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# **Dredged Material Management Plan**

## **Atlantic Intracoastal Waterway**

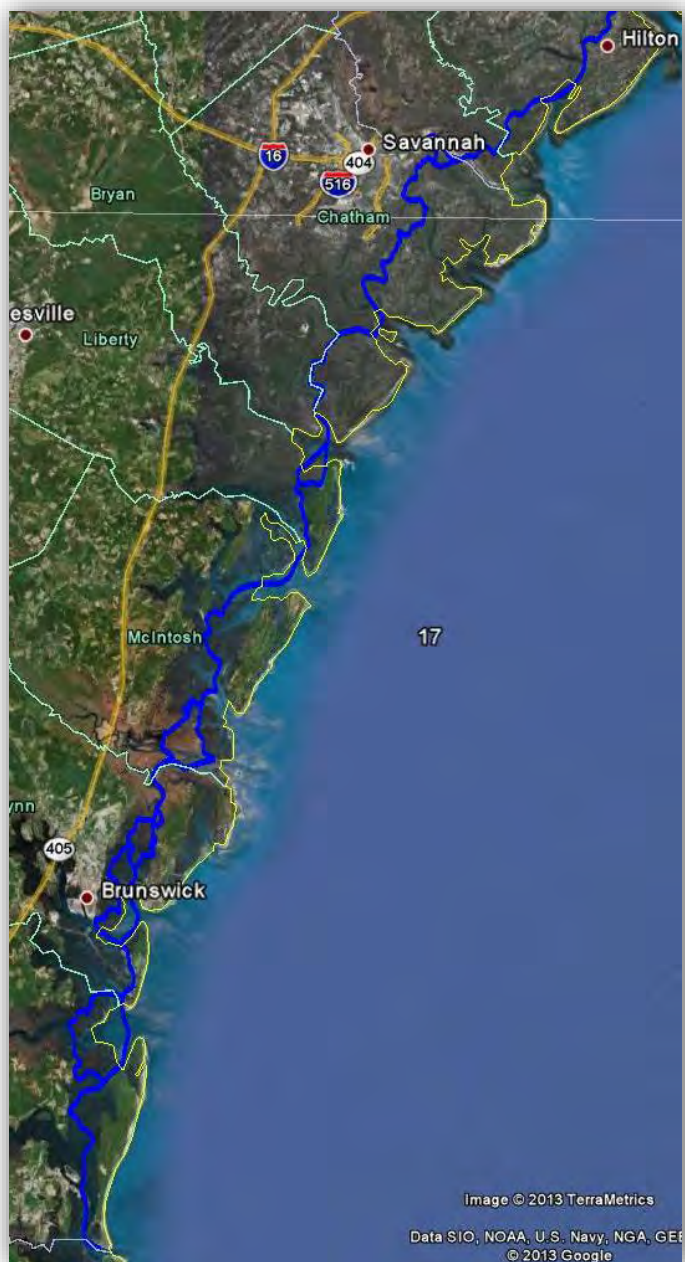
### **Port Royal Sound, South Carolina to**

### **Cumberland Sound, Georgia**

## **November 2015**

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## **Management Plan**



**US Army Corps of Engineers®**  
South Atlantic Division  
Savannah District

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### **List of Acronyms & Abbreviations**

AIWW	Atlantic Intracoastal Waterway
APE	Area of Potential Effect
BATES	Biological Assessment of Threatened and Endangered Species
CESAD	US Army Corps of Engineers South Atlantic Division
Corps	US Army Corps of Engineers
CY	Cubic Yards
DMMP	Dredged Material Management Plan
DMCA	Dredged Material Containment Area
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EWRA	Estuarine Wetland Rapid Assessment Procedure
FONSI	Finding of No Significant Impact
FWOP	Future Without Project Condition
GDNR	Georgia Department of Natural Resources
GDNR – CRD	Georgia Department of Natural Resources – Coastal Resource Division
GDOT	Georgia Department of Transportation
LTMS	Long Term Management Strategy
MHL	Mean High Water
MLW	Mean Low Water
MLLW	Mean Lower Low Water
NAA	No Action Alternative
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
O&M	Operations and Maintenance
ODMDS	Ocean Dredged Material Disposal Site
SHEP	Savannah Harbor Expansion Project
SMMP	Site Management and Monitoring Plan



**DREDGED MATERIAL MANAGEMENT PLAN  
FOR THE  
ATLANTIC INTRACOASTAL WATERWAY  
PORT ROYAL SOUND, SOUTH CAROLINA TO CUMBERLAND SOUND,  
GEORGIA**

## **1.0 Project Description**

The portion of the Atlantic Intracoastal Waterway within the Savannah District Civil Works boundaries 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 on the south, which is located at the Georgia-Florida border, and for the purposes of this document will be referred to as the AIWW. The AIWW is 161 miles long and therefore the waterway was divided into operational reaches to better organize discussion. This Dredged Material Management Plan (DMMP) discusses the shoaling areas, shoaling rates, maintenance requirements and sediment placement areas for each section of the waterway. Maps of the various sections of the AIWW and the sediment placement easements are shown in Figure 1 through Figure 8.

### **1.1 Operational Reaches**

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 infrequently 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 to 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 to SAV-36).

Table 1 summarizes the operational reaches and is a summary of Savannah District dredging data gathered by Taylor Engineering for the U.S. Army Corps of Engineers South Atlantic Division (CESAD) in March of 2011. The average 20-year maintenance volume is based on the average yearly sediment multiplied by twenty years. A bulking factor of 1.5 was applied to all the reaches, unless otherwise noted, because return periods or sediment composition allow a bulking factor lower than 2.0. These values were all based on the 2011 Taylor Engineering Report. The other findings of the report include:

- a. Sixteen of the operational reaches do not require dredging on a regular basis.
- b. Ten operational reaches require dredging once every 1 to 4 years.
- c. Three operational reaches require dredging once every 5 to 9 years.
- d. Six operational reaches require dredging once every 10 to 20 years.
- e. One operational reach is maintained by the Navy, SAV-36; therefore, Savannah District is not responsible for this operational reach.
- f. Operational reach SAV-33 has the largest 20-year volume (7,895,000 cubic yards (CY)), per event dredging volume (461,500 CY), and 20-year required storage volume (15,971,000 CY) of all the Savannah operational reaches.
- g. Four operational reaches have never been dredged.
- h. Thirteen of the operation reaches lack sufficient placement area capacity and are thus unable to meet the 20-year storage volume requirement.
- i. Doboy Sound and Johnson Creek were maintained up to 1978 but now appear to naturally maintain at or below authorized depth.

The current operational practices under which the Savannah District maintains the AIWW were once acceptable to the natural resource agencies as evidenced by completion of the 1976 Environmental Impact Statement (EIS). Since that time, however, the state natural resource agencies have identified impacts associated with some of those practices (e.g. unconfined placement of dredged material) and no longer deem them acceptable. While the states, particularly Georgia Department of Natural Resources – Coastal Resource Division (GA DNR-CRD), have allowed the plan to remain in place until new environmental clearances are obtained, GA DNR-CRD has indicated its intent to revoke the projects Coastal Zone Federal Consistency Determination should the U.S. Army Corps of Engineers (Corps) continue to place dredged sediment material unconfined into saltmarsh areas. As such, identification and approval of the proposed actions contained in these documents will result in new clearances under which the Corps would maintain Savannah District's portion of the AIWW in the future. Upon gaining approvals and clearances outlined in this document, the Corps would operate using the methods described herein. Some of the actions identified in this document require separate environmental clearances that could only be obtained after further investigation (designation of Ocean Dredged Material Disposal Sites). The Corps intends to operate the AIWW using a combination of practices described in Section 5.0 Future Without-Project Condition (placement of dredged material in previously-approved DMCA's 14B, 9A, and Crab Island) until separate environmental clearances are obtained.

The GA DNR-CRD expressed particular concern over eleven high impact areas/reaches on the AIWW, listed below. This DMMP incorporates GA DNR-CRD's concerns into the evaluation of alternatives for each reach.



- Fields Cut
- Elba-McQueen's Cut
- St. Augustine Creek
- Hells Gate
- Florida Passage
- Creighton Narrows
- Little Mud
- South River
- Altamaha Sound
- Buttermilk Sound
- Jekyll Creek

**Table 1: Atlantic Intracoastal Waterway (AIWW) Operational Reaches 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) <sup>1</sup>	Last Dredged Event	Sediment Type	Required 20-yr Storage Capacity Met?	
Port Royal to Ramshorn Creek	SAV-1	552 - 568.5	No Dredging Required							
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							
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	232,000	348,000	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 2-B/3-A and 9-A)	
Skidaway River	SAV-9	585.5 - 591	No Dredging Required					1992 <sup>2</sup>	Mud, Silt	Yes (DMCA 2-B/3-A and 9-A)
Skidaway Narrows	SAV-10	591 - 594	No Dredging Required							
Burnside River to Hells Gate	SAV-11	594 - 600.8	No Dredging Required							
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							
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							
North Newport River	SAV-17	620.5 - 623.9	No Dredging Required							
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							
Front River	SAV-20	639 - 640	No Dredging Required							
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							
Doboy Sound	SAV-23	648.2 - 649.5	No Dredging Required <sup>3</sup>					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							
Frederica River	SAV-31	674 - 677	No Dredging Required							
St. Simon Sound	SAV-32	677 - 680.8	No Dredging Required <sup>3</sup>					1969	Silts, Clays	Yes (Andrews Island)
Jekyll Creek <sup>4</sup>	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							
Cumberland River to Cumberland Sound	SAV-35	692 - 707	18	46,500	51,700	77,550	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.





Figure 1: Atlantic Intracoastal Waterway from mile 552 to 575





Figure 2: Atlantic Intracoastal Waterway from mile 575 to 605



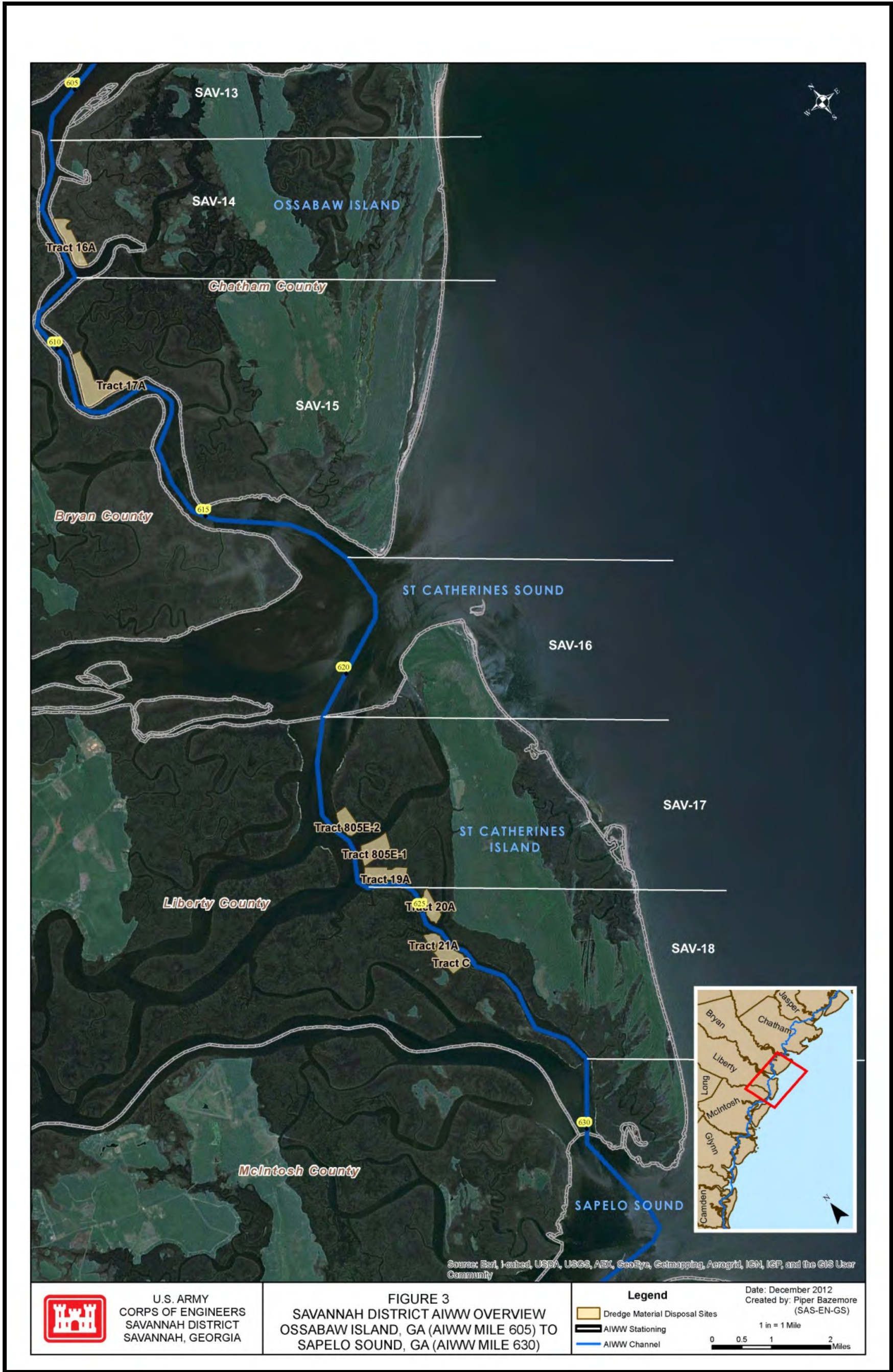


Figure 3: Atlantic Intracoastal Waterway from mile 605 to 630





Figure 4: Atlantic Intracoastal Waterway from mile 630 to 655





Figure 5: Atlantic Intracoastal Waterway from mile 655 to 680





Figure 6: Atlantic Intracoastal Waterway from mile 680 to 705



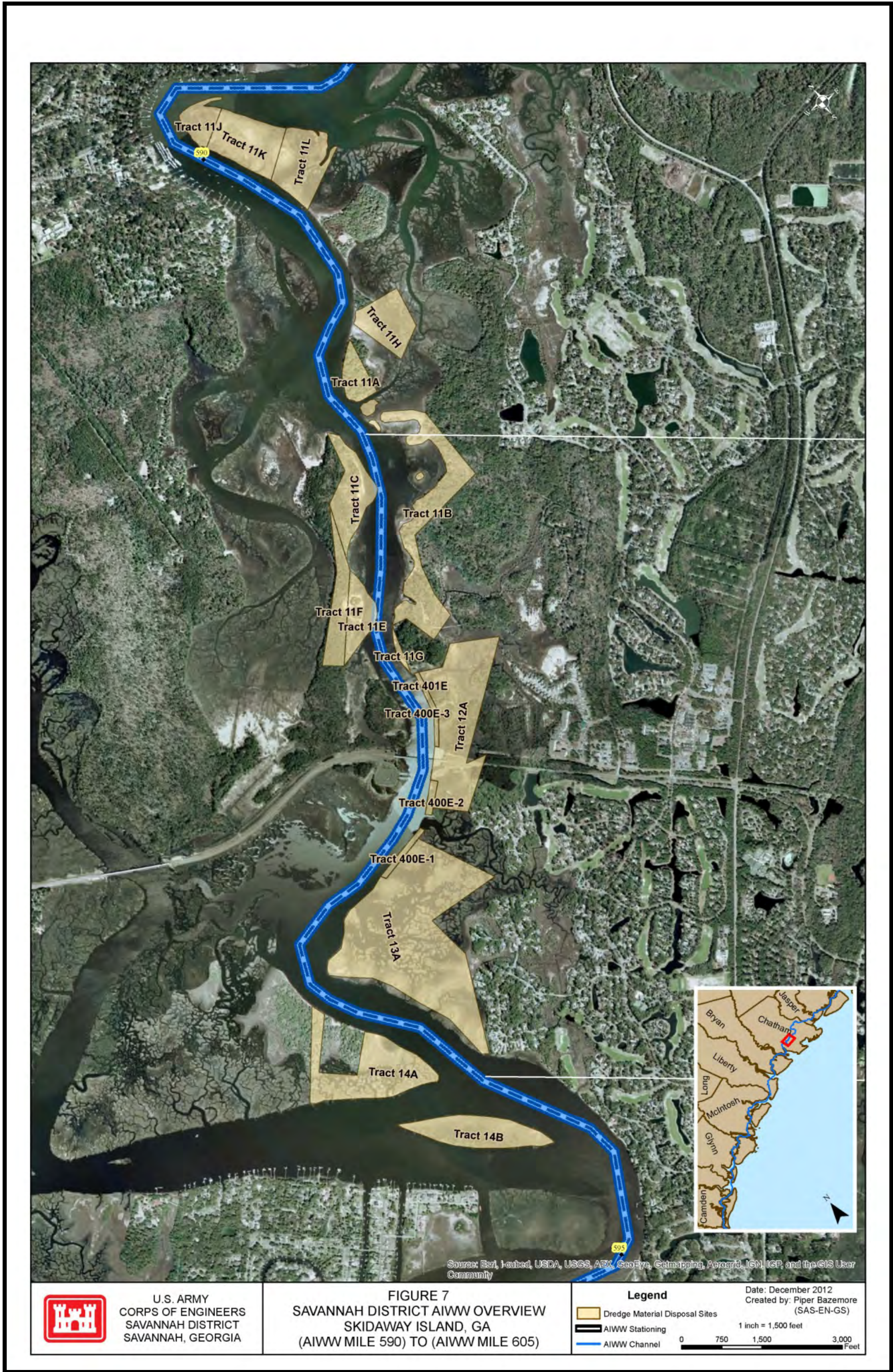


Figure 7: Atlantic Intracoastal Waterway from mile 590 to 605 (SAV-9, 10, and 11)





Figure 8: Atlantic Intracoastal Waterway from mile 700 to 710



## **1.2 Previous Maintenance**

The shoaled reaches of the AIWW were dredged on a consistent basis every two to three years from the 1950's until 1980. After that time, maintenance became more infrequent, with as many as 5 years lapsing between dredging events. In the 1990's maintenance dredging resumed approximately every two years; however, dredging again became more infrequent by the year 2000 (Taylor 2011). The primary reason for the recent reduction of frequency in dredging is a shift in O&M dredging funding priority within the Corps to high use navigation projects. However, the need to dredge still exists. Although the type of vessels using the AIWW has changed over time, the waterway continues to receive substantial use by commercial and recreational boaters. Since O&M dredging funds have been limited, maintenance dredging has been concentrated in critical (shallowest) areas since the 1980's, with other reaches being dredged as funds became available.

## **2.0 Study Scope**

The Atlantic Intracoastal Waterway is one of three waterways that, when combined, stretch along the eastern coast of the continental United States. Together all three form a linear waterway that spans from the Florida Keys to the Manasquan River in New Jersey. The northern portion of the total waterway, called by various smaller project names, starts at the Manasquan River in New Jersey and connects to the Atlantic Intracoastal Waterway at Hampton Roads, Virginia. The Atlantic Intracoastal Waterway is a 739-mile inland waterway system between Hampton Roads, Virginia, and St. John's River, Florida, which enables sheltered passage for waterborne vessels between these two destinations. The portion of the Atlantic Intracoastal Waterway within the Savannah District Civil Works boundaries 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. The southern portion of the waterway system is called the Intracoastal Waterway. This waterway starts at the St. Johns River and connects to the Gulf Intracoastal Waterway at the Florida Keys. Savannah District's portion of the waterway constitutes approximately 22 percent of the Atlantic Intracoastal Waterway.

## **3.0 Authorization and Development History**

The construction and maintenance of the AIWW between Savannah, Georgia, and Fernandina, Florida, was initially authorized by the Rivers and Harbors Act of 1882 (House Document 19, 46th Congress), which authorized modification for portions of the waterway. Additional sections of the AIWW that were not included in the 1882 Act were authorized and incorporated into the project in 1892. The Rivers and Harbors Act of 1892 (House Document 41, 52nd Congress, 1st Session), authorized a 7-foot channel between Savannah and Fernandina. The AIWW between Beaufort, South Carolina, and Savannah, Georgia, was originally authorized by the Rivers and Harbors Act of 1896 (House Document 295, 53rd Congress, 3rd Session). It also authorized a 7-foot channel. After authorization and construction, several other congressional 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 currently-authorized dimensions was passed. The Rivers and Harbors Act of 1937 authorized a 7-foot protected route around St. Andrew Sound, Georgia (Senate Committee Print, 74th Congress, 1st Session) and for a 12-foot channel between Beaufort, South Carolina, and Savannah, Georgia (Rivers and Harbors Committee Doc. No. 6, 75th Congress, 1st Session). 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. 618, 75th Congress, 3rd Sess.). The widths of the AIWW were to be 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 CY. 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. Andrew Sound, the project includes two alternate channels. An alternate 7-foot route was constructed from Doboy Sound to Brunswick, Georgia. It was incorporated into the project in 1912 because it provides more protection for vessels. The River and Harbors Act of 1945 authorized an alternate 9-foot deep and 150-foot wide route in the Frederica River. This alternate route did not require dredging since it had been the main route prior to its abandonment in 1938. The route was substituted for a new route via the 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 authorizing the 12-foot deep channel between Beaufort, South Carolina, and Fernandina, Florida, the River and Harbors Acts of 1937 and 1938 mandated all lands, easements, rights-of-way, and sediment disposal areas needed for the project be furnished free of cost to the Federal Government.

Title 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. Title to all necessary rights-of-way and sediment 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 sediment disposal areas needed for initial work and subsequent maintenance of the 12-foot channel between Savannah, Georgia, and Fernandina, Florida, were approved by the Chief of Engineers on April 4, 1940.

## **4.0 Existing Conditions**

The portion of the AIWW within Savannah District is between Port Royal Sound, South Carolina, (mile 552) on the north and Cumberland Sound (mile 713) on the south, which is located at the Georgia-Florida border. The 161-mile section of the AIWW within Savannah

District is comprised of a 24-mile section in the State of South Carolina, with the remaining 137 miles located in the State of Georgia.

## **4.1 Geology**

The AIWW is contained entirely within the Lower Atlantic Coastal Plain Physiographic Province. As indicated by Johnson, et al., (1974) the Coastal Plain is overridden by many sedimentary strata tilted towards the sea. Limestone of Tertiary and Quaternary age underlies the Coastal Plain to form one of the most productive aquifer systems in the United States. The Tertiary limestone is several thousand feet thick, ranging in age from the Paleocene to the Pliocene epochs.

The chain of barrier islands extending from the South Carolina border into Florida was formed during the last 10,000 years probably as a result of dune ridges and sea level dropping. They formed at low stands of the sea and were inundated when sea level rose again. Barrier beaches formed on the islands from littoral sands. Windblown sand from the beaches became trapped by pioneering vegetation to form the dune ridges which were ultimately stabilized by salt tolerant vegetation. The major habitats contained in the interior of the islands are live oak forests, pine forests, fields and sloughs. The lagoonal systems behind the barrier island fill with sediments and form marshes. Deposition on the marsh continues as the waters spill onto the marsh at high tide, but increases in marsh elevation due to deposition are nearly offset by rising sea levels. The tidal marsh predominantly consists of smooth cordgrass (*Spartina alterniflora*), although there is a zonation of species related to gradients in salinity and elevation (Johnson, et al. 1974).

Barrier island formation has given Georgia and South Carolina both their expansive salt marshes and the "Golden Isles" beaches. Providing access to the islands has been difficult and expensive because of the wide salt marshes. The lack of easy access and a history of large land holdings on the islands have left the majority of them nearly untouched. At present extensive development has occurred only on Tybee Island, St. Simons Island and Jekyll Island. The biggest existing problem of the more inaccessible islands is overgrazing, while the biggest potential problem is over-development. The Federal and state acquisitions of many of these coastal lands provides some protection against over-development.

The total acreage of the six coastal Georgia counties is 1,974,480 acres; of this 358,198 acres are estimated by the U.S. Department of Agriculture, Soil Conservation Service to be salt marshes. Another 1,023,700 acres or 51 percent is forested and about 300,000 acres are agricultural land.

The wetlands through which the AIWW passes are feeding and nursery grounds for birds, mammals and fishes and make up the broad expanse between the barrier islands and the mainland. The water-soil-plant complex forms a nutrient processing area where important phases of the carbon, nitrogen, phosphorous and sulfur cycles take place. Wetlands are sources of organic compounds in detrital food webs. Wetlands act as metering systems, controlling the output of nutrients in non-point source runoff to aquatic systems. Wetlands also serve as buffers between storm driven water and adjacent high ground and help to reduce shoreline erosion. For more information on the value of wetlands see Section 3.8.1 of the AIWW DMMP Environmental Assessment (EA).

#### 4.1.1 Ecological Zones

There are four predominant ecological zones in the study area which lie adjacent to the AIWW. These areas consist of the low marsh zone, the high marsh zone, the shrub zone and an upland community consisting of an oak-juniper-palm forest.

The low marsh zone is regularly flooded by high tides and is generally found below the mean high water (MHW) line. This community is dominated by 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 with high evaporation rates (thus high salt concentrations), the smooth cordgrass is shorter and less productive, which allows other plant species to establish. In salt pan areas, short-form smooth cordgrass is found with glasswort (*Salicornia sp.*) being dominant.

The high marsh zone, beginning at the marsh/land line is regularly flooded by spring tides, but is infrequently flooded during normal high tides. The dominant vegetation in this zone consists of saltmeadow (*Spartina patens*) and salt grass (*Distichlis spicatai*). 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 zone is located at elevations which are occasionally flooded by high spring tides and abnormal high storm tides. This zone 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 (*Borrchia 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.

The upland community, called oak-juniper-palm forest, exists above the shrub zone. This association is essentially a forest border or an upland forest area. These communities are best developed on peninsulas of high ground in the saltmarsh zone with an elevation of 5 feet (Hillestad, 1975). Oak-juniper-palm forest can also be found on dredged disposal sites. The dominant canopy vegetation found in these areas consists of live oak (*Quercus virginiana*), southern red cedar (*Juniperus silicicola*) and cabbage palm (*Sabal palmetto*) with a wide variety of understory vegetation. Commonly, shrubs and vines associated with this vegetation type consist of wax myrtle, Florida privet and sawtooth palmetto (*Serenoa repens*).

## **4.2 Hydrology**

The tides and currents in the AIWW vary since the waterway traverses rivers, sounds, estuaries and land cuts as it winds along the coast between the barrier islands of Georgia and the mainland. Generally, the waterway can be considered to have semidiurnal tides; high tide usually varies between 6 and 10 feet above MLLW. Most of the salt marshes that lie adjacent to the waterway are covered twice daily by tidal waters. The few areas that are not covered by normal tides are saturated by seasonal high tides.

The flow from most of the coastal rivers, including the Savannah River and the Altamaha River, constitutes a large source of turbid freshwater, which mixes in the coastal area and slows in velocity. The sediment loads, upon slowing, tend to be moved and deposited according to the tidal regime into the saltmarsh areas. This provides a substrate for the vegetation present, as well as part of the ecosystem's nutrient supply.

## **4.3 Climate**

The climate of southeast South Carolina and Georgia through which the AIWW extends is considered to be temperate. Summers are typically warm and humid and winters are typically mild. Rainfall is abundant and most of the soils located in the region are moist or saturated throughout the year. The total annual average rainfall is 50.1 inches, ranging from a monthly precipitation of 3.18 in January to 8.94 inches in August. The average annual temperature is 66.4° F with an average temperature of 44.1° F in January and 81.4° F in August.

## **4.4 Cultural Resources**

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, objects and 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/Historic resources and American Indian. For a more detailed account on these resources in the project areas, see Section 3.10 of the AIWW DMMP EA.

### **4.4.1 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 of staging areas and any other ground disturbing activities.

### **4.4.2 Cultural Resource Concerns**

Section 110 of the National Historic Preservation Act (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 sediment 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. Only two locations, CLR-04-AIWW and CRL-16-AIWW, are located within disposal or easement tracts. Tract 11-C, located near Skidaway Island, Georgia, is acquired through a land cut easement and no dredged 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.

As part of the investigations for this DMMP, Panamerican Consultants, Inc. conducted a remote sensing survey of the navigation channel in 12 dredging reaches located in Georgia (James 2012). The reaches investigated were those that were routinely dredged or likely to be dredged. These reaches are:

- St. Augustine Creek
- Wilmington River
- Hells Gate
- Creighton Narrows
- Doboy Sound
- North River
- Rockedundy River
- South River
- Little Mud River
- Altamaha Sound
- Buttermilk Sound
- Jekyll Creek

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. After further investigation, 2 (SS 282 and SS 57) of the 11 sites appear to be large paleo-landforms that may indicate the presence of prehistoric sites. These areas were found in St. Augustine Creek and should be avoided. If it is not possible to avoid these areas, additional mapping, sampling, and probing should be performed. The remaining 9 targets were determined to be of no significant cultural resource. For more detail on possible impacts to cultural resources see Section 3.10.3.6 of the AIWW DMMP EA and the Programmatic Agreement (PA) in that document.

#### **4.5 Effects of Previous Maintenance Dredging**

Beginning in 1896, maintenance of the AIWW involved placing the sediments dredged from the river onto marshes located adjacent to the waterway. Most of the 54 million cubic yards of dredged material has been placed atop salt marshes, which run parallel to the river or AIWW. Where natural depths are not sufficient, the authorized depths for the AIWW have been maintained by hydraulic dredging.



This type of sediment excavation and placement involves placing the discharge line onto a previously-formed mound. The heavier material (sand) settles on and around the mound while the finer particles (silts and clays) filter through the marsh. The fines are generally trapped in the surrounding marsh, although some enters finger streams or creeks down slope of the mound.

During its maintenance dredging coordination procedures, Savannah District received numerous comments about this type of dredged material placement because of concerns about damage to the saltmarsh. As more sediment is pumped onto a mound, the height of the mound grows, sediment accumulates on a larger portion of the site, and the site no longer supports the predominant wetland plant along the AIWW -- smooth cordgrass (*Spartina alterniflora*).

Some marsh areas along the AIWW have been altered by the Corps' sediment disposal practices. The resulting vegetative changes vary depending upon placement techniques and the material dredged. In unconfined placement areas 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 placement sites 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, 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, salt grass and sea ox-eye. Wax myrtles, marsh elder and southern red cedars have grown in areas with higher elevations. 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 placement areas form hammocks similar to high and shrub marsh zones. However, some old diked placement areas which do not undergo the shrub marsh phase are occasionally re-vegetated with broomsedge (*Andropogon sp.*), prickly pear cactus (*Opuntia sp.*) and other upland type vegetation. In most instances, diked placement sites 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 and the AIWW DMMP EA.

The conditions discussed above indicate that some wetland vegetation has been altered along the AIWW as a result of the unconfined sediment placement operations. Such unconfined placement may have less impact on the environment as some other methods. Additionally, in areas where uplands form a positive benefit may result. Diking of the existing saltmarsh placement areas would result in the irretrievable loss of the saltmarsh enclosed within the dikes. In recent years GA DNR-CRD has expressed that the unconfined sediment placement method is not acceptable.

The 1976 AIWW EIS stated that no additional impacts to wetlands would occur through the then proposed unconfined marsh placement operations. As acknowledged in the 1983 DMMP, those placement operations had resulted in wetland impacts that exceeded the amount identified in the 1976 EIS. The District determined the extent of these impacts by comparing the 2011 Tidewater survey to the 1983 DMMP survey. The 1983 DMMP provides the best descriptions of vegetation on the sediment placement sites, so it serves as the baseline against which current impacts are measured. For the sediment disposal tracts that were not included in the 1983

DMMP survey, the District used the 2011 Tidewater survey or an examination of aerial photography of disposal tracts to determine past sediment placement impacts. The tracts that were not surveyed had never been used, had only been used during the initial waterway construction in the 1940s, or had not been used since the 1983 DMMP. For many of the unconfined saltmarsh disposal tracts used since the 1983 DMMP, placement of dredged material into previously intact *Spartina alterniflora* salt marsh has converted the marsh to other types of saltmarsh or to upland. For sediment disposal tracts not used since the 1983 DMMP, many have demonstrated recovery of *Spartina alterniflora* salt marsh after placement of dredged material ceased. To accurately describe the current condition of the saltmarsh disposal tracts, this recovery of saltmarsh must be included in the analysis. These changes can be seen in Table 2.

**Table 2: Wetland Impact from 1983 to 2011**

<b>Disposal Tract</b>	<b>Last Dredged</b>	<b>1983 Impacts (acres)</b>	<b>2011 Impacts (acres)</b>	<b>Impacts Change (acres)</b>
<b>Marsh Tracts Used Since 1983</b>				
15-A	2009	43.1	57.95	14.85
15-B	2009	25	30.86	5.86
16-A	2009	15.4	17.43	2.03
24-A	1999	9.5	14.54	5.04
25-E	1999	31.6	31.39	(0.21)
29-B	1996	35.9	47.83	11.93
30-A	2001	88.9	163.81	74.91
31-A	2009	28.9	28.77	(0.13)
31-B	2009	60.1	107.19	47.09
42-B	2009	17.7	42.04	24.34
43-B	2009	7.5	14.05	6.55
44-A	2009	22.7	22.51	(0.19)
52-A	1999	105.4	127.7	22.30
<b>Marsh Tracts Used Before 1983</b>				
17-A	1977	24.1	7.75	(16.35)
19-A	1973	25.7	12.78	(12.92)
25-A	1982	42.6	32.72	(9.88)
25-C	1982	55.5	33.97	(21.53)
28-A	1940	0	0	0
29-A	1980	19.2	11.94	(7.26)
29-C	1980	53.5	46.76	(6.74)
53-A	1980	107.1	97.02	(10.08)

The effects summarized in Table 2 reveal that the past placement procedures have adversely affected saltmarsh. Because of these impacts, the unconfined sediment placement practice on marshes is no longer environmentally acceptable. Therefore, this is not an acceptable practice for the Future Without Project Condition (FWOP).

#### **4.5.1 Initial Dredging Volumes**

The earliest dredging anticipated under this DMMP would occur in 2016, creating a span of at least seven years between the last dredging event in 2009 and the next anticipated one. Due to the substantial length of time between dredging events, it is also anticipated that the initial dredging volume will not be the same as future maintenance volumes. Savannah District used the July 2012 hydrographic survey to estimate these anticipated volumes. The typical 2-foot overdepth was not used in the initial volume calculation; therefore these volumes show only the amount of sediment material necessary to achieve the authorized 12-foot channel depth. The volumes by reach can be found in Table 3. The higher of the initial volume or the average annual volume was used for both the cost and site capacity analysis.

**Table 3: Initial Dredging Volume by Reach**

<b>Dredging Reach</b>	<b>Operational Reach</b>	<b>Material to be Removed to Achieve a 12-Foot Channel</b>
Port Royal to Ramshorn Creek	SAV-1	0
Ramshorn Creek, SC	SAV-2	14,578
New River	SAV-3	0
Walls Cut	SAV-4	5,380
Fields Cut, SC	SAV-5	8,570
Elba Cut - McQueens Cut	SAV-6	0
St. Augustine Creek	SAV-7	23,100
Wilmington River	SAV-8	24,850
Skidaway River	SAV-9	13,655
Skidaway Narrows	SAV-10	10,000
Burnside River to Hells Gate	SAV-11	0
Hells Gate	SAV-12	150,000
Hells Gate to Florida Passage	SAV-13	0
Florida Passage	SAV-14	15,000
Bear River	SAV-15	0
St. Catherines Sound – N. Newport River	SAV-16	0
North Newport River	SAV-17	0
Johnson Creek	SAV-18	25,140
Sapelo Sound - Front River	SAV-19	0
Front River	SAV-20	0
Creighton Narrows	SAV-21	19,300
Old Teakettle Creek	SAV-22	0
Doboy Sound	SAV-23	5,870
North River Crossing	SAV-24	44,170
Rockedundy River	SAV-25	6,340
South River	SAV-26	46,300
Little Mud River	SAV-27	404,950
Altamaha Sound	SAV-28	86,950
Buttermilk Sound	SAV-29	55,800
Mackay River	SAV-30	16,200
Frederica River	SAV-31	0
St. Simon Sound	SAV-32	0
Jekyll Creek <sup>4</sup>	SAV-33	338,760
Jekyll Creek to Cumberland River	SAV-34	48,200
Cumberland River to Cumberland Sound	SAV-35	74,800
Cumberland River to Cumberland Sound	SAV-36	0

## 4.6 Economics

According to the Waterborne Commerce Statistics Center, the total annual commercial tonnage moved along the Savannah District portion of the AIWW was 116,663 short tons in 2010. The main commodity in 2010 was petroleum products with 64,089 short tons. Other major commodities moved were crude materials (inedible except fuels), soil, sand, rock and gravel, and ore scrap. This follows a consistent drop off since 2003 (shown in Table 4) along with the directions of the traffic.

The traffic identified below as:

- Receipts traffic is cargo whose destination was inside Savannah District’s portion of the AIWW
- “Shipments traffic is cargo that originated inside the Savannah District.
- “Intrawaterway” traffic is cargo that started on the AIWW and went to another waterway system such as the Lower Savannah River.
- “Through traffic is cargo transiting the entire 161 miles that make up Savannah District’s portion of the AIWW.

**Table 4: Savannah District Short Tons by Year and Direction**

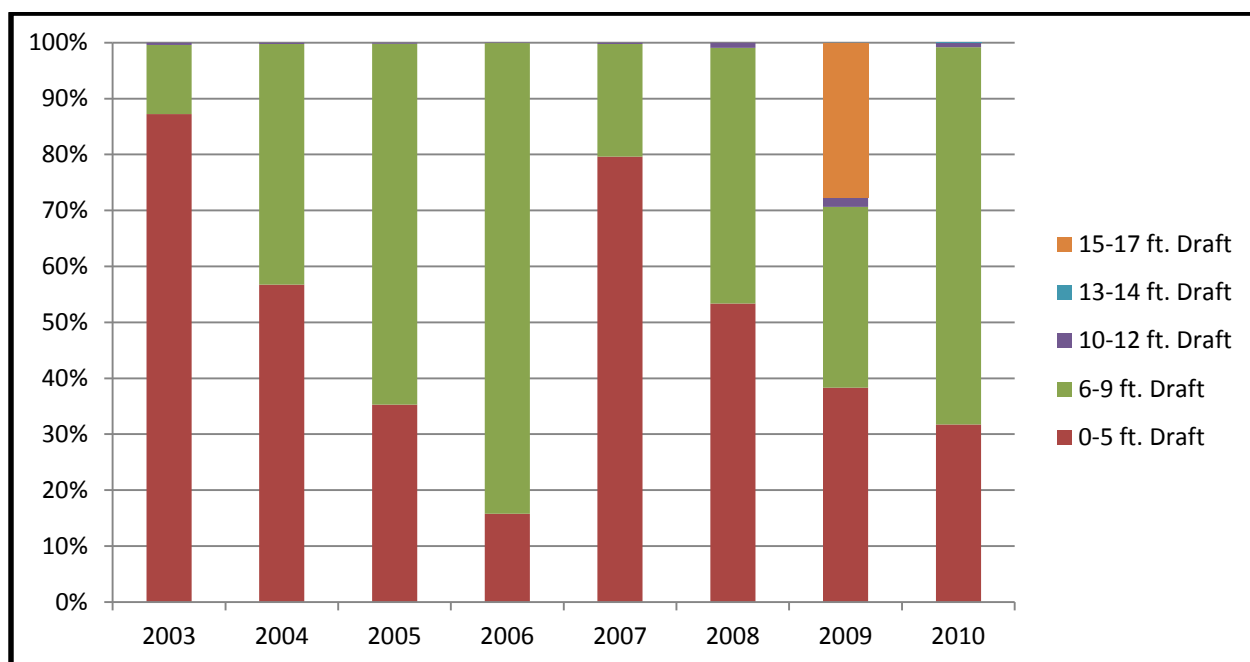
Year	2003	2004	2005	2006	2007	2008	2009	2010
<b>Receipts</b>	40	0	0	0	0	0	0	0
<b>Shipments</b>	100	1	0	0	0	1,500	0	2,201
<b>Intrawaterway</b>	1,505	2	7,050	0	0	0	357	597
<b>Through</b>	301,812	303,856	233,440	159,950	147,158	183,007	150,228	113,865
<b>All Traffic</b>	303,457	303,859	240,490	159,950	147,158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

Based on the 2010 data, a total of 113,865 short tons traveled the entire 161 miles that make up Savannah District’s portion of the AIWW. This is 18.3 million ton miles, a record low for cargo over the last eight years. The record high over the last eight years occurred in 2004. In that year, the AIWW supported 303,856 short tons or 48.9 million ton miles of cargo traversing the entire Savannah District.

According to the Waterborne Commerce Statistics Center, the total number of commercial vessel trips has decreased since 2003 (Table 5). In 2009, the vessels that are near or greater than the authorized 12-foot depth spiked in both the number of trips and the percentage of total trips (Figure 9). 2009 is also the only year between 2003 and 2010 that Savannah District performed maintenance dredging on the AIWW. There could be a correlation between level of maintenance of the AIWW and the composition of the commercial fleet that uses it.

**Table 5: Savannah District Trips by Year and Draft**

Year	2003	2004	2005	2006	2007	2008	2009	2010
<b>0-5 foot draft</b>	13,039	6,447	8,665	3,131	7,743	2,135	1,924	1,199
<b>6-9 foot draft</b>	1,846	4,896	15,862	16,683	1,955	1,830	1,620	2,550
<b>10-12 foot draft</b>	61	24	42	12	26	38	84	30
<b>13-14 foot draft</b>	0	0	0	0	0	0	0	1
<b>15-17 foot draft</b>	0	0	0	0	0	0	1,390	0
<b>All Drafts</b>	14,946	11,367	24,569	19,826	9,724	4,003	5,018	3,780



**Figure 9: Percentage of trips by vessel draft**

Commercial and recreational fishing boats make extensive use of the waterway. These vessels, plus touring pleasure craft, make up the majority of waterway users. The total number of vessel trips on the Georgia portion of the waterway for 2008 was 21,000.

In recent years, the channel along the AIWW deteriorated in many places due to insufficient dredging and maintenance. GA DNR contracted with the Carl Vinson Institute of Government at the University of Georgia to determine the economic benefits of recreational boating on the Georgia portion of the AIWW. The study also aimed to identify the extent of loss that might result from a reduction in recreational boating caused by deterioration of the channel. 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.

#### **4.6.1 Additional Justification of Continued Maintenance**

##### **4.6.1.1 Commercial Uses**

There are 14 commercial shellfish harvesting areas along the Georgia coast, three of these areas would be inaccessible without the AIWW. In Thunderbolt, Georgia a yacht repair facility is located along the AIWW and can only be accessed by using the waterway.

##### **4.6.1.2 Recreational Uses**

There are four recreational shellfish harvesting areas along the Georgia coast, three of these areas would be inaccessible without the AIWW. There are six reaches that have recreational marinas and docks that are only accessible from the AIWW.

The Clarke et al., 2008 study assessed the number of recreational users of the AIWW from Georgia. The study determined that in Georgia there are 161,013 registered boats greater than 15 feet in length. Of those boaters, 13,587 are registered in coastal counties and there is an estimated 15,000 boaters that use the AIWW from counties on or within 3 counties of the AIWW. These 15,000 users are part of an estimated 128,810 users of the AIWW that have boats registered in Georgia.

##### **4.6.1.3 Homeland Security Uses**

One of the major commodities shipped on the AIWW is fuel. One of the main recipients of this fuel is the Marine Corps at Parris Island near Beaufort, SC.

#### **4.6.2 Benefit Considerations**

DMMPs are operational documents that outline the methodology for how a navigation project will be maintained. The assumption for benefits is that the AIWW would be maintained at its optimum level in both the future without-project condition and the future with-project condition. The difference in the future without- and with-project conditions is the type of area and where the sediment material would be placed. Since the navigation benefits of maintaining the

authorized project are the same under both scenarios, a least cost analysis was conducted on the feasible alternatives to identify the most cost effective plan that fulfills the planning objective.

## **5.0 Future Without-Project Condition**

The future without-project condition (FWOP) or no action alternative (NAA) in the EA, typically represents how a project would be maintained if nothing were done to change present conditions and expected future dredging and placement operations. As noted in Section 4.0 Existing Conditions, the unconfined placement of sediment in marshes is no longer acceptable. Therefore, the FWOP differs from the sediment placement practices that are presently occurring (existing condition).

All channel reaches need to have a sediment placement site identified so that the District can obtain the environmental clearances required if at some point in the future maintenance dredging needs to be performed in that reach. This protects against the possibility that a reach that is not commonly dredged needs to be dredged at some point in the future.

There are many sediment placement sites on the AIWW where the Project has sediment 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, which has enough capacity for most of the AIWW because there is no limiting factor on the height of the dikes. However, the placement costs may increase when the dike reaches certain heights. The placement sites for the FWOP are listed in Table 6 by reach and shown in Figure 10.

Section 106 of the National Historic Preservation Act and 36 CFR 800, its implementing regulation, require that the Federal Government survey all lands it controls for cultural resources to determine possible impacts. These surveys have yet to be performed on any of the AIWW placement sites; therefore, they would need to occur on any site retained as part of this or any other alternative. Such surveys will cost at least \$25,000 per easement for unimpacted areas and these survey costs would increase as the size of unimpacted area increases.

The FWOP average annual cost to execute the dredging and maintenance of the AIWW in an environmentally acceptable manner is \$28,591,000.



**Table 6: Placement Sites of the Future Without-Project Condition**

<b>Dredging Reach</b>	<b>Operational Reach</b>	<b>AIWW Mileage</b>	<b>Future Without-Project Disposal Site</b>	<b>Dredging Interval (years)</b>
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	



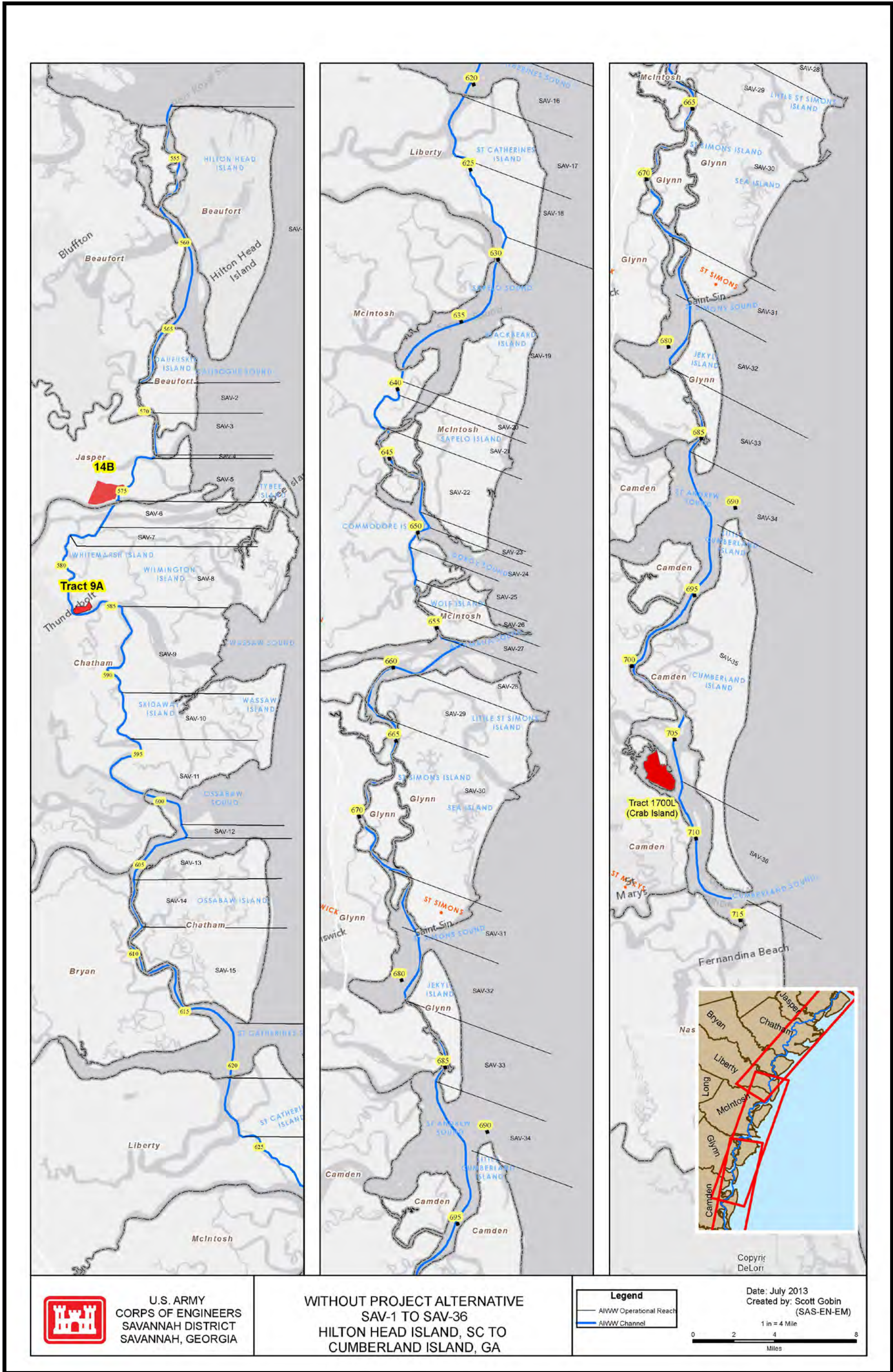


Figure 10: Future Without Project Condition (No Action Alternative)



## **6.0 Problems and Opportunities**

In the past, the majority of the maintenance sediment has been deposited in undiked marsh areas adjacent to the waterway, a procedure that until recently was acceptable. However, this practice is no longer acceptable to the GA DNR-CRD, as stated in their letters dated 21 August 2007 and 25 February 2008. Since the 1983 DMMP and 1976 EIS, scientific research has shown placement of sediment over marsh areas destroys habitat for breeding and nursery areas for many aquatic species. However, a 2011 assessment performed by Tidewater Environmental Services for the Corps, states “Most of the wetland areas onsite show minor adverse impacts to aquatic functions and likely would recover without enhancement activities.”

In summary the problems are:

1. Past sediment placement methods are no longer acceptable.
2. Excessive disposal costs due to limited environmentally acceptable disposal locations
3. Sediment placement is negatively impacting the placement tracts.

In summary the opportunities are:

1. Reduce marsh impacts from sediment placement operations.
2. Use sediment material for some type of beneficial use.

### **6.1 Objectives and Constraints**

The Corps developed and identified the best plan for long-term maintenance dredging of the AIWW. This includes identification of the amount of sediments to be removed to maintain the authorized depth in each channel reach and where to place the maintenance dredging materials.

The objectives that were identified for this study and new plan were:

1. Identify sufficient environmentally acceptable sediment storage to meet the 20-year period of analysis at less cost than the FWOP.
2. Identify a sediment placement site for every reach.
3. All sediment placement methods must be technically sound.

The identified constraints for this study and new plan were:

1. All sediment placement operations need to be environmentally acceptable.
2. The plan should not increase the level of environmental impacts from sediment placement operations.
3. The plan should not impact cultural resources either in the navigation channel or in the sediment placement sites.

## **7.0 Alternatives to the Future Without Project Condition**

### **7.1 Management Measures Considered for Sediment Material Placement**

After the coordination (Appendix A) with GA DNR-CRD, the Corps developed, investigated, and considered various management measures. These measures were developed to differing levels of detail as the study progressed. Measures were eliminated from consideration at various stages of the process, some before alternative plans were assembled from the management measures. These measures were as follows:

1. New Upland Sediment Placement Site
2. Confined Marsh Sediment Placement Site
  - a. Diked
  - b. Geotextile Tube (geo-tube) confinement
3. Open Water Sediment Placement Sites
  - a. Open Water Sites Along the AIWW
  - b. Ocean Dredged Material Disposal Sites (ODMDS)
4. Existing Upland Sediment Placement Sites
5. Agitation Dredging
6. Beneficial Use of Dredged Material
  - a. Ecosystem Restoration
  - b. Beach Renourishment
7. Agitation Dredging
8. Restoring Historic Flows

#### **7.1.1 Upland Sediment Placement Site**

For upland sites, Taylor Engineering 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. The upland sites identified generally consist of pine forest. For the new upland DMCA, a 10-foot dike height served as the basis for calculating the acreage needed for the proposed DMCA. The acreage provides a rough capacity estimate for planning purposes.

##### **7.1.1.1 Real Estate**

Savannah District Real Estate team members evaluated the real estate aspects of the potential upland sediment placement sites along the AIWW. They gathered information on the subject sites, assessed the feasibility of using the sites as dredged material disposal sites, and estimated the cost of the real estate. They also developed reconnaissance level cost estimates (Table 7) for the real estate required for development of the proposed DMCA.

The District estimated dredging costs (Table 8) using the most recent contracts for AIWW maintenance dredging. It estimated dike construction costs using recent contracts for raising dikes for the Savannah Harbor and Brunswick Harbor Federal Navigation Projects. The Corps was unable to obtain rights-of-entry for any of the proposed new upland sediment disposal sites. Due to the inability to obtain rights-of-entry to any of the sites, dike construction costs for these sites are based on established dike templates and the costs to construct those dikes on stable soil. For these sites, it is assumed that adequate borrow material is available within the site.

The District assumed that all upland sites would require some mitigation before they can be used. It developed reconnaissance-level mitigation costs through aerial infrared photography and the National Wetlands Inventory. Should an upland site be selected for use, a detailed investigation would be performed to determine the exact impacts and costs of mitigation. For more on the mitigation analysis, refer to the EA.

**Table 7: Real Estate Acreage Cost for Proposed Upland Placement Sites**

Upland Site	Dredging Reach	Operational Reach	Upland Site (acres)	Price/Acre	Total Real Estate Costs
Bryan County	Florida Passage/ Bear River	SAV-14/ SAV-15	100	\$30,000	\$3,000,000
Liberty County	Johnson Creek	SAV-18	30	\$25,000	\$750,000
Creighton Island	Creighton Narrows	SAV-21	350	\$15,000	\$5,250,000
Sapelo Island	Doboy Sound/ North River Crossing	SAV-23/ SAV-24	320	\$20,000	\$6,400,000
Darien, GA	Rockedundy River/ South River/ Little Mud River	SAV-25/ SAV-26/ SAV-27	850	\$3,000	\$2,550,000
Glynn County	Altamaha Sound/ Buttermilk Sound	SAV-28/ SAV-29	320	\$38,000	\$12,160,000

**Table 8: Costs to Obtain, Construct, and Use Proposed Upland Disposal Sites**

Upland Site	Dredging Reach	Operational Reach	Real Estate Costs	Construction Costs	Mitigation Cost	Per Event Disposal Cost
Bryan County	Florida Passage	SAV-14	\$3,000,000	\$5,496,000	\$1,205,000	\$453,000
	Bear River	SAV-15				\$1,020,400
Liberty County	Johnson Creek	SAV-18	\$750,000	Not assessed because of lack of need for placement in this portion of the AIWW		
Creighton Island	Creighton Narrows	SAV-21	\$5,250,000	\$15,528,000	\$205,000	\$1,541,000
Sapelo Island	Doboy Sound	SAV-23	\$6,400,000	\$12,900,000	Not assessed because of proximity of local historical resources	
	North River Crossing	SAV-24				
Darien, GA	Rockedundy River	SAV-25	\$2,550,000	\$10,702,000	Not assessed because of difficult access to site for pumping operations	
	South River	SAV-26				
	Little Mud River	SAV-27				
Glynn County	Altamaha Sound	SAV-28	\$12,160,000	\$18,948,000	Not assessed because of Conservation Easement to protect site from development	
	Buttermilk Sound	SAV-29				

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

The upland site nearest to the Florida Passage and Bear River reaches is in Bryan County on Killkenny Creek at around AIWW river mile 608. It is an upland site of 100 acres, part of Parcel ID #075 001 which has a total of 2,208.69 acres and is located in the southeastern corner of the parcel. The property is owned by Savannah Land Holdings, LLC and is under a 20-year plan for residential development. The newly established neighborhood is WaterWays Township. A total of 3,000 housing units are planned. The Ogeechee River from Fort McAllister Marina to the WaterWays Marina could have high traffic, recreation boat/jet ski use. This site is likely not suitable for dredged material disposal.

The tract of land directly south of WaterWays Township, is Parcel # 063 001 and is owned by Rayonier Forest Resources. It has 18,311 acres and compares in upland elevation and location. A tract of land to the southeast of this parcel is owned by the State of Georgia and has 25,283 acres; the Parcel ID is #063-9001. These parcels may be suitable for dredged material placement. With these two other parcels being available, the WaterWays Township parcel was only used as a reference site for real estate and other costs.

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

The upland site nearest to the Johnson Creek reach is in Liberty County on St. Catherines Island, near the southwest corner, between AIWW river mile 626 and 627. It is an upland site of 30 Acres, part of Parcel ID #413 001, which has a total of 14,432 acres. The zoning is DM1 (marshlands) and is classified as exempt status. St. Catherines is owned by the St. Catherines Island Foundation Inc. This Foundation is in a cooperative effort with the New York Zoological Society. The island's interior, is in part a survival center of last resort for endangered species from around the world. Once the populations of these rare animals recover, they are then returned to zoos or to the wild. The island is only accessible by boat. There are several historic homes and a dock located on the island. This site would not be suitable because the reaches that could use this site have no required dredging and one reach with a return period of greater than 20 years.

**7.1.1.1.3 *Creighton Island Site, Operational Reach SAV-21***

The upland site nearest to the Creighton Narrows reach is in McIntosh County on Creighton Island in Sapelo Sound (around AIWW river mile 640). This is an upland site of 350 acres, part of Parcel ID #0074 0002, which has a total of 3,773 acres (1,100 acres of high ground and 2,673 acres of marsh). The zoning is conservation use (V5). The subject 350 acres is in the northeast corner of this parcel around 2,000 feet from the river. The property owners are the Williams Brothers, and the property is only accessible by boat. This site would be suitable for dredged material placement.

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

The upland site nearest to the Doboy Sound and North River Crossing reaches is in McIntosh County on the southeast corner of Sapelo Island (around AIWW river mile 649). The proposed disposal site is located directly south in the historic Hog Hammock community. This is an

upland site of 320 acres, part of Parcel ID #0089 0001, which has a total of 1,376.78 acres. The property is owned by the State of Georgia. A small portion of the subject tract is owned by the Sapelo Island Research Foundation. Sapelo Island is not connected to the mainland by road, but is accessible by ferry. Tourists visit the Island on a regular basis and are offered guided tours. The zoning is E1 exempt. This site would not be suitable for dredged material placement because of the nearby historic resources and ownership.

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

The upland site nearest to the Rockedundy River, South River, and Little Mud River reaches is in McIntosh County in Darien, GA. It is directly west of Highway 99, next to Smith Road (around AIWW river mile 651). This is an upland site consisting of 850 acres, part of Parcel ID #0051 0023, which has a total of 1,352.9 acres. The zoning is agricultural (A5) and is wooded. The assessor believes this area is a pine plantation. The owners are the Williams Brothers. The site does not have water access and the dredging pipeline as well as the outfall pipeline would have to cross Georgia Highway 99. Several small neighborhoods and some vacant lands are located to the east of this site next to the waterway. This site would not be suitable for dredging material placement because a pipeline would have to cross all major north-south routes through Darien, GA.

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

The upland site nearest to the Altamaha Sound and Buttermilk Sound reaches is in Glynn County on the northern end of St. Simons Island, off of Lawrence Road. This is close to Taylors Fish Camp in an area known as Cannons Point (around AIWW river mile 666). This is an upland site consisting of 320 acres, part of Parcel ID # 04-00206, which has a total of 4,393.86 acres. This tract has 3,195.95 uplands and remainder is marshlands. The zoning is planned development and forest agricultural (PD/FA). This is one of the largest undeveloped tracts on the island and 600 acres (including the 320 acres considered in this document) is under contract and will be protected as a public nature preserve. Wells Fargo acquired the land in late 2009 from the Sea Island Company. According to Chief Assessor Robert Gerhardt, a Conservation Easement to protect the site from development has not been filed, but one is expected. This site's current and future situation does not make it a good candidate for dredged material placement.

#### **7.1.1.2 Analysis of Upland Sites**

After the initial assessment of site suitability, feasibility to use the site, and costs, the only sites remaining for consideration in the alternative analysis were a Bryan County Site (excluding the parcel for WaterWays Township), and the Creighton Island Site. The initial Bryan County Site may be hard to obtain. Therefore, the neighboring tracts of comparable elevation and location to the AIWW would be pursued in its place.

#### **7.1.2 Confined Marsh Placement Site**

All sites that were considered as a marsh placement site are marsh tracts on which the Corps already holds sediment disposal easements. A tract could be confined in one of two ways, depending on the quantity of sediment material to be stored in the site. The first is by enclosing the entire tract with an earthen dike and the second is by using geotubes to enclose a portion of

the tract. The geotubes would not provide as great of height as a typical earth dike, so the geotubes provide less sediment storage volume.

#### **7.1.2.1 Previously Used Marsh Site with New Dike Construction**

Based on past experience, the Corps assumed dikes could be constructed at a marsh site in two phases -- an initial 6-foot raising and then raising to a 10-foot target height. The District developed a construction methodology and estimated the costs for the two phased dike construction on previously used marsh disposal sites 5-A, 16-A, 17-A, 19-A, 24-A, 25-C, 25-E, 30A, 32-A, and 52-A. The designs were developed based on one prepared for disposal areas 25-E and 19-A by GeoSyntec Consultants for the Savannah District in 2002 (Table 9). The size of the diked area was based on using the entire easement area for sediment placement. The use of geotubes is assumed to allow construction on a relatively soft foundation using on-site fine-grained material. This is the only feasible borrow source due to the remote location of the marsh sites.

All the sediment placement easements that the Corps holds along the AIWW are for saltmarsh tracts. Therefore, mitigation would be needed to develop the sites into confined dredged material containment areas. The District estimated mitigation costs in the same manner. In a report prepared for Savannah District, Tidewater Engineering identified the acreage of each disposal tract that had been impacted by sediment placement operations prior to 2011. The mitigation cost was determined by multiplying the cost to obtain and preserve one acre of saltmarsh along the Georgia portion of the AIWW by the number of acres at each site that had not been impacted by previous sediment placement operations.

The District calculated sediment disposal costs on a per event basis using the estimated cost per cubic yard to place the material in the marsh site multiplied by the projected per event volume, plus mobilization costs. The costs to place the dredged sediment on the site were developed based on the most recent dredging contracts for the AIWW in the reach closest to that disposal area and the Corps' CEDEP Program. The costs included both the cost per cubic yard to dispose of the sediments and the mobilization and demobilization costs. The Corps determined all per event sediment placement costs in this manner. For more detail on these costs and how they were developed, see the Cost Engineering Appendix.



**Table 9: DMCAs Constructed on Previously Used Marsh Sites**

<b>Dredging Reach</b>	<b>Operational Reach</b>	<b>Marsh Tract</b>	<b>Acres</b>	<b>Construction Costs</b>	<b>Total Mitigation Costs</b>	<b>Per Event Disposal Cost</b>
Wilmington River	SAV-8	3-A	129	\$6,046,000	\$848,000	\$382,000
Florida Passage	SAV-14	16-A	131	\$4,948,000	\$1,246,000	\$398,000
Bear Creek	SAV-15	17-A	245	\$6,593,000	\$2,447,000	\$371,000
Johnson Creek	SAV-18	19-A	98	\$4,401,000	\$976,000	\$463,000
Creighton Narrows	SAV-21	24-A	130	\$11,173,000	\$2,944,000	\$1,534,000
	SAV-21	25-C	130			
	SAV-21	25-E	43			
Rockedundy River	SAV-25	30-A	120	\$4,484,000	\$1,246,000	\$467,000
Little Mud River	SAV-27	32-A	281	\$6,480,000	\$817,000	\$1,401,000
Jekyll Creek	SAV-33	52-A	116	\$7,221,000	\$845,000	\$2,265,000

#### **7.1.2.2 Geotube Confinement**

Geotubes can be used to confine smaller quantities of sediment material than dikes at a reduced cost. The District determined that geotubes would be most effective when used in conjunction with open water placement. With this combination, sediment material that is not suitable for open water would be deposited in the geotube confined area. The reaches considered for open water placement can be seen in Table 10.

#### **7.1.3 Open Water Placement**

There are two types of open water placement that are considered environmentally acceptable for the AIWW. They include open water placement sites along the AIWW when the sediment is predominantly sands and at an ODMDS. Both these options have requirements that must be met in order for them to be used. Those requirements are discussed in the following sections.

##### **7.1.3.1 Open Water Sites along the AIWW**

Sediment analyses are used to identify the physical and (sometimes) chemical characteristics of the sediment to be dredged. Those sediments classified as sand would continue to be deposited in open water sites, while those classified as sand and silts would be placed into diked marsh tracts (using geotextile tubes). Grain size analysis would be performed before each dredging event at any reach where open water disposal is the preferred method to verify that the sediment meets state requirements (predominantly sands). All the reaches using an open water site are in Georgia and follow GA DNR-CRD placement protocols.

The South Carolina Department of Natural Resources has stated that they would not approve open water disposal of dredged material, except in approved ODMDS or for nourishing seriously eroded beaches. They would also consider other beneficial uses of dredged material other than beach nourishing where appropriate. These requirements were stated in a letter to the Corps dated 21 May 2012.

In December 2011, GA DNR-CRD stated in a meeting that open water placement could occur in Georgia when the sediment is 80 percent or greater sand, and reaches where the sediment is 51 to 79 percent sand will be considered on a case-by-case basis. Open water disposal would not be acceptable for sediments containing less than 51 percent sand. GA DNR-CRD reiterated that position in June 2012. Savannah District assumed that only reaches with greater than 80 percent sand would meet this requirement because any other percentage may not be allowed to use open water disposal. These criteria leave only three AIWW channel reaches able to use open water placement. Those reaches are shown in Table 10, along with the per event sediment placement costs for the open water disposal.

**Table 10: Open Water Placement Sites**

Dredging Reach	Reach	AIWW Mileage	Material Type	Volume Per Event (CY)	Per Event Disposal Costs	20-Year Sediment Storage Volume (CY)	Last Dredged	Material Placement Options
Hells Gate	SAV-12	601.8	Sand, Silt, Clay	154,000	\$1,441,825	1,540,050	2009	Open Water - N & S sides Raccoon Key
Altamaha Sound	SAV-28	658.3	Sand, Silt	108,000	\$783,250	1,080,000	2009	Open Water - Dump Area 32 and 34
Buttermilk Sound	SAV-29	662.6	Sand, Silt	217,000	\$1,177,050	2,170,050	2009	Open Water - Adjacent to 42-C, Dump Area 43 & 44

#### 7.1.3.2 Ocean Dredged Material Disposal Site

New Ocean Dredged Material Disposal Sites can be identified through the Environmental Protection Agency (EPA) designation process. This process typically takes at least 3 years, is likely to cost up to \$3 million, and will require an EIS. This time frame and cost was used for all reaches where the District considered this placement strategy. The size and shape of a new ODMDS were not specifically identified for this study; however, the Savannah Harbor ODMDS was used as an approximation of size to verify that enough capacity would be generated for the 20-year evaluation period. Designation of an ODMDS is an EPA action, so this DMMP identified a location that would be studied if a new ODMDS is selected. This area begins 3-miles off the Georgia shoreline, outside of state waters, and is no more than 8-miles from the Sound used to name the proposed ODMDS. The estimated cost for placing sediment in a proposed ODMDS was based on the maximum 8-mile distance from the Sound, thus basing the investment decision on a maximum cost.

Savannah District believes that a single new ODMDS would not be able to cost effectively serve the sediment disposal needs for the AIWW because of the distance between some reaches and the new ODMDS. As a result, the District believes that two new ODMDS would be needed to minimize the long term sediment placement costs. Spacing the two new ODMDS along the Georgia coast so there is approximately equal distances between the four ODMDS (two existing plus two new ODMDS) would be place them near Sapelo Sound and Altamaha Sound.

If the sediment is found suitable and if there is sufficient sediment storage capacity, the Savannah Harbor and Brunswick Harbor ODMDSs can also be used for the AIWW. Before sediments from the AIWW could be deposited in those existing ODMDS, a sediment analysis would need to be performed on the channel reaches proposed for use, a new Section 103 Evaluation prepared by the District, and EPA concurrence in the sediment's compliance with the site's requirements. Along with this effort, a Site Management and Monitoring Plan (SMMP) would be prepared and the rules for the ODMDSs would be revised to include the reaches of the AIWW that are approved to be placed into one of the ODMDSs.

#### **7.1.4 Existing Upland Confined Sediment Placement Sites**

There are three upland sites along the AIWW that are presently being used that comply with current environmental regulations and are considered environmentally acceptable. These sites are DMCA14B, DMCA 9A, and Crab Island. These sites were discussed in the FWOP and continue as a future management measure because of their low construction cost and lack of mitigation required for their future use.

Another upland DMCA site near the AIWW that is presently used in compliance with current environmental regulations and is considered environmentally acceptable is Brunswick Harbor's Andrews Island DMCA. This site may be available for use for AIWW sediments from those reaches that have low volumes which would not affect the limited sediment storage capacity of the site. Sediments from the Jekyll Creek reach have been placed at this site once before, but afterward the local sponsor of the Brunswick Harbor project verbally told the Corps that large amounts of sediment material could not be deposited there from projects other than the harbor. Part of the St. Simon Sound reach is part of the Brunswick Harbor channel. To use the Andrews Island DMCA, a sediment storage capacity analysis would be required.

#### **7.1.5 Beneficial Use of Dredged Material**

The Corps requires evaluation of the beneficial use of dredged material as a management measure in any DMMP. The two main types of beneficial use are for ecosystem restoration and beach renourishment for storm damage reduction. The District evaluated both of these types of beneficial use. Some AIWW reaches pass along marshes (where ecosystem restoration may be feasible) and other reaches pass within reasonable pumping distance to beaches of Georgia and South Carolina (where beach renourishment could be feasible).

##### **7.1.5.1 Ecosystem Restoration**

The sediment material found in most reaches of the AIWW is very high in silt content and so is only suitable for wetland restoration. The District coordinated with the states, but no sites suitable to this restoration could be identified along the AIWW. Therefore, this measure was not considered further.

##### **7.1.5.2 Beach Placement**

Some reaches of the AIWW have sandy material and beach placement was considered for these reaches. Only one of these reaches is close to a beach that also provides storm damage protection and that is Ramshorn Creek, SC. Therefore, beach placement was carried forward into alternative analysis for only Ramshorn Creek, SC.

#### **7.1.6 Agitation Dredging**

Agitation dredging was only briefly considered as impacts cannot be controlled and the sediment material would not have the proper hydraulics to be excavated from the AIWW as all reaches contain a minimum of one tidal node. This would result in the suspended sediment materials moving around in the reach or transferring to the next reach in the channel but never be removed in a manner that would not increase the shoaling rate of the AIWW. Lacking control of the impacts, location is a large concern with this procedure as there are 14 commercial shellfish harvesting areas along the AIWW that could be adversely impacted by the suspended sediment. As a result, this measure was not carried forward to alternative analysis.

#### **7.1.7 Restore Historic River Flows**

This measure would only be beneficial in the Jekyll Creek reach because the historic flows there were drastically modified when the causeway on State Route 50 to Jekyll Island was built in the early 1950s. Based on the Latham River/Jekyll Creek Glynn County, Georgia Section 1135 Final Ecosystem Restoration Report and EIS prepared by the Corps in June 1999, restoring historic river flows in this area would reduce the amount of sediment in the reach. However, it would not eliminate the sedimentation, so this would need to be performed in tandem with a sediment disposal option. Also, a DMMP does not have the authority to fully investigate or implement a project of this kind. Therefore, this measure cannot be carried forward to alternative analysis.



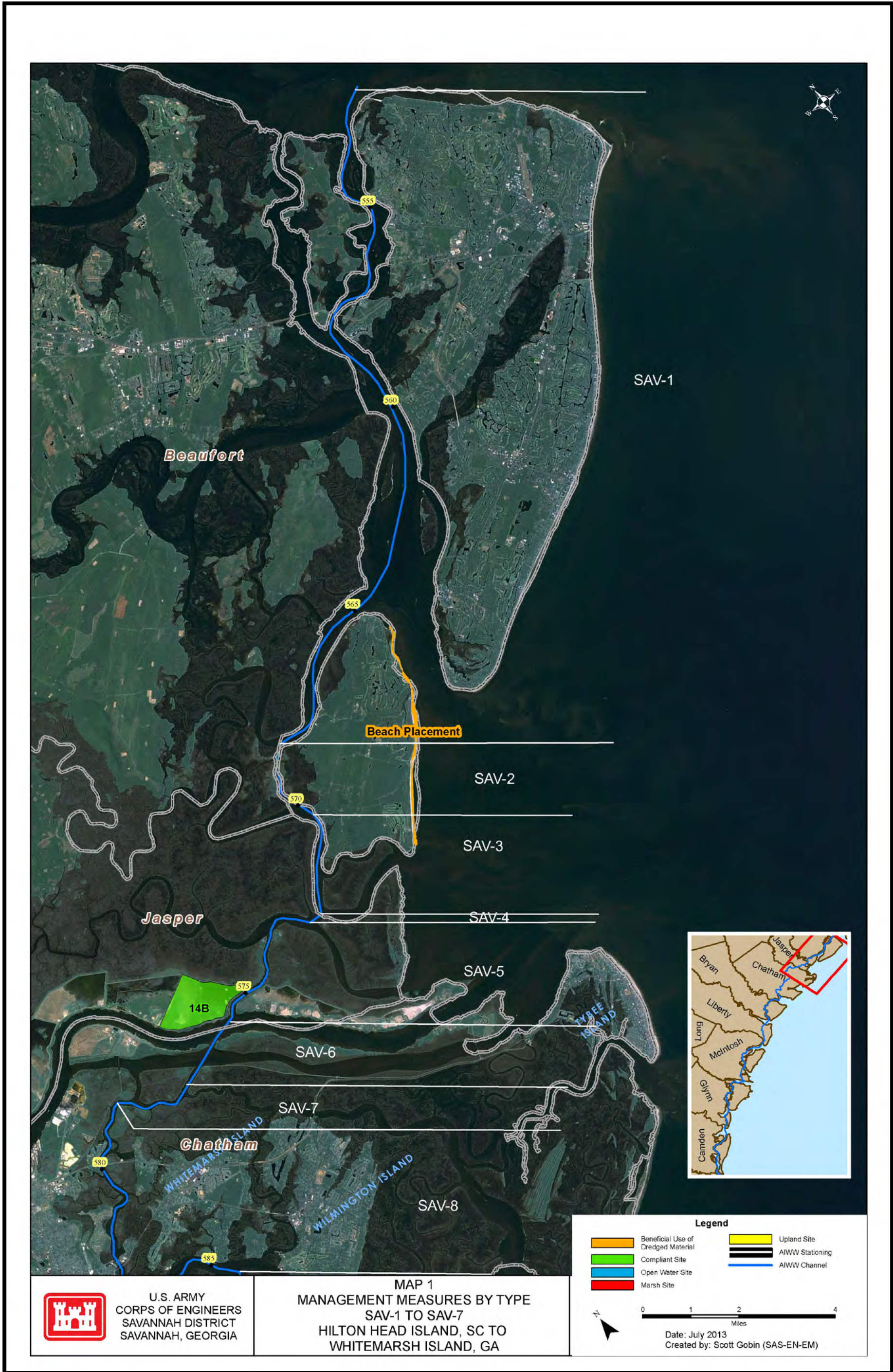


Figure 11: Management Measures Fully Considered from SAV-1 to SAV-7



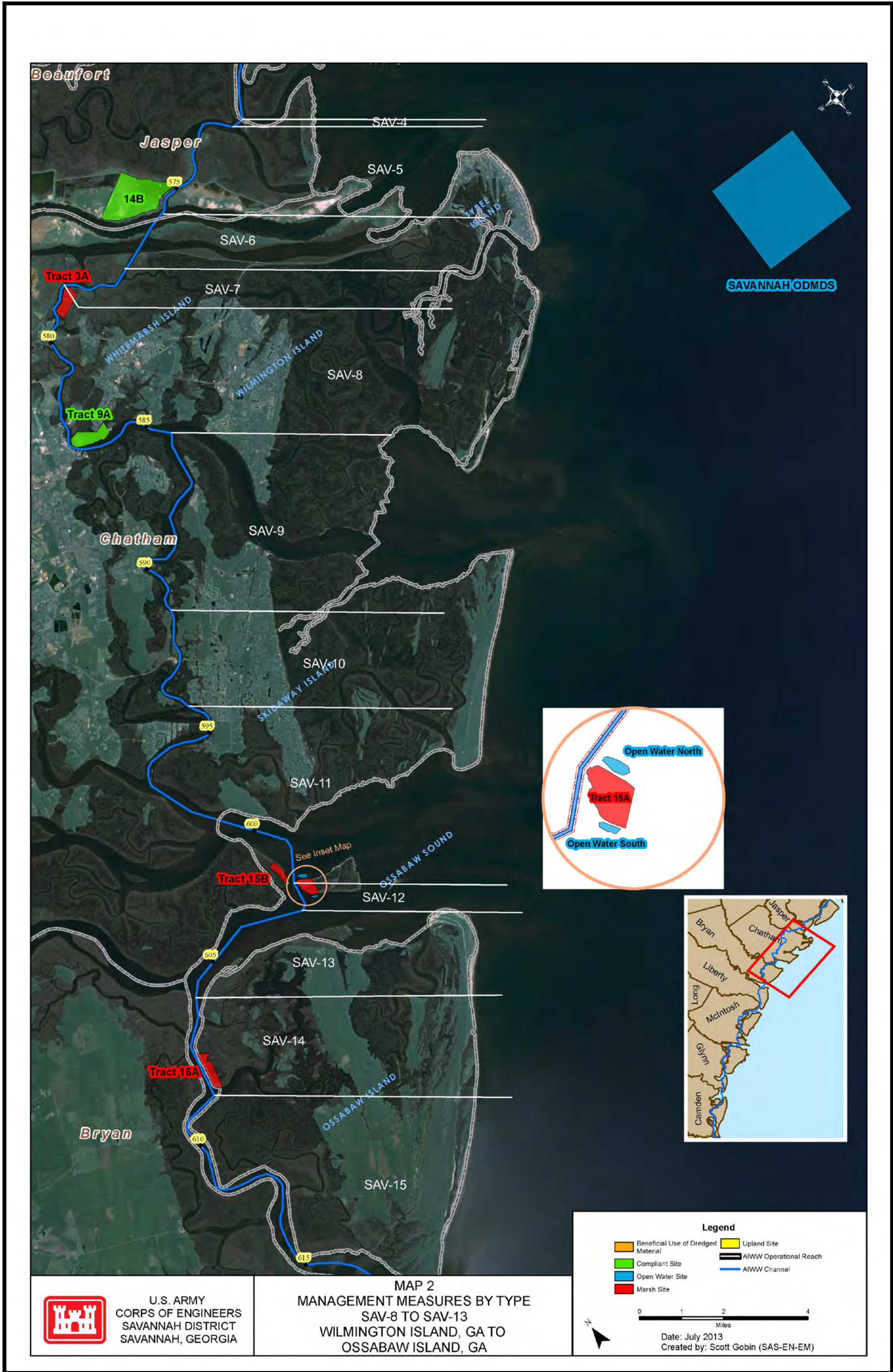


Figure 12: Management Measures Fully Considered from SAV-8 to SAV-13



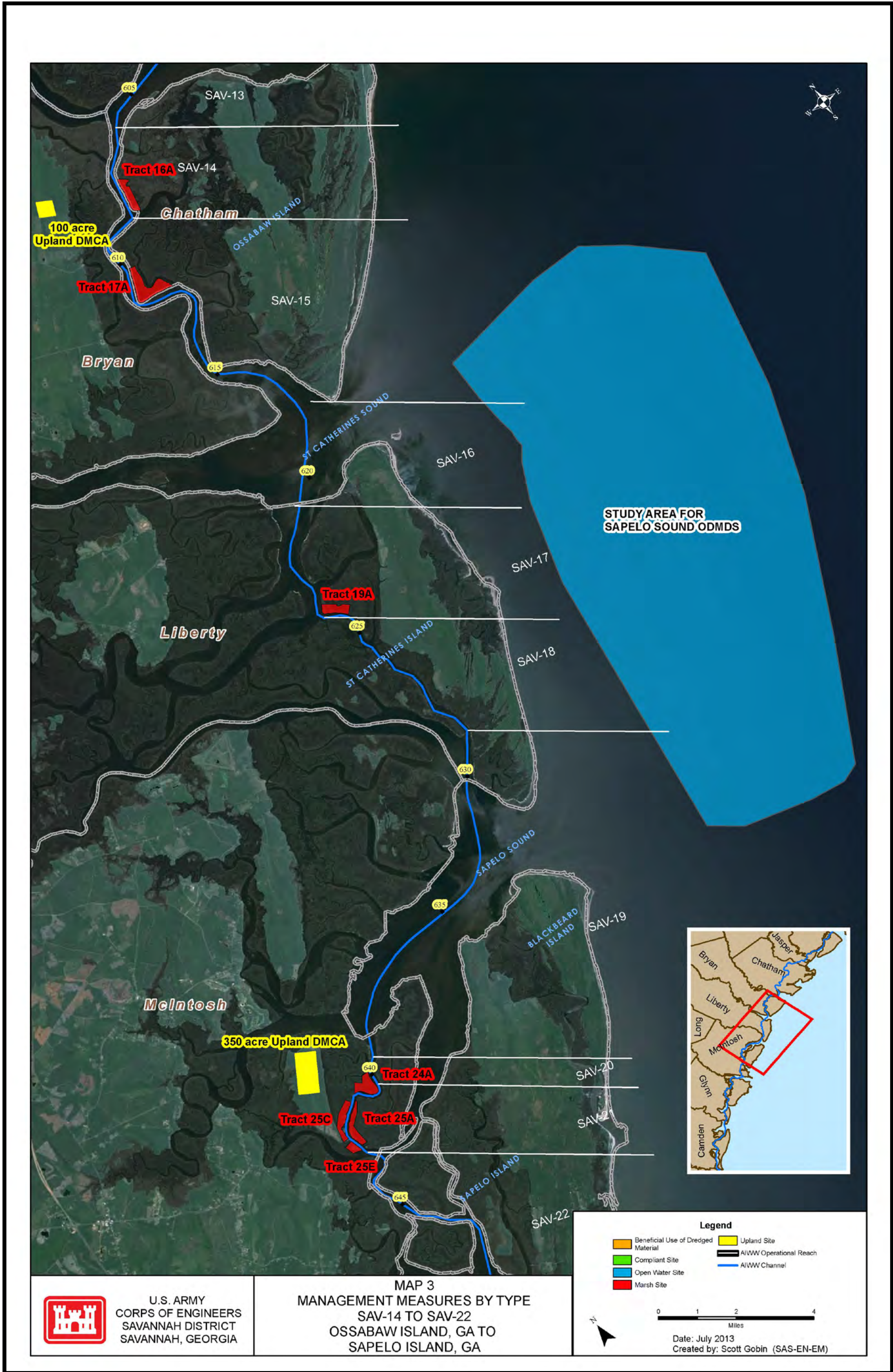






Figure 14: Management Measures Fully Considered from SAV-23 to SAV-25





Figure 15: Management Measures Fully Considered for SAV-26





Figure 16: Management Measures Fully Considered from SAV-27 to SAV-32



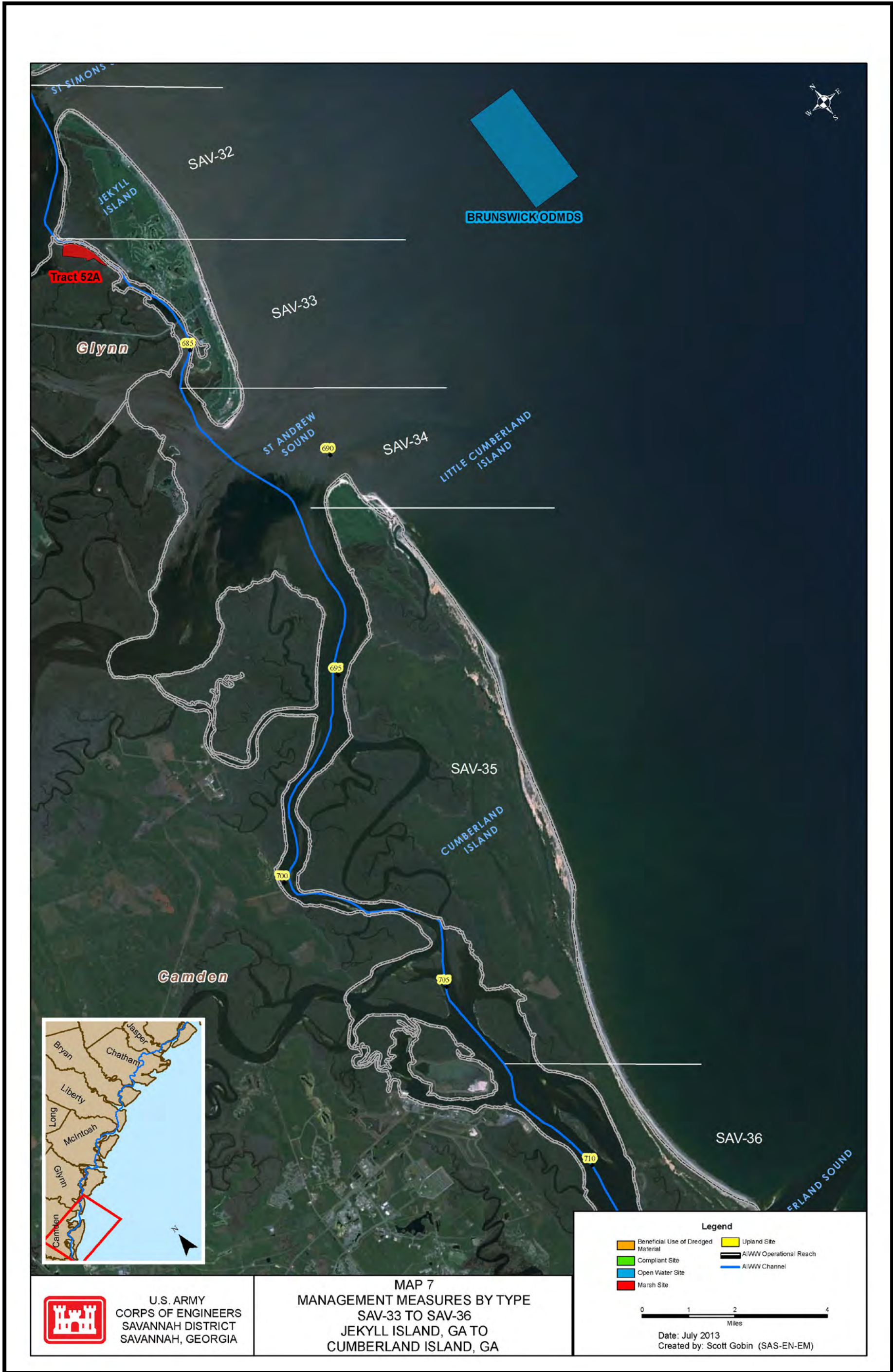


Figure 17: Management Measures Fully Considered from SAV-33 to SAV-36

## **7.2 Combining Measures to form Alternative Plans**

By using sites that already meet performance criteria for sediment placement, construction costs can be reduced because there would be low first costs to obtain and develop the site into a suitable sediment placement site. Those sites would be particularly beneficial when they do not require any material to be removed. Therefore, all alternatives assume that sediments in a channel reach within pumping distance of a site that already meets the environmental criteria and also had no dredging requirements in the past would be placed in that existing site. These reaches are:

- Port Royal to Ramshorn Creek
- New River
- Skidaway River
- Skidaway Narrows
- Burnside Rive to Hells Gate
- Mackay River
- Frederica River
- St. Simon Sound

This was also the case for those reaches that under the current operation would go to an already compliant site. If beneficial use of dredged material was feasible for one of these reaches, it was evaluated as an alternative. The reaches where the sediments currently go to site with no feasible beneficial use of dredged material alternative are:

- Walls Cut
- Fields Cut
- Elba Cut – McQueens Cut
- St. Augustine Creek
- Cumberland River to Cumberland Sound

After making these determinations, it was evident that the remaining measures could be combined across the remaining 23 reaches into many different alternatives. However, by combining measures by placement site, where possible, the most cost effective method would emerge.

Alternative 1 was developed with the main objective of avoiding mitigation and construction costs. This plan would also have the least negative impacts to the environment and would be environmentally acceptable. The only way to avoid both mitigation and construction costs would be to have open water placement in a site along the AIWW that is already environmentally acceptable, using an existing ODMDs, proposing designation of new ODMDs, or using already compliant upland sites. This plan would meet all the project objectives.

Alternative 2 had the main objective of no longer impacting marsh and avoiding open water disposal where possible. This created a plan concentrated on already compliant upland sites, new upland DMCAs, a new ODMD, and existing ODMDs. It was determined the only

reaches that would not be able to use one of these methods are reaches that have a low likelihood of being dredged in the future. This plan would meet all the project objectives.

Alternative 3 had the main objective of no real estate costs and reducing the number of future studies, while still being environmentally acceptable. Avoiding these two things resulted in using diked marsh tracts, already compliant upland sites, an existing ODMDS, and new ODMDSs. This plan would meet all the project objectives.

Alternative 4 was developed to compare present sediment disposal practices to other alternatives, including the FWOP. The current practice is to place sediment materials on the closest placement easement. The plan was modified to avoid impacting sites that have little to no presently impacted wetland areas. This plan would meet most project objectives, but would not be environmentally acceptable.

The results of combining management measures as stated above resulted in four fully evaluated alternatives to the FWOP. These alternatives are listed in Table 11 below and locations are shown by site type in Figure 11 through Figure 17.

Table 11: 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 <sup>1</sup>	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 <sup>1</sup>	Partially diked Tract 3-A and DMCA in Tract 9-A <sup>1</sup>
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 <sup>1</sup>
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 <sup>2</sup>	Undiked Tract 24-A, 25-C, and 25-E <sup>2</sup>
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 Tract 42-B	Open Water Sites 43and 44 (coarse); confined Tract 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 <sup>1</sup>
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 <sup>3</sup>	Undiked Tract 52-A <sup>3</sup>
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

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

### **7.3 Management Measure Considered to Reduce Costs**

The District considered several management measures to reduce overall costs; however, the majority of these measures were found to be infeasible or outside the project authority. One management measure could be implemented independent of sediment placement alternative to reduce project costs. This is discussed below.

#### **7.3.1 Releasing Easements**

To comply with the National Historical Preservation Act and its implementation regulation 36 CFR 800, the Corps must survey all tracts for which it continues to hold a sediment disposal easement. The survey would identify cultural resources on the tract and any impacts from past Federal actions. Therefore, a measure that could reduce the costs of the project is for the Corps to release sediment disposal easements that are no longer needed. These could include easements that have not been used during the life of the project, were used only during the construction phase of the project in 1940 through 1942, and/or ones that are identified as not being needed for the next 20 years of operating the AIWW project. These easements total 2,372 acres, with 1,774-acres located in Georgia and the other 598 acres located in South Carolina. Releasing these easements will not count as mitigation for the AIWW operations because release of an easement would not restore the functionality of wetlands occurring on the site. The sites identified for potential release and their respective acreages are contained in Table 12 and shown in Figure 18.

Conducting the cultural resource survey on these sites would cost a minimum of \$700,000, while releasing the easements would cost approximately \$43,000 if performed as a single action. The details of the process required and the costs breakdown are found in Sections 1.21 and 1.5 of the Real Estate Appendix.



**Table 12: Easements Available for Release**

State Tract	Current Owner (2012)	Acreage
Georgia		
8A	State of Georgia	46.6
9B	State of Georgia	126.0
10C	State of Georgia	57.6
11B	State of Georgia	48.8
11H	State of Georgia	19.5
11K	State of Georgia	24.7
11L	Floride S. Liederman et al.	39.6
12A	State of Georgia	67.9
13A	State of Georgia	162.1
14A	State of Georgia	44.5
14B	State of Georgia	32.8
21A	State of Georgia	34.6
26A	State of Georgia	31.0
27A	State of Georgia	80.2
27B	State of Georgia	101.9
42C	State of Georgia	14.5
45B	State of Georgia	167.6
45C	State of Georgia	59.5
46A	State of Georgia	96.7
47A	State of Georgia	167.3
48A	State of Georgia	59.5
48B	State of Georgia	52.1
49A	State of Georgia	69.5
49B	State of Georgia	103.5
49C	State of Georgia	66.2
Total Acreage in Georgia		1774.2
South Carolina		
Ramshorn-3	State of SC	278.0
Ramshorn-2	State of SC	58.6
100E-1	State of SC	262.0
Total Acreage in South Carolina		598.6
Total Acreage		2372.8





Figure 18: Easements available for release



## **8.0 Evaluation of Alternative Plans**

Section 7 identified and evaluated the management measures available to address the project objectives and constraints. The District removed the measures 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 DMMP. Each alternative was evaluated for the extent to which it meets the project objectives and constraints, and its cost effectiveness. Each of the alternatives designated a placement site for sediments from every reach of the AIWW and would be environmentally acceptable, except Alternative 4 which is not environmentally acceptable.

### **8.1 Alternative 1 (Previously-Approved DMCA's, Geotextile Tubes, and Open Water Sites)**

Alternative 1 meets the project objective of having the required amount of 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 to accept sediments from three channel reaches each, 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 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 site is also required by the Navy who maintain that reach of the AIWW. Sediments from reach SAV-35 are already placed in Crab Island by the Navy and are included in their capacity analysis of that placement site.

Open water placement is part of this alternative. Suitable sediments would be deposited at present AIWW open water sites, the existing Savannah ODMDS, the existing Brunswick ODMDS, a new ODMDS near Sapelo Sound, and a new ODMDS near Altamaha Sound. All open water placement sites would follow the requirements in the Section 404(b)(1) Evaluation and the conditions stated in Section 7.1.3.2 Ocean Dredged Material Disposal Site. These sites all have sufficient capacity to handle the anticipated required O&M materials.

In conjunction with the AIWW open water sites, this alternative would use geotextile tube confined placement. This placement technique would only be for sediments removed from portions of specific reaches that do not meet the requirements for open water placement. The geotextile tubes would be used to confine the O&M sediment materials to previous impacted portions of the placement site. This would convert some previously impacted but low functioning wetlands into uplands over the life of the project. 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 would be placed in previously 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. The average annual cost to develop, mitigate, and implement this alternative is

\$8,151,500. The mitigation for the 35.7 acres of environmental impacts of this alternative would cost an estimated \$2,625,000.

## **8.2 Alternative 2 (Upland and Geotextile tubes, Previously-Approved DMCA's, and Open Water Sites)**

Alternative 2 meets the project objective of having the required amount of 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 each, 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 will be sufficient to accommodate the anticipated required O&M sediment materials. Crab Island already has the capacity for sediments from reach SAV-36 because this is required by the Navy who maintain that reach of the AIWW. Sediments from reach SAV-35 are 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 saltmarsh 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 sediment 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 existing AIWW open water sites, the existing Brunswick ODMDS, and a new ODMDS near Sapelo Sound. All open water placement sites would follow the requirements in the Section 404(b)(1) Evaluation and the conditions stated in Section 7.1.3.2 Ocean Dredged Material Disposal Site. These sites all have sufficient capacity to handle the anticipated required material.

In conjunction with the AIWW open water sites, this alternative would use geotextile tube confined placement. This placement technique would only be for sediments removed from portions of specific reaches that do not meet the requirements for open water placement. The geotextile tubes would be used to confine the O&M materials to previously impacted areas of the placement site. This would convert some previously impacted but low functioning wetlands into uplands over the life of the project. This would be performed to avoid or minimize future impacts to both the marsh and any possible cultural resources on the sites. Placing O&M sediment materials on these easements could impact the function of 71 acres of saltmarsh.

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 channel reaches. The average annual cost to develop, mitigate, and implement this alternative is \$10,931,400. The mitigation

for the 71.3 acres of environmental impacts of this alternative would cost an estimated \$4,991,000.

### **8.3 Alternative 3 (Previously-Approved DMCA's, Diking Marsh Tracts, and Open Water Sites)**

Alternative 3 meets the project objective of having the required amount of 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 each, 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 will be sufficient to accommodate the anticipated required material. Crab Island already has the capacity for sediments removed from reach SAV-36 because this is also required by the Navy who maintain that reach of the AIWW. Sediments from reach SAV-35 are already placed there and the Navy includes that reach in their capacity analysis.

New marsh DMCA's would be constructed to enclose an entire existing sediment placement easement. Enclosing these easements will impact a total of 1,174 acres of saltmarsh. This method of placement has the most environmental impacts of all the alternatives due to its removal of that saltmarsh from the tidal system.

Open water placement is part of this alternative. Suitable sediment would be deposited at existing AIWW open water sites, the existing Savannah ODMDS, and a new ODMDS near Altamaha Sound. All open water placement sites would follow the requirements in the Section 404(b)(1) Evaluation and the conditions stated in Section 7.1.3.2 Ocean Dredged Material Disposal Site. These sites have sufficient capacity to handle the anticipated required O&M materials.

In conjunction with the AIWW open water sites, this alternative would use geotextile tube confined placement. This placement would only occur for O&M materials removed from portions of specific reaches that do not meet the requirements for open water placement. The geotextile tubes would be used to confine the O&M material to previously impacted portions of the placement site. This would convert some previously impacted but low functioning wetlands into uplands over the life of the project. This would be performed to avoid or minimize future impacts to saltmarsh 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 saltmarsh 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 provides the required sediment storage volume for all channel reaches. The average annual cost to develop, mitigate for, and implement this alternative is \$15,044,500. The

mitigation for the 1,211 acres of environmental impacts of this alternative would cost an estimated \$84,805,000.

#### **8.4 Alternative 4 (Previously-Approved DMCA's and Closest Previously-Used 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 each, none of which have a high likelihood of being dredged in the next 20 years. Therefore, the 130,000 CY in DMCA 9-A and Andrews Island 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 are already 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 saltmarsh over the long term.

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

Alternative 4 could result in impacts to cultural resources because O&M sediment materials 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 be 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. The average annual cost to develop, mitigate, and implement this alternative is \$11,315,200. The mitigation for the 497 acres of environmental impacts of this alternative would cost an estimated \$84,805,000.

### **9.0 Trade-off Analysis**

As shown in Table 13, the least cost alternative was Alternative 1. Table 13 shows all development, mitigation, implementation, study, and dredging costs for the Future Without Project Condition and four alternatives over the 20-year period of analysis.



**Table 13: Average Annual Cost of Alternatives by Reach**

Channel Reach Name	Reach Number	Future W/O Project	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Port Royal to Ramshorn Creek	SAV-1	\$30,200	\$30,200	\$30,200	\$30,200	\$30,200
Ramshorn Creek SC	SAV-2	\$76,700	\$84,400	\$305,900	\$84,400	\$84,400
New River	SAV-3	\$26,000	\$26,000	\$26,000	\$26,000	\$26,000
Walls Cut	SAV-4	\$26,000	\$26,000	\$26,000	\$26,000	\$26,000
Fields Cut, SC	SAV-5	\$225,800	\$118,400	\$118,400	\$118,400	\$118,400
Elba Cut - McQueens Cut	SAV-6	\$209,100	\$87,700	\$87,700	\$87,700	\$87,700
St. Augustine Creek	SAV-7	\$958,900	\$644,000	\$644,000	\$1,142,800	\$644,000
Wilmington River	SAV-8	\$268,200	\$296,900	\$296,900	\$282,800	\$108,400
Skidaway River	SAV-9	\$29,500	\$29,500	\$29,500	\$29,500	\$29,500
Skidaway Narrows	SAV-10	\$31,000	\$31,000	\$31,000	\$31,000	\$31,000
Burnside River to Hells Gate	SAV-11	\$33,100	\$33,100	\$33,100	\$33,100	\$33,100
Hells Gate	SAV-12	\$1,393,600	\$616,800	\$616,800	\$978,700	\$505,500
Hells Gate to Florida Passage	SAV-13	\$36,500	\$56,000	\$79,700	\$67,400	\$8,100
Florida Passage	SAV-14	\$97,700	\$95,000	\$109,800	\$145,800	\$53,400
Bear River	SAV-15	\$108,500	\$87,700	\$139,700	\$145,400	\$36,000
St. Catherines Sound - North Newport River	SAV-16	\$42,400	\$31,400	\$41,000	\$93,200	\$7,000
North Newport River	SAV-17	\$43,800	\$31,400	\$41,000	\$93,200	\$7,000
Johnson Creek	SAV-18	\$98,000	\$60,700	\$70,300	\$89,200	\$3,300
Sapelo Sound - Front River	SAV-19	\$47,800	\$28,800	\$60,600	\$103,600	\$40,700
Front River	SAV-20	\$49,900	\$28,300	\$45,500	\$88,500	\$8,700
Creighton Narrows	SAV-21	\$1,679,200	\$632,500	\$731,600	\$1,406,900	\$248,800
Old Teakettle Creek	SAV-22	\$52,200	\$34,700	\$45,500	\$88,500	\$8,700
Doboy Sound	SAV-23	\$45,100	\$50,600	\$187,400	\$54,200	\$5,600
North River Crossing	SAV-24	\$684,800	\$210,300	\$415,800	\$213,900	\$122,400
Rockedundy River	SAV-25	\$484,000	\$153,300	\$299,600	\$156,900	\$58,800
South River	SAV-26	\$1,114,700	\$327,400	\$641,300	\$1,043,600	\$210,500
Little Mud River	SAV-27	\$4,762,500	\$911,500	\$2,166,100	\$1,943,300	\$550,600
Altamaha Sound	SAV-28	\$1,738,400	\$480,200	\$703,300	\$703,300	\$701,500
Buttermilk Sound	SAV-29	\$3,193,900	\$866,700	\$866,700	\$927,400	\$849,900
Mackay River	SAV-30	\$64,000	\$39,300	\$39,300	\$39,300	\$7,900
Frederica River	SAV-31	\$66,200	\$39,300	\$39,300	\$39,300	\$7,900
St. Simon Sound	SAV-32	\$68,300	\$39,300	\$39,300	\$39,300	\$39,300
Jekyll Creek	SAV-33	\$10,499,000	\$1,814,800	\$1,814,800	\$4,542,200	\$996,700
Jekyll Creek to Cumberland River	SAV-34	\$70,600	\$25,300	\$25,300	\$66,500	\$70,600
Cumberland River to Cumberland Sound	SAV-35	\$235,400	\$83,000	\$83,000	\$83,000	\$5,547,600
Cumberland River to Cumberland Sound	SAV-36	\$0	\$0	\$0	\$0	\$0
Total Average Annual Cost		\$28,591,000	\$8,151,500	\$10,931,400	\$15,044,500	\$11,315,200
Total Average Annual Cost (rounded)		\$28,600,000	\$8,200,000	\$10,900,000	\$15,000,000	\$11,300,000

## **10.0 Plan Comparison and Selection**

The Corps desires to avoid impacts to saltmarsh where possible, so Alternative 3 and Alternative 4 are not preferred because they would result in the most impacts to the saltmarsh. The least cost environmentally acceptable alternative would be the best manner to maintain the AIWW and should be selected when all other factors are the same. Since Alternative 1 has the lowest average annual cost and is environmentally acceptable, the District identifies Alternative 1 as the Selected Plan.

## **11.0 Selected Plan**

Alternative 1 is the Selected Plan. It incorporates a mixture of undiked, but confined marsh placement sites, open water placement sites near the AIWW channel, ODMDSs, and existing upland sites to accomplish the goal of maintaining the AIWW in a cost effective, environmentally acceptable manner. The average annual costs to maintain the AIWW using this plan would be \$8,151,500. This plan is shown in Figure 19 through Figure 24.

### **11.1 Sediment Placement Sites**

To implement the Selected Plan, the issues in Table 14 and Table 15 need to be resolved. These are shown by operational reach, even though many of the channel reaches use the same site.

- a. In reaches where open water placement is proposed, the sediments would need to be tested before each dredging contract to confirm they are predominantly sand and meet the State of Georgia's requirement for open water placement (80% sands).
- b. For sediment material that is to be placed in the Brunswick ODMDS, Savannah ODMDS, or a proposed new ODMDS, a Section 103 Evaluation (which includes sediment testing) would need to be performed and EPA concur in the findings of that Evaluation. This testing should be conducted no earlier than 6 years prior to dredging. For development of the new ODMDS, the Corps would prepare an EIS jointly with EPA to evaluate the environmental effects of designating the new site. This process would likely take 3-4 years.
- c. The Selected Plan addresses how Savannah District should maintain the AIWW at its authorized 12 foot depth. It does not address any section of the waterway that is not currently at authorized depth or how to achieve the authorized depth from the current condition.
- d. If a Jasper container terminal is constructed in DMCA 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. Part of mitigating for the lost sediment placement capacity would be providing

alternate storage capacity for sediments removed from the AIWW that would have been deposited in DMCA 14-B. 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.

**Table 14: Selected Plan with Requirements**

Dredging Reach	Operational Reach	Selected Sediment Placement Site	Average Distance to Site (miles)	Required Issue or Action to Resolve
Port Royal to Ramshorn Creek	SAV-1	DMCA 14-B	13.60	None
Ramshorn Creek, SC	SAV-2		6.06	
New River	SAV-3		4.34	
Walls Cut	SAV-4		3.22	
Fields Cut, SC	SAV-5		1.61	
Elba Cut - McQueens Cut	SAV-6		1.36	
St. Augustine Creek	SAV-7		3.41	
Wilmington River	SAV-8		4.73	
Skidaway River	SAV-9	DMCA 9-A if needed	4.10	None
Skidaway Narrows	SAV-10		6.60	
Burnside River to Hells Gate	SAV-11		10.60	
Hells Gate	SAV-12	Open Water (coarse); confined Tracts 15-A and 15-B (fines)	0.28	Sediment Analysis
Hells Gate to Florida Passage	SAV-13	Savannah ODMDS	37	Section 103 Sediment Analysis, Revise rules for Savannah ODMDS, Revise Site Management and Monitoring Plan (SMMP)
Florida Passage	SAV-14	Proposed ODMDS @ Sapelo Sound	36	Designate Sapelo Sound ODMDS
Bear River	SAV-15		30	
St. Catherines Sound - North Newport River	SAV-16		24	
North Newport River	SAV-17		21	
Johnson Creek	SAV-18		17	
Sapelo Sound - Front River	SAV-19		9	
Front River	SAV-20		8	
Creighton Narrows	SAV-21		14	
Old Teakettle Creek	SAV-22		18	



**Table 15: Selected Plan with Requirements (Continued)**

Dredging Reach	Operational Reach	Selected Sediment Placement Site	Average Distance to Site (miles)	Required Issue or Action to Resolve
Doboy Sound	SAV-23	Proposed ODMDS @ Altamaha Sound	17	Designate Altamaha Sound ODMDS
North River Crossing	SAV-24		16	
Rockedundy River	SAV-25		14	
South River	SAV-26		13	
Little Mud River	SAV-27		11	
Altamaha Sound	SAV-28		0.38	
Buttermilk Sound	SAV-29	Open Water Sites 43 and 44 (coarse), Silt confined Tracts 42-B and 42-C (fines)	0.95	Sediment Analysis
Mackay River	SAV-30	Andrews Island DMCA if Needed (GDOT must approve this action before use)	9.58	Perform Capacity loss analysis for Andrews Island DMCA
Frederica River	SAV-31		5.18	
St. Simon Sound	SAV-32		4.75	
Jekyll Creek	SAV-33	Brunswick ODMDS	10	Section 103 Sediment Analysis, Revise Site Management and Monitoring Plan (SMMP)
Jekyll Creek to Cumberland River	SAV-34		19	
Cumberland River to Cumberland Sound	SAV-35	Diked Placement in tract 1700L (Crab Island)	0.81	None
Cumberland River to Cumberland Sound	SAV-36	Dredged by the Navy	N/A	

## 11.2 Costs of the Selected Plan

The initial costs to develop the sites needed to implement this plan are shown in Table 16 in FY14 price levels. The construction, mitigation, and additional study cost will be cost shared with the sponsor, GA DOT, in accordance with the current PCA. The real estate costs will be borne by GA DOT as part of the required Lands, Easements, Rights-of-Way, Relocation, and Disposal Areas (LERRD). All easements will be provided to the Corps in accordance with the current PCA.

**Table 16: Development Costs by Site**

<b>Site</b>	<b>Real Estate</b>	<b>Construction</b>	<b>Additional Study</b>	<b>Mitigation</b>	<b>Total</b>
DMCAs 14-A and 9-A	\$0	\$0	\$0	\$0	\$0
Open Water @ Hells Gate	\$0	\$0	\$0	\$0	\$0
Savannah ODMDS	\$0	\$0	\$500,000	\$0	\$500,000
Sapelo Sound ODMDS	\$0	\$0	\$3,000,000	\$0	\$3,000,000
Altamaha Sound ODMDS	\$0	\$0	\$3,000,000	\$0	\$3,000,000
Open Water @ Buttermilk Sound	\$0	\$0	\$0	\$0	\$0
Andrews Island	\$0	\$0	\$0	\$0	\$0
Brunswick ODMDS	\$0	\$0	\$500,000	\$0	\$500,000
Crab Island	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$0	\$7,000,000	\$0	\$7,000,000

Table 17: Cost Schedule for Selected Plan

Site	Reach			2016 Costs	2017 Costs	2018 Costs	2020 Cost	2022 Costs	2024 Costs	2026 Costs	2028 Costs	2030 Costs	2032 Costs	2034 Costs	2036 Costs	
Ramshorn Creek, SC	SAV-2	568.5 - 569.9	14B	\$489,940		\$0	\$0	\$0	\$0	\$0	\$0	\$489,940	\$0	\$0	\$0	
Walls Cut	SAV-4	572.2 - 572.6	14B	\$203,060		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$203,060	\$0	
Fields Cut, SC	SAV-5	572.6 - 575.3	14B	\$258,100		\$0	\$258,100	\$0	\$0	\$258,100	\$0	\$0	\$258,100	\$0	\$0	
Elba Cut - McQueens Cut	SAV-6	575.3 - 577.4	14B	\$340,100		\$0	\$0	\$0	\$340,100	\$0	\$0	\$0	\$0	\$340,100	\$0	
St. Augustine Creek	SAV-7	577.4 - 578.2	14B	\$1,003,170		\$1,003,170	\$1,003,170	\$1,003,170	\$1,003,170	\$1,003,170	\$1,003,170	\$1,003,170	\$1,003,170	\$1,003,170	\$1,003,170	
Wilmington River	SAV-8	578.2 - 585.5	14B	\$731,860		\$0	\$731,860	\$0	\$731,860	\$0	\$731,860	\$0	\$731,860	\$0	\$731,860	
Hells Gate	SAV-12	600.8 - 602.4	15 A/B Semi- Confined (fine)+In-Water (coarse)	\$609,840 \$1,750,000		\$609,840	\$0	\$609,840	\$609,840	\$0	\$609,840	\$609,840	\$0	\$609,840	\$609,840	
Florida Passage	SAV-14	605.9 - 608.5	Sapelo ODMDS			\$0	\$555,450	\$0	\$0	\$0	\$0	\$555,450	\$0	\$0	\$0	
Bear River	SAV-15	608.5 - 617.5	Sapelo ODMDS			\$0	\$540,360	\$0	\$0	\$0	\$0	\$0	\$0	\$540,360	\$0	
Johnson Creek	SAV-18	623.9 - 629.3	Sapelo ODMDS			\$0	\$609,960	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Creighton Narrows	SAV-21	640 - 642.9	Sapelo ODMDS			\$0	\$2,109,030	\$0	\$2,109,030	\$0	\$2,109,030	\$0	\$2,109,030	\$0	\$0	
North River Crossing	SAV-24	649.5 - 651.4	Altamaha ODMDS			\$0	\$510,080	\$0	\$510,080	\$0	\$510,080	\$0	\$510,080	\$0	\$510,080	
Rockedundy River	SAV-25	651.4 - 652.7	Altamaha ODMDS			\$0	\$434,070	\$0	\$434,070	\$0	\$0	\$434,070	\$0	\$434,070	\$0	
South River	SAV-26	652.7 - 653.5	Altamaha ODMDS			\$0	\$412,380	\$412,380	\$412,380	\$412,380	\$412,380	\$412,380	\$412,380	\$412,380	\$412,380	
Little Mud River	SAV-27	653.5 - 656.4	Altamaha ODMDS			\$0	\$2,559,284	\$1,646,360	\$1,646,360	\$1,646,360	\$1,646,360	\$1,646,360	\$1,646,360	\$1,646,360	\$1,646,360	
Altamaha Sound	SAV-28	656.4 - 660.1	Altamaha ODMDS			\$1,135,080	\$0	\$1,135,080	\$1,135,080	\$0	\$1,135,080	\$1,135,080	\$0	\$1,135,080	\$1,135,080	
Buttermilk Sound	SAV-29	660.1 - 664.5	42B Semi-Confined(fine)+ 43/44 In-water(coarse)	\$1,310,680 \$3,500,000		\$1,310,680	\$0	\$1,310,680	\$1,310,680	\$0	\$1,310,680	\$1,310,680	\$0	\$1,310,680	\$1,310,680	
Jekyll Creek	SAV-33	680.9 - 685.9	Brunswick ODMDS	\$2,819,765		\$2,819,765	\$2,819,765	\$2,819,765	\$2,819,765	\$2,819,765	\$2,819,765	\$2,819,765	\$2,819,765	\$2,819,765	\$2,819,765	
Cumberland River to Cumberland Sound	SAV-35	692 – 707	Crab Island	\$315,656		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$196,230	\$0	
			Mob/Demob 18" Hydraulic Cutterhead Dredge	\$897,000		\$735,000	\$681,000	\$735,000	\$735,000	\$681,000	\$771,000	\$771,000	\$681,000	\$771,000	\$771,000	
-	-	-	894,000 cy	\$5,262,406	-	\$4,058,770	\$1,993,130	\$4,058,770	\$5,130,730	\$1,261,270	\$4,790,630	\$4,548,710	\$1,993,130	\$4,798,160	\$4,790,630	-
TOTAL PIPELINE CONTRACT			90 to 180 cal days	\$6,159,406		\$4,793,770	\$2,674,130	\$4,793,770	\$5,865,730	\$1,942,270	\$5,561,630	\$5,319,710	\$2,674,130	\$5,569,160	\$5,561,630	
PED				\$184,782		\$143,813	\$80,224	\$143,813	\$175,972	\$58,268	\$166,849	\$159,591	\$80,224	\$167,075	\$166,849	
S&A(\$70,000/mo)	-	-	-	\$210,000	-	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	-
TOTAL PIPELINE Costs				\$6,554,188		\$5,147,583	\$2,964,354	\$5,147,583	\$6,251,702	\$2,210,538	\$5,938,479	\$5,689,301	\$2,964,354	\$5,946,235	\$5,938,479	
			Mob/Demob for clamshell /scows/tugs to the ODMDS	\$500,000		\$500,000	\$710,000	\$570,000	\$657,500	\$570,000	\$657,500	\$640,000	\$657,500	\$657,500	\$657,500	
			1,209,500 cy	\$2,819,765		\$2,819,765	\$10,550,379	\$4,878,505	\$7,931,685	\$4,878,505	\$7,497,615	\$5,868,025	\$7,497,615	\$5,852,935	\$7,497,615	



Table 18: Cost Schedule for Selected Plan (Continued)

TOTAL MECHANICAL CONTRACT			90 to 180 cal days	\$3,319,765		\$3,319,765	\$11,260,379	\$5,448,505	\$8,589,185	\$5,448,505	\$8,155,115	\$6,508,025	\$8,155,115	\$6,510,435	\$8,155,115	
PED				\$99,593		\$99,593	\$337,811	\$163,455	\$257,676	\$163,455	\$244,653	\$195,241	\$244,653	\$195,313	\$244,653	
S&A(\$70,000/mo)				\$210,000		\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	
TOTAL Mechanical Costs				\$3,629,358		\$3,629,358	\$11,808,190	\$5,821,960	\$9,056,861	\$5,821,960	\$8,609,768	\$6,913,266	\$8,609,768	\$6,915,748	\$8,609,768	
GEOTEXTILE TUBE & SAMPLING Investigations CONTRACT			25,000 LF	\$5,250,000	\$0											
PED			365 cal days	\$157,500	\$0											
S&A(\$70,000/mo)				\$700,000	\$0											
Total Geotube & Investigations				\$6,107,500	\$0											
Total Contract Cost (Oct 2012 Price Level)				\$15,864,251	\$0	\$8,113,535	\$13,934,509	\$10,242,275	\$14,454,915	\$7,390,775	\$13,716,745	\$11,827,735	\$10,829,245	\$12,079,595	\$13,716,745	\$131,035,245
PED				\$475,928	\$0	\$243,406	\$418,035	\$307,268	\$433,647	\$221,723	\$411,502	\$354,832	\$324,877	\$362,388	\$411,502	\$3,931,057
S&A(\$70,000/mo)				\$1,120,000	\$0	\$420,000	\$420,000	\$420,000	\$420,000	\$420,000	\$420,000	\$420,000	\$420,000	\$420,000	\$420,000	\$5,320,000
ODMDS Development and Permitting																
Sapelo Sound				\$1,000,000	\$1,000,000	\$1,000,000										
Altamaha Sound				\$1,000,000	\$1,000,000	\$1,000,000										
Total w/o Contingencies				\$18,291,046	\$2,000,000	\$10,776,941	\$14,772,544	\$10,969,543	\$15,308,562	\$8,032,498	\$14,548,247	\$12,602,567	\$11,574,122	\$12,861,983	\$14,548,247	\$146,286,302
				2016 Costs	2017 Costs	2018 Costs	2020 Cost	2022 Costs	2024 Costs	2026 Costs	2028 Costs	2030 Costs	2032 Costs	2034 Costs	2036 Costs	
Contingencies (25% initial-30% out years)				\$4,572,762	\$600,000	\$3,233,082	\$4,431,763	\$3,290,863	\$4,592,569	\$2,409,749	\$4,364,474	\$3,780,770	\$3,472,237	\$3,858,595	\$4,364,474	20-year maintenance cost
TOTAL				\$22,863,808	\$2,600,000	\$14,010,023	\$19,204,308	\$14,260,406	\$19,901,131	\$10,442,248	\$18,912,722	\$16,383,337	\$15,046,359	\$16,720,578	\$18,912,722	\$189,257,641
TOTAL (rounded)				\$22,900,000	\$2,600,000	\$14,000,000	\$19,200,000	\$14,300,000	\$19,900,000	\$10,400,000	\$18,900,000	\$16,400,000	\$15,000,000	\$16,700,000	\$18,900,000	\$189,000,000





Figure 19: Selected Plan for Reaches SAV-1 through SAV-8





Figure 20: Selected Plan for Reaches SAV-9 through SAV-13





Figure 21: Selected Plan for Reaches SAV-14 through SAV-22









Figure 23: Selected Plan for Reaches SAV-28 through SAV-32





Figure 24: Selected Plan for Reaches SAV-33 through SAV-36



## **12.0 Impacts of the Selected Plan**

As documented in the EA, the Selected Plan for maintenance dredging will have some adverse environmental impacts. However, the magnitude and short and long-term impacts of the proposed dredging will vary depending on location, time of the year, type of sediment disposal (confined, diked, ocean disposal, and open water), frequency of use of disposal sites and the elevation to which the dredged material accumulates. This plan includes the use of two marsh sediment disposal sites that have been used in the past. Similar impacts associated with the proposed work have previously occurred on these sites. Maintenance of the authorized project through dredging will allow continued commercial and recreational use of the Intracoastal Waterway and benefit nesting birds that use the confined sediment disposal sites.

### **12.1 Water Quality**

The water quality investigations by the Skidaway Institute of Oceanography (Windom, et al, 1974) indicate that the impacts of maintenance dredging using hydraulic dredges have little, if any, long-term detrimental effects on water quality. Hydraulic dredging of shoaled areas causes a temporary increase in suspended solids and turbidity in the immediate vicinity of the dredged area (Biggs, 1967), but that impact is limited in size and duration. The increase in turbidity may cause fish and motile invertebrates to avoid the area temporarily. The disposal of the dredged sediments can cause water quality impacts depending on the type of sediments and the manner in which they are placed on a site. The impacts would be minor and temporary for sandy sediments that meet the State of Georgia's criteria for open water placement or for silty sediments that are confined and allowed to decant to meet water quality standards before the water is discharged.

### **12.2 Impacts on Vegetation**

The placement of dredged sediments at the designated disposal sites will cause some loss of saltmarsh vegetation and the associated wildlife habitat. However, the extent of the vegetation impacts would be relatively minor. Since the sediment disposal areas were previously used in maintaining the AIWW, substantial impacts to saltmarsh vegetation have already occurred. Previous maintenance activities resulted in the development of high marshes, hammocks and upland vegetation becoming established in what was once a smooth cordgrass (*Spartina alterniflora*) community. New sediment disposal on previously-used sites will cause some of the vegetation to be covered by the dredged sediments, but after the dredging activities are complete the disposal areas can be expected to partially recover.

The Corps has sediment disposal easements of approximately 5,170 acres of lands (including open water disposal areas) from the States of South Carolina and Georgia for placement of dredged material to maintain the AIWW. Although these easement areas were used numerous times in the past, a large number of these disposal sites remain in tidal saltmarsh vegetation. The 19 land easement disposal areas currently in use have a total of 4,389 acres, of which approximately 56 percent (2,459 acres) remains vegetated with tidal saltmarsh vegetation (principally smooth cordgrass). Only 35 percent (1,524 acres) of the easement lands are actually used for deposition of dredged material.

### **12.3 Fish and Aquatic Invertebrates**

The adverse impacts of maintenance dredging on fish and motile macroinvertebrates are substantially less than those on benthic organisms. The temporary destruction of bottom habitats and temporary increase in turbidity in dredged areas is a distinct environmental aspect of maintaining the AIWW project. The impacts of dredging on fish and aquatic invertebrates cannot be avoided. Once the decision was made to construct and maintain this navigation project, these impacts were inevitable.

### **12.4 Benthic Organisms**

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 Perlmuter, 1974). Complete or near-complete removal of benthos occurs, 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 this same phenomena. In areas where open water disposal methods are used, the impacts and recovery of benthic organisms are also expected to follow this pattern.

### **12.5 Wildlife**

Impacts to wildlife along the AIWW would be minimal during dredging since wildlife generally avoid the disturbance associated with dredging and sediment disposal. Some impacts would occur to marsh placement sites, as some existing vegetation would be covered with dredged material. Some existing marsh placement sites have older sediment mounds that now support hammock-like plant communities. These provide isolated habitat for wildlife, particularly roosting and nesting habitat for birds. Dredging would be scheduled to minimize disruption of nesting migratory birds if they are found to be using these disposal areas.

### **12.6 Threatened and Endangered Species**

Impacts to threatened and endangered species are expected to be minimal, since these species are mobile and can avoid the immediate area being dredged. The Corps will require dredge contractors to adhere to terms and conditions in the latest Biological Opinion for dredging operations. These measures are designed to minimize impacts to protected species in the area, including marine mammals (whales and manatee) and sea turtles. If threatened or endangered birds are found to be nesting on sediment disposal areas to be used during dredging, the activity will be scheduled to minimize potential adverse affects to these species.

### **12.7 Cultural Resources**

In 2013 the Corps entered into a Programmatic Agreement with the appropriate State Historic Preservation Offices to describe the steps the Corps will take to identify and either avoid, protect, or mitigate impacts to significant archaeological and historic resources along the AIWW. The Corps will implement that Agreement.



## **12.8 Wetlands**

Implementing the DMMP Selected Plan would result in the loss of 37.5 acres of estuarine emergent wetlands (saltmarsh). These wetlands are located within the impacted portions of three existing undiked saltmarsh disposal tracts (Tracts 15-A, 15-B, and 42-B). These wetlands have been impacted to some degree in the past by placement of dredged sediments.

## **12.9 Mitigation Plan**

The Corps will implement a mitigation plan to address adverse impacts to wetlands (mainly saltmarsh) that may result from implementing this DMMP. Unavoidable adverse impacts to wetlands could be mitigated through three types of actions: (1) purchasing credits from approved wetland banks, (2) using in-lieu-fee mitigation, and (3) providing funds to an approved land trust or state natural resource agency to be used for preservation or restoration of saltmarsh. Releasing sediment disposal easements on unneeded tracts would not directly mitigate for wetland impacts, but would make them available for restoration by a third party in the future.

At present, there are no approved tidal saltmarsh mitigation banks within Savannah District that could provide credits for the AIWW. In addition, Savannah District does not have an approved in-lieu-fee program that could be used to mitigate for AIWW impacts.

As mitigation for the adverse impacts expected to saltmarsh from implementation of this AIWW DMMP, the Corps would provide funds to an approved land trust or state natural resource agency for the purpose of preserving or restoring saltmarsh. As with an in-lieu-fee program, the receiving entity would be responsible for selecting, designing, implementing, and monitoring the preservation or restoration sites. The amount of funds proposed to be provided by the Corps is calculated at \$70,000 per acre for 37.5 acres of saltmarsh to be impacted in the five undiked marsh sediment disposal tracts. Funds would be provided in the amount of \$2,625,000 (FY14 price levels).

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

## **13.0 Results of Coordination**

GA DNR-CRD informed the Corps that placing O&M sediment materials in unconfined marsh tracts could not be continued because it is environmentally unacceptable. Upon further coordination with GA DNR, the Corps determined that a study would need to be performed to determine the most cost effective environmentally acceptable method of dredged material placement. The result of this coordination with GA DNR was the objectives, constraints, and management measures that would produce an environmentally acceptable management plan for the AIWW. The coordination with GA DNR can be found in Appendix A of the EA. The study results are the EA and DMMP.

The views of the US Fish and Wildlife Service on the proposed action are included in the Fish and Wildlife Coordination Act Report that can be found in Appendix G of the EA.

### **13.1 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 natural resource agencies were notified that a 30-day scoping period would be conducted for the proposed project. 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

In the course of the investigation, Savannah District reduced the scope of the alternatives. This was primarily the result of a recognition by the District that a DMMP could only be used to evaluate and identify future actions to maintain a navigation project. It could not be used to address impacts from past operations. Those impacts must be addressed separately. As a result, the alternatives considered during the study can be evaluated through preparation of an Environmental Assessment and do not need a full Environmental Impact Statement. The comments and concerns expressed in these comments and letters received in response to the NOI were used in the preparation of the EA and DMMP.

#### **13.1.1 Public and Agency Comments**

A copy of the Draft EA was sent to all parties that provided scoping comments and anyone requesting it. The EA was posted on Savannah District's public website and a notice of its availability was published in the Savannah and Brunswick newspapers. Similarly, the Final EA will be posted on Savannah District's public website. The District's responses to the comments that it received on the Draft EA are included as an appendix in the Final EA.

Upon review the Corps received 15 comment letters, 3 from Federal Agencies (EPA, NOAA, USFWS). The following environmental clearances were obtained:

- South Carolina Coastal Zone Consistency
- Section 404 (b) (1) of the Clean Water Act
- South Carolina Section 401 Water Quality Certification
- Fish and Wildlife Coordination Act
- Endangered Species Act



In response to the comments the Corps has made the following revisions to the proposed action:

- The ILF cost for mitigation was raised from \$10,000 per acre to \$70,000
- The process for designating and expanding the use of ODMDS's was clarified and the EA now reflects the entire process

### **13.2 Agency Coordination**

Cultural resources investigations were 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 assess the condition of cultural and historic resources that could be impacted by the proposed project. A 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 the EA. Savannah District would undertake further coordination with the SHPOs as further investigations are conducted.

The Final EA contains Savannah District's Consistency Determination with the Georgia Coastal Management Program. The determination was 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.

The Final EA contains Savannah District's Consistency Determination with the South Carolina Coastal Management Program. The determination was 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.

The Final EA contains Savannah District's Section 404(b) (1) Evaluation on the proposed project. This evaluation was 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 requested water quality certification as part of GA DNR-EPD's review of the Draft EA. The Section 404(b) (1) Evaluation was also 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 requested water quality certification as part of SC DHEC's review of the Draft EA. The Corps also provide the Evaluation to EPA Region 4 for their review.

Consultation has occurred under Section 7(c) of the Endangered Species Act of 1973, as amended, with the U.S. Department of the Interior, USFWS and the U.S. Department of Commerce, NMFS. The Biological Assessment (BA) addressing these issues is included in Appendix B of the EA.

The Corps has coordinated with the Federal and State natural resource agencies on the proposed action as required by the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661, et seq). The Coordination Act Report dated January 2013 is presented in Appendix G of the EA.

The following environmental clearances to implement the proposed action have not yet been obtained:

- Georgia Coastal Zone Consistency
- Section 103 of the Marine Protection, Research and Sanctuaries Act
- Georgia Section 401 Water Quality Certification

### **13.3 Implementation Responsibilities**

As a measure from the selected plan is completed and receives the required clearance and approvals, it will be used to maintain the designated portion of the AIWW identified in this DMMP. Until then, the FWOP measure would be used to ensure that the sediments removed to maintain the AIWW channel depths are placed in an environmentally safe manner for a reach. The Corps will continue to seek approvals for the new ODMDS sites as funding permits.



## 14.0 Recommendations

After giving full consideration to the environmental, engineering, and economic aspects of the AIWW DMMP and EA, I have concluded the project is justified and environmentally acceptable. I recommend that the Selected Plan be implemented as the new Dredged Material Management Plan for the AIWW within Savannah District. The estimated average annual cost of that plan is \$8,515,500 (FY14 price levels), which will be a Federal responsibility. The non-Federal sponsor must provide necessary lands, easements, rights-of-way, relocations, and borrow or disposal areas required to implement the plan. I also recommend that the sediment disposal easements identified as being unnecessary for future operation of this project be considered for release to the owner of the property.

The recommendations contained herein reflect the information available at this time and current Department policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of the national Civil Works Operations and Maintenance program nor the perspective of higher review levels within the Executive Branch.

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Date

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Marvin L. Griffin  
Commander  
Savannah District  
U.S. Army Corps of Engineers

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