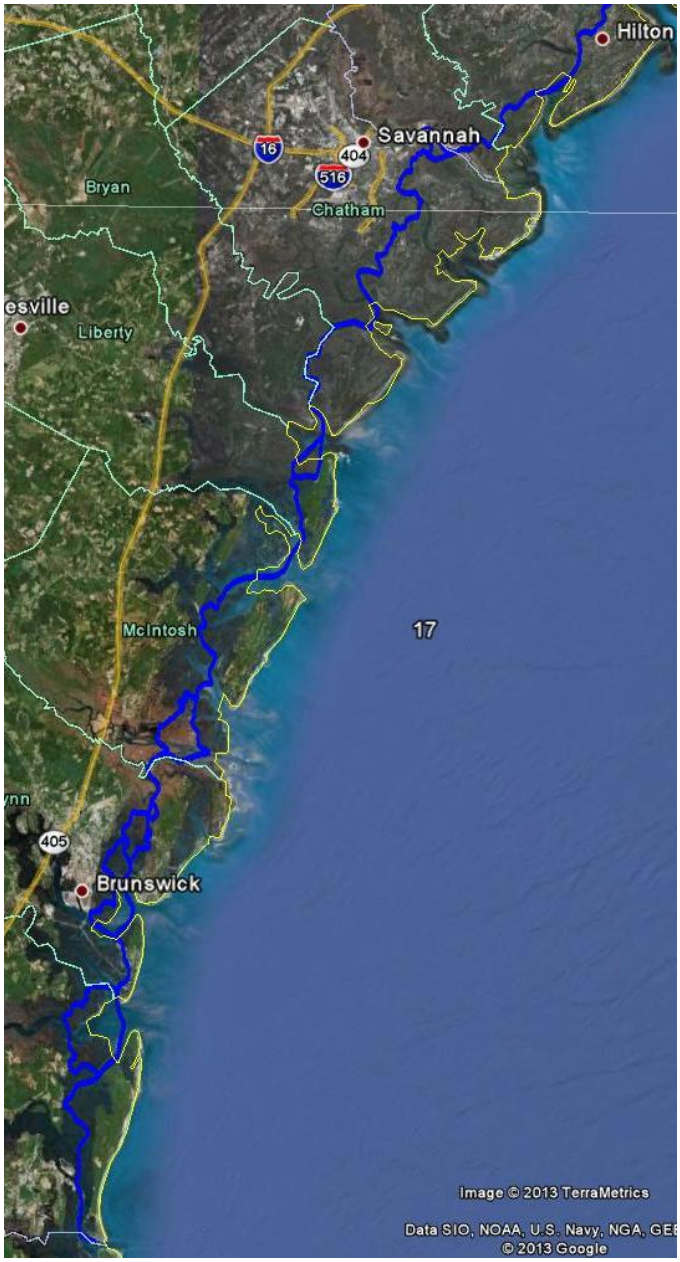
Dredged Material Management Plan
Atlantic Intracoastal Waterway
Port Royal Sound, South Carolina to Cumberland Sound, Georgia
November 2015

Appendix J: Economics



US Army Corps of Engineers®
South Atlantic Division
Savannah District

1.0 Benefits

According to the Waterborne Commerce Statistics Center, in 2010 the total annual commercial tonnage moved along the Savannah District portion of the AIWW was 116,663 short tons. The main commodity in 2010 was petroleum products with 64,089 short tons. Other major commodities moved were crude materials inedible except fuels, soil, sand, rock and gravel, and ore scrap. This tonnage is after a consistent drop off since 2003 shown in Table 1 along with the directions of the traffic.

Receipts traffic is the traffic that's destination was inside the Savannah District portion while Shipments traffic is the traffic that originated inside the Savannah District. Intrawaterway traffic is the traffic that started on the AIWW and went to another waterway system such as the Lower Savannah River. Through traffic travels through the entire 161 miles that make up the Savannah District portion of the AIWW.

Table 1: Savannah District Short Tons by Year and Direction

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

Based on the 2010 data a total of 113,865 short tons of cargo traveled the entire 161 miles that make up the Savannah District's portion of the AIWW and into other districts portions. This is 18.3 million ton miles of cargo, and is lowest point for cargo over the last eight years. At its highest point over the last eight years, in 2004, the AIWW had 303,856 short tons or 48.9 million ton miles of cargo traversing the entire Savannah District.

Also according to the Waterborne Commerce Statistics Center, the total number of commercial vessel trips has decreased since 2003 (Table 2). In 2009 the vessels that are near or greater than the authorized 12 foot depth have an abrupt spike in both the number of trips and the percentage of total trips (Figure 1). 2009 is also the only year between 2003 and 2010 that the AIWW received any dredging. It appears that there is some correlation between the maintenance of the AIWW and the make-up of the commercial fleet that uses it.

Table 2: Savannah District Trips by Year and Draft

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

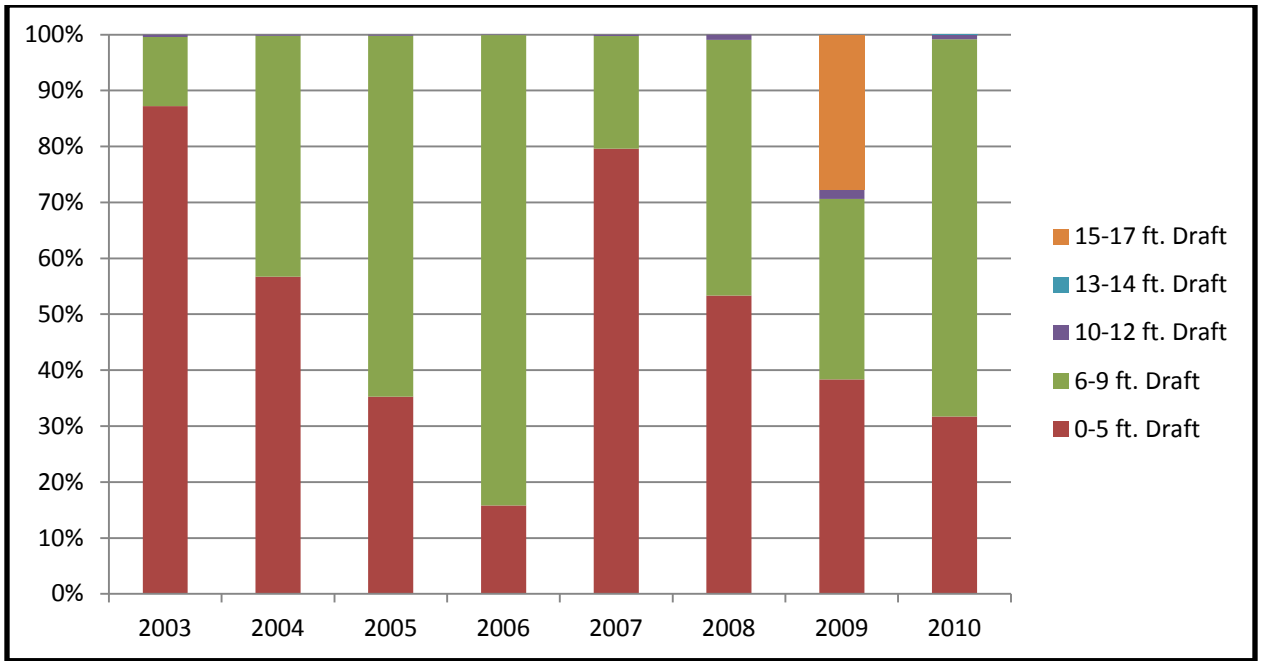


Figure 1: Percentage of trips by vessel draft

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

The GDNR contracted with the Carl Vinson Institute of Government at the University of Georgia to conduct a study to determine the economic benefits of recreational boating on the Georgia portion of the AIWW and to determine the extent of loss that might result from a reduction in recreational boating caused by deterioration of the channel.
In recent years, the channel along the AIWW has deteriorated in many places due to insufficient dredging and maintenance. A summary of the results of data analysis from Clarke et al., 2008 is as follows:

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

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

1.1 Benefit Considerations

The benefits of the DMMP are assumed to be the same no matter which alternative is selected. If a flat amount of funds are received the most benefits would accumulated by the least cost plan. The completed DMMP would allow the AIWW Project to be operated and maintained in a cost effective and environmentally sustainable manner. If funding were done as a percentage of cost the navigation benefits would be the same for all alternatives. The cost of the alternatives would differ and they would be compared to identify the least-cost, environmentally acceptable plan. Therefore benefits do not need to be evaluated for this analysis.

2.0 Costs

2.1 Initial Volumes

The last dredging on the AIWW was in 2009 and it did not dredge every reach in the AIWW. The first anticipated dredging under any alternative not occurring until 2016 at least seven years after the last event. This is a spacing between dredging events will cause the initial volume to be higher. This volume was not included in the economic analysis; however, costs were developed for this. Those costs can be seen in the Cost Appendix and DMMP.

2.2 Return Periods

The costs for the fully considered alternatives fell into one of a few categories. These were construction costs, additional studies cost, per event dredging costs, mitigation costs, and routine operation and maintenance costs. The initial construction costs, mitigation costs, and additional studies costs are one time upfront costs while the other two costs have return periods. The routine operations and maintenance costs have an annual return while the per event dredging costs return period varied from 2 years to 18 years depending on the reach.

If a dredging event is set to occur in a non-dredging it was included in the dredging that occurred in the previous year. However, the dredging interval still counted from the year dredging should have occurred if the AIWW was dredged annually.

2.3 Development Costs

The development costs included construction, real estate, additional studies, and mitigation costs. The costs to develop a placement site were divided by the amount of placement capacity created by the site to determine the cost per CY of created placement capacity. Any reach that had as an alternative a given site then multiplied this cost per CY by the 20-yr required storage capacity of the reach. This allowed sites that would create a larger capacity but at a larger initial investment to be compared evenly with sites that had little to no development costs. However, any remaining storage after 20-years would need to be included in the costs of implementing beyond

the 20-year horizon of this study. By using this method each reach could be considered independent from the other reaches and still evaluate the plans as a system of sites.

2.4 Phased Approach

Any reach with multiple alternatives was evaluated. Each method of placement had different timing constraints that had to be applied. For the future-without project condition dredging would begin in 2016, the first budget year after the completion of the plan. For the other alternatives the one time upfront costs all occur during 2016. The dredging would be phased in as the alternative became available for use. For new diked DMCAs this would be one year for construction and then the next year dredging would begin because the AIWW is dredged biennially. For new ODMDS there would be a study period that would last three years and then the next year dredging would begin because the AIWW is dredged biennially.

2.5 Annualized Costs

All costs were converted to average annual costs using the 2013 discount rate of 3.750% (EGM 13-01). This was done by first converting all costs to a present value in 2013 dollars using

$$P = F \times (1 + i)^{-n}$$

where P is the present value, F is the future value, i is the discount rate and n is the number of years between 2013 and the future year. After this the present value was converted to an average annual cost was calculated using

$$A = P \times \frac{i(1 + i)^n}{(1 + i)^n - 1}$$

where A is the average annual costs, and all the other values are the same as above.

This process was done for each reach regardless of future need. The reach would only be paying for the portion of the site it would use during the twenty year period of analysis, as the remaining life beyond 20 years varies from one site toanother site. The summary of this analysis can be found in the Table 3. The TSP is shown in the Table 4.

Table 3: Average Annual Cost of Alternatives for Comparison

Ops Reach	FWOP	Alt 1	Alt 2	Alt 3	Alt 4
SAV-1	$30,200	$30,200	$30,200	$30,200	$30,200
SAV-2	$76,700	$84,400	$305,900	$84,400	$84,400
SAV-3	$26,000	$26,000	$26,000	$26,000	$26,000
SAV-4	$26,000	$26,000	$26,000	$26,000	$26,000
SAV-5	$225,800	$118,400	$118,400	$118,400	$118,400
SAV-6	$209,100	$87,700	$87,700	$87,700	$87,700
SAV-7	$958,900	$644,000	$644,000	$1,142,800	$644,000
SAV-8	$268,200	$296,900	$296,900	$278,300	$108,400
SAV-9	$29,500	$29,500	$29,500	$29,500	$29,500
SAV-10	$31,000	$31,000	$31,000	$31,000	$31,000
SAV-11	$33,100	$33,100	$33,100	$33,100	$33,100
SAV-12	$1,393,600	$500,500	$500,500	$978,700	$422,400
SAV-13	$36,500	$56,000	$79,700	$67,400	$8,100
SAV-14	$97,700	$95,000	$109,800	$109,000	$53,400
SAV-15	$108,500	$87,700	$139,700	$109,900	$36,000
SAV-16	$42,400	$31,400	$41,000	$59,200	$7,000
SAV-17	$43,800	$31,400	$41,000	$59,200	$7,000
SAV-18	$98,000	$60,700	$70,300	$65,300	$3,300
SAV-19	$47,800	$28,800	$60,600	$78,600	$40,700
SAV-20	$49,900	$28,300	$45,500	$63,400	$8,700
SAV-21	$1,679,200	$632,500	$731,600	$937,500	$248,800
SAV-22	$52,200	$34,700	$45,500	$63,400	$8,700
SAV-23	$45,100	$50,600	$187,400	$54,200	$5,600
SAV-24	$684,800	$210,300	$415,800	$213,900	$122,400
SAV-25	$484,000	$153,300	$299,600	$156,900	$58,800
SAV-26	$1,114,700	$327,400	$641,300	$480,200	$210,500
SAV-27	$4,762,500	$911,500	$2,166,100	$1,973,500	$550,600
SAV-28	$1,738,400	$480,200	$550,700	$550,700	$548,900
SAV-29	$3,193,900	$814,100	$814,100	$927,400	$812,300
SAV-30	$64,000	$39,300	$39,300	$39,300	$7,900
SAV-31	$66,200	$39,300	$39,300	$39,300	$7,900
SAV-32	$68,300	$39,300	$39,300	$39,300	$39,300
SAV-33	$10,499,000	$1,621,500	$1,621,500	$7,409,000	$996,700
SAV-34	$70,600	$25,300	$25,300	$99,900	$70,600
SAV-35	$235,400	$83,000	$83,000	$83,000	$83,000
SAV-36	$0	$0	$0	$0	$0
Total Average Annual Dredging Cost	$28,591,000	$7,789,300	$10,416,600	$16,545,600	$5,577,300

Table 4: Tentatively Selected Plan by Reach

Dredging Reach	Ops Reach	Dredging Interval (yrs)	Tentatively Selected Plan Placement Site (Alternative 1)
Port Royal to Ramshorn Creek	SAV-1		Sav Harbor DMCA 14-B if needed
Ramshorn Creek, SC	SAV-2	14	Sav Harbor DMCA14-B
New River	SAV-3		Sav Harbor DMCA 14-B if needed
Walls Cut	SAV-4	19	Sav Harbor DMCA14-B
Fields Cut, SC	SAV-5	5	Sav Harbor DMCA14-B
Elba Cut - McQueens Cut	SAV-6	9	Sav Harbor DMCA14-B
St. Augustine Creek	SAV-7	2	Sav Harbor DMCA14-B
Wilmington River	SAV-8	4	Sav Harbor DMCA14-B
Skidaway River	SAV-9		9-A if needed
Skidaway Narrows	SAV-10		9-A if needed
Burnside River to Hells Gate	SAV-11		9-A if needed
Hells Gate	SAV-12	3	Open Water (coarse); confined Tracts 15-A and 15-B (fines)
Hells Gate to Florida Passage	SAV-13		Savannah ODMDS if needed
Florida Passage	SAV-14	11	Proposed ODMDS @ Sapelo Sound
Bear River	SAV-15	15	Proposed ODMDS @ Sapelo Sound
St. Catherines Sound - North Newport River	SAV-16		Proposed ODMDS @ Sapelo Sound if needed
North Newport River	SAV-17		Proposed ODMDS @ Sapelo Sound if needed
Johnson Creek	SAV-18	30	Proposed ODMDS @ Sapelo Sound
Sapelo Sound - Front River	SAV-19		Proposed ODMDS @ Sapelo Sound if needed
Front River	SAV-20		Proposed ODMDS @ Sapelo Sound if needed
Creighton Narrows	SAV-21	4	Proposed ODMDS @ Sapelo Sound
Old Teakettle Creek	SAV-22		Proposed ODMDS @ Sapelo Sound if needed
Doboy Sound	SAV-23		Proposed ODMDS @ Altamaha Sound
North River Crossing	SAV-24	4	Proposed ODMDS @ Altamaha Sound
Rockedundy River	SAV-25	5	Proposed ODMDS @ Altamaha Sound
South River	SAV-26	2	Proposed ODMDS @ Altamaha Sound
Little Mud River	SAV-27	2	Proposed ODMDS @ Altamaha Sound
Altamaha Sound	SAV-28	3	Proposed ODMDS @ Altamaha Sound
Buttermilk Sound	SAV-29	3	Open Water Sites 43 and 44 (coarse), Silt confined Tracts 42-B (fines)
Mackay River	SAV-30		Andrews Island DMCA if needed
Frederica River	SAV-31		Andrews Island DMCA if needed
St. Simon Sound	SAV-32		Andrews Island DMCA if needed
Jekyll Creek	SAV-33	2	Brunswick ODMDS (interim solution)
Jekyll Creek to Cumberland River	SAV-34		Brunswick ODMDS if needed
Cumberland River to Cumberland Sound	SAV-35	18	Diked Disposal in tract 1700L (Crab Island)