cumulative effects analysis addresses additive, countervailing, synergistic effects, looking beyond the life of the action, and addressing the sustainability of resources, ecosystems, and human communities. Consequently, this part of the cumulative analysis should include:

1. Identifying the important cause-and effect relationship relationships between human activities and resources, ecosystems, and human communities
2. Determining the magnitude and significance of cumulative impacts
3. Modifying or adding alternatives to avoid, minimize, or mitigate significant cumulative impacts,
4. Monitoring to determine the cumulative effects of the selected alternative and adapting management measures as required.

4.20.5 Scoping for Cumulative Impacts

Scoping for the cumulative impacts associated with the AIWW DMMP was aided by several information sources. These included a wetland and upland assessment of dredged material placement areas along the Savannah District AIWW (Tidewater Environmental Services, 2011) and underwater archaeological survey of 12 reaches that require frequent dredging (Dial Cordy and Associates, 2012).

In addition to data generated from the wetlands and cultural resources studies, the District received input from technical experts from Federal and State resource agencies. The cumulative impact analysis was aided by information contained in the Preliminary Draft Fish and Wildlife Coordination Act Report (FWCAR) prepared by Dial Cordy and Associates in cooperation with the US Fish and Wildlife Service's Office of Ecological Services field office in Townsend, GA. This report included input from the National Marine Fisheries Service, the South Carolina Department of Natural Resources, and the Georgia Department of Natural Resources.

4.20.6 Identification of Critical Resources or Issues

As discussed above, the CEQ handbook directs that cumulative effect analysis should "Focus on truly meaningful effects". The proposed new DMMP could affect the human environment through several potential avenues. A broad list of potential avenues and items for consideration was developed as a result of the scoping process.

The agencies that submitted scoping comments and participated in the FWCAR review considered the following to be the major resources or issues of concern for this project:

- Wetlands
- Fisheries including Shellfish
- Water Quality
- Public Lands Managed for Natural Resources
- Migratory Birds
- Threatened/Endangered Species

Of these resources, the proposed action (implementing the proposed DMMP) would not significantly affect fisheries including shellfish, water quality, public lands managed for natural resources, migratory birds, or threatened/endangered species. Wetlands would be affected but with the proposed mitigation, no net loss of wetlands would result. Water quality in the reaches to be dredged would be affected during and immediately after dredging events, but any effects are expected to be short-term and localized. Public conservation lands would not be affected by the action. Migratory birds would not be adversely affected by the project. Threatened and endangered species may be affected, but are not likely to be adversely affected by the project.

Section 4.0 of this EA discusses the environmental consequences of the proposed action on wetlands (Section 4.8), fisheries including shellfish (Sections 4.4 and 4.5), water quality (Sections 4.2 and 4.4), public lands managed for natural resources (Section 4.7), migratory birds (Section 4.7), and threatened/endangered species (Section 4.9).

According to the CEQ, a cumulative effect "is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." For the reasons given in the paragraph above, the Corps does not expect the implementation of the proposed DMMP to produce significant cumulative impacts for these resources.

The remainder of this cumulative impact analysis will focus on wetlands. The analysis will use the following format:

- Issue
- Geographic scope
- Historical basis (baseline condition)
- Past actions / stresses

- Present condition
- Present actions / stresses
- Capacity to withstand stress
- Future actions / stresses
- Incremental impact
- Alternatives to avoid, minimize, or mitigate cumulative effects

4.20.7 Wetlands

4.20.7.1 Geographic Scope

The scope of the cumulative effects analysis for wetlands is the southern South Carolina and Georgia coasts (however, no adverse impacts to wetlands in South Carolina would result from implementing the proposed action).

4.20.7.2 Historical basis (baseline condition)

Prior to construction and maintenance of the AIWW, the disposal easements located along the waterway were primarily supporting smooth cordgrass (*Spartina alterniflora*) saltmarsh. In total, saltmarsh would have comprised well over 400,000 acres of the southern South Carolina and Georgia coasts. Section 3.0 of this EA discusses the affected environment, including saltmarsh, of the project area.

4.20.7.3 Past actions / stresses

Most of the past impacts to this wetland type (saltmarsh) can be attributed to residential and industrial development (ports facilities, marinas, docks, etc.,) and use of these areas for the placement of dredged material. Effects of these activities involved fill of wetlands, draining of wetlands, and conversion of wetlands from one type to another. Construction of DMCAs for the Savannah and Brunswick harbors, the AIWW, and the Kings Bay channel resulted in the loss of approximately 7,500 acres of wetlands. The Savannah harbor DMCAs affected freshwater marsh, brackish marsh, and saltmarsh; the other DMCAs affected primarily saltmarsh. For the AIWW alone, deposition of dredged material from the construction of the 12-ft channel in the early 1940s to 1983 affected approximately 2,100 acres of saltmarsh (conversion to upland or to another type of tidal wetland).

An additional factor affecting saltmarsh would be sea level rise. A 1995 EPA publication indicates that a historic rate of sea level rise for this area (as measured at the Fort Pulaski gage) is 3 mm/year (0.011 feet/year). The 1996 Savannah District Corps of Engineers Annual Survey states that over the 51-year period from 1935 through 1986, mean sea level was observed to rise 0.628 feet at the Fort Pulaski gage (0.012 feet/year). Using that historic rate, sea level may have risen 3.4 feet since Georgia was settled in 1733. The upper limit of saltmarsh is approximately 5 ft above mean low water, so this degree of sea level rise has had a measurable impact on the extent of saltmarsh on the Southeast coast.

4.20.7.4 Present condition

Between 1983 and 2011, maintenance activities had produced a net impact to an additional 189 acres in Georgia (no net impacts occurred in South Carolina). The affected acreages include conversion to upland and conversion from one type of tidal wetland to another (usually low marsh to high marsh). The SHEP EIS documented a net loss of saltmarsh in the Savannah River estuary of about 2,600 acres from 1854 - 1999 (USACE 2012).

4.20.7.5 Present actions / stresses

All marsh along the Georgia coast is protected from development by the provisions of Section 404 of the Clean Water Act. Anyone who wishes to impact wetlands associated with development must apply for a Section 404 Permit from the US Army Corps of Engineers. As part of the permit process, the applicant must show through a detailed analysis that there is no practicable alternative to impacting wetlands. When wetland impacts cannot be avoided, the applicant must show what actions they will take to minimize those impacts and mitigate remaining wetland losses. In-kind mitigation (at a ratio of approximately 2:1) within the same watershed is required. Purchase of credits from a mitigation bank is the preferred method of compensatory mitigation. However, no commercial mitigation banks are presently operating near Savannah for brackish or saltmarsh wetlands.

Department of the Army Permits for activities in tidal (brackish and salt) wetlands are more difficult to obtain and mitigation is difficult because of the scarcity of saltmarsh mitigation banks and opportunities to restore saltwater marsh. According to the Savannah District Regulatory database, 17.5 acres of tidal marsh fills have been authorized in coastal Georgia over the last 10 years. Mitigation for these impacts has been at a ratio of approximately 2:1.

The US Army Corps of Engineers does not issue itself a Section 404 Permit when a Federal navigation project impacts wetlands. However, the agency is responsible for following the Section 404 permit procedures including avoiding wetland impacts where possible, minimizing impacts to the maximum extent practicable and providing mitigation for any remaining wetland losses.

4.20.7.6 Capacity to withstand stress

The States of Georgia and South Carolina still contain large expanses of saltmarsh. However, past development actions have greatly impacted this resource. Although there are large amounts of saltmarsh and brackish marsh remaining in coastal Georgia and South Carolina, the philosophy of the Corps of Engineers and state wetland protection programs is a “no net loss” wetland policy.

4.20.7.7 Future actions / stresses

Because of state and Federal laws protecting wetlands from development, it is unlikely that large-scale adverse impacts would occur in the future. Through provision of compensatory mitigation, the proposed action would not result in the net loss of wetlands. Other potential actions that would affect wetlands would also be required to ensure that they would produce no net loss of wetlands. Future forseeable stresses that could impact the remaining wetlands along the Georgia coast include construction of the SHEP, construction of the Jasper Terminal on the

Savannah River, and activities associated with private residential development and industries in the coastal area.

A proposed Jasper Terminal could be sited in what is now DMCAs 14-A and 14-B, which are used for the placement of dredged material from the Savannah Harbor Federal Navigation Project (14-A and 14-B) and the AIWW (14-B). Based on recent conceptual plans for this facility, approximately 7.5 miles of rail infrastructure (to connect with the existing rail line) and 5.7 miles of new roadway to connect the facility to US Highway 17 would be required. Much of the area to be crossed by the new rail line and roadway is wetlands. The roadway and rail improvements would require a Section 10 and Section 404 Permit from the Charleston District Regulatory Branch.

If a Jasper Terminal is constructed in DMCAs 14-A (728 acres) and 14-B (725 acres), the loss of sediment placement capacity would have to be mitigated before the Federal Government would release its dredged material disposal easements in these two areas. This could result in additional impacts to wetlands if replacement of this capacity involves construction of new placement areas in wetlands. In view of wetland protection laws and wetland mitigation requirements, this avenue would be difficult. Construction of the landside infrastructure to support a Jasper Terminal could result in a substantial direct loss of salt and brackish marsh.

4.20.7.8 Incremental impact

Implementing the proposed DMMP would result in the loss of 37.5 acres of saltmarsh that has already been altered by the placement of dredged material in the past. Fine-grained sediments from twoAIWW reaches (Hells Gate, Buttermilk Sound) would be placed on the existing impact areas (both wetland and upland) of three previously used marsh disposal tracts.

4.20.7.9 Alternatives to avoid, minimize, or mitigate cumulative effects

As discussed above, the Corps must go through the same procedures as a Section 404 permit applicant even thought the agency does not issue itself a permit. The AIWW DMMP was able to avoid significant impacts to saltmarsh by using existing DMCAs and ocean placement wherever practicable and avoiding creating diked DMCAs on existing saltmarsh disposal tracts. The preferred plan does propose to confine fine-grained dredged material to existing impacted portions of five disposal tracts, resulting in loss of altered saltmarsh. Consequently, the project must provide mitigation for the loss of 37.5 acres of brackish marsh. The Corps proposes to provide funds in the amount of $375,000 to a land trust or state resource agency for preservation and/or restoration of an equivalent acreage of saltmarsh. The mitigation plan for the AIWW DMMP would ensure that no net loss of wetlands would result from implementing the proposed DMMP.

Based on the expected new AIWW DMMP's impacts and implementation of the project's mitigation plan, significant cumulative adverse impacts are not expected from the incremental effects of the new AIWW DMMP when considered together with other past, present, and reasonably foreseeable future projects in the area.

4.21 Summary of Environmental Consequences

The following is a summary of adverse effects which cannot be avoided should the proposed new DMMP be implemented**.**

4.21.1 Direct Adverse Impacts

For the purposes of this section, a project's direct adverse impact is defined as an effect on the environment in the project area that is immediately attributable to the project and caused directly by the project. With the preferred DMMP alternative, the following direct adverse impacts would occur:

A. Loss of 37.5 acres of previously impacted marsh due to project placement requirements
B. Temporary, localized dredging and placement impacts on water quality, benthic communities, etc. during dredging events.
C. Adverse impacts to 83.4 acres of created upland (dredged material) due to project placement requirements.

4.21.2 Indirect Adverse Impacts

For the purposes of this section, an indirect impact of a project can be defined as an effect on the environment in the project area that is not immediately attributable to the project but is caused indirectly by the project. In the case of the new AIWW DMMP, maintenance of the existing AIWW channel is not expected to result in a significant increase in vessel traffic or an increase in goods moving along the AIWW which in turn could lead to the need for more and larger facilities to handle an increase in vessel traffic and cargo.

4.21.3 The Relationship Between Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity

4.21.3.1 Wetlands

Implementation of the new DMMP would result in the loss of 37.5 acres of saltmarsh. These wetlands would be permanently lost. However, mitigation for this loss involves providing funds to a third party (land trust or state resource agency) for the preservation and/or restoration of estuarine emergent wetlands; relinquishing disposal easements on a number of tracts that have been adversely impacted by the past deposition of dredged material would make these tracts available for saltmarsh restoration. Approximately $375,000 would be provided to compensate for this loss. Consequently, once the mitigation plan is implemented, there would be no net loss of wetlands.

4.21.3.2 Biological Resources

Implementation of the proposed new DMMP would result in short-term impacts to fish and wildlife resources through a temporary increase in turbidity and decrease in dissolved oxygen that would be caused by dredging of the channel.
[add synopsis of agency opinions from EFH, FWCAR when available]

4.21.3.3 Endangered Species

The Savannah District has determined that implementing the DMMP would have No Effect on the Red-cockaded woodpecker, American chaffseed, Pondberry, Canby's dropwort, Kirtland's warbler, Bachman's warbler, Eastern indigo snake, Altamaha spinymussel, and Flatwoods salamander.

The Savannah District has determined that implementing the DMMP may affect, but is not likely to adversely affect, the following listed species: Wood stork; Piping plover; West Indian manatee; leatherback, loggerhead, Kemp's ridley, hawksbill, and green sea turtles. The District further determined that the action may affect, but is not likely to adversely affect, critical habitat for Piping plover (Georgia Units 1-16; South Carolina Units 12-15).

[add synopsis of USFWS and NMFS opinions when available]

4.21.4 Possible Conflicts Between the Proposed Action and the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies and Controls for the Area

The proposed new DMMP involves placement of dredged sediments from the maintenance of an existing Federal Navigation Channel. The dredged material would be placed in existing DMCAs in Savannah and Brunswick harbors and Wilmington River, in open water sites in conjunction with confined placement in existing disposal tracts, or in existing and new ODMDSs. The proposed project does not conflict with current uses of the harbors or land use plans.

Without mitigation, the proposed project would conflict with the objectives of the GA DNR Coastal Resources Division, NOAA/NMFS, and USFWS because the project would result in the loss of tidal wetlands which provide valuable fish and wildlife habitat. However, with mitigation, the project does not conflict with these agencies' objective of conserving coastal wetlands.

Conceptual plans have been developed for a Jasper County Marine Terminal (container port) to be located in what is now DMCA 14-A and 14-B in Savannah Harbor (about River Mile 6). Some of the comments received on the recent Savannah Harbor Expansion (SHEP) EIS (USACE 2012) expressed concern that use of DMCA 14-A and 14-B for deposition of dredged material from construction of the SHEP would conflict with that proposed project. On the contrary, the engineering consultant retained by the SC and GA Port Authorities to pursue development of a terminal stated in March 2011 that placement of sediment into DMCA 14-A and/or 14-B would provide much of the fill that would be required should a terminal be constructed at those sites.

Savannah Harbor DMCA 14-B is also designated to receive dredged material from the AIWW. Should DMCA 14-B be withdrawn from use due the Jasper Terminal development, the AIWW and Savannah Harbor non-Federal sponsor (GA DOT) would be required to provide an equivalent placement site for dredged material from the Savannah Harbor and AIWW projects.

5.0 Compliance with Environmental Requirements

Compliance with the following laws, Executive Orders, regulations, etc. would be required for all placement options under consideration in the proposed new DMMP.

5.1 Section 401 of the Clean Water Act.

Implementing the proposed new DMMP would require a Section 401 Water Quality Certificate from the Georgia DNR-EPD and the South Carolina DHEC. Section 401 Water Quality Certification from both states would be requested in conjunction with their review of the EA.

5.2 Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972

Samples of maintenance sediments from portions of the Savannah District AIWW proposed for placement in existing ODMDSs would be tested to evaluate the toxicity and bioaccumulation potential of chemical contaminants which may be associated with those maintenance sediment materials. If these site-specific test results indicate that the maintenance sediments meet the testing criteria of the EPA Ocean Dumping Regulations and Criteria and are, therefore, acceptable for transportation for ocean dumping under Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, USEPA, Region IV would be asked to approve of these findings and grant authority for the placement of the material in the ODMDS.

5.3 Section 404 of the Clean Water Act

All but one (use of existing confined placement areas) of the placement alternatives under consideration would involve the discharge of dredged and fill material into waters of the United States. All sites designated to receive dredged or fill material, excluding sites covered under Section 103 (MPRSA), have been evaluated using the Section 404 (b) (1) Guidelines and found to be in compliance with the requirements of these guidelines (see Appendix E of this EA).

5.4 Magnuson-Stevens Fishery Conservation and Management Act

This Act requires Federal action agencies to consult with the National Marine Fisheries Service (NOAA) if a proposed action may affect Essential Fish Habitat. The Corps evaluated potential project impacts on NOAA-managed fish species and their Essential Fish Habitats. As indicated in Section 4.05, the Corps believes the proposed action would not result in significant adverse impacts to Essential Fish Habitat or EFH species and that the mitigation proposed under Section 404 of the Clean Water Act would be sufficient to offset the expected future impacts. No mitigation for loss of EFH other than tidal wetlands would be required.

Continued impacts to approximately 37.5 acres of previously impacted estuarine emergent wetlands would occur in the future from implementing the proposed new DMMP. Compensatory mitigation would be provided by payment to a land trust or state agency of $375,000 (37.5 acres at $10,000 per acre). These funds would be for the purpose of purchase and preservation/restoration of estuarine emergent wetlands.

Implementation of the mitigation plan would bring the DMMP preferred plan into compliance with the provisions of the Magnuson Stevens Fishery Conservation and Management Act.

5.5 Anadromous Fish Conservation Act, 16 U.S.C. 757, et. Seq

All DMMP alternatives under consideration are in compliance with the Act. No adverse impacts to anadromous fish are expected from implementation of the new DMMP.

5.6 Clean Air Act, as amended, 42 U.S.C. 1857h-7, et. Seq

All DMMP alternatives are in compliance with the Act.

5.7 Fish and Wildlife Coordination Act, as amended 16 U.S.C

The new DMMP will comply with the Act. The project is being fully coordinated with the US Fish and Wildlife Service. The Service has participated in preparation of a Draft Section 2(b) Fish and Wildlife Coordination Act Report which was used in preparation of the draft EA. The Service will submit a Final Report after their review of the draft EA (see Appendix G of this EA).

5.8 Endangered and Threatened Species Act

A biological assessment evaluating the potential impacts of the proposed action on endangered and threatened species has been prepared (see Appendix B of this EA). The assessment is being coordinated with the USFWS (jurisdiction over several terrestrial and freshwater species, the Florida manatee, piping plover, and nesting sea turtles) and NMFS (jurisdiction over other protected marine and aquatic species which may occur in the project vicinity) pursuant to Section 7 of the Endangered Species Act of 1973 (PL 93-205), as amended. The USFWS and NMFS would provide their position on the project's compliance with Section 7 as part of their comments on the draft EA. Compliance obligations under Section 7 would be satisfied prior to or during implementation of the proposed action.

5.9 Section 106 of the National Historic Preservation Act

Significant impacts to known archaeological or historic resources are not anticipated as a result of the proposed work. The Savannah District, in consultation with the Georgia and South Carolina SHPOs and the Advisory Council on Historic Preservation, has developed a Programmatic Agreement for the project's compliance with Section 106 of the National Historic Preservation Act and it will implement that Agreement. A copy of the signed Agreement is found in Appendix K of this EA. The Savannah District will conduct archaeological surveys (and data recovery if necessary) of any un-surveyed reaches of the AIWW prior to dredging the AIWW channel. Any portions of disposal easements that do not already contain dredged material will also be surveyed to identify and evaluate cultural resources.

In light of these factors, the Corps believes that the proposed action is in compliance with Section 106 of the National Historic Preservation Act.

5.10 Executive Order 11988 (Flood Plain Management)

Dredged sediments would be placed in existing DMCAs and existing, previously used disposal easements that are located in the floodplain. The proposed action is not anticipated to induce development of the floodplain or to otherwise adversely affect any floodplain, since no land use changes are expected to result from the project. The proposed action is in compliance with the requirements of Executive Order 11988.

5.11 Executive Order 11990 (Protection of Wetlands)

Loss of approximately 37.5 acres of estuarine emergent wetlands would occur in the future from implementing the proposed new DMMP. These impacts would be mitigated through payment of funds to a land trust or state agency (see Section 4.15 of this EA). With implementation of the mitigation plan, the proposed action would be in compliance with Executive Order 11990.

5.12 Executive Order 11593 (Protection and Enhancement of the Cultural Environment)

Significant impacts to known archaeological or historic resources are not anticipated from the proposed work. The Savannah District, in consultation with the Georgia and South Carolina SHPOs and Advisory Council on Historic Preservation, developed a draft Programmatic Agreement (see Appendix K of this EA). The project would comply with that Agreement once it is finalized and signed by all parties. Pursuant to the conditions and restrictions of this Agreement, the proposed action is in compliance with Executive Order 11593.

5.13 Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations, Low Income Communities and Low Income Populations)

The Proposed Action would not impact minority communities or low-income populations. The proposed action would occur in the existing AIWW navigation channel and deposition of excavated sediments would occur within existing DMCAs; open water sites and existing disposal tracts in Ossabaw, Buttermilk, and Altamaha sounds; or in existing and new ODMDSs. Consequently, the project would not require any minority communities or low-income populations to be relocated or destroyed. In light of these factors, the proposed action is in compliance with Executive Order 12898.

5.14 Executive Order 13045 (Protection of Children from Environmental Health Risks)

This E.O. mandates Federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children as a result of the implementation of Federal policies, programs, activities, and standards (63 Federal Register 19883-19888). The proposed action would not impact schools or housing areas or areas where children might gather. Therefore, there

would be no short- or long-term impacts on the health and safety of children. The proposed action is in compliance with Executive Order 13045.

5.15 Executive Order 13186 (Protection of Migratory Birds)

This Executive Order mandates agencies protect and conserve migratory birds and their habitats. Nesting migratory birds receive protection under the Migratory Bird Treaty Act. Under that Act, nests, eggs, or individual birds cannot be destroyed unless a depredation permit is obtained from the USFWS. The proposed action would use existing DMCAs, previously impacted portions of existing saltmarsh disposal tracts, and open water and ocean placement sites. Migratory birds commonly use the existing Savannah Harbor DMCAs for foraging, nesting, and roosting habitat. They may also use the confined portion of the existing saltmarsh disposal tracts when material is placed there. Some species of migratory birds nest within the Savannah Harbor DMCAs and on their confining dikes. Individuals of those species could be impacted by sediment placement operations or DMCA maintenance activities if those activities are conducted during the nesting season. Once a DMCA is flooded, nesting sites on the floor of the area are not available and sediment placement operations would not impact nesting migratory birds. Due to the lead time resulting from required contracting procedures, precise timing of the start of sediment placement operations or area maintenance work is generally not available. Therefore, some degree of uncertainty often exists when those activities are scheduled for use during the May to August nesting season. If nests are present when work is ready to start, three options are available: (1) delay the start of work until the young birds have left the site, (2) work in areas where no nests are located, or (3) attempt to obtain a Depredation Permit from the USFWS. With these conditions in place, the proposed action is in compliance with Executive Order 13186.

The proposed action would not have a measurable negative effect on migratory bird populations.

5.16 The Federal Coastal Zone Management Act (CZMA), 16 U.S.C. 1451 et seq., as amended

The Federal Coastal Zone Management Act (CZMA) requires each Federal agency activity performed within or outside the coastal zone (including development projects) that affects land or water use, or natural resources of the coastal zone to be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs. A direct Federal activity is defined as any function, including the planning and/or construction of facilities, which is performed by or on behalf of a Federal agency in the exercise of its statutory responsibilities. A Federal development project is a Federal activity involving the planning, construction, modification or removal of public works, facilities or other structures, and the acquisition, use or placement of land or water resources.

To implement the CZMA and to establish procedures for compliance with its Federal consistency provisions, the US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), promulgated regulations which are contained in 15 C.F.R. Part 930. The Corps prepared its Consistency Determinations in compliance with Part 930.30 through 930.44 of those regulations.

5.16.1 **State of Georgia Coastal Zone Management Program (see Appendix D)**

NOAA approved Georgia's Coastal Management Plan (GA CMP) in 1997. It later approved a routine program change (in 2005) that incorporated the provisions of Georgia HB 727 and a Memorandum of Understanding with the Corps' Savannah District on Regional Sediment Management. Since the proposed action would affect estuarine waters and wetlands within the coastal zone, Savannah District evaluated the proposed action for its consistency with the State's CMP.

In accordance with the CZMA, it was determined that the implementing the proposed DMMP would be carried out in a manner which is consistent with the enforceable policies of the Georgia Coastal Management Program. There are no beach-quality sands in the Georgia reaches of the AIWW. The proposed DMMP would not adversely impact any coastal uplands (i.e., beaches or dunes) in Georgia. Dredged sediments would be placed in existing DMCAs; open water sites and existing disposal tracts in Ossabaw, Buttermilk, and Altamaha sounds; or in existing and new ODMDSs. Impacts to the environment are fully discussed within the GA Coastal Consistency Determination (see Appendix D of this EA).

The Corps' Georgia CZM Consistency Determination will be submitted to the Georgia DNR Coastal Resources Division for review and concurrence.

5.16.2 **State of South Carolina Coastal Zone Management Program (see Appendix C)**

NOAA approved South Carolina's Coastal Management Plan (SCCMP) in 1977. Since the proposed action would affect estuarine waters and adjacent wetlands, Savannah District evaluated the proposed action for its consistency with the State's CMP.

In accordance with the CZMA, it was determined that the implementing the proposed DMMP would be carried out in a manner which is consistent with the enforceable policies of the South Carolina Coastal Management Program. The proposed DMMP would not adversely impact any coastal uplands (i.e., beaches or dunes) in South Carolina. Dredged sediments would be placed in an existing upland containment area (Savannah Harbor DMCA 14-B) located in South Carolina. There would be no unconfined placement of dredged sediments in South Carolina. Impacts to the environment are fully discussed within the SC Coastal Consistency Determination (see Appendix E of this EA).

The Corps' South Carolina CZM Consistency Determination will be submitted to the Office of Ocean and Coastal Resource Management of the South Carolina Department of Health and Environmental Control for review and concurrence.

6.0 Public Involvement, Review and Coordination

6.1 Public Involvement and Review

A Notice of Intent (NOI) to prepare an EIS for this project was published in the Federal Register on 20 April 2012. With the NOI, the public and agencies were notified that a 30-day scoping period would be conducted for the proposed project. The public scoping period ended 21 May 2012. Scoping period comments were received from the following:

- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- South Carolina Department of Natural Resources
- National Marine Manufacturers Association
- Atlantic Intracoastal Waterway Association
- Frederica Yacht Club Owners Association
- Jekyll Island Authority
- Private Citizens

Comments and concerns expressed in these comments and letters were used in the preparation of a Preliminary Draft EIS. Subsequently, the Corps determined that its preferred plan (implementing the proposed new DMMP and mitigation plan) would not result in significant impacts to the natural or human environment, and therefore an Environmental Assessment (EA) is the appropriate NEPA documentation.

The EA mailing list is included as Table 6-1. A notice of availability of the EA will be published in local newspapers and a copy of the EA sent to anyone requesting it. The EA will also be available at Savannah District's website. Comments received will be used in preparation of the Final EA and Finding of No Significant Impact (FONSI).

6.2 Required Coordination

Cultural resources investigations and reconnaissance have been coordinated with the Georgia and South Carolina State Historic Preservation Officers, pursuant to the National Historic Preservation Act of 1966, as amended. The SHPOs have reviewed reports that have been prepared that assess the condition of cultural and historic resources that could be impacted by the proposed project. A draft Programmatic Agreement has been developed that describes the actions the Corps would take to comply with the National Historic Preservation Act. That Agreement is included as Appendix K of this EA. Savannah District would undertake further coordination with the SHPOs as further investigations are conducted.

This draft EA contains Savannah District's Consistency Determination with the Georgia Coastal Management Program. The determination will be provided to the GA DNR Coastal Resources Division, which administers the Georgia CZM Program, for review and concurrence, in compliance with the Coastal Zone Management Act (CZMA), 16 U.S.C. 1451 et seq., as amended.

This draft EA contains Savannah District's Consistency Determination with the South Carolina Coastal Management Program. The determination will be provided to the Office of Ocean and Coastal Resource Management of the South Carolina Department of Health and Environmental Control, which administers the South Carolina CZM Program, for review and concurrence, in compliance with the Coastal Zone Management Act (CZMA), 16 U.S.C. 1451 et seq., as amended.

This draft EA contains Savannah District's Section 404(b) (1) Evaluation on the proposed project. This evaluation will be provided to the Georgia Department of Natural Resources, Environmental Protection Division. GA DNR-EPD administers the Section 401 water quality certification program in Georgia under the authority of the Clean Water Act. The Corps will request water quality certification as part of GA DNR EPD's review of the EA. The Section 404(b) (1) Evaluation will be provided to the South Carolina Department of Health and Environmental Control. SC DHEC administers the Section 401 water quality certification program in South Carolina under the authority of the Clean Water Act. The Corps will request water quality certification as part of SC DHEC's review of the EA.

Consultation under Section 7(c) of the Endangered Species Act of 1973, as amended, has been initiated with the US Department of the Interior, USFWS and the US Department of Commerce, NMFS. The Biological Assessment (BA) addressing these issues is included in Appendix B of this EA.

The coordination required under the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661, et seq), is currently being conducted. The preliminary draft Coordination Act Report dated January 2013 is presented in Appendix G of this EA.

Table 6-1: Mailing List for the Draft Environmental Assessment

Federal Agencies
U.S. Army Corps of Engineers, Charleston District
Environmental Protection Agency, Region 4
U.S. Department of the Interior, Regional Environmental Officer
U.S. Department of the Interior, Fort Pulaski National Monument
U.S. Fish and Wildlife Service, Region 4
U.S. Fish and Wildlife Service, Ecological Services Office, Charleston, SC
U.S. Fish and Wildlife Service, Savannah Coastal Refuges
U.S. Fish and Wildlife Service, Ecological Services Office, Townsend, GA
National Marine Fisheries Service, Habitat Conservation Division
National Marine Fisheries Service, Protected Resources Division
Advisory Council on Historic Preservation

Georgia
Department of Natural Resources, Environmental Protection Division
Department of Natural Resources, Coastal Resources Division

Department of Natural Resources, Wildlife Resources Division
Department of Transportation
Georgia Ports Authority
State Historic Preservation Officer

South Carolina
Department of Natural Resources
Department of Health and Environmental Control, Division of Water Quality and Shellfish Management
Department of Health and Environmental Control, Office of Ocean and Coastal Resources Management
State Historic Preservation Officer

Other
Atlantic Intracoastal Waterway Association
Jekyll Island Authority

7.0 Preparers

Role	Name and Affiliation
Environmental Technical Lead	Charles W. (Win) Seyle (USACE)
Section 404(b) (1) Evaluation	David Coleman (Dial Cordy and Associates)
Essential Fish Habitat	Lee Swain (Dial Cordy and Associates)
Fish and Wildlife Coordination Act Report	Jason Evert (Dial Cordy and Associates)
Threatened and Endangered Species; Coastal Zone Management	David Walker (USACE)
Cultural Resources Technical Lead	Julie Morgan (USACE)
Plan Formulation	Thomas S. Jester (USACE)
Socioeconomics	Jeffrey M. Morris (USACE)
Costs	Carol Abercrombie (USACE)
Real Estate	Stephen Bruce (USACE)
Engineering GIS Support	Scott Gobin and Piper Bazemore (USACE)

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