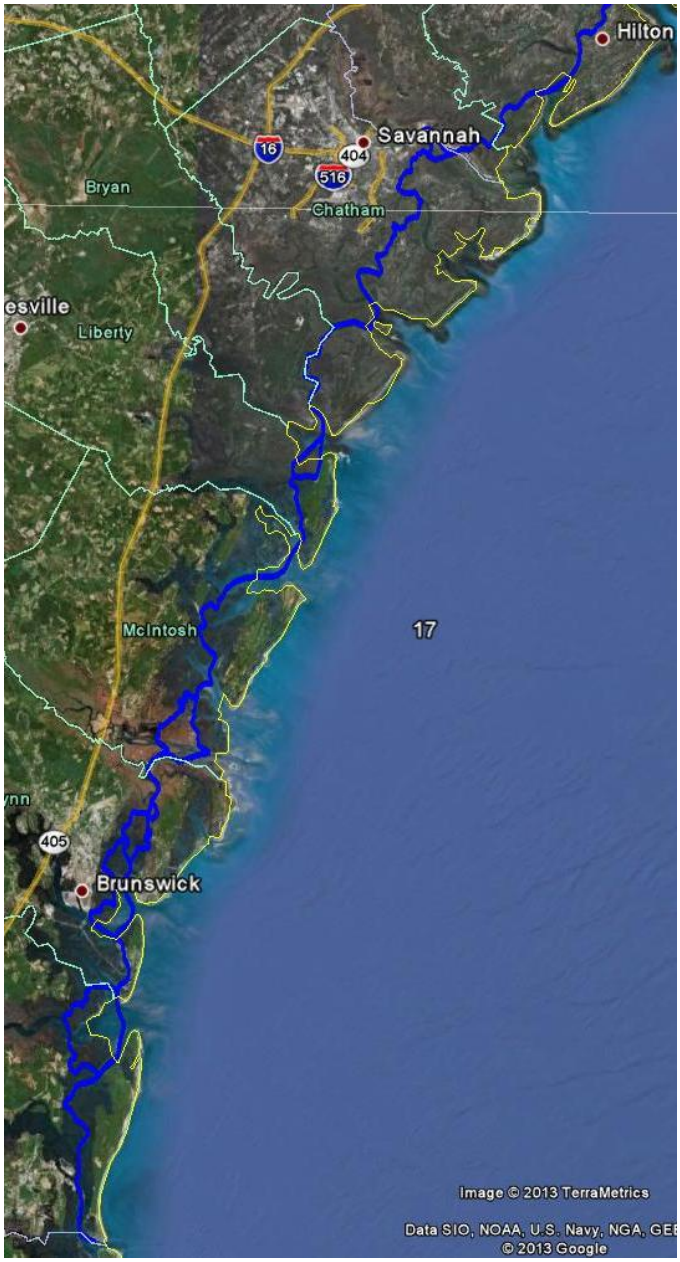
Dredged Material Management Plan
Atlantic Intracoastal Waterway
Port Royal Sound, South Carolina to Cumberland Sound, Georgia
November 2015

Appendix E: Section 404(b)(1) Evaluation



US Army Corps of Engineers®
South Atlantic Division
Savannah District

SECTION 404 (b) (1) EVALUATION

MAINTENANCE DREDGING OF THE ATLANTIC INTRACOASTAL WATERWAY WITHIN THE SAVANNAH DISTRICT AREA OF OPERATION

1.0 INTRODUCTION

Section 404 (b) (1) of the Clean Water Act of 1972 requires that any proposed discharge of dredged or fill material into waters of the United States must be evaluated using the guidelines developed by the Administrator of the U.S. Environmental Protection Agency (EPA) in conjunction with the Secretary of the Army. These guidelines are located in Title 40, Part 230 of the Code of Federal Regulations (40 CFR Part 230). The following Section 404 (b) (1) evaluation is prepared in accordance with those guidelines. This Section 404 (b) (1) evaluation analyzes all activities associated with maintenance dredging of the Atlantic Intracoastal Waterway (AIWW) that involve the discharge of dredged material into waters of the United States. The purpose of the guidelines is to "restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material". Fundamental to these guidelines is the precept that "dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern".

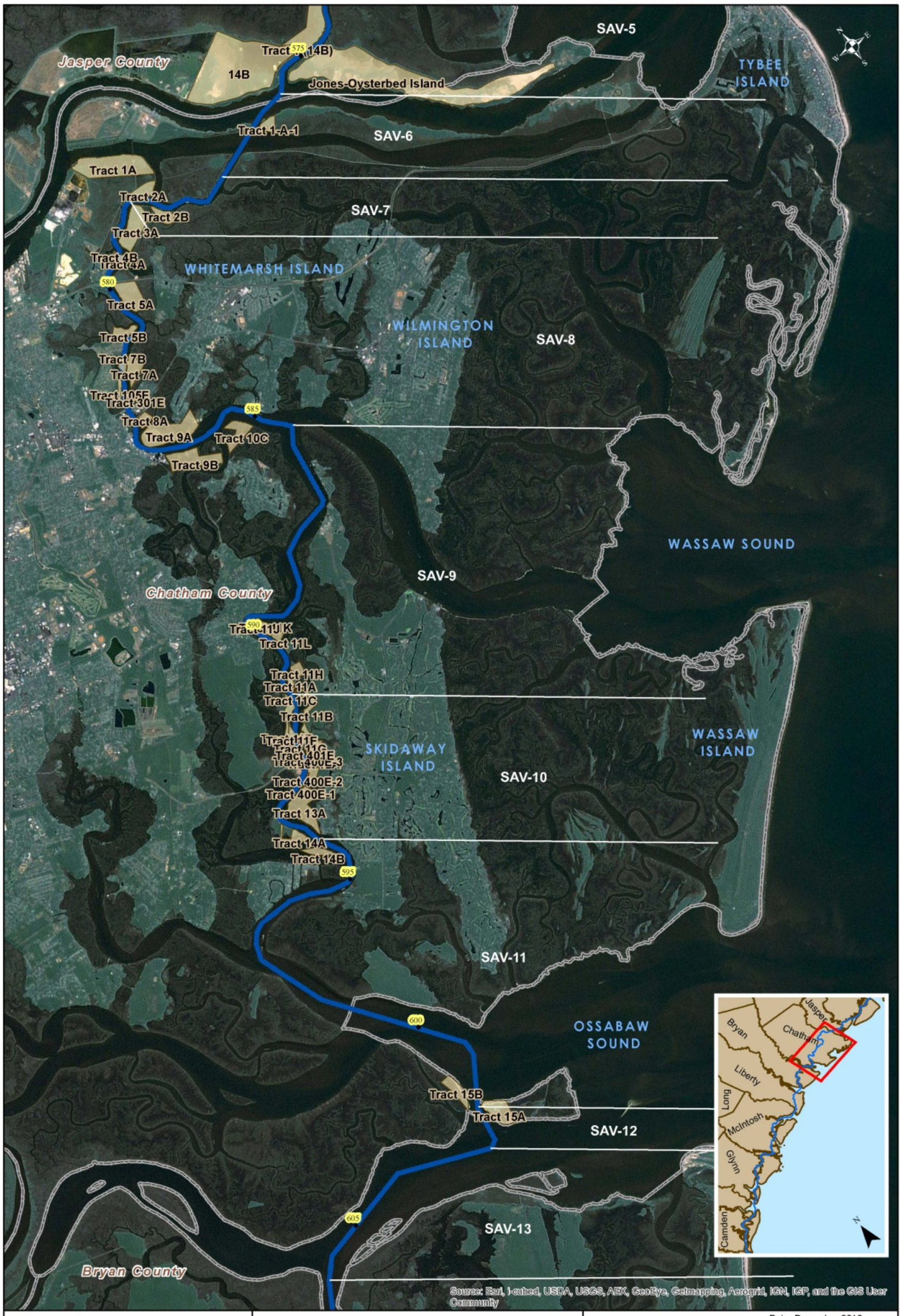
This Section 404 (b) (1) evaluation is being prepared in support of a study to formulate a 20-year maintenance plan for the AIWW within Savannah District. The primary objective of this study is to identify a maintenance scheme that allows continued maintenance of the project while minimizing adverse effects associate with the dredging and the subsequent disposal of the dredged material. The results of the study will be used to develop a 20-year Dredged Material Management Plan (DMMP) for the AIWW.

This Section 404 (b) (1) Evaluation focuses on aspects of the AIWW project that would involve the discharge of dredged material into waters of the United States. An Environmental Assessment (EA) is being prepared which provides a comprehensive analysis of the other environmental issues associated with the project.

2.0 PROJECT DESCRIPTION

The Atlantic Intracoastal Waterway is a 739-mile inland waterway system between Hampton Roads, Virginia, and St. John's River, Florida, which offers a continuous, sheltered passage between these two destinations. The portion of the AIWW within Savannah District is situated 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. Thus, Savannah District's portion of the waterway constitutes approximately 22 percent of the AIWW. Maps of the waterway are shown in Figures 1 - 7. 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.


555
HILTON HEAD ISLAND
SAV-1
560
Beaufort County
565
DAUFUSKIE ISLAND
CALIBOGUE SOUND
Tract 3
570
SAV-2
SAV-3
SAV-4
Jasper County
Tract 2
SAV-5
Tract 1 (14B)
575
14B
Jones-Oysterbed Island
TYBEE ISLAND
Chatham County
Tract 1-A-1
SAV-6
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Jasper
Bryan
Chatham
Liberty
Long
McIntosh
Glynn
Camden
N
U.S. ARMY
CORPS OF ENGINEERS
SAVANNAH DISTRICT
SAVANNAH, GEORGIA
FIGURE 1
SAVANNAH DISTRICT AIWW OVERVIEW
HILTON HEAD ISLAND, SC (AIWW MILE 552) TO
TYBEE ISLAND, GA (AIWW MILE 575)
Legend
Dredge Material Disposal Sites
AIWW Stationing
AIWW Channel
Date: December 2012
Created by: Piper Bazemore
(SAS-EN-GS)
1 in = 1 Mile
0 0.5 1 2
Miles


SAV-5
Jasper County
Tract 575 (14B)
14B
Jones-Oysterbed Island
TYBEE ISLAND
Tract 1-A-1
SAV-6
Tract 1A
Tract 2A
Tract 2B
SAV-7
Tract 3A
Tract 4B
Tract 4A
WHITEMARSH ISLAND
580
Tract 5A
Tract 5B
WILMINGTON ISLAND
SAV-8
Tract 7B
Tract 7A
Tract 105F
Tract 301E
585
Tract 8A
Tract 9A
Tract 10C
Tract 9B
WASSAW SOUND
SAV-9
Chatham County
590
Tract 11K
Tract 11L
Tract 11H
Tract 11A
Tract 11C
Tract 11B
Tract 11F
Tract 11G
Tract 401E
SKIDAWAY ISLAND
WASSAW ISLAND
SAV-10
Tract 400E-2
Tract 400E-1
Tract 13A
Tract 14A
Tract 14B
595
SAV-11
OSSABAW SOUND
600
Tract 15B
Tract 15A
SAV-12
605
SAV-13
Bryan County
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Jasper
Bryan
Chatham
Liberty
Long
McIntosh
Glynn
Camden
N
U.S. ARMY
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SAVANNAH DISTRICT
SAVANNAH, GEORGIA
FIGURE 2
SAVANNAH DISTRICT AIWW OVERVIEW
TYBEE ISLAND, GA (AIWW MILE 575) TO
OSSABAW SOUND, GA (AIWW MILE 605)
Legend
Dredge Material Disposal Sites
AIWW Stationing
AIWW Channel
Date: December 2012
Created by: Piper Bazemore
(SAS-EN-GS)
1 in = 1 Mile
0 0.5 1 2
Miles

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SAVANNAH, GEORGIA

FIGURE 3
SAVANNAH DISTRICT AIWW OVERVIEW
OSSABAW ISLAND, GA (AIWW MILE 605) TO
SAPELO SOUND, GA (AIWW MILE 630)

Legend
Dredge Material Disposal Sites
AIWW Stationing
AIWW Channel

Date: December 2012
Created by: Piper Bazemore
(SAS-EN-GS)
1 in = 1 Mile
0 0.5 1 2 Miles


630
Liberty County
SAPELO SOUND
635
BLACKBEARD ISLAND
SAV-19
SAV-20
640
Tract 24A
SAV-21
SAPELO ISLAND
Tract 25C
Tract 25D
Tract 25BA
Tract 25E
Tract 26A
Tract 27A
645
Tract 27B
SAV-22
Tract 28A
SAV-23
650
SAV-24
Dumping Area 28
DOBOY SOUND
McIntosh County
SAV-25
Tract 29A
Tract 29D
Tract 29B
Tract 29C
WOLF ISLAND
SAV-26
Tract 30A
Tract 30B
SAV-27
655
Tract 31B
Tract 31A
ALTAMAHA SOUND
Dumping Area 32
Dumping Area 34
Tract 34A
SAV-28
DARIEN
Jasper
Bryan
Chatham
Liberty
Long
McIntosh
Glynn
Camden
N
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
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SAVANNAH DISTRICT
SAVANNAH, GEORGIA
FIGURE 4
SAVANNAH DISTRICT AIWW OVERVIEW
SAPELO SOUND, GA (AIWW MILE 630) TO
ALTAMAHA SOUND, GA (AIWW MILE 655)
Legend
Dredge Material Disposal Sites
AIWW Stationing
AIWW Channel
Date: December 2012
Created by: Piper Bazemore
(SAS-EN-GS)
1 in = 1 Mile
0 0.5 1 2
Miles


Bird Island Disposal Area
680
JEKYLL ISLAND
Tract 52B
Dumping Area 52
Tract 52A
52A
Tract 52C
Tract 53A
SAV-33
Glynn County
685
Tract 1500E
690
SAV-34
Umbrella Cut
Tract COE 1
Tract COE 3
Dover Cut
ST ANDREW SOUND
LITTLE CUMBERLAND ISLAND
Tract COE 2
695
Tract COE 4
SAV-35
CUMBERLAND ISLAND
700
Camden County
705
Tract 1700L
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Jasper
Bryan
Chatham
Liberty
Long
McIntosh
Glynn
Camden
N
U.S. ARMY
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SAVANNAH DISTRICT
SAVANNAH, GEORGIA
FIGURE 5
SAVANNAH DISTRICT AIWW OVERVIEW
JEKYLL ISLAND, GA (AIWW MILE 680) TO
CUMBERLAND ISLAND, GA (AIWW MILE 705)
Legend
Dredge Material Disposal Sites
AIWW Stationing
AIWW Channel
Date: December 2012
Created by: Piper Bazemore
(SAS-EN-GS)
1 in = 1 Mile
0 0.5 1 2
Miles

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SAVANNAH DISTRICT
SAVANNAH, GEORGIA

FIGURE 6
SAVANNAH DISTRICT AIWW OVERVIEW
CUMBERLAND ISLAND, GA (AIWW MILE 700) TO
CUMBERLAND SOUND, GA (AIWW MILE 710)

Legend
Dredge Material Disposal Sites
AIWW Stationing
AIWW Channel

Date: December 2012
Created by: Piper Bazemore
(SAS-EN-GS)
1 in = 1 Mile
0 0.5 1 2 Miles


Tract 11J
Tract 11K
Tract 11L
590
Tract 11H
Tract 11A
Tract 11C
Tract 11B
Tract 11F
Tract 11E
Tract 11G
Tract 401E
Tract 400E-3
Tract 12A
Tract 400E-2
Tract 400E-1
Tract 13A
Tract 14A
Tract 14B
595
Jasper
Bryan
Chatham
Liberty
Long
McIntosh
Glynn
Camden
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
U.S. ARMY
CORPS OF ENGINEERS
SAVANNAH DISTRICT
SAVANNAH, GEORGIA
FIGURE 7
SAVANNAH DISTRICT AIWW OVERVIEW
SKIDAWAY ISLAND, GA
(AIWW MILE 590) TO (AIWW MILE 605)
Legend
Dredge Material Disposal Sites
AIWW Stationing
AIWW Channel
Date: December 2012
Created by: Piper Bazemore
(SAS-EN-GS)
1 inch = 1,500 feet
0 750 1,500 3,000
Feet

In 1937, the first piece of legislation that would create the waterway with the dimensions authorized today was passed. The River and Harbor Act of August 26, 1937, provided for a 7-foot protected route around St. Andrew Sound (Senate Committee Print, 74th Congress, 1st Sess.) and for a 12-foot channel between Beaufort, South Carolina, and Savannah, Georgia (Rivers and Harbors Committee Doc. No. 6, 75th Congress, 1st Sess.). On 20 June 1938, a 12-foot channel between Savannah, Georgia, and Fernandina, Florida, with various cut-offs, and an anchorage basin at Thunderbolt was authorized (House Doc. No. 6liB, 75th Congress, 3d 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 cubic yards (CY) and completed in 1941 with the removal of 6,168,556 CY.

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

3.0 MAINTENANCE DREDGING ON THE AIWW

Since the AIWW within Savannah District is quite long (161 miles), the waterway has been divided into operational reaches (36) to facilitate discussion. Figures 1 - 7 show these various operational reaches as well as the location of the disposal areas that are used to deposit the material from maintenance dredging activities. Each section of the waterway is discussed in regard to its shoaling areas, shoaling rates, maintenance requirements (for the next 20 years) and disposal areas, and the impacts that have occurred from using those disposal areas. Maintenance of the AIWW is usually accomplished using a hydraulic pipeline dredge. In most reaches, the dredged material is discharged onto existing disposal mounds in undiked disposal areas. For the most part, these undiked disposal areas are located in wetlands. The head section (discharge pipe) of the dredge is generally placed on existing dredged material deposits. The heavier material (sand) tends to settle in the area of the existing deposits while the fines (silt, mud) filter through the marsh. Some of this fine-grain material remains in the disposal tract while some of it reenters the waterway. On some occasions, fine-grain material from AIWW dredging operations has encroached on marsh areas outside of the disposal easements. There are several reaches where the material is discharged into diked disposal areas or into open water disposal sites.

An Environmental Impact Statement (EIS) was completed in 1976 that examined the environmental impacts of maintaining the existing Savannah District portion of the AIWW (Port Royal Sound, South Carolina to Cumberland Sound, Georgia). The EIS concluded that continued maintenance of the AIWW would not produce significant impacts to saltmarsh above what had occurred from the initial waterway construction in the 1940s and from the maintenance dredging that occurred from the 1940s until 1976.

A Maintenance Evaluation Study for the AIWW within Savannah District was completed in 1983. As part of this study, impact determination evaluations were conducted to assess the effects of depositing dredged material into the undiked disposal areas. These evaluations were conducted through the analysis of color infrared photography and site inspections of the most heavily used disposal tracts.

A similar study to the one described in the preceding paragraph was completed in 2011 (Wetland and Upland Assessment of Dredged Material Placement Areas Atlantic Intracoastal Waterway). In addition to determining the impacts of the past disposal of dredged material in the undiked disposal areas, the 2011 report referenced also evaluated the potential for recovery of lost wetland functions with or without enhancement activities. An Estuarine Wetland Rapid Assessment Procedure (E-WRAP) analysis was conducted for these undiked disposal sites which utilized a standardized matrix that assists in evaluating wetland habitats and their landscape setting, and in determining the potential for recovery of any lost wetland function with or without enhancement activities. The matrix established a numerical ranking for individual ecological factors that can strongly influence the recovery of wetlands. Wildlife utilization of upland and wetland areas on each site was scored. Vegetative cover for each site was analyzed, including presence of desirable canopy, shrub, and ground cover vegetation. Adjacent land use that would affect the recovery of the site was categorized and scored. The ability of the site to recover lost wetland functions was determined.

The 1983 and 2011 reports are used in the following discussion of impacts to determine how vegetation in some of the disposal areas has changed in response to either additional dredged material deposition or non-use since the 1983 report.

4.0 DESCRIPTION OF EXISTING DISPOSAL AREAS

Operational Reach SAV-1. Port Royal Sound, SC to Ramshorn Creek, SC (AIWW Mile 552.-568.5)

The first 16.5 miles of the AIWW within the Savannah District traverses Skull Creek from Port Royal Sound to Calibogue Sound, thence Cooper River to Ramshorn Creek. This reach of the waterway affords sheltered, naturally deep waters. No dredging has been required since construction of the 12-foot channel. No disposal areas have been acquired for this reach of the AIWW.

Operational Reach SAV-2. Ramshorn Creek, SC (AIWW Mile 568.5-569.9)

This reach of the waterway has only been dredged two times (1966, 1980) since completion of the 12-foot channel when about 54,000 and 34,000 cubic yards (CY) of material (sand) were dredged and deposited in SC Tract 3 which is undiked. SC Tract 3 (about 278 acres) consists of 12 small created upland islands surrounded by tidal marsh. Although the small islands only occupy 6.6 acres of the tract, approximately 107.5 acres of the tract appear to have been impacted by dredged material deposition. Based on the small amount of maintenance material that has been placed in the site and the maturity of some of the trees on the islands in SC Tract 3, most of the impacts in this site can be attributed to construction of the 12-foot channel. Most of SC Tract 3 (187.89 acres) remains tidal wetlands.

Operational Reach SAV-3. New River, SC (AIWW Mile 569.9-572.2)

This reach of the AIWW has not required any maintenance dredging. No disposal areas have been designated for this reach.

Operational Reach SAV-4. Walls Cut, SC (AIWW Mile 572.2-572.6)

Maintenance dredging in Walls Cut has been conducted on three occasions (1964, 1980, 2001) when about 90,000, 24,000 and 19,000 CY of material (sand) respectively were removed. SC Tract 2 which is undiked was designated to receive material dredged from this reach of the AIWW. Although it was probably used for placement of dredged material resulting from construction of the 12-foot project and early maintenance dredging cycles, it has not been used in the recent past. Material removed during the 1980 cycle was probably placed in SC Tract 1 while material removed during the 2001 cycle was placed in an existing diked disposal area (DMCA 14-B) adjacent to Fields Cut which is designated to receive dredged material from both the Savannah Harbor and AIWW projects. SC Tract 2 is located on Turtle Island. Turtle Island is a South Carolina Department of Natural Resources Wildlife Management Area.

An evaluation of SC Tract 2 (58.6 acres) indicates that it consists of one small upland island (1.73 acres) surrounded by tidal marsh. Although deposition of dredged material has resulted in the direct loss of 1.73 acres of marsh, the actual acreage of impacts is about 22.45 acres.

Operational Reach SAV-5 Fields Cut, SC (AIWW Mile 572.6-576.2)

Fields Cut has been dredged 11 times since completion of the 12-foot project, with the last occurring in 2009. Approximately 555,890 CY of material (fine silt) have been dredged and placed in three disposal areas. SC Tract 1 is located on the western side of Fields Cut. Part of SC Tract 1 was included within DMCA 14-B when it was constructed for Savannah Harbor beginning in 1983. Thus dredged material from Fields Cut can be placed into this fully diked site. The remaining portion of SC Tract 1 is diked only on the front side adjacent to Fields Cut. This part of SC Tract 1 received much of the maintenance material from the AIWW until more recent maintenance dredging cycles when the material was placed into DMCA 14-B. The existing Jones Oysterbed Island DMCA for Savannah Harbor is also available for dredged material from the lower end of Fields Cut.

SC Tract 1 (232 acres outside of DMCA 14-B dike) consists of 191.3 acres of tidal wetlands, 39.7 acres of upland islands, and a 1.0-acre freshwater wetland on one of the upland islands. The acreage of impacts for this site is 203 acres. The remaining 248 acres of SC Tract 1 are included within the dikes of DMCA 14-B for Savannah Harbor.

Operational Reach SAV-6 Elba Cut-McQueens Cut (AIWW Mile 576.2-577.4).

Most of the maintenance requirements for this reach of the waterway have been in Elba Cut. Elba Cut-McQueens Cut has been dredged on seven occasions with the last maintenance performed in 1987. Approximately 546,000 CY of material (fine silt) have been dredged and placed in several disposal areas. Tract 1-A-1 which is undiked received most of the dredged material from this reach. Tract A (not shown on the project maps) was briefly used through a Special Use Permit from the National Park Service.

However, this permit was terminated in 1973, and Tract A is no longer a disposal area. Tract 1-A (204.9 acres, not shown on Figure 2A) has only a few small disposal mounds totaling 11.43 acres that probably date to the construction of the 12-foot channel in the 1940s and has not been used for maintenance of the waterway. This tract was used prior to construction of Elba and McQueens cuts.

Site 1-A-1 (38.7 acres) is comprised of 22.09 acres of wetlands and 16.61 acres of upland islands. All of the site has been impacted to some extent by the deposition of dredged material. The wetland survey of the site in 1983 indicated that dredged material disposal had already impacted 100% of the site by that time.

Operational Reach SAV 7-St. Augustine Creek (AIWW Mile 577.4-578.2)

This reach of the waterway has been dredged six times since completion of the 12-foot project with the last maintenance occurring in 1972. Approximately 534,000 CY of material (mud, silt) was dredged and deposited into Disposal Areas 2-A, 2-B, and 3-A. Site 2-A (43.44 acres) which is partially diked consists of 40.38 acres of tidal wetlands and 3.06 acres of upland islands. Approximately 39.77 acres of this site have been impacted. Field studies conducted for the 1983 study indicated that Tract 2-A had already been fully impacted (100%) by that time.

Disposal Site 2-B shows evidence of past diking, but some of the dike appears to have eroded. At one time, tracts 2-B and 3-A were fully diked and joined together to form a large diked containment area. Site 2-B (36.4acres) consists of 33.45 acres of tidal wetlands and 2.95 acres of upland islands. Total impacts for this site include 35.31 acres. Disposal site 3-A (119.0 acres) consists of about 47 acres of tidal wetlands and a 22-acre upland island. The site also includes a 29-acre freshwater wetland area. A dike surrounds the upland island and freshwater wetland and extends southward to partially enclose the tidal wetland. The original diked area encompassed 107 acres. Total impacts for this site are 121.21 acres. Field studies conducted in 1983 indicated both Tracts 2-B and 3-A had been fully impacted at that time. Aerial photography from 1994 indicates that Tract 3-A was probably last used in 1989. Tract 2-B probably saw its last use in 1972.

Operational Reach SAV 8-Wilmington River (AIWW Mile 578.2-585.5)

Maintenance dredging has been performed in this reach of the AIWW on 16 occasions between 1950 and 1989. Approximately 5,000,000 CY of material (mud, silt) has been removed and placed in eight disposal areas. All of these disposal areas are undiked with the exception of a 26-acre diked area located within Tract 9-A. This diked site is also used by a vessel repair business for the maintenance of its yacht basin. This private user is required to maintain 130,000 CY of capacity within this diked disposal site for Federal use under terms of its agreement with the Corps.

Tract 2-A. Some of the material dredged from the upper portions of the Wilmington River has been placed into this disposal site. The impacts to this site were discussed in a preceding paragraph.

Tract 2-B/3-A. Some of the material dredged from the upper portions of the Wilmington River has been placed into this disposal site. The impacts to this site were discussed in a preceding paragraph.

Tract 5-A. Tract 5-A (128.7 acres) consists of nine upland islands surrounded by tidal marsh. A highway (US 80) bisects the northern portion of the site, with a total right-of-way of 11.0 acres not counted as part of the disposal easement. Tidal wetlands (116.63 acres) make up most of the site with upland islands (12.07 acres) comprising the rest of the site. The acreage of impacts for this site is 105.82 acres. The field surveys for the 1983 report indicated that about 105.7 acres of the tract had been affected by dredged material disposal. Field surveys for the 2011 report indicate that impacts totaled 105.82, indicating that the tract has not been used since the 1983 survey for disposal. The site has also been impacted by the construction of ditches to control mosquitoes, but not as part of the dredging and disposal of AIWW sediments. Mosquito ditches are not counted in the impacts due to dredging and disposal.

Tract 5-B. Tract 5-B (30 acres) consists of one upland island surrounded by tidal wetlands. Tidal wetlands comprise about 29 acres with the upland island comprising the remaining acreage of the site. The acreage of impacts for this site is 6.62 acres. Based on the small area of impacted marsh in the tract and the maturity of the trees on the island, it does not appear to have been used in the recent past. This site was not evaluated during the 1983 field work because of its limited use.

Tract 7-A. Tract 7-A (52.47 acres) consists of seven upland islands surrounded by tidal marsh. Tidal wetlands comprise about 40 acres of the site with 12.47 acres of upland islands comprising the remainder of the site. The acreage of impacts for this site is 37.31 acres which is about 71% of the site and includes 7.4 acres outside the easement boundaries. Studies conducted during the field work for the 1983 report indicate that about 41.1 acres of the site was impacted at that time, including 10.2 acres of impacts outside the easement. Total impacts in 2011 were 3.79 acres less than in 1983; consequently, maintenance dredging (1985, 1987, 1989) conducted since that time does not appear to have further impacted wetlands in the tract.

Tract 8-A. Tract 8-A (about 46.6 acres) consists of one small upland island surrounded by tidal marsh. Approximately 50% of the wetland area is bare ground. Tidal wetlands make up about 42.1 acres of the site while the remaining 4.5 acres are upland island. The acreage of impacts for this site is 16.10 acres (about 34.5% of the site). This corresponds closely to the acreage of impacts (17.2 acres-36.9%) identified in the 1983 study which indicates the tract has not been used in the recent past.

Site 9-A. Site 9-A (about 133.5 acres) consists of 2 small upland islands and one 26-acre, circular diked disposal area surrounded by tidal marsh. Tidal wetlands make up about 126.5 acres of the site, with 7 acres of upland islands comprising the remainder of the site. The acreage of impacts for this site is 88.8 acres, including about 9.0 acres outside the easement. This compares to impacts of about 90.7 acres, including about 10.0 acres outside the easement, identified in the 1983 study. Consequently, it appears that no additional disposal occurred outside the diked area since 1980.

Site 9-B. Site 9-B is approximately 24 acres in size and consists of one 0.48-acre upland island surrounded by tidal marsh. Tidal wetlands comprise about 23.71 acres of the site. The acreage of impacts for this site is 6.33 acres. The site was not assessed in the 1983 study because it was not being routinely used for maintenance dredging.

Tract 10-C (about 57.6 acres) is also located along this reach of the AIWW. Tract 10-C is undiked and has never been used.

Operational Reach SAV-9-Skidaway River (AIWW Mile 585.5-591.0)

Maintenance dredging has only been conducted once in this reach of the AIWW (1992-16,800 CY) since completion of the 12-foot channel in the 1940s. Dredged material from this reach has been deposited into four undiked disposal sites which are designated Tracts 11-B, 11-H, 11-K and 11-L.

Tract 11-K (24.7 acres) consists of 23.88 acres of tidal wetlands, with about 0.82 acres of upland islands. The acreage of impacts for this site is 7.42 acres or about 30% of the tract. Impacts determined in the 1983 study showed about 14.4 acres or about 58.5% of the tract had been impacted by that time. This tract has not been used in the recent past, and it appears that some of the impacted marsh in this tract has recovered. In 1983, 1.5 acres of impacts were recorded outside the easement; no such impacts were noted in 2011.

Tract 11-L (39.6 acres) consists of 39.12 acres of tidal wetlands and 0.48 acres of upland islands. The acreage of impacts for this site is 1.83 acres. This tract also apparently shows signs of marsh recovery as the field work for the 1983 study indicated that about 6.0 acres or 15.1% of the tract had been impacted at that time.

Disposal Tract 11-H (19.5 acres) which is undiked is also located along this reach of the waterway. It contains one small deposit (1.91 acres) of dredged material in the front portion of the disposal easement as a result of material from the construction of the 12-foot project.

Operational Reach SAV-10-Skidaway Narrows (AIWW Mile 591-594)

No maintenance of this reach of the AIWW has been required since completion of the 12-foot channel. Undiked Tract 12-A (67.9 acres) was used to place dredged material from the construction of the 12-foot project. This site also received dredged material in 1974 as a result of dredging to straighten the channel. Tract 12-A is also crossed by the Diamond Causeway to Skidaway Island (State Highway 204) which also impacted wetlands. Tidal wetlands make up approximately 50.41 acres of the tract with upland islands comprising the remaining 17.49 acres. The total acreage of impacts for this site is 11.87 acres (17.5%). This tract also seems to show some signs of marsh recovery from not having been used since 1974. Marsh impacts identified in the 1983 study indicated that about 21.2 acres or about 31.2% of the tract had been impacted at that time.

Tract 11-B (undiked) is also located along this reach of the AIWW. Tract 11-B (48.8 acres) has 5.15 acres of dredged material dating from initial channel construction and one maintenance dredging cycle in 1974. Undiked Tracts 13-A (162.1 acres) and 14-A (44.5 acres) are located at the confluence of the Skidaway Narrows and Burnside River. Tract 13-A contains deposits of dredged material (5 small upland islands totaling 7.24 acres) from the construction of the 12-foot project and/or early maintenance dredging. Tract 14-A appears to have never been used.

Operational Reach SAV-11-Burnside River to Hells Gate (AIWW Mile 594-600.8)

This reach of the AIWW has not required any maintenance since completion of the 12-foot channel. Tract 14-B (32.8 acres) is an undiked marsh island disposal easement that has never been used.

Operational Reach SAV-12-Hells Gate (AIWW Mile 600.8-602.4)

Maintenance dredging in this reach of the AIWW has been conducted 22 times with the last maintenance dredging occurring in 2009. Approximately 2,815,925 CY of maintenance material (mostly sand, with some silt and clay) has been removed. The dredged material has been deposited into either undiked Tract 15-A (109 acres) on the western end of Raccoon Key or undiked Tract 15-B (66.6 acres). Tract 15-A consists of one large upland island adjacent to a freshwater wetland area surrounded by tidal marsh. Tidal wetlands make up about 88 acres of the tract while the remainder of the tract consists of the freshwater wetland (2.61 acres) and the upland island (18.39 acres). The total acreage of impacts for this site is 57.95 acres (about 53.1% of the tract). Use of this tract has resulted in additional wetland impacts since the 1983 report which showed total impacts of about 49.6 acres including 6.5 acres outside the easement.

Tract 15-B consists of tidal marsh. The largest vegetative community present onsite is bare ground area in the tidal marsh areas. The total acreage of impacts for this site is 30.86 acres which is about 46.3% of the tract. Additional impacts have occurred to wetlands in the tract since the 1983 report which indicated about 25 acres or 37.4% had been impacted at that time.

Tracts 15-A and 15-B have been extensively used for maintenance material from Hells Gate. However, several agencies expressed concern over the damage occurring to several finger streams in Tract 15-A. In response to this concern, the Corps began to also use open water disposal on the north and south sides of Raccoon Key for material that is mostly sand.

Operational Reach SAV-13-Hells Gate to Florida Passage (AIWW River Mile 602.4-605.9)

No maintenance dredging has been required in this reach of the AIWW. There are no disposal areas in this portion of the AIWW.

5Operational Reach SAV-14-Florida Passage (AIWW Mile 605.9-608.5)

The Florida Passage has been dredged on five occasions since completion of the 12-foot channel, having been last dredged in 2009. Approximately 268,000 CY of dredged material (mud, silt) have been removed and placed in undiked Tract 16-A (131 acres). The site consists of two upland islands surrounded by tidal marsh. Tidal wetlands make up 126.57 acres of the site while the upland islands comprise the remaining 4.43 acres. The total acreage of impacts for this site is 17.43 acres or about 13.3% of the tract. Tract 16-A has only been used once (2009) since completion of the 1983 report. Consequently, the existing, adverse impacts to marsh are similar to those in the 1983 report which indicated about 15.4 acres or 11.7% of the tract had been impacted.

Operational Reach SAV-15-Bear River (AIWW Mile 608.5-617.5)

Maintenance dredging has been conducted in Bear River on four occasions since completion of the 12-foot project with the last being conducted in 1977. The dredged material (mud, silt) has been placed in undiked Tract 17-A. Tract 17-A (244.7 acres) consists of tidal wetlands with four impacted areas. The total acreage of impacts at this site is 7.75 acres or 3.2% of the site. This tract has only been used once (1977) since completion of the 1976 EIS. Since this tract was last used for the 1977 maintenance dredging cycle, overall marsh recovery has occurred in the site. The field surveys for the 1983 study indicated about 24.1 acres or 9.9% of the site had been impacted by dredged material disposal placement at that time.

Operational Reach SAV-16-St. Catherines Sound to North Newport River (AIWW Mile 617.5-620.5)

From Bear River, the AIWW crosses St. Catherines Sound to the mouth of the North Newport River. No maintenance of this reach of the AIWW has been required, and no disposal areas are located along this portion of the waterway.

Operational Reach SAV-17 North Newport River (AIWW Mile 620.5-623.9)

Maintenance dredging has only been performed in this section of the AIWW on one occasion (1964). About 67,110 CY of material was placed into Tract 805 E-2 (not shown on Figure 2B), resulting in 3.43 acres of dredged material in one mound. Track 805 E-1 (not shown on Figure 2B) was also designated for dredged material from the North Newport River but was never used for placement of dredged material. The Corps had only 10-year easements on these sites, and the right to dispose on them was terminated in 1974.

Operational Reach SAV-18 Johnson Creek (AIWW Mile 623.9-629.3)

Maintenance dredging in Johnson Creek has only been conducted on one occasion (1973) when about 141,537 CY of material was removed. Two undiked disposal areas (Tracts 19-A and 20-A) have been used for the dredged material removed from this reach of the waterway. Tract 19-A (97.8 acres) consists of two small upland islands surrounded by tidal marsh. Most of the site (97.59 acres) is comprised of tidal marsh while the remaining 0.21 acres is upland islands. The acreage of impacts for this site is 12.78 acres or about 13% of the site. The lack of use of this site is evidenced by the apparent recovery of some the marsh within the tract. Field surveys conducted for the 1983 report indicated that about 25.7 acres or about 26.2% of the tract had been impacted at that time.

Tract 20-A (71.9 acres) consists of tidal marsh. About 10.35 acres or about 14.4% of the site have been impacted by dredged material disposal. This site shows some evidence of marsh recovery as the 1983 report indicates that about 13.2 acres or 18.4% of the tract had been impacted at that time.

Tract 21-A (34.6 acres) is located just upstream of Tracts 19-A and 20-A. It appears to have never been used for disposal of dredged material.

Operational Reach SAV-19 Sapelo Sound-Front River (AIWW Mile 629.3-639)

No maintenance dredging has been required in this reach of the AIWW. There are no disposal areas in this portion of the AIWW.

Operational Reach SAV-20-Front River (AIWW Mile 639-640)

No maintenance dredging has been required in Front River. Disposal Tract 24-A (128.6 acres) shows evidence of deposition of a small amount of material from construction of the 12-foot project. Tract 24-A has probably also received some material from maintenance dredging of the upper end of Creighton Narrows which is discussed in the following paragraph.

Operational Reach SAV-21-Creighton Narrows (AIWW Mile 640-642.9)

Creighton Narrows has been dredged on 11 occasions since completion of the 12-foot project, with the last event in 1999. Approximately 1,629,509 CY of material (silt, clays) has been removed and deposited in four undiked disposal areas located adjacent to the waterway. Disposal Tract 24-A (128.6 acres) consists of six small upland islands on the southern portion of the site surrounded by tidal marsh. The site is almost entirely tidal wetlands with the exception of the six upland islands which are 0.69 acres (total). The total acreage of impacts for this site is 14.54 acres or about 11.3% of the tract. The 1983 report indicated that about 9.5 acres or 7.4% of the tract had been impacted at that time.

Tract 25-A (104.2 acres) consists of 6 upland islands surrounded by tidal marsh. Tidal wetlands make up most of the site with the exception of 3.55 acres which are upland islands. The total acreage of impacts for this site is 32.72 acres or about 31.4% of the tract. This tract has apparently been used very little during recent maintenance dredging cycles as evidenced by the comparison to site impacts in the 1983 report which indicated that about 42.6 acres or 40.9% of the tract had been impacted.

Tract 25-C (133.8 acres) consists of five upland islands surrounded by tidal marsh. Tidal wetlands make up most of the site except for 2.38 acres of upland island. The total acreage of impacts for this site is 33.97 acres (25.4%). This tract also shows evidence of marsh recovery as the 1983 report indicates that about 55.5 acres or 41.5% of the tract was impacted at that time.

Tract 25-E (43.13 acres) consists of 3 upland islands surrounded by tidal marsh. The tidal marshes account for 40.05 acres of the site while the upland islands constitute 3.08 acres. The total acreage of impacts for this site is 31.39 acres which is about 72.8% of the site. The 1983 report showed a similar extent of impacts (31.6 acres-73.3%).

Operational Reach SAV-22-Old Teakettle Creek (AIWW Mile 642.9-648.2)

Maintenance dredging has not been required in Old Teakettle Creek. There are three undiked disposal tracts along Old Teakettle Creek which are designated to receive dredged material from this reach of the waterway. Tract 26-A (31 acres) and Tract 27-B (101.9 acres) show evidence of deposits associated with construction of the 12-foot project. Tract 26-A has 7.42 acres and Tract 27-B has 2.36 acres of dredged material, respectively. Tract 27-A (80.2 acres) appears to have never been used.

Operational Reach SAV-23-Doboy Sound (AIWW Mile 648.2-649.5)

Doboy Sound has been dredged on six occasions since completion of the 12-foot project with the last dredging event occurring in 1979. Approximately 199,312 CY of material (mud, silt) have been removed and deposited into open water on the north side of Commodore Island (Dump Area 28). Tract 28-A (155.6 acres) is located on Little Sapelo Island adjacent to the waterway. This site has never been used for the deposition of dredged material. The Sapelo Island National Estuarine Reserve is located on the western perimeter of Sapelo Island. The Center is dedicated to research, education, stewardship, and sound management of coastal resources in Georgia. The reserve is administered by the National Oceanic and Atmospheric Administration and managed by the Georgia Department of Natural Resources.

Operational Reach SAV-24-North River Crossing (AIWW Mile 649.5-651.4)

Maintenance dredging has been performed on five occasions in the North River Crossing since completion of the 12-foot project, with the last maintenance occurring in 1980. Approximately 238,596 CY of dredged material (mud) has been removed and placed in an undiked disposal area adjacent to this reach of the waterway. Most of the maintenance material from the North River Crossing has been deposited into undiked Tract 29-B. Tract 29-B (120 acres) consists of one upland island surrounded by tidal marsh. Tidal wetlands make up about 116 acres of this site while the upland island is located on the other four acres of the tract. The total acreage of impacts on this tract is 47.83 acres (30.2% of the site). Additional impacts to wetlands have occurred since completion of the 1983 study which indicated that about 35.9 acres or 30% of the site had been impacted at that time.

Undiked Tract 29-A (158.3 acres) consists of a large tidal wetland with no upland areas present. Some dredged material (probably from construction or early maintenance dredging) has been deposited in this site. The total acreage of impacts is 11.94 acres (7.5%). Since this site has not been used for recent dredged material disposal, it shows some signs of marsh recovery. The 1983 report indicated that about 19.2 acres or 12.1% of the tract had been impacted at that time.

Undiked Tract 29-C (92.6 acres) is located at the confluence of the North River Crossing and the Rockdedundy River. The site consists of two upland islands surrounded by tidal wetlands. The total acreage of impacts for this tract is about 46.76 acres or 50.5% of the area. There appears to be some marsh recovery within the site as evidenced by the impact shown in the 1983 report which was 53.5 acres (57.8%)

Operational Reach SAV-25- Rockdedundy River (AIWW Mile 651.4-652.7)

Maintenance of this portion of the AIWW has only been performed on four occasions since 1980 with the last dredging occurring in 1996. The material (mud) has been placed in either Tract 29-B or 30-A which are undiked. Tract 29-B was discussed in the preceding section addressing the North River Crossing.

Tract 30-A (230.1 acres) consists of one upland island surrounded by tidal marsh. The upland island is approximately 27.59 acres while the remainder of the tract is tidal marsh. The total acreage of impacts for this tract is 163.81 acres. This tract shows a substantial increase in impacts (mainly because of maintenance requirements in the South River and Little Mud River) over those reported in the 1983 report which indicated that about 88.9 acres or 38.7% of the tract had been impacted. The aerial photographs used in the 1983 study and the 2011 study indicate impacts have occurred outside of the easement.

Operational Reach SAV-26-South River (AIWW Mile 652.7-653.5)

South River has required extensive maintenance (mud, silt) as it has been dredged 22 times between 1952 and 1999. Approximately 1,362,623 CY have been removed and placed in Tract 30-A which was discussed in the preceding paragraph.

Operational Reach SAV-27-Little Mud River (AIWW Mile 653.5-656.4)

Little Mud River has also required extensive maintenance as it has been dredged 19 times between 1963 and 2001. Approximately 4,947,674 CY of material (mud, silt) has been removed and placed in undiked Tracts 30-A, 30-B, and 32-A. Tract 30-A has been discussed in previous paragraphs. Tract 30-B was used for construction and some of the early maintenance material; however the easement for this tract was terminated in 1973 when it became part of Wolf Island National Wildlife Refuge.

Tract 32-A (228.9 acres) consists of one upland island surrounded by tidal marsh. The upland island takes up about 10.03 acres of the tract with the rest being tidal marsh. The total acreage of impacts for this tract is 195.52 acres including impacts that extend beyond the boundary of the easement. Much of the impacts to wetlands have occurred during maintenance dredging cycles since the 1983 report which showed impacts to about 58.3 acres of marsh (25.5%) and no impacts outside of the easement.

Operational Reach SAV-28-Altamaha Sound (AIWW Mile 656.4-660.1)

Maintenance dredging of the Altamaha Sound portion of the AIWW has been performed on 16 occasions between 1960 and 2009. Approximately 1,724,315 CY of material (sand, silt) has been removed and placed in undiked disposal tracts 31-A, 31-B, 34-A, and 36-A. On occasion, open water disposal sites 32 (located adjacent to Tract 31-A) and 34 (adjacent to Tract 34-A) have been used.

Tracts 31-A and 31-B are located on the southern end of Wolf Island. Tract 31-A was used for two dredging cycles in 1963 and 1969. The easements for these two tracts were terminated in 1973 when they became part of Wolf Island National Wildlife Refuge.

Tract 34-A (80.9 acres) consists of two upland islands surrounded by tidal marsh. The upland islands comprise about 12.35 acres of the site while tidal marsh constitutes the remainder. The total acreage of impacts for this site is 28.77 acres (35.6%). Tract 34-A has been used very little since the 1983 report which showed impacts to 28.9 acres of the site.

Tract 36-A (260.4 acres) consists of three upland island surrounded by tidal marsh. The three upland islands comprise about 42.68 acres of the tract while the tidal wetlands comprise about 217.72 acres. The total acreage of impacts for this tract is 107.19 acres. This tract shows a substantial increase in impacts over that reported in the 1983 study which indicated that about 60.1 acres or 23.0% had been impacted at that time.

Operational Reach SAV-29-Buttermilk Sound (AIWW Mile 660.1-664.5)

Buttermilk Sound has required extensive maintenance. It has been dredged 22 times between 1952 and 2009. Approximately 4,042,151 CY of material (sand, silt) have been removed and placed into undiked tracts 42-C, 42-B, 43-A, 43-B, 44-A, and 45-B. Open water disposal areas are located adjacent to Tract 42-C, 43-A, 43-B and downstream of Tract 42-B.

Tract 42-B (65 acres) consists of an upland area adjacent to tidal marsh. The upland area is about 9.96 acres. The total acreage of impacts for this site is 42.04 acres (64.7%). This is a substantial increase in marsh impacts over that reported in the 1983 study which indicated that about 17.7 acres or 27.2% of the tract had been impacted.

Tract 42-C (14.5 acres) is made up entirely of tidal wetlands. There have been minor impacts to 1.60 acres of these wetlands. Tract 42-C was not surveyed for the 1983 report because it was not regularly used as a disposal site.

Tract 43-B (176.4 acres) consists of one upland island surrounded by tidal marsh. The site is mostly tidal wetlands with the upland island occupying 4.87 acres. The total acreage of impacts for this tract is 14.05 acres. This is a slight increase in wetland impacts over that reported in the 1983 study which indicated that about 7.5 acres or 4.2% of the tract had been impacted by dredged material disposal.

Tract 44-A (76.4 acres) consists of 6 upland islands surrounded by tidal marsh. The island occupies about 5.05 acres of the site while tidal wetlands comprise the other 71.35 acres. The acreage of impacts for this site is 22.51 acres. This tract has not been used in the recent past as indicated by the 1983 report which showed that about 22.7 acres of the tract had been impacted at that time.

Tract 43-A (138.3 acres) was used for some of the early maintenance dredging, but the easement was terminated in 1972, and it is no longer a disposal site.

Tract 45-B (167.6 acres) has not been used for maintenance, but contains a 14-acre, mature hammock-like upland island resulting from disposal of material from the initial construction of the 12-foot channel in the 1940s. Tract 45-C (59.5 acres) has never been used.

One of the open water sites, (42), was an experimental marsh development site. The Georgia Department of Natural Resources in conjunction with the US Army Corps of Engineers Waterways Experiment Station conducted research relative to marsh establishment as part of the Corps of Engineers Dredged Material Research Program.

Operational Reach SAV-30-Mackay River (River Mile 664.5-674)

This section of the AIWW has not required maintenance dredging. Six undiked disposal tracts are located along this reach of the AIWW. Tract 46-A (96.7 acres) contains a small (0.77-acre) deposit of dredged material from construction of the 12-foot project. Tract 48-B (52.1 acres) has never been used. Tract 48-A (59.5 acres) contains one upland island surrounded by tidal marsh. The tidal marsh occupies most of the track with the upland island occupying about 3.31 acres. The total acreage of impacts for this tract is 12.46 acres. Tract 48-A was not surveyed for the 1983 report because it was not heavily used as a disposal site. Tracts 49-A (69.5 acres), 49-B (103.5 acres) and 49-C (68.2 acres) appear to have never been used.

Operational Reach SAV-31-Frederica River (AIWW Mile 674-677)

No maintenance dredging has been required in the Frederica River. Track 47-A (167.3 acres) contains some dredged material deposits (6.06 acres) from initial construction of the 12-foot channel in the 1940s.

Operational Reach SAV-32-St. Simon Sound (AIWW Mile 677-680.8)

Maintenance dredging St. Simon Sound has been conducted on two occasions in 1963 and 1969. Tract 51-A (67.6 acres) is available, but it does not appear to have ever been used. The material (silts, clays) from this reach of the waterway was probably deposited in Open Water Site No. 51 located near the confluence of the Frederica River and St. Simon Sound.

Operational Reach SAV-33-Jekyll Creek (AIWW Mile 680.9-685.9)

Jekyll Creek has by far required the most maintenance of any reach of the AIWW within Savannah District. It has required maintenance dredging 20 times between 1952 and 1999. Approximately 10,842, 893 CY of material (mud, silt) has been removed during these maintenance dredging cycles. It should be noted that additional maintenance would have been performed between 1999 and 2011 had acceptable disposal options been available. Material is usually placed in three undiked disposal areas which are 52-A (115.7 acres), 52-B (190.0 acres) and 53-A (180.4 acres). On occasion, an overboard disposal site located in the Brunswick River adjacent to Tract 52-A has been used. Much of the material from Jekyll Creek has reentered the waterway after being discharged into Tracts 52-A, 52-B and 53-A.

Tract 52-A (115.7 acres) consists of 6 upland islands surrounded by tidal marsh. Most of the site remains a tidal marsh with the exception of 8.94 acres comprised of the upland islands. All 115.7 acres of the tract have been impacted by dredged material disposal. In addition, dredged material has spread over approximately 12 acres outside the easement boundaries. The 1983 report indicated that about 105.4 acres or 91.1% of the tract had already been impacted by that time.

Tract 52-B (95acres) consists of tidal marsh with no uplands on site. This site has been completely impacted by the disposal of dredged material as determined by the survey for the 1983 report.

Tract 53-A (180.4 acres) consists of tidal marsh with no uplands present. The acreage of impacts for this site is 97.02 acres (53.8%). This is in close agreement with the findings of the 1983 report which found

that about 107.1 acres or 59.4% of the site had been impacted. The apparent marsh recovery in Tract 53-A indicates that it has not been used for dredged material disposal in the recent past.

Operational Reach SAV-34-Jekyll Creek to Cumberland River (AIWW Mile 685.9-692)

This section of the AIWW traverses deep water in St. Andrews Sound and has not required maintenance. There are no disposal tracts designated for use for this portion of the waterway.

Operational Reach SAV-35-Cumberland River to Cumberland Sound (AIWW Mile 692-707)

This section of the AIWW has been dredged in 1965, 1995, and 2001. Approximately 92,300 CY of material (sand, silt) has been removed during these dredging cycles. Some of the material was deposited in Tract Parcel B2-3 which is a fully diked disposal area. Tract Parcel B2-3 (now known as Tract 1700-L or Big Crab Island) was transferred to the Department of the Army Military Ocean Terminal Kings Bay in 1974 for use in maintaining that facility. It is currently owned by the US Navy and used to deposit dredged material from maintenance of channels associated with the Naval Submarine Base Kings Bay. Through an agreement with the Navy, maintenance material dredged from the AIWW in 1995 and 2001 was placed into this disposal site. In 1965, some of the dredged material from this reach of the AIWW was also discharged into open water at a site east of Tract Parcel B2-3. Four other disposal tracts used for this section of the AIWW were also transferred to the Department of the Army Military Ocean Terminal Kings Bay in 1974. Parcel No.1 (54.64 acres), Parcel No. 5 (1199.1 acres), Parcel No. 6 (139 acres), and Parcel No. 7 were also transferred to the Kings Bay facility. The Corps reserved a perpetual spoil disposal easement in Parcels 5, 6, and 7. Parcel No. 4 was also available for dredged material disposal for this reach of the AIWW. However, this disposal easement was not used since it is located on Cumberland Island National Seashore.

Operational Reach SAV-36-Cumberland River to Cumberland Sound (AIWW Mile 707-713)

This section of the AIWW required maintenance dredging on one occasion in 1965. It is currently maintained by the US Navy as part of the Naval Submarine Base Kings Bay.

Alternate Route Around St. Andrews Sound

An alternate route (7 feet deep, 75 feet wide) around St. Andrews Sound was completed in 1940. This alternate route extends from the main channel of the AIWW in Jekyll Creek through Jekyll Sound, Little Satilla River, Umbrella Cut, Umbrella Creek and its south branch, through Dover Cut to Dover Creek, thence up Dover Creek and through a narrow neck of land to Satilla River, thence through a land cut south of Todd Creek and through Floyd Creek to the main route of the waterway in Cumberland River. Almost all the shoaling problems have occurred in Umbrella Cut and Umbrella Creek with some minor shoaling in Floyd Creek. Maintenance dredging has not been performed in this alternate route in many years.

There are two disposal tracts that have been used for maintenance material from this alternate AIWW route. Tract 1 (140 acres) is located in Camden County, Georgia. It has received very little dredged

material. Consequently, it is comprised entirely of tidal marsh. The total acreage of impacts for this disposal area is 9.32 acres.

Tract 3 (673.0 acres) which is also located in Camden County has received most of the dredged material from this section of the waterway. Tract 3 consists of one small upland island (0.58 acres) surrounded by tidal marsh. The total acreage of impacts for this disposal tract is 75.83 acres.

5.0 SUMMARY OF IMPACTS – MAINTENANCE DREDGING – AIWW SAVANNAH DISTRICT

The preceding discussion has provided information on the impacts that have occurred over the past 70-odd years associated with the construction and maintenance of the Savannah District's portion of the AIWW. Defining both the nature and extent of impacts is extremely important since this information can be used to develop a 20-year DMMP for the AIWW. The goal is to develop a DMMP that provides a plan that allows for maintenance of the waterway while avoiding or minimizing impacts to the aquatic environment. The following summarizes the above discussion:

1. The existing project (12-foot channel) was completed in the early 1940s. The Corps was provided disposal easements which were predominately located in tidal marsh adjacent to the waterway.

2. Most of the dredged material resulting from both construction of the project and subsequent maintenance of the project was deposited into these easements in an unconfined manner, i.e., no dikes were constructed within these easements to confine the dredged material. More than likely, this was done to eliminate the costs associated with constructing large diked disposal areas along numerous reaches of the waterway. Also in view of the instability of the substrate in these marsh areas, it is highly questionable how feasible it would have been to construct diked areas in these wetlands. Diked dredged material containment areas constructed in these wetlands would have been subject to failure because of their exposure to extreme high tides and storm events.

3. Disposal of dredged material from construction of the project adversely impacted tidal marsh. Much of the material from construction of the 12-foot channel was sand which raised the elevation of the marshes to the extent that upland vegetation replaced the wetland species present in the marsh. This is evidenced by the presence of mature hammock-like upland islands in many of the disposal easements that only received dredged material from the initial channel construction in the 1940s.

4. Disposal of dredged material from maintenance dredging cycles has also adversely affected tidal marsh. As evidenced by information presented in the above discussion, areas of impacted marsh were observed in many of the disposal tracts during the field surveys for the 1983 report and the 2011 report.

5. Some of the disposal tracts have been totally impacted for many years since construction and early maintenance of the waterway. These tracts are located in heavy maintenance areas and include such sites as Tract 1-A-1 (Elba Cut-McQueens Cut), Tracts 2-A, 2-B, and 3-A (St. Augustine Creek-upper Wilmington River), and Tracts 52-A and 52-B (Jekyll Creek).

6. Maintenance of the AIWW continues to have impacts on tidal wetlands in disposal tracts that are used for those areas of the waterway requiring maintenance. Since completion of the 1983 impact

study, additional marsh impacts have been observed in Tracts 5-A, 7-A and 9-A (Wilmington River), 15-A and 15-B (Hells Gate), 16-A (Florida Passage), 24-A (Creighton Narrows), 29-B (North River Crossing), 32-A (Little Mud River), 36-A (Altamaha Sound) and 42-B and 42-A (Buttermilk Sound). Although some of the tracts have already been totally impacted by the deposition of AIWW maintenance material (see paragraph 5 above), continued use of these sites prevents any chance of marsh recovery.

7. For those tracts that have not been used or received very little use in the recent past, some evidence of marsh recovery has been observed. These tracts include 11-K and 11-L (Skidaway River), 12-A (Skidaway River), 17-A (Bear River), 19-A and 20-A (Johnson Creek), 25-A and 25-C (Creighton Narrows), 29-A and 29-C (North River Crossing), 30-A (Rockdedundy River), and 53-A (Jekyll Creek). A total of 16 tracts show recovery totaling 124 acres.

8. There are 12 disposal tracts along the AIWW that appear to have never been used including 10-C (Wilmington River), 14-A (Skidaway River), 14-B (Burnside River), 21-A (Johnson Creek), 27-A (Old Teakettle Creek), 28-A (Doboy Sound), 45-C (Buttermilk Sound), 48-B, 49-A, 49-B, 49-C (Mackay River), and 51-A (St. Simon Sound). These unused tracts total 721.7 acres.

9. Although use of undiked disposal in tidal wetlands has impacted marsh, these impacts would have been much worse had the disposal tracts been diked. If the disposal tracts provided to the Corps in the 1940s had been diked, these dikes would have been more than likely constructed to encompass the entire easement. Subsequently, wetlands within the dikes would have been cut off from tidal flow and completely destroyed with little to no chance to recover from dredged material deposition.

10. Disposal of dredged material into wetland areas has created additional wildlife habitat. The 2011 study included use of the Estuarine Wetland Rapid Assessment Procedure which evaluated wildlife utilization of upland and wetland areas on the disposal tracts. Based on the results of this analysis, most of the tracts showed minimal to moderate wildlife utilization of the uplands or wetlands on the disposal tracts.

11. Although undiked disposal has impacted wetlands, much of the remaining wetlands on the disposal tracts have retained most of their wetland functions. The Estuarine Wetland Rapid Assessment Procedure was also used to determine the potential for recovery of any lost wetland function with or without enhancement activities. For most disposal tracts, this assessment was able to conclude: “Most of the wetland areas onsite show minor adverse impacts to aquatic functions and likely would recover without enhancement activities”.

6.0 PROPOSED DISPOSAL SITES FOR FUTURE MAINTENANCE OF THE AIWW

Based on the information developed in Section 4.0 above, the discharge of dredged material into undiked tidal wetlands associated with the maintenance of the AIWW within the Savannah District has had significant adverse impacts on these wetlands. In addition to impacts to tidal wetlands, undiked disposal can adversely affect water quality in the vicinity of the discharge. While the heavy material (sand) tends to remain in the disposal area, the fine grain material (mud, silt, clay) can leave the disposal area during the disposal process resulting in an increase in turbidity and suspended solids in adjacent

waterways. The fine grain material that remains in the disposal area is also subject to enter adjacent waterways due to the influence of high tides and storm events. The tendency of some of the fine grain materials to leave the disposal area has also been observed in several tracts along the AIWW where dredged material has spilled into adjacent marshes outside of the easement.

The South Carolina Department of Natural Resources (SCDNR) and the Georgia Department of Natural Resources (GADNR) have requested that the practice of discharging dredged material into undiked disposal areas in wetlands be discontinued along the AIWW. The SCDNR has also expressed general opposition to open water disposal of dredged material unless that material is being placed into an approved offshore dredged material disposal site (ODMDS) or onto a seriously eroding beach with beach-compatible sand. The GADNR has stated that it would consider open water disposal of dredged material in certain areas provided that material is at least 80% sand.

In view of the adverse effects associated with undiked disposal of dredged material along the AIWW and the requests of the SCDNR and GADNR, the Corps is preparing a new 20-year DMMP for the AIWW. The main objective of the is 20-year DMMP is to identify alternative disposal methods for those sections of the AIWW that will require maintenance over the next 20 years that will meet the dredged material disposal requirements of the project while minimizing impacts to the aquatic environment and addressing the requests of the State resource agencies.

In view of the adverse effects of undiked disposal into tidal marshes and the comments and concerns of the GADNR and SCDNR, the following conclusions can be reached relative to the consideration of disposal alternatives for Savannah District's portion of the AIWW:

1. For the long term, continued discharge of dredged material into undiked tidal wetlands is not a viable alternative in either state.

2. The SCDNR does not usually approve open water disposal of dredged material. If the material is suitable for beach nourishment, the SCDNR will consider approving the material to be placed on a severely eroding beach.

3. The GADNR would prefer that open water disposal of dredged material be discontinued. However, they have indicated that they would consider this alternative if the material is clean sand (at least 80% sand).

4. The construction of high ground diked disposal areas in the vicinity of some of the high shoaling areas would be a preferred method of disposal versus the existing practice of undiked disposal into wetlands. However, an evaluation of potential high ground disposal sites along Savannah District's portion of the AIWW indicates several logistical problems in many reaches of the AIWW that would be associated with the construction of such areas. First, much of the high ground along the ocean side of the waterway is located on property that is in a protected status, i.e., Wassaw Island, Ossabaw Island, Blackbeard Island, St. Catherine's Island, Sapelo Island, etc. Much of the land on the mainland side of the waterway has been or is being developed or is too far from the waterway to serve as a feasible disposal area.

5. Disposal of some of the material from the AIWW into an approved or new ODMDS is a viable alternative. However, this potential disposal alternative presents problems relative to both logistics and costs. All of the Districts that maintain the AIWW from Norfolk to Jacksonville have approved ODMDSs. However, these disposal sites are used to maintain entrance channels to various other deep draft navigation projects, and none of them are designated to receive dredged material from maintenance of the AIWW. Problems encountered in considering the ODMDSs for maintenance of the AIWW include access for hopper dredges to the shallow channel of the AIWW, and moving large amounts of silty material from portions of the AIWW channel to the ODMDS.

With the above stipulations taken into consideration, the following disposal alternatives were developed for the 35 reaches of the AIWW within Savannah District that may require maintenance dredging to provide a 20-year DMMP.

Disposal options under consideration for the 20-year DMMP for the AIWW include:

1. Use of existing diked disposal areas where available. Implementation of this alternative where possible eliminates the need to discharge dredged material into undiked disposal tracts along various reaches of the waterway. The DMMP utilizes existing diked disposal areas to the maximum extent practicable.

2. Beneficial use of suitable material (beach nourishment). Suitable material for beach nourishment was identified in two reaches in the South Carolina portion of the waterway. This material could be placed on the beaches on either Hilton Head Island or Daufuskie Island. However, the State of South Carolina normally only approves beach nourishment projects for severely eroding beaches. Various environmental documents (EA, etc.) would have to be prepared and environmental clearances would have to be obtained. Considering the small amount of material that would be available for beach nourishment, this option is probably not economically practicable when considering placement costs and the costs to obtain required environmental clearances. However, the State of South Carolina will be notified of any future maintenance in Ramshorn Creek or Walls Cut to determine if there is an interest in using the material for shore protection.

3. Construction of new, high ground, diked diposal areas. Implementation of this alternative would reduce the use of the undiked disposal areas located in tidal marsh along the AIWW. Several potential sites were located where diked disposal areas could be constructed. However, when the total costs (land acquisition, site preparation and dike construction, site maintenance, environmental clearances, mitigation etc.) were considered along with potential impacts to wildlife habitat, this alternative was eliminated.

4. Construction of diked disposal areas within the existing disposal easements. Implementation of this alternative would reduce the disposal of dredged material into undiked disposal areas in tidal marsh. However, this alternative would have significant adverse impacts on tidal marsh. Many of the disposal tracts have large expanses of functioning tidal marsh. Large amounts of functioning marsh would be enclosed within the dikes since most of the easement would require diking to provide sufficient capacity for the dredged material. Based on observations of the impacts of undiked disposal on tidal marsh,

implementation of this alternative would have even greater adverse impacts on the aquatic ecosystem. After considering the adverse impacts to tidal marsh and the associated mitigation costs, this alternative was eliminated from consideration.

5. Ocean dumping of dredged material into the existing ODMDS sites for the Savannah Harbor and Brunswick Harbor projects as well as the establishment of two new dredged material ocean disposal sites off Sapelo Sound and Altamaha Sound. The dredged material would be placed onto barges by bucket dredge. The material would be unloaded onto an ocean-going dump scow which would take it to the designated ODMDS. Although this "triple handling" of the dredged material greatly increases costs when compared to other dredging and disposal methods, it also eliminates other costs such as dike construction and maintenance, wetland mitigation, etc. This disposal method also totally removes the dredged material from both the channel and the aquatic ecosystem. There are several shallow draft hopper dredges which could possibly be used in lieu of the bucket dredge. If available and practical to use within the Savannah District's portion of the AIWW, this type of dredged would allow the material to be taken directly to the ODMDS in lieu of having to use the barges and dump scows. Regardless of the type of dredge used, the operator would not be allowed to overflow the vessel while traveling from the AIWW to the ODMDS.

6. Use of existing open water disposal sites within the State of Georgia. The Georgia Department of Natural Resources has indicated they would consider continued use of some of the existing open water disposal sites provided the material is at least 80% sand. Two reaches (Hells Gate and Buttermilk Sound) were identified where at least some of the maintenance material would meet that criterion. However, some of the material in those reaches would not meet the 80% sand requirement. Consequently, the suitable material to be removed from two reaches would be placed in existing open water disposal sites. Material not meeting this criterion would be placed on existing dredged material deposits within the current disposal easements for that reach of the waterway. Some of the material would be used to fill geo-tubes (or some other similar technology) which in turn would serve as the containment dikes to keep the material confined to existing deposits within the disposal area.

Table 1 shows future anticipated dredging requirements as well as the disposal alternatives considered for each reach. Alternative 1 is the preferred alternative for future dredged material placement.

Table 1. AIWW DMMP Disposal Alternatives by Reach

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

Table 1 (continued). AIWW DMMP Disposal Alternatives by Reach

Dredging Reach Name	Reach Number	20-yr Capacity Required (Cubic Yards)	Alternative 1 (Preferred Alternative)	Alternative 2	Alternative 3	Alternative 4
Mackay River	SAV-30	0	Andrews Island DMCA	Andrews Island DMCA	Andrews Island DMCA	Undiked Tracts 46-A and 48-A[1]
Frederica River	SAV-31	0	Andrews Island DMCA	Andrews Island DMCA	Andrews Island DMCA	Undiked Tract 48-A
St. Simons Sound	SAV-32	0	Andrews Island DMCA	Andrews Island DMCA	Andrews Island DMCA	Andrews Island DMCA
Jekyll Creek	SAV-33	9,230,000	Brunswick ODMDS	Brunswick ODMDS	Dike Tract 52-A[3]	Undiked Tract 52-A[3]
Jekyll Creek to Cumberland River	SAV-34	0	Brunswick ODMDS	Brunswick ODMDS	Dike Tract 52-A[3]	Diked Disposal in tract 1700L (Crab Island)
Cumberland River to Cumberland Sound	SAV-35	77,550	Diked Disposal in tract 1700L (Crab Island)	Diked Disposal in tract 1700L (Crab Island)	Diked Disposal in tract 1700L (Crab Island)	Diked Disposal in tract 1700L (Crab Island)
Cumberland River to Cumberland Sound	SAV-36	0	Diked Disposal in tract 1700L (Crab Island) Maintained by U.S. Navy	Diked Disposal in tract 1700L (Crab Island) Maintained by U.S. Navy	Diked Disposal in tract 1700L (Crab Island) Maintained by U.S. Navy	Diked Disposal in tract 1700L (Crab Island) Maintained by U.S. Navy

[1]Placement will be in the site closest to the portion of the reach being dredged.

[2]All three tracts will be needed to handle the anticipated volumes to be dredged from Creighton Narrows (SAV-21)

[3]Tract 52-A would be used on a temporary basis while a long term solution is investigated for Jekyll Creek (SAV-33)

Based on the preceding discussion of alternatives, the following disposal alternatives are proposed for the future maintenance requirements of the AIWW within Savannah District. The alternative discussion includes information on the amount of material that would have to be dredged and the type of material that is removed. Due to the bulking factor involved with dredged material, the amount of storage capacity required is generally one a-and-a-half to two times the amount of the material that is removed during maintenance dredging.

Operational Reach SAV-1 Port Royal to Ramshorn Creek (mile 552-568.5)

No previous maintenance dredging has been required in this reach of the AIWW, and no maintenance is anticipated to be required during the 20-year life of the DMMP. If maintenance is required in this reach of the waterway, the material would be placed in existing DMCA 14-B.

Operational Reach SAV-2 Ramshorn Creek (mile 568.5-569.9)

Approximately 49,000 cubic yards of material (sand) would be removed during the 20-year life of the DMMP. This reach of the water way is projected to require 66,000 CY of storage capacity.

The preferred method for disposal of dredged material from this reach of the AIWW is to use existing DMCA 14-B which is designated to receive material from Savannah Harbor and the AIWW. Although the costs of adding sufficient booster pumps to move the material approximately seven miles or taking the material to DMCA 14-B by barge would be great, it would be cheaper than building a diked disposal area in SC Tract 3 (especially considering the wetland mitigation costs for impacts in SC Tract 3).

Operational Reach SAV-3-New River (AIWW Mile 569.9-572.2)

Maintenance dredging has not been required in this reach of the AIWW. If the need arises to conduct maintenance dredging in New River, the material could be deposited into existing DMCA 14-B which is designated to receive dredged material from Savannah Harbor and the AIWW.

Operational Reach SAV-4-Walls Cut (AIWW Mile 572.2-572.6)

It is estimated that Walls Cut will have to be dredged once (23,000 CY of sand) during the 20-year life of the DMMP which would require 35,000 CY of storage capacity. SC Tract 2 is designated to receive dredged material form Walls Cut, however, this disposal tract has not been used in many years. SC Tract 2 is located on Turtle Island which is a South Carolina Department of Natural Resources Wildlife Management Area.

Maintenance was last performed in 2001, and the material was last placed in existing DMCA 14-B. This is the preferred method of dredged material disposal for this reach of the AIWW for future maintenance.

Operational Reach SAV-5-Fields Cut-AIWW Mile 572.6-575.3)

It is estimated that approximately 298,000 CY of storage capacity would be required during the 20-year life of the DMMP to handle the estimated 232,000 cubic yards of maintenance material (fine silt).

Tract 1 was designated to receive dredged material from this reach of the AIWW. Approximately 172 acres of Tract 1 were included within the dikes of DMCA 14-B. Future maintenance material would be placed in DMCA 14-B. No further dredged material would be placed into the remainder of SC Tract 1 which is diked on the front side (Fields Cut).

Operational Reach SAV-6-Elba Cut-McQueens Cut (AIWW Mile 575.3-577.4)

Estimates indicate that about 299,000 CY of storage capacity would be required to handle the 199,000 cubic yards of maintenance material (fine silt) for the 20-year life of the DMMP.

Most of the material removed from this section of the AIWW has been placed into Tract 1-A-1. Future maintenance material would be placed into DMCA 14-B which is designated to receive dredged material from Savannah Harbor and the AIWW.

Operational Reach SAV-7-St.Augustine Creek (AIWW Mile 577.4-578.2)

It is estimated that about 1,190,000 cubic yards of dredged material (mud and silt) would be removed during the 20-year life of the DMMP. Approximately 1,785,000 CY of storage capacity would be required to handle this material.

In the past, maintenance material from this reach of the AIWW has been placed in either Tract 2-A or Tracts 2-B/3-A. All future maintenance material would be placed in DMCA14-B.

Operational Reach SAV-8-Wilmington River (AIWW Mile 578.2-585.0)

Approximately 345,000 CY of storage capacity would be needed to meet the requirements since about 230,000 cubic yards of material (mud and silt) would be removed during the 20-year life of the DMMP.

Some sections of the Wilmington River (especially the upper portion) have high maintenance requirements. Consequently, substantial amounts of maintenance material have been placed into Tracts 2-A, 2-B/3-A, 5-A, 7-A, and 9-A. Disposal of dredged material into undiked Tracts 2-A, 5-A, 7-A and the undiked portion of Tract 9-A would be discontinued. Tracts 2-B/3A were fully diked to form one 155.4-acre disposal area. However, no maintenance dredging has been conducted in the Wilmington River since 1989, and the dike has apparently gone into disrepair. The dike around 2-B/3-A would be repaired and this site used for future maintenance of the Wilmington River. Initial estimates indicate that this site could provide approximately 2.5 million CY of dredged material disposal capacity if the site is constructed with 10-foot dikes.

Tracts 2-B and 3-A have been totally impacted by dredged material disposal as evidenced by field studies conducted in 1983 and 2011. Tidal wetlands in these two tracts have also been degraded by being diked which removed them from tidal influence. Tidal wetlands (about 96 acres) are still evident in these areas, and a 29-acre freshwater wetland has formed in Tract 3-A. Consequently, restoring the dike around Tracts 2-B/3-A will result in impacts to these wetlands. Costs of restoring and maintaining the dikes around Tracts 2-B and 3-A and mitigating for loss of tidal wetlands within the dikes make this

option more expensive than sending the material from the northern portion of this reach to DMCA 14-B. Consequently, the preferred plan for this reach is to use DMCA 14-B.

In addition to DMCA 14-B which can be used for maintenance of the upper Wilmington River, some disposal capacity will be required for the anticipated shoaling in the lower Wilmington River. The preferred disposal option for the lower section of the Wilmington River is to use the diked containment area in Tract 9-A. A small (26-acre) diked area has already been constructed in Tract 9-A. It is used by a local vessel repair business to maintain depths at their facilities. As a requirement for their use of the disposal area, this business must maintain 130,000 CY of capacity within the diked disposal area for use by the Government, if required.

Operational Reach SAV-9 Skidaway River (AIWW Mile 585.0-591.0)

This reach of the AIWW within Savannah District has not required maintenance. If any future maintenance dredging is required, the material could be placed into the diked area in Tract 9-A previously discussed.

Operational Reach SAV-10-Skidaway Narrows (Mile 591.0-594.0)

No maintenance dredging has been required for this reach of the AIWW. If any future maintenance dredging is required, the material could be placed into the diked area in Tract 9-A previously discussed.

Operational Reach SAV-11-Burnside River to Hells Gate (AIWW Mile 594.0 to 600.8)

This reach of the AIWW has not required maintenance dredging. If any future maintenance dredging is required, the material could be placed into the diked area in Tract 9-A previously discussed.

Operational Reach SAV-12 Hells Gate (AIWW Mile 600.8 to 602.4)

Hells Gate is a major shoaling area, and it is estimated that 1,540,000 CY of storage capacity will be required for the 20-year life of the DMMP to provide sufficient capacity for the estimated maintenance dredging quantity (1,027,000 cubic yards). Hells Gate was last dredged in 2009. The material removed from Hells Gate has been discharged into undiked tracts 15-A and 15-B while some of the material was discharged into open water disposal sites on the north and south sides of Raccoon Key. Both tracts 15-A and 15-B showed additional marsh impacts during the field surveys for the 2011 study versus those observed in the 1983 study. The need for open water disposal on the north and south sides of Raccoon Key was previously identified based on damage to finger streams that was occurring in Tract 15-A.

Dredged material from this reach of the AIWW can vary from silt and clay to sand. For future maintenance dredging, some of the material (sand) could be discharged into the open water sites on the north and south sides of Raccoon Key as has been the practice. However, the river bottoms and the estuarine water column are essential fish habitat that must be considered in evaluating the impacts of open water disposal. Sediment sampling and grain size analysis would be required before each dredging cycle to ascertain how much of the material would be suitable for open water disposal. The State of

Georgia has indicated that the material would have to be at least 80% sand before they would consider it suitable for open water disposal.

Disposal of the material unsuitable for open water disposal would involve confining it on the existing deposits within Tracts 15-A and 15-B. Instead of constructing traditional earthen dikes within the disposal area, the material would be placed in geo-tubes (or other similar technology) which would serve as the confining structure. This would reduce the amount of additional marsh that would be impacted by the construction of traditional dikes in the disposal tracts.

If the use of geo-tubes proves infeasible, the unsuitable material would be placed in the existing ODMDS for Savannah Harbor provided the material was determined to be suitable for ocean disposal per the stipulations of the Section 103 Guidelines.

Operational Reach SAV-13-Hells Gate to Florida Passage (AIWW Mile 602.4-605.9)

No maintenance of this reach of the AIWW has been required. If maintenance is required over the 20-year life of the DMMP, the material would be placed in the Savannah Harbor ODMDS or disposed of in accordance with the procedures prescribed for the Florida passage described below.

Operational Reach-14-Florida Passage (AIWW Mile 605.9 to 608.5)

It is estimated that approximately 95,400 CY of storage requirement would be required for this reach of the waterway for the 20-year life of the DMMP. Approximately 63,600 cubic yards of material (mud and silt) would be removed during this time.

This reach of the waterway was last dredged in 2009, and the material was discharged into undiked disposal Tract 16-A. This is the only time this tract has been used since the 1983 report. Consequently the amount of the tract that was observed during the field studies for the 2011 report to have been impacted by dredged material disposal (13.3%) is very similar to that observed (11.7%) during the field work for the 1983 study.

The preferred disposal alternative is to place the material into a new ODMDS located offshore of Sapelo Sound. The establishment of a new ODMDS at this location would require site designation studies per the requirements of Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA) and site designation approval by the US Environmental Protection Agency (USEPA).

Operational Reach SAV-15- Bear River (AIWW Mile 608.5-617.5)

The 20-year storage requirement for this reach of the AIWW is 79,000 CY (dredging requirements-about 53,000 cubic yards of mud and silt). Past maintenance dredging and disposal involves placing the material into undiked Tract 17-A. Tract 17-A has been used only once since completion of the 1983 study, and the field work for the 2011 study suggests marsh recovery has occurred in this tract. The 2011 study indicates that about 8 acres of this 244-acre tract have been impacted by dredged material disposal compared to 24 acres observed in the 1983 study.

Material removed from Bear River would be handled in the same manner as that discussed for the Florida Passage above, i.e., placed into the ODMDS to be established off Sapelo Sound.

Operational Reach SAV-16-St. Catherines Sound (AIWW Mile 617.5-620.5)

Maintenance dredging has not been required for this reach of the AIWW. If maintenance is required in this reach during the 20-year life of the DMMP, the material would be placed in the new ODMDS off Sapelo Sound.

Operational Reach SAV-17-North Newport River (AIWW Mile 620.5-623.9)

Maintenance dredging has not been required in the North Newport River. If maintenance dredging is required in this reach of the AIWW in the future, the material would be placed in the new ODMDS off Sapelo Sound.

Operational Reach SAV-18-Johnson Creek (Mile 623.9-629.3)

In the past, dredged material from Johnson Creek has been deposited into either Tract 19-A (97.8 acres) or Tract 20-A (71.9 acres). This reach of the AIWW has not required maintenance dredging since 1973. Consequently, the field surveys for the 2011 report indicate that some marsh recovery is occurring in these tracts.

Although maintenance dredging has not been required in Johnson Creek since 1973, it is estimated that about 106,500 CY of dredged material disposal capacity could be needed for the 20-year life of the DMMP to handle the 71,000 cubic yards of mud and silt that would be removed.

The preferred alternative is to place the material from Johnson Creek in the new ODMDS off Sapelo Sound.

Operational Reach SAV-19-Sapelo Sound-Front River (AIWW Mile 629.3-639)

This reach of the AIWW has not required maintenance dredging. If maintenance dredging is required in the future, the material would be placed in the new ODMDS that would be established off Sapelo Sound.

Operational Reach SAV-20-Front River (AIWW Mile 639-640)

This reach of the AIWW has not required maintenance dredging. If maintenance dredging is required in the future, the material would be placed into the new ODMDS off Sapelo Sound.

Operational Reach SAV-21-Creighton Narrows (AIWW Mile 640-642.9)

This reach of the AIWW has not been dredged since 1999, however, it is anticipated that the 20-year storage capacity to meet project needs is about 1,361,000 CY. About 908,000 cubic yards of material (silts and clays) would be removed during the 20-year life of the DMMP. Four disposal tracts have been used to deposit dredged material. These disposal tracts are Tract 24-A (128.6 acres), Tract 25-A (104.2 acres), Tract 25-C (133.8 acres), and Tract 25-E (43.13 acres).

The preferred disposal alternative is to place the maintenance material from this reach of the waterway into the new ODMDS off Sapelo Sound.

Operational Reach SAV-22- Old Teakettle Creek (AIWW Mile 642.9-648.2)

This reach of the AIWW has not required maintenance dredging. If maintenance dredging is required, the material would be disposed of at the new ODMDS off Sapelo Sound.

Operational Reach SAV-23- Doboy Sound (AIWW Mile 648.2-649.5)

This reach of the AIWW has not been dredged since 1978. When it has been dredged, the material has placed into an open water disposal area adjacent to Commodore Island. Although the material has some sand, it also contains silts and clays. If maintenance is required in Doboy Sound in the future, the material would be placed into a new ODMDS off Altamaha Sound.

Operational Reach SAV-24-North River Crossing (AIWW Mile 649.5-651.4)

Maintenance dredging has not been conducted in the North River Crossing since 1980. In the past, material has been deposited into undiked tracts 29-A, 29-B, and 29-C.

For purposes of the DMMP, it is estimated that about 480,000 CY of storage capacity will be required to handle about 320,000 cubic yards of material (mud). If future maintenance is required, the material would be deposited into the new ODMDS off Altamaha Sound.

Operational Reach SAV-25-Rockdedundy River (AIWW Mile 651.4-652.7)

Maintenance dredging was last performed in the Rockdedundy River in 1996. Material dredged from this portion of the AIWW has been placed in either undiked Tracts 29-B or 30-A. It is estimated that approximately 351,000 CY of storage would be required for the 20-year life of the DMMP to handle about 2,340,000 cubic yards of dredged material (mud). Future maintenance material from this portion of the AIWW would be deposited into the new ODMDS off Altamaha Sound.

Operational Reach SAV-26-South River (AIWW Mile 652.7-653.5)

This reach of the AIWW was last dredged in 1999. The material has normally been placed in undiked Tracts 29-C or 30-A.

Approximately 870,000 CY of storage capacity would be needed to meet the requirements of the DMMP. Future maintenance material (about 580,000 cubic yards of mud and silt) from the South River would be placed into the new ODMDS off Altamaha Sound.

Operational Reach SAV-27-Little Mud River (AIWW Mile 653.5-656.4)

Little Mud River has required extensive maintenance having been dredged 19 times between 1963 and 2001. It is estimated that about 3,908,000 CY of storage capacity would be required for the 20-year life of the DMMP to handle about 2,605,000 cubic yards of mud and silt. In the past, material has been discharged Tracts 30-A, 30-B, or 32-A.

The preferred alternative is to place future maintenance material from Little Mud River into the new ODMDS off Altamaha Sound.

Operational Reach SAV-28-Altamaha Sound (AIWW Mile 656.4-660.1)

This reach of the AIWW was last dredged in 2009. It is estimated that about 1,080,000 CY of dredged material storage capacity would be required to meet the requirements of the 20-year DMMP. The maintenance material to be removed (about 720,000 cubic yards) varies from silt to sand.

In the past, dredged material has been placed into Tracts 34-A and 36-A. Open water sites 32 and 34 have also been used to dispose of the course grained sediments.

The preferred alternative is to place the material into the new ODMDS off Altamaha Sound.

Operational Reach SAV-29-Buttermilk Sound (AIWW Mile 660.1-664.5)

Buttermilk Sound has been dredged 22 times between 1952 and 2009. The dredged material has been placed into undiked tracts 42-C, 42-B, 43-A, 43-B, 44-A and 44-B as well as open water disposal sites located adjacent to Tracts 42-C, 43-A, 43-B and downstream of Tract 42-B. It is estimated that about 2,171,000 CY of storage capacity will be needed to satisfy the requirements of the 20-year DMMP. The maintenance material (about 1,447,000 cubic yards) to be removed varies from silt to sand.

The DMMP provides for the continued use of the open water sites for coarse grain material. The material that is unsuitable for open water disposal would be placed in geo-tubes to provide a contained disposal area in tract 42-B. The intent is to confine the newly placed dredged material to the portions of this tract already impacted by disposal activities in the past. If this method of disposal proves infeasible, the material would be placed into the new ODMDS off of Altamaha Sound.

Operational Reach SAV-30-Mackay River (AIWW Mile 664.5-674.0)

This reach of the AIWW has not required maintenance dredging. If dredging is required in Mackay River, the material would be placed into the diked disposal area (Andrews Island) designated for the maintenance of Brunswick Harbor.

Operational Reach SAV-31-Frederica River (AIWW Mile 674-677)

No maintenance dredging has been required for this reach of the AIWW. If maintenance is necessary, the material would be placed into the existing diked Andrews Island disposal area.

Operational Reach SAV-32-St. Simon Sound (AIWW Mile 677-680.9).

Maintenance dredging St. Simon Sound has been conducted on two occasions in 1963 and 1969, and no future maintenance dredging in St. Simon Sound is anticipated to be necessary. However, should maintenance dredging be required in St. Simon Sound, the material would be placed into the existing Andrews Island disposal area.

Operational Reach SAV-33-Jekyll Creek (AIWW Mile 680.9-685.9)

It is estimated that approximately 9,230,000 CY of dredged material storage capacity would be required to maintain Jekyll Creek for the 20-year life of the DMMP. The maintenance material to be removed (about 4,615,000 cubic yards) is predominantly silts and clays.

In the past, most of the dredged material from Jekyll Creek has been discharged into undiked Tracts 52-A (115.7 acres) and 52-B (95 acres) which have been completely impacted by this activity although most of these tracts remain tidal wetlands. Tract 53-A (180.4 acres) has also been used. In addition to impacts to marsh within the disposal tracts, past dredged material disposal into Tracts 52-A and 52-B has been characterized by material running through the disposal areas and back into Jekyll Creek.

A thorough alternatives analysis was conducted for this reach of the AIWW in regards to the construction of a diked disposal area within Tracts 52-A and 52-B. There have been dike stability problems with past attempts to partially dike these sites. There has also been opposition expressed to constructing diked disposal areas in Tracts 52-A and 52-B based on aesthetic impacts to the viewshed of the nearby Jekyll Island National Historic District. There is insufficient high ground in the vicinity of Jekyll Creek to construct an upland diked disposal area large enough to handle the anticipated 20-year volume of material in this reach.

Based on these previous studies, the preferred alternative is to deposit dredged material from Jekyll Creek into the existing ODMDS for the Brunswick Harbor Navigation Project.

Operational Reach SAV-34-Jekyll Creek to Cumberland River (AIWW Mile 685.9-692)

This section of the AIWW has not required maintenance dredging, and there are no designated disposal areas for this reach. Should this reach require dredging in the future, the material would be placed into the existing ODMDS for the Brunswick Navigation project.

Operational Reach SAV-35-Cumberland River to Cumberland Sound (AIWW Mile 692-707)

This reach of the AIWW was dredged in 1965, 1995, and 2001. The Corps has an agreement with the US Navy to use their diked disposal area (Tract 1700-L or Crab Island) for any future maintenance requirements for this reach of the AIWW.

Operational Reach SAV- 36-Cumberland River to Cumberland Sound (AIWW Mile 707-713)

This reach of the AIWW is maintained by the US Navy as part of the channel for the Naval Submarine Base Kings Bay.

Alternate Route Around St. Andrews Sound. Maintenance of the alternate route around St. Andrews Sound is not included in the DMMP.

7.0 APPLICATION OF THE SECTION 404 (b) (1) GUIDELINES

The proposed project, including the amount and characteristics of the dredged material to be removed from the various reaches of the AIWW within Savannah District during the 20-year life of the DMMP have been described in preceding paragraphs. The purpose of this Section 404 (b) (1) evaluation is to assess the dredged material disposal alternatives in the DMMP to determine if they meet the intent of the Section 404 (b) (1) Guidelines.

In the past, much of the maintenance material from the AIWW has been placed in undiked disposal areas located adjacent to the waterway. Many of these disposal areas are located in tidal wetlands. Disposal of dredged material into these undiked disposal sites within the tidal wetlands is no longer a viable disposal alternative for maintenance of the AIWW. Consequently, this disposal alternative will not be addressed in this Section 404 (b) (1) evaluation.

In summary, the following three disposal alternatives are proposed in the DMMP for the portion of the AIWW within the Savannah District:

1. Use of existing diked disposal areas where available.

This method of disposal is proposed for the following reaches of the AIWW within Savannah District:

Reach SAV-1 Port Royal to Ramshorn Creek (DMCA 14-B)

Reach SAV-2 Ramshorn Creek (DMCA 14-B)

Reach SAV-3 New River (DMCA 14-B)

Reach SAV-4 Walls Cut (DMCA 14-B)

Reach SAV-5 Fields Cut (DMCA 14-B)

Reach SAV-6 Elba/McQueens Cut (DMCA 14-B)

Reach SAV-7 St. Augustine Creek (DMCA 14-B)

Reach SAV-8 Wilmington River (DMCA 14-B and Diked area within Tract 9-A)

Reach SAV-9 Skidaway River (Diked area within Tract 9-A)

Reach SAV-10 Skidaway Narrows (Diked area within Tract 9-A)

Reach SAV-11 Burnside River to Hells Gate (Diked area within Tract 9-A)

Reach SAV-30 Mackay River (Andrews Island DMCA)

Reach SAV-31 Frederica River (Andrews Island DMCA)

Reach SAV-32 St. Simons Sound (Andrews Island DMCA)

Reach SAV-35 Cumberland River to Cumberland Sound (Kings Bay Crab Island Disposal Area)

2. Ocean disposal of dredged material.

Much of the maintenance material that would be dredged from the AIWW in the future would be placed into USEPA approved ODMDSs. Ocean disposal would involve use of two existing ODMDSs (Savannah Harbor and Brunswick Harbor) and the establishment of two new ODMDSs off Sapelo Sound and Altamaha Sound. Establishment of the two new ODMDSs and use of the existing ODMDSs for the Savannah Harbor and Brunswick Harbor Projects for material from the AIWW would require site designation studies and USEPA approval per the requirements of Section 103 of the Marine Protection, Research and Sanctuaries Act. Ocean disposal of dredged material is proposed for the following reaches of the AIWW:

Reach SAV-13 Hells Gate to Florida Passage (Savannah Harbor ODMDS)

Reach SAV-14 Florida Passage (ODMDS Sapelo Sound)

Reach SAV-15 Bear River (ODMDS Sapelo Sound)

Reach SAV-16 St. Catherines Sound to North Newport River (ODMDS Sapelo Sound)

Reach SAV-17 North Newport River (ODMDS Sapelo Sound)

Reach SAV-18 Johnson Creek (ODMDS Sapelo Sound)

Reach SAV-19 Sapelo Sound to Front River (ODMDS Sapelo Sound)

Reach SAV-20 Front River (ODMDS Sapelo Sound)

Reach SAV-21 Creighton Narrows (ODMDS Sapelo Sound)

Reach SAV-22 Old Teakettle Creek (ODMDS Sapelo Sound)

Reach SAV-23 Doboy Sound (ODMDS Altamaha Sound)

Reach SAV-24 North River (ODMDS Altamaha Sound)

Reach SAV-25 Rockdedundy River (ODMDS Altamaha Sound)

Reach SAV-26 South River (ODMDS Altamaha Sound)

Reach SAV-27 Little Mud River (ODMDS Altamaha Sound)

Reach SAV-28 Altamaha Sound (ODMDS Altamaha Sound)

Reach SAV-33 Jekyll Creek (ODMDS Brunswick Harbor)

Reach SAV-34 Jekyll Creek to Cumberland River (ODMDS Brunswick Harbor)

3. Open Water Disposal in Conjunction with Confined Disposal

Reach SAV-12 Hells Gate (Open water north and south of Raccoon Key, Tracts 15-A and 15-B)

ReachSAV-29 Buttermilk Sound (Open Water Sites 43 and 44, Tract 42-B)

7.0 TIMING AND DURATION OF DISCHARGE

Maintenance dredging is performed on the AIWW on an annual basis provided the work is funded. Hydraulic cutterhead dredges have historically performed the dredging work on the AIWW, since the disposal sites were next to the reaches being dredged. Mechanical dredges with scows would be used to dredge reaches where the disposal site is located farther (> 6 miles) than a cutterhead dredge can efficiently pump the material. Small hopper dredges would be used where the dredge material is suitable for beneficial use and for near shore beach renourishment. Hopper dredges and mechanical dredges would be used when dredged material is to be transported to Ocean Dredged Materials Disposal Sites (ODMDS). To minimize impacts to sea turtles, use of a hopper dredge would be restricted to December 15 – March 31 of any year. No other time-of-year restrictions are proposed.

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

8.0 SUBPART B – COMPLIANCE WITH THE SECTION 404 (b) (1) GUIDELINES

8.1 Restrictions on Discharge (Section 230.10)

8.1.1 Practicable Alternatives.

“ No discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. (1) For the purpose of this requirement, practicable alternatives include, but are not limited to: (i) Activities which do not involve a discharge of dredged or fill material into the waters of the United States or ocean waters; (ii) Discharges of dredged or fill material at other locations in waters of the United States or ocean waters.”

Almost all dredging projects involve the discharge of dredged material into waters of the United States or ocean waters. Because of the location of the project, dredging methods and the amount of dredged material that is removed during a normal AIWW maintenance dredging cycle, there is no practicable alternative to discharging dredged material into waters of the United States or ocean waters. Under the maintenance plan presented in the DMMP, maintenance of the AIWW would result in the discharge of dredged material into waters of the United States as a result of discharges of effluent from the diked disposal areas, incidental leakage of dredged material from the dredges used to remove the material, placement of material into disposal tracts where geo-tubes are used, and where material is discharged into open water disposal sites adjacent to existing disposal easements. Maintenance of the AIWW will

also result in the discharge of dredged material into ocean waters since much of the future maintenance material will be placed into designated ODMDSs off Savannah Harbor, Sapelo Sound, Altamaha Sound and Brunswick Harbor.

Although there is no practicable alternative to the discharge of dredged material into waters of the United States or ocean waters, the proposed plan presented in the DMMP has determined that there are practicable alternatives to discharge dredged material at other locations in waters of the United States or ocean waters that will reduce impacts to the aquatic environment compared to those that have occurred in the past. Material that has been discharged into undiked disposal areas located in tidal marsh in the past will be discharged into diked disposal areas or taken to a designated ODMDS.

8.1.2 State Water Quality Standard or Toxic Effluent Standards.

"(b) Discharged of dredged material shall not be permitted if it;"

"Causes or contributes, after consideration of disposal dilution and dispersions, to violations of any applicable state water quality standard;"

"(2) Violates any applicable toxic effluent standard or prohibition under Section 370 of the Clean Water Act."

The discharge of dredged material associated with maintenance of the AIWW would not result in the violation of any state water quality standard or violate any applicable toxic effluent standard or prohibition under Section 370 of the Clean Water Act. Very few chemical analyses have been conducted on sediments within Savannah District's portion of the AIWW. However, most reaches of the AIWW are sufficiently removed from known sources of pollution such that maintenance sediments are not expected to contain contaminants at levels of concern. Chemical analytical data - elutriate chemistry, whole sediment toxicity, suspended phase toxicity, 28-day bioassay and bioaccumulation data, and tissue chemistry were developed for sediments from the Jekyll Creek area in 2003. Sediments in Jekyll Creek would be most likely to contain contaminants at levels of concern because of Jekyll Creek's close proximity to Brunswick, Georgia. The results of this study suggest that Jekyll Creek sediments contain limited quantities of contaminants.

Material that is taken to the ODMDSs will be evaluated per the Section 103 protocols (Green Book). The effluent from the diked disposal areas would be monitored to ensure that no applicable state water quality standard is violated. Material that is discharged into the open water disposal sites is expected to be clean sand from Hells Gate, Altamaha Sound, and Buttermilk Sound.

8.1.3 Threatened and Endangered Species.

"(3) Jeopardizes the continued existence of species listed as endangered and threatened under the Endangered Species Act of 1973, as amended."

USACE, Savannah District prepared a biological assessment (BATES) evaluating the potential impacts of the proposed action on endangered and threatened species. USACE, Savannah District has made a

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

The BATES has been coordinated with the US Fish and Wildlife Service and the National Marine Fisheries Service.

8.1.4 Marine Sanctuaries.

"Violates any requirements imposed by the Secretary of Commerce to protect any marine sanctuary designated under Title III of the Marine Protection Research and Sanctuaries Act of 1972."

The discharge of dredged material associated with implementation of the AIWW DMMP will not affect any marine sanctuary or other items addressed under the Act. Gray's Reef National Marine Sanctuary is located about 16 miles east of Sapelo Island. The DMMP proposes two new ODMDSs, one off Sapelo Sound and one off Altamaha Sound. Site investigations and NEPA documentation for these new sites will be conducted in accordance with USEPA requirements for designating ocean disposal sites and will require USEPA approval.

8.1.5 Human Health or Welfare.

"(c) Except as provided under Section 404(b)(2), no discharge of dredged or fill material which will cause or contribute to significant degradation of the waters of the United States. Findings of significant degradation related to the proposed discharge shall be based upon appropriate factual determinations, evaluations, and tests required by Subparts B and G of the consideration of Subparts C-F with special emphasis on the persistence and permanence of the effects contributing to significant degradation considered individually or collectively include:"

"(1) Significant adverse effects of the discharge of pollutants on human health, or welfare including, but not limited to effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites."

The discharge of dredged or fill material associated with implementation of the AIWW DMMP would not result in the discharge of pollutants that would have adverse effects on municipal water supplies, plankton, fish, shellfish, wildlife or special aquatic sites. There would be no discharge of dredged material in the vicinity of a municipal water supply intake, designated shellfish harvesting area or special aquatic site.

8.1.6 Aquatic Life and Wildlife Dependent on Aquatic Ecosystems.

"(2) Significant adverse effects of the discharge of pollutants on life stages of aquatic life and other wildlife dependent upon aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their by-products outside the disposal site through biological, physical, and chemical processes."

None of the dredged material that is to be disposed of at the ODMDSs, placed into the diked disposal areas, or deposited into the open water disposal sites is considered contaminated, and therefore implementation of the AIWW DMMP would not result in the spread or transfer of pollutants outside of the disposal areas.

8.1.7 Aquatic Ecosystem Diversity, Productivity and Stability.

"(3) Significant adverse effects of the discharge of pollutants on aquatic ecosystems diversity, productivity, and stability. Such effects may include, but are not limited to, loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy; or

(4) Significant adverse effects of the discharge of pollutants on recreational, aesthetic, and economic values."

Implementation of the AIWW DMMP will actually result in net benefits to estuarine emergent wetlands in the project area. The disposal practice of discharging dredged material into undiked disposal areas located in tidal wetlands would be discontinued. In addition to estuarine emergent wetlands, Essential Fish Habitat (EFH) in the project area includes oyster reefs and shell bars, intertidal flats, and estuarine and marine water columns. Most of the maintenance material from the AIWW would be taken to a designated ODMDS or placed in a diked disposal area. Consequently there would be no adverse impacts to these EFH resources. A small amount of material will be placed into existing open water disposal sites at Hells Gate and in Altamaha and Buttermilk Sound. This material is clean sand, and it will be placed onto a water bottom with similar substrate.

There would be some loss of impacted tidal wetland habitat associated with the proposed confined disposal of fine-grained sediments unsuitable for open water disposal at Hells Gate and Buttermilk Sound. Geo-tubes or some equivalent confinement method would be used to confine the dredged material to the already impacted portions of several previously used marsh tracts. Appropriate wetland mitigation would be provided for the impacts to the remaining marsh in the impacted portions of these marsh tracts. As mitigation, funds would be provided to a land trust or state resource agency which would be designated for wetland restoration projects within the State. The DMMP also provides for some of the disposal easements for some of the undiked disposal tracts along the AIWW to be relinquished to the States of Georgia and South Carolina since the practice of disposing dredged material into undiked disposal tracts will be discontinued. Depending on priorities, wetland restoration projects in these former undiked disposal tracts using the funds provided may be appropriate.

An evaluation of the impacts of implementing the AIWW DMMP on EFH has been prepared. This EFH analysis has been coordinated with the National Marine Fisheries Service.

The discharge of dredged material associated with maintenance of the AIWW will not result in the discharge of pollutants that would have significant adverse impacts on recreational, aesthetic and economic values.

7.1.8 Steps Taken to Minimize Adverse Effects.

"(d) Except as provided under Section 404(b)(2), no discharge or dredged or fill material shall be permitted unless appropriate and practical steps have been taken which will minimize the potential adverse effects of the discharge on the aquatic ecosystem."

Most of the future maintenance material from the AIWW will be discharged into diked containment areas or taken to a designated ODMDS which would greatly minimize impacts to the aquatic environment compared to the past practice of discharging the dredged material into undiked disposal tracts located in tidal marsh.

Use of a hopper dredge and the associated disposal of the material will only be conducted during the period December 15 - March 31 of any year to minimize impacts to sea turtles. No other time-of-year restrictions are proposed for other types of dredges (hydraulic cutterhead, mechanical) expected to be used on the AIWW.

As requested by the Georgia Department of Natural Resources, material placed in the open water disposal sites at Hells Gate and in Altamaha Sound and Buttermilk Sound will have a sand content of 80% or greater. Material with a high sand content settles very quickly, and consequently, this material would tend to stay in the disposal site.

9.0 FACTUAL DETERMINATION (SECTION 230.11)

9.1 Physical Substrate Determination.

Consideration shall be given to the similarity in particle size, shape, and degree of compaction of the material proposed for discharge and the material constituting the substrate at the disposal site and any potential changes in substrate elevation and bottom contours.

Most of the future maintenance material from the AIWW would be removed from the aquatic environment and discharged into designated ODMDSs. Some of the future maintenance material would be placed into diked disposal areas. Only a small amount of solids in the effluent from the diked disposal areas would re-enter the aquatic environment. Open water disposal sites at Hells Gate and Buttermilk Sound would be used during some maintenance dredging cycles provided the material is at least 80% sand. These open water disposal sites are close to the AIWW channel, and thus the substrate at these sites is sandy in nature. Some material would continue to be placed in Tracts 15-A and 15-B (Hells Gate) and Tract 42-B (Buttermilk Sound). This material would be confined to the existing deposits within these disposal areas by using geo-tubes or similar technology.

Possible Loss of Environmental Values. The future disposal of dredged material as provided for in the AIWW DMMP is not expected to cause any substantial changes in substrate elevation or bottom contours in the aquatic environment based on the rationale discussed in the previous paragraph.

Actions to Minimize Impacts. Implementation of the AIWW DMMP would actually minimize impacts to changes in substrate elevation in the aquatic environment that have occurred during past maintenance of the project. In the past, much of the maintenance material was placed in an unconfined manner into undiked disposal areas located in tidal marshes. Deposition of the dredged material raised the substrate elevation in the marsh which eliminated or reduced tidal influence necessary for marsh propagation. The AIWW DMMP does not include this type of dredged material disposal.

9.2 Water Circulation, Fluctuations, and Salinity Determinations.

Consideration shall be given to water chemistry, salinity, clarity, color, odor, taste, dissolved gas levels, temperature, nutrients, and eutrophication plus other appropriate characteristics. Also to be considered are the potential diversion or obstruction of flow, alterations of bottom contours, or other significant changes in the hydrologic regime. Changing the velocity of water flow can result in adverse changes in location, structure, and dynamics of aquatic communities, shoreline erosion and deposition, mixing rates and stratification, and normal water-level fluctuation patterns. These affects can alter or destroy aquatic communities.

The only disposal method proposed in the AIWW DMMP that has the potential to cause the diversion or obstruction of flow, alterations of bottom contours or significant changes in the in the hydrologic regime is use of the open water sites located at Hells Gate and Buttermilk Sound. All of these open water sites are located in or adjacent to large bodies of water (sounds). Placement of a relatively small amount of dredged material on an infrequent basis (about every 3 years) will have little to no effect on the hydrologic regime in the receiving water body.

Loss of Environmental Value

No net loss of environmental value from a change in the hydrologic regime as a result of implementing the AIWW DMMP is envisioned based on the preceding discussion.

Actions to Minimize Impacts

The disposal methods proposed in the AIWW DMMP would not result in any significant changes in hydrologic conditions at the proposed disposal sites.

9.3 Suspended Particulate/Turbidity Determinations.

Effects due to potential changes in the kinds and concentrations of suspended particulate/turbidity in the vicinity of the disposal site. Factors to be considered include grain size, shape and size of any plume generated, duration of the discharge and resulting plume, and whether or not the potential changes will cause violations of applicable water quality standards. Consideration shall include the proposed method, volume, location, and rate of discharge, as well as the individual and combined

effects of current patterns, water circulation and fluctuations, wind and wave action, and other physical factors on the movement of suspended particulates.

Much of the maintenance material to be removed in the future would be taken to approved ODMDSs. Consequently, there would be no impacts to the aquatic environment. Some of the dredged material will be placed into diked disposal areas. The slurry discharged into these disposal sites is retained to allow the solids to settle out before the effluent from the confined disposal area is discharged to the receiving water body. This type of dredged material disposal is usually very effective in retaining the solids within the disposal site. As an example, a test of one of confined disposal area for Savannah Harbor found a solids retention rate of over 99.93 percent (Palermo, 1988).

Some of the maintenance material would be discharged into open water sites located at Hells Gate and Buttermilk Sound. This material would be heavy sand which would settle rapidly at the disposal site.

Loss of Environmental Values

Due to reduction in light transmission, reduction in photosynthesis, reduced feeding and growth of sight dependent species, direct destructive effects to nektonic and planktonic species, reduced DO, increased levels of dissolved contaminants, aesthetics.

There would be no loss of environmental values associated with placing AIWW maintenance material in either the diked disposal areas or the open water disposal sites. As discussed in the preceding paragraph, most of the dredged material is expected to remain in the diked disposal area. Likewise, material (heavy sand) is expected to settle rapidly into the open water disposal areas. Consequently, there would be no reduction in light transmission, reduction in photosynthesis or direct destructive effects to nektonic and planktonic species. Maintenance material removed from the AIWW is far enough removed from sources of pollution such that it is not expected to be contaminated.

Actions to Minimize Impacts

Use of hopper dredges on the AIWW would only occur during the period December 15 - March 31 of any year to minimize impacts to sea turtles. No time-of-year restrictions are proposed for use of other types of dredges (hydraulic cutterhead, mechanical). The effluent from the confined disposal sites would be monitored during the dredging and disposal process to ensure no applicable water quality standards were being violated. Such monitoring routinely includes analyses of various water quality parameters including suspended solids and dissolved oxygen.

Dredged material would not be placed into the open water disposal sites unless it has at minimum 80% sand content.

9.4 Contamination Determination.

Consider the degree to which the proposed discharge will introduce, relocate, or increase contaminants. This determination shall consider the material to be discharged, the aquatic

environment at the proposed disposal site, and the availability of contaminants. Consideration of Evaluation and Testing (parts 230.60 and 230.61).

As discussed in preceding paragraphs, material removed during the maintenance dredging of the AIWW is considered to be far enough removed from sources of pollution that it is not expected to be contaminated. Various analyses were conducted on sediments from the Jekyll Creek area in 2003. Sediments from this portion of the AIWW would be expected to have the greatest potential to be contaminated because of Jekyll Creek's close proximity to Brunswick, Georgia. These analyses did not indicate the presence of any contaminants in the sediments at levels of concern.

Loss of environmental values

Implementation of the disposal plans in the AIWW DMMP would not result in the loss of any environmental values due to the introduction, relocation or increase in contaminant levels at the disposal sites.

Actions to Minimize Impacts

The material to be placed in the ODMDSs must meet the requirements of the Section 103 Guidelines (including chemical and biological testing) before it can be transported to these sites for disposal. However, since sediments removed from the AIWW during maintenance dredging are not considered contaminated (because they are removed from sources of pollution), they may be exempt from some of the more stringent testing requirements.

9.5 Aquatic Ecosystem and Organism Determinations.

Effect on the structure and function of the aquatic ecosystem and organisms and effect on the re-colonization and existence of indigenous aquatic organisms or communities.

The discharge of dredged material associated with the disposal plans proposed in the AIWW DMMP are not expected to have any effect on the structure and function of the aquatic ecosystem and organisms or on the re-colonization and existence of indigenous aquatic organisms or communities. There would be some adverse impacts to benthic communities within the open water disposal sites at Hells Gate and in Altamaha and Buttermilk Sounds. However, these impacts would be confined to the immediate disposal sites which represent a very small amount of available habitat in the project area. Affected benthic populations would have the opportunity to recover as use of these open water disposal sites would only occur every 3-4 years.

Fish, Crustaceans, Mollusks and Other Aquatic Organisms in the Food Web

Implementation of the dredged material disposal plans in the AIWW DMMP would not interfere with any recreational or commercial fishing operations. There would be no discharge of dredged material in the vicinity of any commercial or recreational shellfish harvesting area.

Other Wildlife

There will be only minimal adverse impacts to wildlife and wildlife habitat as result of implementation of the AIWW DMMP. Most of these impacts would be associated with confined placement of fine-grained sediments from Hells Gate and Buttermilk and Altamaha Sounds onto existing impacted portions of 5 existing disposal tracts. Field studies conducted in 2011 of these sites indicated minimal to moderate evidence of wildlife utilization. Much of the saltmarsh within the impacted portions of these tracts is dominated by smooth cordgrass, indicating that the marsh has been disturbed.

Loss of these resources is unavoidable if these sites are used again for dredged material disposal. The sites will be evaluated and appropriate wetland mitigation funds provided to a land trust or state resource agency for the purpose of marsh restoration.

10.0 PROPOSED DISPOSAL SITE DETERMINATIONS

Each disposal site shall be specified through application of the guidelines. The mixing zone shall be confined to the smallest practicable zone within each specified disposal site that is consistent with the type of dispersion determined to be appropriate by the application of the guidelines.

The AIWW DMMP provides for three major types of dredged material disposal to handle future maintenance requirements of the waterway.

Most of the future maintenance material will be placed in two existing ODMDSs (Savannah Harbor and Brunswick Harbor) or two new ODMDSs which would be located off Sapelo Sound and Altamaha Sound. The two new ODMDSs would be sized in accordance with project requirements and the Section 103 Guidelines.

The AIWW DMMP utilizes five existing diked upland disposal sites to handle maintenance material from 15 reaches. These existing diked disposal areas include DMCA 14-B, a DMCA within Tract 9-A, Andrews Island DMCA, and the Big Crab Island Disposal Area at Kings Bay. Use of existing diked disposal areas eliminates the impacts (fish and wildlife habitat, cultural resources, etc.) associated with the establishment of new sites as well as the initial costs (land acquisition, environmental, site clearing, dike construction, etc.)

For two reaches (Hells Gate, Buttermilk Sound), the AIWW DMMP utilizes four existing open water disposal sites in conjunction with three existing disposal tracts. If the material has a sand content of at least 80%, the material would be placed in open water disposal sites north and south of Raccoon Key (Hells Gate), and open water sites 43 and 44 (Buttermilk Sound). If the material is unsuitable for open water disposal, it would be placed in existing AIWW disposal tracts 15-A and 15-B (Hells Gate), and 42-B (Buttermilk Sound). However, the material would not be discharged into these tracts in an unconfined manner as in the past. Geo-tubes or some similar technology would be used to confine the dredged material onto existing deposits within the tracts thereby eliminating additional impacts to tidal marsh. If this method of dredged material disposal proves unsuccessful, the unsuitable material would be taken to one of the ODMDSs.

11.0 DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEM

Cumulative Effects attributable to the discharge of dredged or fill material in Waters of the United States should be predicted to the extent reasonable and practical.

Implementation of the AIWW DMMP would actually minimize or eliminate many of the cumulative impacts that have occurred to tidal marsh as a result of construction and maintenance of the AIWW. The 70-year-old practice of discharging dredged material into undiked disposal tracts located in tidal marsh would be discontinued. Over time, there may even be additional benefits in the form of marsh recovery as storms and tidal action remove some of the dredged material deposits within these undiked disposal tracts which may allow marsh in some of these tracts to recover. Some evidence of marsh recovery was observed in the 2011 field studies versus marsh impacts observed in the 1983 field work in those tracts that had been used very little or not at all between 1983 and 2011.

Use of the existing Savannah Harbor ODMDS and the Brunswick Harbor ODMDS and establishment of two new ODMDSs off Sapelo Sound and Altamaha Sound will require site designation studies. As part of these studies, an assessment will have to be made of any cumulative impacts that could be associated with taking additional dredged material to the ocean for disposal. Since the proposed action involves ocean disposal of non-contaminated, naturally occurring sediments, it is not envisioned that use of these ODMDSs would have any significant long-term cumulative impacts.

12.0 DETERMINATION OF SECONDARY IMPACTS ON THE AQUATIC ECCOSYSTEM

The primary secondary impacts associated with implementation of the AIWW DMMP would be mostly beneficial based on the following determinations:

There would be less adverse impacts to tidal marsh from maintenance of the AIWW since the practice of discharging dredged material into undiked disposal tracts in tidal marsh would be discontinued.

In the long-term, areas of tidal marsh within some of these undiked disposal tracts could recover from dredged material deposition

A land trust or state resource agency will receive funds for the loss of marsh associated with confined disposal of fine-grained material into the impacted portions of three undiked disposal tracts. These funds would be designated for marsh restoration projects which further benefit tidal marsh in coastal Georgia. No mitigation would be required for future impacts in South Carolina, since all material from the South Carolina reaches would be placed in the existing Savannah Harbor DMCA 14-B.

13.0 FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH RESTRICTIONS ON DISCHARGE (SECTION 230.12)

13.1 Determinations.

a. An ecological evaluation of the discharge of dredged material associated with the implementation of the AIWW DMMP has been made following the evaluation guidance in 40 CFR 230.6, in conjunction with the evaluation considerations in 40 CFR 230.5 .

b. Potential short-term and long-term effects of the proposed work on the physical, chemical, and biological components of the aquatic ecosystem have been evaluated and it has been found that the proposed discharge will not result in significant degradation of the environmental values of the aquatic ecosystem.

c. There are no less environmentally damaging practicable alternatives to the proposed work that would accomplish the project goals and objectives. The AIWW DMMP was developed to minimize impacts to tidal marsh compared to existing disposal practices.

(1) The proposed work will not cause or contribute to violations of any applicable State water quality standards, will not violate any applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act, will not jeopardize the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, and will not violate any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.

(2) The proposed work will not cause or contribute to significant degradation of the waters of the United States.

(3) The discharge includes all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem.

13.2 Findings.

On the basis of the guidelines, the proposed disposal sites for the discharge of dredged material as proposed by the AIWW DMMP are specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.