SAVANNAH HARBOR NAVIGATION PROJECT
MITIGATION RECOVERY
CHATHAM COUNTY, GEORGIA AND JASPER COUNTY, SC

DRAFT
ENVIRONMENTAL ASSESSMENT

November 2016

Environmental Assessment

Savannah Harbor Navigation Project
Mitigation Recovery
Chatham County, Georgia and Jasper County, SC

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EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE), Savannah District (CESAS), has prepared this Environmental Assessment (EA) to evaluate the potential impacts associated with the proposed rehabilitation of wildlife habitats in the wetland impoundments at the Savannah National Wildlife Refuge (SNWR), for which the Savannah Harbor Navigation Project (the Project) would receive mitigation credits to cover its anticipated 6,200 Habitat Unit (HU) deficit in mitigation credits.

The Savannah Harbor Navigation Project committed to produce migratory bird habitat in the Dredged Material Containment Areas (DMCAs) as mitigation for wetland impacts that resulted from impounding DMCA 14A in 2006. The mitigation plan is described in the August 1996 Long Term Management Strategy (LTMS) Environmental Impact Statement (EIS). The Project committed to provide 1,769 HUs of bird habitat each year. From 2010 to 2014, the Project failed to provide the required 1,769 HUs. This was partially due to lower funding than expected for O&M dredging, resulting in less water being pumped into the DMCAs. USACE now expects that the Project would provide less than its commitment until 2019, when dike raising operations in the DMCAs are expected to allow the Project to meet the requirements once again. Depending on the timing of construction, the Project's production of wildlife habitat in the DMCAs may also be affected by the Savannah Harbor Expansion Project. To recover the temporary deficit in mitigation credits, USACE proposes to rehabilitate multiple freshwater wetland impoundment pools at the SNWR to improve the effectiveness of those sites as bird habitat. The proposed work consists of removing small cross dikes and clearing, deepening, and expanding interior ditches. This will allow staff at the SNWR to produce more wildlife habitat within the Refuge impoundments.

Environmental Assessment

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1.0 Introduction

This Environmental Assessment (EA) identifies and evaluates the environmental impacts associated with improving freshwater wetland impoundment pools in the Savannah National Wildlife Refuge (SNWR) and using those increased habitat outputs for temporary mitigation for the Savannah Harbor Navigation Project.

The National Environmental Policy Act (NEPA) of 1969 requires consideration of the environmental impacts for major Federal actions. The purpose of this EA is to ensure the environmental consequences of the proposed action are analyzed and that the project information is available to the public.

This EA was prepared in accordance with the NEPA of 1969, the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) parts 1500-1508), U.S. Army Corps of Engineers Department of the Army procedures for implementing NEPA (33 CFR parts 230 and 325), and Engineering Regulation (ER) 200-2-2: Procedures for Implementing NEPA.

1.1 Background

In 1996, the U.S. Army Corps of Engineers (USACE) Savannah District (CESAS) completed an Environmental Impact Statement (EIS) that evaluated operation and maintenance activities for the Savannah Harbor Navigation Project (the Project). The evaluation resulted in a Long Term Management Strategy (LTMS) for the Savannah Harbor Navigation Project. That strategy outlined actions (e.g., improvements to dredge pipe ramps) that would result in environmental impacts in both Georgia and South Carolina. The strategy also identified the need for another Dredged Material Containment Area (DMCA), which would become DMCA 14A, located in Jasper County, South Carolina. The site was largely comprised of wetlands (~300 wetland acres and ~500 upland acres). As required by Federal law, USACE and the regulatory agencies attempted to find in-kind wetland mitigation areas, but they were unable to locate sites capable of fulfilling the mitigation requirements. As a result, USACE committed to several mitigation actions, including a water management strategy to create beneficial habitat for shorebirds, migratory birds, waterfowl and colonial nesting seabirds while maintaining the primary purpose of the DMCAs, which is dredged material placement. The mitigation plan was approved by the U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), NOAA National Marine Fisheries Service (NMFS), South Carolina Department of Health and Environmental Control (SC DHEC),

South Carolina Department of Natural Resources (SC DNR), and Georgia Department of Natural Resources (GA DNR).

The LTMS EIS identified nine sites in the inner harbor where dredged material would be deposited: Areas 12A, 12B, 13A, 13B, 14A, 14B, Jones/Oysterbed Island, 2A, and 1N. Figure 1 is a map that shows the location of the DMCAs for the Savannah Harbor Navigation Project. When the LTMS EIS was prepared, DMCAs 1N, 2A, and the lower half of Jones/Oysterbed Island were owned by the USFWS, while the remaining areas were owned by Georgia Department of Transportation. Since that time, ownership of DMCAs 14A and 14B was transferred and they are now jointly owned by the Georgia and South Carolina State Port Authorities. In addition, USACE combined DMCAs 12B and 13A.

Impacts resulting from dredged material disposal area activities in all the sites were covered in the LTMS EIS. Some of those actions (including the diking of a new area) would cause environmental impacts and the LTMS EIS contained a mitigation plan to compensate for those impacts. One of the mitigation features is creation and maintenance of wildlife habitat within the DMCAs. The habitats include bare ground islands for use by colonial nesting birds, and shallow water areas for foraging/roosting by waterfowl and shorebirds. The LTMS identified these activities as being performed in seven of the DMCAs. In 2013, the CESAS prepared an EA that resulted in the Project obtaining permission to include DMCA 1N as an approved site to create bird habitats that count toward its mitigation commitment.

1.2 Existing Project

Through the 1996 LTMS EIS, USACE obtained environmental approvals to continue operation and maintenance of the Project and create DMCA 14A. In that EIS, USACE committed to perform several types of mitigation. The main long term commitment involved the creation and maintenance of 1,769 yearly average habitat units (HUs) of four types of bird habitats: bare ground nesting, shorebird feeding, waterfowl feeding, and wetland nesting. The environmental compliance of the Project is partially based on USACE fulfilling these commitments.

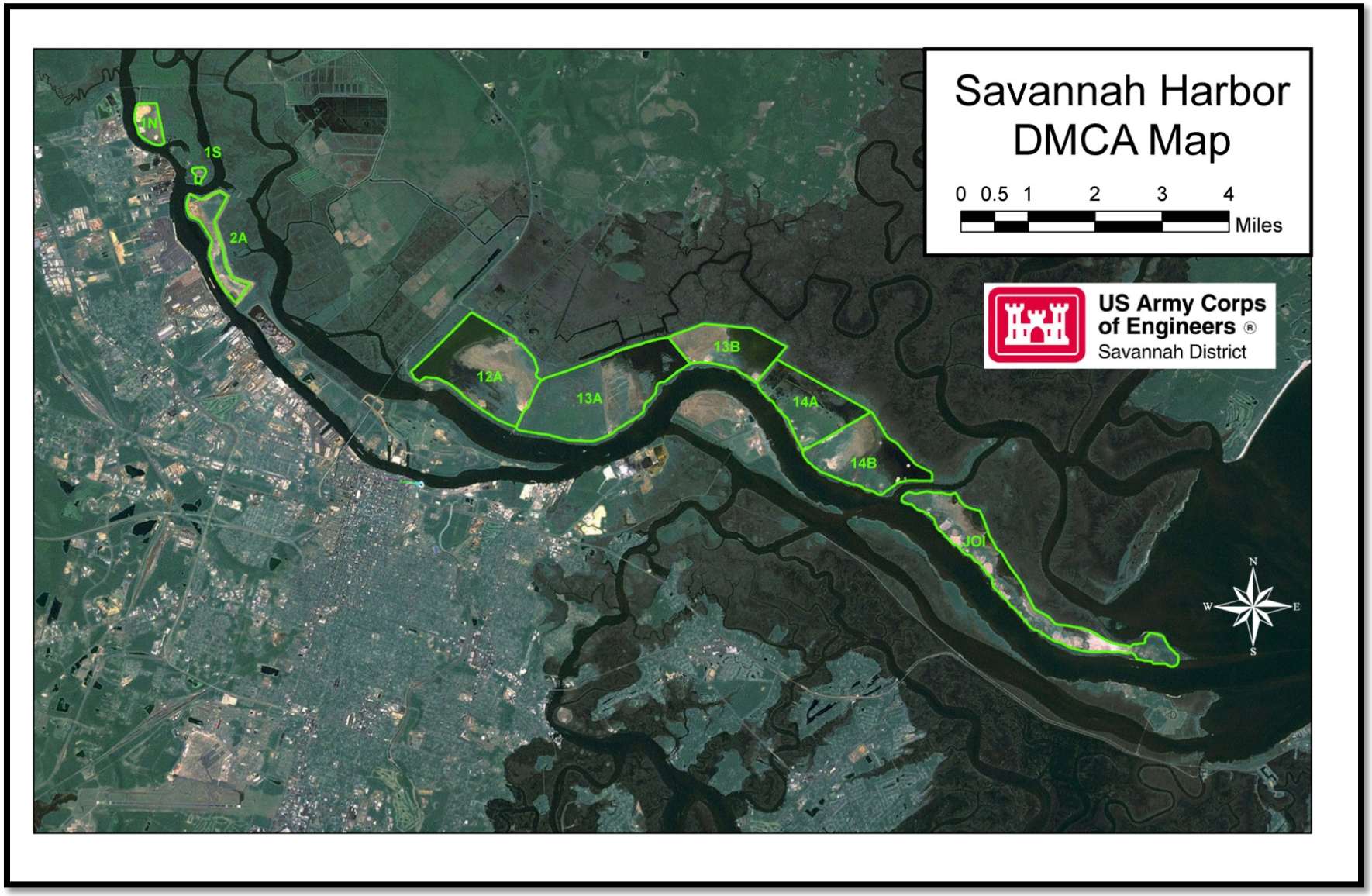

Figure 1: Location map of Savannah Harbor Navigation Project DMCAs.

1.3 Purpose and Need

The Project did not fully achieve the required habitat units in 2013, 2014 or 2015, and USACE anticipates the deficit to continue through 2019. This was partially due to lower funding than expected for O&M dredging, resulting in less water being pumped into the DMCAs. USACE and the natural resource agencies have agreed that the Navigation Project's wildlife habitat mitigation compliance will be calculated using a rolling 6-year average. As shown in Table 1 below, the Project did not produce its yearly mitigation target in 2010 and failed to meet its 6-year average mitigation commitment starting in 2013.

	Bare-Ground Nesting	Wetland Nesting Acres/ Months	Waterfowl Feeding Acres	Shorebird Feeding Acres	Total/Year	6-Year Average Total
Total Required / Year	74	450	505	740	1,769	1,769
FY06	79	663	714	312	1,768	1,768
FY07	66	653	417	799	1,935	1,852
FY08	46	1,294	914	803	3,057	2,253
FY09	59	1,127	873	737	2,795	2,389
FY10	52	284	442	711	1,489	2,209
FY11	53	290	284	390	1,017	2,010
FY12	48	60	97	318	523	1,803
FY13	47	350	112	154	664	1,591
FY14	73	305	240	286	903	1,232
FY15	101	359	896	521	1,877	1,079
Total Last 6-Years	332	2,416	2,088	2,681	7,515	
Total Required / 6-Years	444	2,700	3,030	4,440	10,614	
Surplus / Deficit Last 6-Years	-112	-284	-942	-1,759	-3,099	

Based on USACE projections for dredging and dike construction, the Project will regain full compliance in 2020. The proposed mitigation would assist in the Navigation Project's compliance for the years 2013 through 2019. Partially as a result of coordination with regulatory agencies that occurred in 2013, USACE decided that a penalty of 10% of the deficit for the year should be applied to any year that the Project does not fulfill its wildlife habitat mitigation commitment. The Project's ability to provide

wildlife habitat in the DMCAs is also expected to be adversely impacted by construction of the Savannah Harbor Expansion Project. USACE expects a total of 6,200 HUs would need to be produced outside the DMCAs to assist the Project in meeting its mitigation commitments through 2019, including a 10% penalty.

1.3.1 Coordination with Natural Resource Agencies

USACE coordinated with the regional Federal and State natural resource agencies in June 2014 and explained the anticipated deficit in wildlife habitat production by the Project and USACE's expectation that the deficit would continue through 2019.

USACE identified changes it had made in its operating plans for the Project that will increase the wildlife habitat production within the DMCAs and allow the Project to meet its mitigation commitments in the DMCAs in the future. Those changes include the following:

A. Increase the size of the bird islands within each DMCA from two 1-acre islands to one 8-acre island. That will allow more bare ground nesting habitat to be produced each DMCA.

B. Place posts within the DMCAs to mark the percent of length of the site (generally a post every 10% of a site's length). That will allow ready identification of the percent of the site that is flooded each week. That procedure will be quicker than waiting until aerial photos are obtained on a quarterly basis. Getting that information on a "real time" basis will allow USACE to stay informed of its status in producing mitigation habitats within the site and allow it to make more timely adjustments to the weir discharges when needed.

C. Hold water for 4-years instead of 3-years (in a 6-year cycle) to increase mitigation outputs. This will provide the capability to produce more habitat units within the DMCAs in the 6-year operational cycle.

D. Incorporate DMCA 1N into the mitigation plan. This adds 120 acres to what is available to produce wildlife habitat and mitigation credits.

E. Coordinate with the USFWS to obtain better training in use of herbicides and pesticides for application on the bird islands. USACE expects this to enable the Project to keep more vegetation off the bird islands during nesting season, allowing more of the sites to be suitable for nesting. It will also allow the Project to reduce the occurrence of fire ants on the islands, allowing more of the sites to provide suitable habitat throughout the nesting season.

1.4 Authority for the Proposed Action

The proposed action is part of the environmental compliance for the Savannah Harbor Navigation Project as contained in the Long Term Management Strategy that was prepared in response to House Report 102-555, submitted on June 11, 1992, by the House of Representatives' Committee on Appropriations, and Senate Report 102-344, submitted on July 27, 1992, by the Senate Committee on Appropriations. Both those reports refer to the Energy and Water Development Appropriation Bill of 1993.

1.5 Public Concerns

The SNWR is a freshwater wetland that provides wildlife habitats and serves as a location for the public to view and enjoy local wildlife that would normally be difficult to access. The Port of Savannah is a key economic engine in the region and the nation. Maintaining the channel depths in the Project is vital to the port continuing to function effectively.

1.6 Proposed Action

USACE proposes to perform work within the SNWR to enhance wildlife habitats in the Refuge and use those habitats as a temporary means to meet the wildlife habitat mitigation commitments of the Savannah Harbor Navigation Project (SHNP). The work would consist of rehabilitating existing freshwater wetland impoundment pools at the SNWR so that they provide more bird habitat than expected if no action is taken. Rehabilitation could consist of raising portions of the perimeter dike to 12 feet mean lower low water (MLLW); raising interior dikes surrounding one of the impoundment pools to 9 feet MLLW; removing dikes to combine pools that are too small to effectively manage; and clearing, deepening, and expanding interior ditches in several wetland impoundments to enable more effective delivery and drainage of water. The proposed action specifically identifies ditching Impoundment pools 6, 8, and 11, removing the small experimental pools in Impoundment pool 11; and replacing the John Hill Water Control Structure (Figure 2).

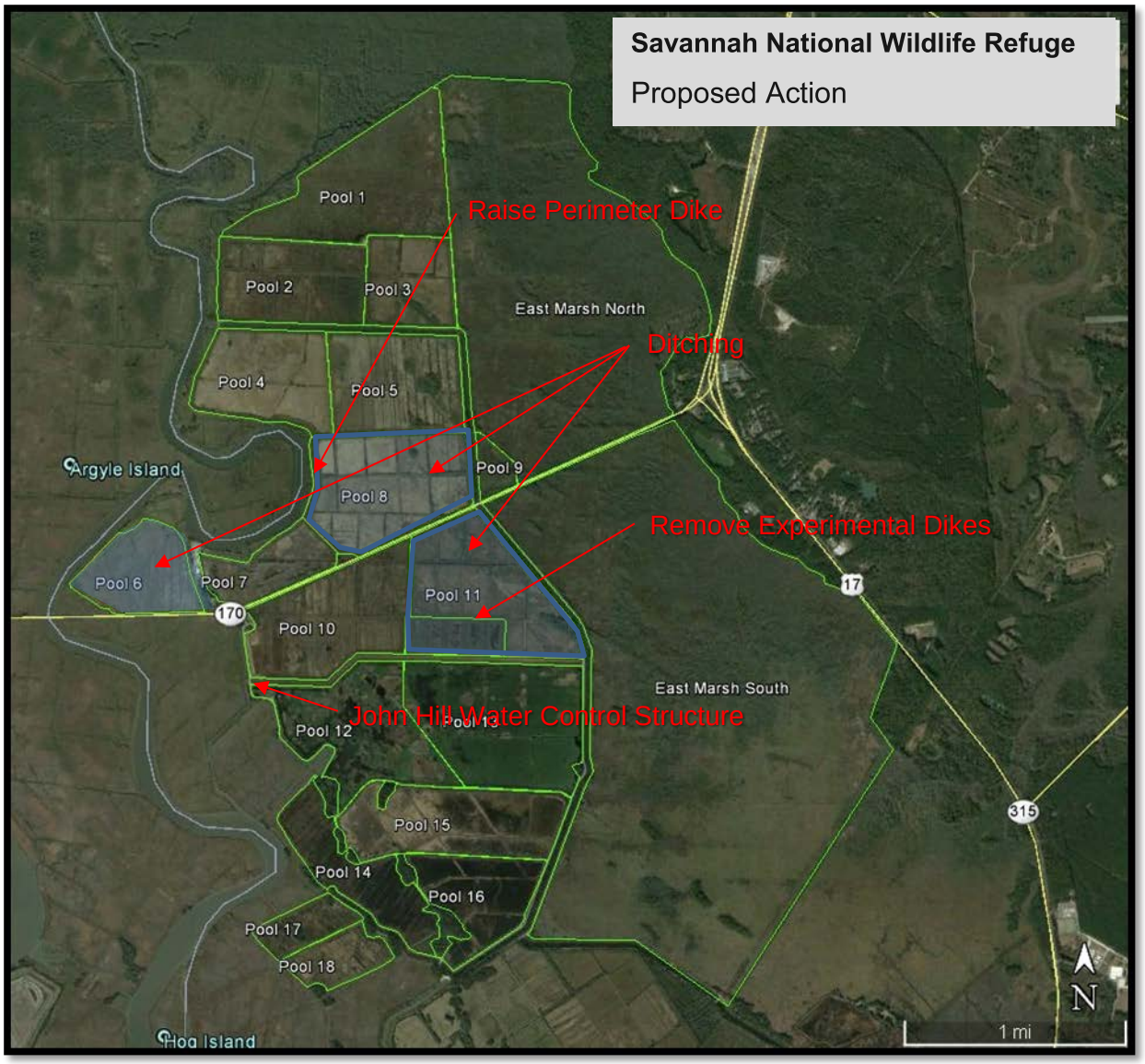

Figure 2: Proposed Action

2.0 Alternatives

2.1 Measures Considered

2.1.1 Measures Considered During Initial Planning

USACE investigated a number of actions that it could take within or adjacent to the DMCAs to make additional wildlife habitats of the required type. These actions are shown in Table 1 along with their initial evaluations and determinations.

Table 1: Initial Measures Considered

Measure	Cost Level	Benefit Level	Other Considerations	Continue Forward
Removing perimeter vegetation from DMCAs	Medium	Low	Possibility of not having any benefit to estuary	No
Grading down AIWW tracts SC-1, 2, and 3	High	Low	Likely to have no net benefits	No
Buying Freshwater Mitigation Credits	High	None	Out of Kind mitigation would not address shortfall	No
Buying Saltwater Mitigation Credits	N/A	N/A	No saltwater mitigation banks are established in watershed	No
Creating Saltmarsh Mitigation Bank	Very High	Medium	Likely not able to obtain sufficient land for required bank	No
Creating Offshore Bird Island	Very High	Low		No
Grading Jones/Oysterbed interior for additional ponding	Medium	Low	Sediment deposition can occur each year, likely negating the wildlife benefit	No
Pumping additional water into DMCA for additional ponding	High	Very Low	Not likely to produce sufficient number of benefits	No
Creating new DMCA on Long Island to provide wildlife mitigation	Very High	Low	Would require additional authority for this study; likely require additional wetland mitigation	No
Create marsh between Jones/Oysterbed and training wall	High	Low	High costs result in this being beyond the scope of an O&M funded action	No
Create similar habitat on non-Project lands within estuary	Low to Medium	High		Yes

After consideration of these potential measures to increase the production of Habitat Units within the DMCAs, adjacent to the DMCAs or elsewhere in the estuary, USACE concluded that creating similar habitats on non-Project lands in the estuary appeared to be the best option for making up the expected mitigation deficit.

USACE coordinated with the USFWS and staff of the SNWR offered the potential use of the Refuge to provide additional wildlife habitat units. The Corps could perform or fund work to enhance wildlife habitats within the SNWR and use those habitat improvements to recover the Project's wildlife habitat mitigation deficit. The work could consist of rehabilitating existing freshwater wetland impoundment pools at the SNWR so that they provide more bird habitat than expected if no action is taken.

USACE proposed this approach to the regional natural resource agencies at an interagency meeting in June 2014. The group concurred in USACE further investigating this approach as the means to make up the temporary deficit in wildlife habitat production by the Project. The group also agreed that USACE should use an independent organization to identify the number of Habitat Units that should result from implementation of the individual habitat improvements that USACE may consider.

2.1.2 Measures Considered To Improve Wildlife Habitats

CESAS requested that the SNWR staff identify measures that would provide similar wildlife habitats to those the Project provides in the DMCAs. The habitat improvement measures they identified focus on avian species. These measures were evaluated by an independent team that included members from the SC DNR, Ducks Unlimited, and Folk Land Management. The team was led by Dial Cordy and Associates and consulted with the USFWS to establish the baseline condition of each of the impoundment pools. The results of the evaluation are included in the January 2015 Dial Cordy report "Assessment of Potential Wildlife Habitat Improvements at Savannah National Wildlife Refuge" (included as Appendix A).

The measures that continued into detailed analysis consisted of the SNWR impoundment rehabilitation measures listed in Table 2. Figure 3 shows each impoundment's location within the SNWR.

The rehabilitation measures (Table 2) include raising and leveling impoundment dikes, clearing ditches, deepening and expanding ditches in the impoundments, removing dikes that create inefficient small areas, and constructing cross dikes and water control structures. Perimeter dikes would be raised to 12 feet MLLW, while interior dikes would be raised to 9 feet MLLW. Measures that raise a dike would include restoring both the exterior and interior berms in an impoundment. Measures that restore ditches in a pool consist of digging a 40 foot wide by 12 foot deep canal around the inside perimeter of an impoundment. This would be supplemented by also digging interior ditches that were laid out by Refuge staff, which would distribute water efficiently across the impoundment.

Larger canals and consistent dike heights will allow greater hydraulic control of individual impoundment pools. This will allow the Refuge staff to provide the correct type of habitat for migratory avian species.

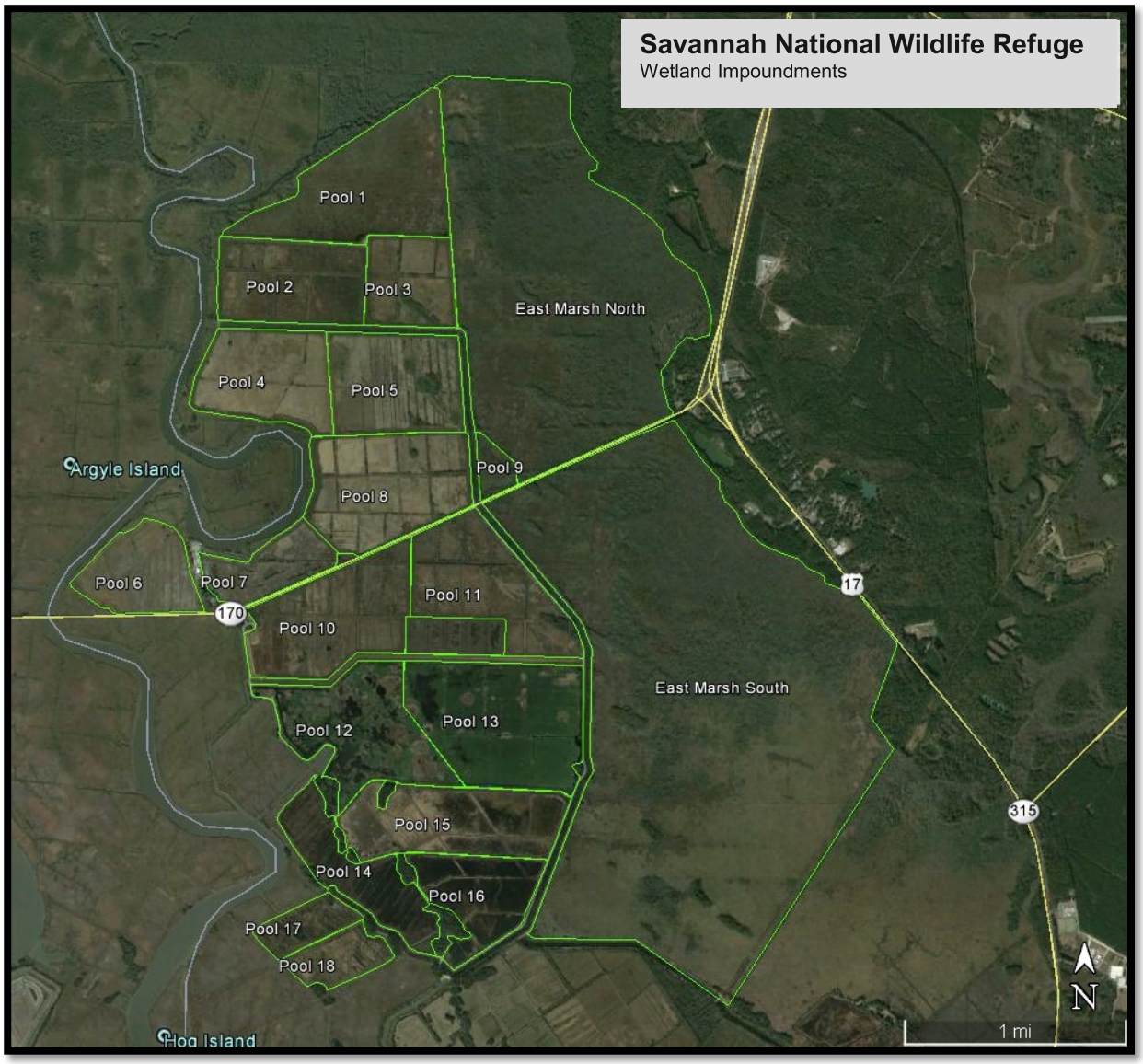

Figure 3: Savannah National Wildlife Refuge Wetland Impoundments.

Table 2: Measures Considered To Improve Wildlife Habitat Quality

Measure ID	Description of Modification to Refuge
1	Replacement of John Hill Water Control Structure
2	Perimeter Dike Raising to 12 feet MLLW (Pool 2)
3	Perimeter Dike Raising to 12 feet MLLW (Pool 4)
4	Perimeter Dike Raising to 12 feet MLLW (Pool 8)
5	Perimeter Dike Raising to 12 feet MLLW (Pool 7)
6	Perimeter Dike Raising to 12 feet MLLW (Pool 14 &17)
7	Interior Dike Raising to 9 feet MLLW (Pool 2 & 3)
8	Interior Dike Raising to 9 feet MLLW (Pool 4)
9	Interior Dike Raising to 9 feet MLLW (Pool 5)
10	Interior Dikes Raising to 9 feet MLLW (Pool 10 & 11)
11	Interior Dike Raising to 9 feet MLLW (Pool 12, 13, & 15)
12	Interior Dike Raising to 9 feet MLLW (Pool 15 & 16)
13	Ditching for Pool 1
14	Ditching for Pool 2
15	Ditching for Pool 3
16	Ditching for Pool 4
17	Ditching for Pool 5
18	Ditching for Pool 6
19	Ditching for Pool 7
20	Ditching for Pool 8
21	Ditching for Pool 9
22	Ditching for Pool 10
23	Ditching for Pool 11
24	Ditching for Pool 12
25	Ditching for Pool 13
26	Ditching for Pool 14
27	Ditching for Pool 15
28	Ditching for Pool 16
29	Ditching for Pool 17
30	Ditching for Pool 18
31	Removal of Experimental Pools in Pool 11
32	Cross Dike and WCS Construction in Pool 10
33	Cross Dike and WCS Construction in Pool 11
34	Cross Dike and WCS Construction in Pool 12 & 13

When combining these measures into alternatives, USACE consulted the USFWS, who provided insight to determine the importance of various measures and details about dike lengths and past ditching practices that have not been adequate.

2.1.3 Alternative Development

USACE determined that the most reasonable construction practice would be that any material removed from ditching a pool would be deposited on an adjacent Refuge dike to raise the elevation of that dike. Material would first be placed on dikes that are part of the alternative plan and then on the closest dike in need of raising and leveling. Any fill material needed for dike raising and leveling would come from ditching pools in the SNWR impoundments. Fill material would first be obtained from ditching pools identified in the alternative plan and then from the closest pool to the dike being raised. The construction would be completed with small backhoes, earthwork equipment, and dump trucks to avoid damaging the dikes around the impoundments and to minimize impacts.

Some benefits may occur on the Refuge from ditching or dike raising that are not included in an alternative's total benefit calculation. USACE did not include habitat benefits from an action if USACE did not fully construct a given measure (fully raise a certain dike) and thus not provide reliable habitat improvements. No credit would be given if an action does not fully complete a given measure (i.e. raise the entire length of a dike to 9 feet MLLW).

The production of wildlife habitats at the DMCAs would be adversely impacted by construction of the Savannah Harbor Expansion Project. Sediment deposition from the SHEP project will alter the scheduled use the DMCAs. The deposition of cadmium-laden sediments into DMCAs 14A and 14B will result in no bird habitats being produced in those DMCAs during that construction period. The SHEP activities are expected to produce a 1,000 HU deficit over 3 years in the Navigation Project's ability to produce its 1,729 HUs of wildlife habitat each year within the DMCAs. The District has included that additional deficit in the alternatives discussed in the remainder of this document.

USACE combined measures into alternatives using the Corps' Institute for Water Resources Planning Suite. It also consulted with USFWS personnel at the SNWR and packaged a group of measures that they identified into an alternative. The USFWS plan is based on the SNWR's highest priority work – the portions of the Refuge they would most like to improve. The USACE plans were the least cost combination of measures that would provide the thresholds of 6,200 HUs and 7,200 HUs. All the alternatives that were carried forward, except the No Action Alternative (NAA), would produce a minimum of 6,200 HUs.

USACE evaluated the following four detailed alternatives in addition to the No Action Alternative: (1) 6,200 Habitat Unit Alternative, (2) 7,200 Habitat Unit Alternative, (3) Refuge Alternative, and (4) 7,200 Habitat Unit + Long Term Alternative.

2.2 No Action Alternative / Without Project Condition

The NAA, or Without Project Condition, is the most likely future condition for the impoundments in the SNWR if no work is undertaken by USACE. The following projections were made based on the maintenance and rehabilitation history of the SNWR:

- The USFWS will maintain the SNWR wetland impoundments in a manner so that their functionality will not decrease.
- The wetland impoundments will not receive the needed maintenance work to measurably increase their functionality.

Therefore, the present conditions at the SNWR also reflect the projected NAA. The NAA would not provide any additional HUs to reduce or recover the Project temporary mitigation deficit.

2.3 Alternative 1: Refuge Alternative

The Refuge Alternative (Alternative 1) consists of ditching in impoundment Pools 1, 7, 8, 15, and 17. This alternative would produce 6,200 HUs (the required amount) to be used by the Project to help meet its past and near-term future mitigation commitments. These specific actions were identified by Refuge staff as being the combination that would be most helpful to the SNWR while also providing 6,200 HUs. The total cost of this alternative is $6,106,000, or $975 per HU. The material from the ditching work would be placed on nearby berms and dikes, with a priority given to raising a dike to its required height, thereby providing an ancillary benefit to the Refuge.

Table 3: Refuge Alternative

Measure ID	Description of Modification	Duration (Years)	Lifetime Habitat Unit Yield
1	Replace John Hill Water Control Structure	25	1,591.88
13	Ditching for Pool 1	25	1,450.00
20	Ditching for Pool 8	25	1,633.25
27	Ditching for Pool 15	25	1,365.00
29	Ditching for Pool 17	25	220.00
		Total	6,260.13

2.4 Alternative 2: 6,200 Habitat Unit Alternative (Preferred Alternative)

The 6,200 Habitat Unit Alternative (Alternative 2) consists of ditching in Impoundment Pools 6, 8 and 11; removing the experimental pools in Impoundment 11; and replacing the John Hill Water Control Structure. This alternative would produce 6,248 HUs, slightly more than the required amount, to be used by the Project as temporary mitigation. The total cost of this alternative is $4,630,000, or $741 per HU. The excess sediment obtained from ditching would be placed on the nearest dike in need of restoration.

Table 4: 6,200 HU Alternative (Preferred Alternative)

Measure ID	Description of Modification	Duration (Years)	Lifetime Habitat Unit Yield
1	Replace John Hill Water Control Structure	25	1,591.88
4	Raise Perimeter Dike at Pool 8	15	241.2
18	Ditching for Pool 6	25	693.75
20	Ditching for Pool 8	25	1,633.25
23	Ditching for Pool 11	25	1,381.25
31	Removal of Experimental Pools in Pool 11	20	707.20
		Total	6,248.53

2.5 Alternative 3: 7,200 Habitat Unit Alternative

The 7,200 Habitat Unit Alternative (Alternative 3) consists of ditching in impoundment Pools 5, 6, 8 and 11; raising the perimeter dike at Pool 8; removing the experimental Pools in impoundment 11; and replacing the John Hill Water Control Structure. This alternative would produce 7,383 HUs, 1,283 more units than is required, to be used by the Project as temporary mitigation. The total cost of this alternative is $5,423,000, or $734 per HU. The sediment materials obtained from ditching the pools would first be placed on the closest of the perimeter dikes for impoundment Pool 8. If there is insufficient material from ditching the pools to restore the dikes, the additional needed fill material would come from ditching other pools nearby. Any excess sediment obtained from ditching would be placed on the nearest dike in need of restoration. Any additional volume of fill that is needed to raise the dikes would be obtained from the Project DMCAs.

Table 5: 7,200 Habitat Unit Alternative

Measure ID	Description of Modification to Refuge	Duration (Years)	Lifetime Habitat Unit Yield
1	Replace John Hill Water Control Structure	25	1,591.88
4	Perimeter Dike Raising to 12 feet MLLW (Pool 8)	15	241.20
17	Ditching for Pool 5	25	1,134.5
18	Ditching for Pool 6	25	693.75
20	Ditching for Pool 8	25	1,633.25
23	Ditching for Pool 11	25	1,381.25
31	Removal of Experimental Pools in Pool 11	20	707.20
		Total	7,383.03

2.6 Alternative 4: 6,200 Habitat Unit + Long Term Alternative

The 6,200 Habitat Unit + Long Term Alternative (Alternative 4) consists of the actions identified in the 6,200 Habitat Unit Alternative plus the creation of an additional 600 Habitat Units each year on average within the Refuge. This alternative would resolve the short term problem of the Savannah Harbor Navigation Project not being able to fulfilling its wildlife habitat mitigation requirements, compensate for the adverse effects of the Savannah Harbor Expansion Project on habitat production in the DMCAs, and take additional actions to improve habitats within the Refuge over time as fulfillment of a portion of the Navigation Project's long term mitigation commitments. The Navigation Project would fund actions identified in Table 2 that would improve wildlife habitat quality within the Refuge. This would not modify the total number of wildlife Habitat Units that the Navigation Project is required to produce to meet its mitigation requirement, but it would reduce the number of Habitat Units required to be produced within the DMCAs. With this alternative, 600 of the 1,769 Habitat Units that the Navigation Project is required to produce each year (on average) would be produced at the Savannah National Wildlife Refuge.

Table 4 shows the actions that are included in this alternative.

The actions to meet the short term mitigation needs consist of the following:

- Ditching in Pools 6, 8, 11
- Removal of the Experimental Pools in Pool 11
- Raising the Perimeter Dike to 12 feet MLLW at Pool 8

Table 6: 6,200 HU + Long Term Alternative

Measure ID	Description of Modification	Useful Life (Years)	Habitat Units Per Cycle	Number of Cycles	Total Habitat Units Produced
1	Replace John Hill Water Control Structure	25	1,592	2	3,184
4	Raise Perimeter Dike at Pool 8	15	241	3	723
18	Ditching for Pool 6	25	694	2	1,388
23	Ditching for Pool 11	25	1,381	2	2,862
27	Ditching for Pool 15	25	1,365	2	2,730
31	Removal of Experimental Pools in Pool 11	20	707	1	707
		Total Short Term Action	6,248		11,594
2	Raise Perimeter Dike at Pool 2	15	180	3	540
3	Raise Perimeter Dike at Pool 4	15	176	3	528
5	Raise Perimeter Dike at Pool 7	15	94	3	281
6	Raise Perimeter Dike at Pools 14 &17	15	140	3	420
7	Raise Interior Dikes at Pools 2 & 3	15	221	3	663
8	Raise Interior Dikes at Pool 4	15	132	3	396
9	Raise Interior Dikes at Pool 5	15	99	3	297
10	Raise Interior Dikes at Pools 10 &11	15	371	3	1,113
13	Ditching for Pool 1	25	1,450	2	2,900
14	Ditching for Pool 2	25	1,031	2	2,062
15	Ditching for Pool 3	25	600	2	1,200
16	Ditching for Pool 4	25	1,102	2	2,204
17	Ditching for Pool 5	25	1,134	2	2,268
18	Ditching for Pool 6	25	694	2	1,388
19	Ditching for Pool 7	25	536	2	1,072
20	Ditching for Pool 8	25	1,633	2	3,266
22	Ditching for Pool 10	25	1,194	2	2,388
23	Ditching for Pool 11	25	1,381	2	2,763
26	Ditching for Pool 14	25	700	2	1,400
27	Ditching for Pool 15	25	1,365	2	2,730
29	Ditching for Pool 17	25	220	2	440
		Total Alternative	14,453		36,316

The actions to address a portion of the long term mitigation needs consist of the following:

- Ditching in Pools 1, 2, 3, 4, 5, 7, 8, 10, 11, 14, 15, 17
- Raising the Perimeter Dike to 12 feet MLLW at Pools 2, 4, 7, 14, 17
- Raising the Interior Dike to 9 feet MLLW at Pools 2, 3, 4, 5, 10, 11, 15, 16
- Replacing the John Hill Water Control Structure
- Constructing a Cross Dike and Water Control Structure in Pools 12 & 13

This alternative includes a major rehabilitation of the above items to the initial construction design at the end of their identified 15 or 25-year useful life. The plan would initially produce 6,248 HUs that would be used by the Project to fulfill its short term mitigation deficit. It would produce another 30,068 HUs over a 50-year period to fulfill a portion of the Project's long term mitigation needs. The total cost of this alternative is $36,050,000, which is $993 per HU. Any excess sediment obtained from ditching would be placed on the nearest dike in need of restoration. Any additional volume of fill that is needed to raise the dikes would be obtained from the Project DMCAs.

Savannah District also considered other ways to produce a portion of the Habitat Units that the Navigation Project is required to produce each year. Lands in South Carolina that presently contain impoundments are valued for about $6,500 per acre. The Savannah Harbor Navigation Project could purchase some of those lands and dedicate them to produce bird habitats similar to those provided by the DMCAs. To replace all of the Project's 1,729 Habitat Unit commitment would require at least 1,729 acres to be purchased, preserved, and managed for waterfowl and shorebird habitats. If one assumes that those lands are already diked and produce those habitats for some of the year, preserving and managing them to fulfill the Project's HU commitment could require twice that acreage or 3,458 acres to count 1,729 Habitat Units of environmental improvement from preservation and management for the SH Navigation Project. At a value of $6,500 per acre, the initial cost to produce all of the Project's Habitat Unit commitment on other lands could be $22 M. Savannah District has experienced management costs of about $400 per year / Habitat Unit. If one assumes more expenses would have been needed to produce all of the HUs required, site O&M costs may average $500 per year / HU over the long term. Using that $500/HU rate, O&M costs would be $86 M over 50 years for a 3,458-acre site that replaces and fully meets the Project's wildlife mitigation commitment. Acquiring and managing other lands to produce the Habitat Units that are now produced at the Project DMCAs would be expensive, approaching $100 M over 50 years. That level of expense is beyond what the Corps believes it could presently fund, so the Corps will not further pursue at this time acquiring and managing other lands to fulfill the Project's entire HU commitment.

One can also use the approach described in the previous paragraph to evaluate the cost of acquiring and managing lands to produce a portion of the Project's HU annual commitment. A property that would produce 600 Habitat Units each year would fulfill

roughly 1/3 of the Project's annual HU commitment. If one assumes producing 600 HUs per year would require a diked property of twice the size, the following costs could be estimated:

Initial cost: 600 HUs x 2 x $6,500/acre =	$7.8 M
Operating cost: 1,200 acres x $500/acre/year x 50 years =	$30 M
Total =	$38 M

This $38 M expense is beyond what the Corps believes it could fund at this time.

Another way in which some or all of the Project's annual Habitat Unit commitment could be met would be through use of established mitigation banks. Unfortunately, at present there are no mitigation banks approved for wildlife credits. Wetland mitigation banks exist in the project area, but a conversion factor would need to be applied to use their credits to replace the wildlife habitats produced at the DMCAs. The conversion factor would likely mean that more than one mitigation bank credit would be needed to compensate for one Habitat Unit at the DMCAs. Credits were recently sold from one of the approved wetland mitigation banks at a cost of $7,000 each. Using that rate and a 50% conversion factor, the cost to replace 1,729 Habitat Units would likely cost over $24 M. That expense is beyond what the Corps believes it could fund at this time.

For the purposes of this analysis, the Corps will continue with the 6,200 Habitat Unit + Long Term Alternative (Alternative 4) as an action that would address the Project's recent deficit in wildlife Habitat Units and some of its long term needs for those Habitat Units.

2.7 Comparison of Alternatives

Except for the NAA, all the alternatives produce enough habitat units to meet the needs of the Project. The construction-related effects would be similar among the alternatives, with the amount of impact directly related to the number of habitat units created. As a result, the cost effectiveness of an alternative to create a habitat unit was the main method used to compare the alternatives. The most cost effective alternative is the 7,200 Habitat Unit Alternative (Alternative 3), but it exceeds the needs short term habitat deficits expected by the Savannah Harbor Navigation Project. The 6,200 Habitat Unit Alternative (Alternative 2) is the Recommended Plan because it more closely meets the Project's short term habitat needs. The Refuge Alternative (Alternative 1) would be a more costly way of meeting the Project's short term habitat needs. The 6,200 Habitat Unit + Long Term Alternative (Alternative 4) would be costly way of meeting the Project's short term habitat needs and only a portion of its long term habitat needs.

Table 7: Habitat Units Produced and Costs

	Alternative	Total Lifetime Habitat Unit	Total Cost	Cost Per Habitat Unit
1	Refuge	6,260	$6,106,000	$975
2	6,200 Habitat Units (Recommended)	6,248	$4,630,000	$741
3	7,200 Habitat Units	7,383	$5,420,000	$735
4	6,200 Habitat Units + Long Term	36,316	$36,050,000	$993

3.0 Affected Environment

3.1 General

The USFWS actively manages approximately 3,000 acres of moist soil impoundment systems at the SNWR to benefit overwintering and migrating waterfowl, breeding wood ducks, migrating passerines, breeding/foraging colonial wading birds, migrating shorebirds, and foraging terns. To accomplish the overall goals of the Refuge, the staff actively manages 16 impoundments that range in size from 54 to 437 acres. Within this impoundment system, there are approximately 35 miles of dikes and 52.5 miles of ditches. Management techniques include timed water manipulation, mowing, disking, and burning. The entire impoundment system is managed specifically for moist soil plant species, invertebrates, and submerged aquatic vegetation to provide the highest quality foraging habitat for dabbling and diving ducks.

The features that allow the USFWS to manage the pools to provide the desired wildlife habitat are ditches, dikes, and water control structures. All the water control structures are maintained by the USFWS. Some were recently replaced by the USACE as part of the Freshwater Control System Project (2010). The Refuge uses two types of ditches to manage the impoundment system; perimeter and interior. Perimeter ditches are deeper and wider than the interior ditches and are necessary to drain the majority of the water from the impoundments. Interior ditches run through the interior of the impoundments and are typically shallower and are important for drying out the bed of the impoundment for management activities, especially in the larger impoundments.

3.2 Hydrology

The water used to flood the Refuge impoundments primarily comes from the Little Back River into the Diversion Canal. The canal starts between impoundment pools 2 and 4, and then flows between the East Marsh and the other impoundments, and finally returns to the Little Back River south of pools 16 and 18 (see Figure 4). The water enters the

impoundment pools through water control structures into the perimeter and interior ditches. Most ditches are presently shallow and have extensive vegetation growing in them, restricting their ability to carry the water to create and maintain wetland habitats.

Figure 4: Savannah National Wildlife Refuge Hydrology

3.3 Air Quality and Noise

Air quality or noise issues only occur at the SNWR during maintenance activities in the impoundments. These issues are temporary and result mostly from construction equipment and fires burning off invasive vegetation to maintain the wetland impoundments.

3.4 Aquatic Resources

The primary aquatic resource in the impoundments is macroinvertebrates that serve as prey for birds and other wildlife. The shallow water depth in the wetland impoundments result in macroinvertebrates being readily available as food to specific wildlife species. These organisms provide a high source of protein to waterfowl during their migration, when their energy needs are particularly high. The ability to control the availability and depth of water on a given site allows the USFWS to make the macroinvertebrates available at vital times in the life cycles of the species that use them as a food source.

3.5 Wetlands and Floodplains

The SNWR primarily manages the impoundment pools as freshwater wetlands for migratory waterfowl. Dial Cordy and Associates Inc. performed an assessment of the SNWR impoundments to determine the environmental lifts that would be produced by the possible habitat improvement measures. This work required determining the current function of the impoundments and the function if the proposed improvements are implemented. The assessment and projection of expected benefits were developed independent of USACE. The January 2015 Dial Cordy and Associates Inc. report assessed the functionality of the wetland impoundments in the SNWR. The assessment expressed the current condition (Table 8) as a percentage of the maximum quality of habitat that an impoundment could produce.

Table 8: Impoundment Pool Functional Level

Pool	Initial condition/value (% functioning)
1	30
2	25
3	30
4	20
5	25
6	30
7	25
8	15
9	0
10	30
11	30
12	60
13	60
14	30

15	20
16	25
17	40
18	40

3.6 Threatened, Endangered, and Protected Species

Wood storks and bald eagles are the threatened, endangered, or protected species that are consistently documented in the SNWR. Various migratory bird species use the area temporarily, but many of these species vary from year to year. Table 9 contains a complete list of the Threatened, Endangered, and Protected species found in Jasper County, South Carolina.

Table 9: Threatened, Endangered, and Protected Species in Jasper County, SC

Name	Status
Frosted Flatwoods salamander (Ambystoma cingulatum)	Threatened
*Bald eagle (Haliaeetus leucocephalus)	Protected (Recovery)
Kirtland's Warbler (Setophaga kirtlandii (= Dendroica kirtlandii))	Endangered
Red-cockaded woodpecker (Picoides borealis)	Endangered
*Wood stork (Mycteria americana)	Threatened
Piping Plover (Charadrius melodus)	Threatened
Pondberry (Lindera melissifolia)	Endangered
Canby's dropwort (Oxypolis canbyi)	Endangered
American chaffseed (Schwalbea americana)	Endangered
West Indian Manatee (Trichechus manatus)	Endangered
Hawksbill sea turtle (Eretmochelys imbricata)	Endangered
Leatherback sea turtle (Dermochelys coriacea)	Endangered
Kemp's ridley sea turtle (Lepidochelys kempii)	Endangered
Green sea turtle (Chelonia mydas)	Threatened
Loggerhead sea turtle (Caretta caretta)	Threatened
Gopher tortoise (Gopherus polyphemus)	Candidate

*Can be consistently found on Savannah National Wildlife Refuge

3.7 Cultural Resources

The Refuge's impoundment system is located within the footprint of several former 19th century Savannah River rice plantations and many of the impoundments utilize the dike system of the earlier rice agricultural fields. Plantation-era structures, such as slave settlements, mills, and outbuildings, can be located in these areas as documented by Leech and Wood (1994) and James et al (2014). Based upon archival maps, Pool 8 is

primarily located on the former Beech Hill Plantation, with a small portion in the southwest corner extending onto Laurel Hill Plantation; Pools 6 and 11 are located entirely within the former Laurel Hill Plantation; the water control structure is also within the former Laurel Hill Plantation.

A survey of the Refuge conducted in 1979 documented 35 prehistoric and historic site locations (Marrinan 1979). In 2012, a low water shoreline survey documented 12 historic sites on the bank of Little Back River in the areas that border Pools 6 and 8, specifically (James et al 2014). No definitive National Register of Historic Places eligibility recommendations were made during the low water shoreline survey. Additional testing is required to determine if the sites have the potential to yield significant archaeological information on 19th – early 20th century rice agriculture.

4.0 Environmental Impacts

This section of the EA addresses the environmental impacts of the three action Alternatives, in addition to the No Action Alternative. None of the alternatives would negatively impact groundwater resources, socio-economic resources, or safety.

4.1 Hydrology

All three detailed alternatives include ditching the SNWR impoundment pools. Improving these ditches will allow managers to flood and drain the impoundments more effectively and increase the quality of moist soil plant species for waterfowl, allow them to provide optimum shallow water foraging for colonial wading birds, and improved foraging habitat for shorebirds.

4.1.1 NAA

If the NAA is chosen, no hydrologic changes would occur. The Refuge is not expected to be able to fund the major rehabilitation to the impoundment system that would be needed for the system to provide more wildlife habitats.

4.1.2 Refuge Alternative

The Refuge Alternative would improve the hydrology in impoundment pools 1, 8, 15, and 17 through restoring, expanding, and deepening ditches. Replacing the John Hill Water Control Structure would allow flows to be better managed to several pools. The improvements would increase the wetland function of those impoundments over a 15- to 25-year period.

4.1.3 6,200 Habitat Unit Alternative

The recommended alternative would improve the hydrology in impoundment pools 6, 8 and 11 through restoring, expanding, and deepening ditches. Replacing the John Hill Water Control Structure would allow flows to be better managed to several pools.

These improvements would increase the wetland function of those impoundments over a 15- to 25-year period.

4.1.4 7,200 Habitat Unit Alternative

The 7,200 Habitat Unit Alternative would improve the hydrology in impoundment pools 5, 6, 8 and 11 through restoring, expanding, and deepening ditches. Removing the interior dike between impoundments 10 and 11 will allow the impoundments to be flooded without affecting adjacent areas. Replacing the John Hill Water Control Structure would allow flows to be better managed to several pools. Raising and leveling the perimeter dike around impoundment 8, salt water would not be able to enter that impoundment on high tides and moderate river flows. The improvements would increase the wetland function of those impoundments over a 15- to 25-year period.

4.1.5 6,200 Habitat Unit + Long Term Alternative

The 6,200 Habitat Unit + Long Term Alternative would improve the hydrology in impoundment pools 1, 2, 3, 4, 5, 6, 8, 10, 11, 14, 15 and 17 through restoring, expanding, and deepening ditches. Removing the interior dike between impoundments 10 and 11 will allow the impoundments to be flooded without affecting adjacent areas. Replacing the John Hill Water Control Structure would allow flows to be better managed to several pools. Raising and leveling the perimeter dike around impoundments 2, 4, 7, 14 and 17, salt water would not be able to enter those impoundments on high tides and moderate river flows. Raising and leveling the interior dikes at impoundments 2, 3, 4, 5, 10, 11, 15 and 16, would allow the site managers to maintain a hydraulic separation between those pools, even when they are flooded. The improvements would substantially increase the wetland function of the impoundments over a 50-year period.

4.2 Air Quality and Noise

4.2.1 NAA

If the NAA is chosen, no air quality and noise changes would occur.

4.2.2 Refuge Alternative

The Refuge Alternative would have only short term, minor impacts to air quality and noise during construction activities, because of the size of the equipment and the duration of the work.

4.2.3 6,200 Habitat Unit Alternative

The recommended alternative would result in only short term, minor impacts to air quality and noise during construction activities, because of the size of the equipment and duration of the work.

4.2.4 7,200 Habitat Unit Alternative

The 6,200 Habitat Unit Alternative would have only short term, minor impacts to air quality and noise during construction activities, because of the size of the equipment and duration of the work.

4.2.5 6,200 Habitat Unit + Long Term Alternative

The 6,200 Habitat Unit + Long Term Alternative would have minor impacts to air quality and noise during construction activities. The impacts would be experienced on more occasions with this alternative as the construction activities would be repeated over time when rehabilitation of the measure is needed for it to provide the intended level of performance.

4.3 Aquatic Resources

4.3.1 NAA

If the NAA is chosen, no aquatic resource changes will occur.

4.3.2 USFWS Alternative

The Refuge Alternative would improve aquatic resources by improving the hydrologic function of the repaired impoundments, thereby improving macroinvertebrates that would be used as prey for birds and other wildlife.

4.3.3 6,200 Habitat Unit Alternative

The recommended alternative would improve aquatic resources by improving the hydrologic function of the repaired impoundments, thereby improving macroinvertebrates that would be used as prey for birds and other wildlife.

4.3.4 7,200 Habitat Unit Alternative

The 7,200 Habitat Unit Alternative would improve more aquatic resources by improving the hydrologic function of the repaired impoundments, thereby improving macroinvertebrates that would be used as prey for birds and other wildlife.

4.3.5 6,200 Habitat Unit + Long Term Alternative

The 6,200 Habitat Unit + Long Term Alternative would provide greater improvements to aquatic resources than the other alternatives because of the additional habitat improvement measures that would be implemented (36,000 HUs produced) and the longer duration over which those benefits would accrue (50 years vs. 15 to 25 years).

4.4 Wetlands and Floodplains

4.4.1 NAA

The NAA alternative would have no effect on wetlands or floodplains.

4.4.2 Refuge Alternative

The Refuge Alternative would improve approximately 659 acres of managed wetland habitat.

4.4.3 6,200 Habitat Unit Alternative

The recommended alternative would improve approximately 533 acres of managed wetland habitat.

4.4.4 7,200 Habitat Unit Alternative

The 7,200 Habitat Unit Alternative would improve approximately 698 acres of managed wetland habitat.

4.4.5 6,200 Habitat Unit + Long Term Alternative

The 6,200 Habitat Unit + Long Term Alternative would improve approximately 2,367 acres of managed wetland habitat. The improvements would also extend over a longer time period than with the other alternatives.

4.5 Threatened, Endangered, and Protected Species

4.5.1 NAA

The NAA would not adversely affect threatened, endangered, or protected species even though wood storks and bald eagles are present at the site.

4.5.2 Refuge Alternative

The Refuge Alternative is likely to restore habitat for threatened, endangered, or protected species such as the wood storks and bald eagles. No long term adverse impacts to threatened, endangered, or protected species or their habitat are expected.

4.5.3 6,200 Habitat Unit Alternative

The recommended alternative is likely to restore habitat for threatened, endangered, or protected species such as the wood storks and bald eagles. No long term adverse impacts to threatened, endangered, or protected species or their habitat are expected.

4.5.4 7,200 Habitat Unit Alternative

The 7,200 Habitat Unit Alternative is likely to restore habitat for threatened, endangered, or protected species such as the wood storks and bald eagles. No long term adverse impacts to threatened, endangered, or protected species or their habitat are expected.

4.5.5 6,200 Habitat Unit + Long Term Alternative

The 6,200 Habitat Unit + Long Term Alternative would restore habitat for threatened, endangered, or protected species for a longer period of time (50 years vs. 15-25 years).

4.6 Cultural Resources

4.6.1 NAA

The NAA would result in no actions that would adversely affect cultural resources.

4.6.2 Refuge Alternative

This alternative represents an evolution of the earlier land use patterns of Low Country rice plantations and would not adversely affect the Refuge's historic rice plantation landscape. No prehistoric cultural resources would be impacted.

4.6.3 6,200 Habitat Unit Alternative

The alternative will have no adverse effect upon the 19th century rice agricultural/plantation landscape associated with Beech Hill and Laurel Hill Plantations. No prehistoric cultural resources would be impacted.

4.6.4 7,200 Habitat Unit Alternative

This alternative represents an evolution of the earlier land use patterns of Low Country rice plantations and would have not adversely affect the Refuge's historic rice plantation landscape. No prehistoric cultural resources would be impacted.

4.6.5 6,200 Habitat Unit + Long Term Alternative

This alternative represents an evolution of the earlier land use patterns of Low Country rice plantations and would have no adverse effect upon the Refuge's historic rice plantation landscape. No prehistoric archaeological sites would be impacted.

4.7 Hazardous, Toxic, and Radioactive Waste

USACE is obligated under Engineer Regulation 1165-2-132 to reasonably identify and evaluate all Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within the vicinity of the proposed action. USACE coordinated with the managers of the SNWR, who stated that they have no reason to believe the impoundments contain any HTRW substances. The wildlife exposure to and use of those sites over the years has not resulted in any concerns for potential contamination. No further investigations are warranted.

5.0 Cumulative Impacts

Cumulative effects are defined in 40 CFR 1508.7 as those effects that result from:

> *...the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

Cumulative environmental effects for the proposed project were assessed in accordance with guidance provided by the President's Council on Environmental Quality (CEQ).

All impacts on affected resources can be called cumulative. However, according to CEQ guidance, *"the role of the analyst is to narrow the focus of the cumulative effects analysis to important issues of national, regional, or local significance"* (CEQ 1997, p. 12). In addition to this relevancy criterion, only those resources expected to be directly or indirectly affected by the project, as well as by other actions within the same geographic scope and time frame were chosen for the analysis. Based on these criteria, the following resources were identified as target resources for the cumulative effects analysis:

- Wetlands
- Threatened, Endangered, and Protected Species

Resource Study Area: The study area in this EA for assessing cumulative effects on resources includes the SNWR and nearby portions of the Savannah River estuary, including the Savannah River, Front River, Back River, and the Kings Island Turning Basin.

5.1 Wetlands

Historical Context and Current Condition: Prior to historic harbor improvements, the majority of the study area contained freshwater wetlands. Originally most of the estuary was considered freshwater and was surrounded by bottomland hardwoods. Early settlers cleared the forests and leveled the lowlands to allow rice production. The saltwater interface was originally located near what is now Old Fort Jackson.

Since the SNWR began operations in 1927, four harbor deepening projects have occurred. The Savannah Harbor navigation channel was deepened to 30 feet in 1937, to 34 feet in 1958, to 38 feet in 1975, and to 42 feet in 1994. All of these deepening projects allowed saltwater to migrate farther upstream. Sea level rise has also occurred in the more than 250 years since the City of Savannah was founded in 1751, resulting in an estimated 3.4 foot rise since Savannah was settled in 1733.

Information supplied in the 2012 Fish and Wildlife Coordination Act Report for the Savannah Harbor Expansion Project indicates that the freshwater interface has moved from near the City of Savannah (Mile 14 of Savannah Harbor) in 1940 (30-foot channel) to near the upstream limit of the project (Mile 21.3) just downstream of the Georgia Highway 25 (Houlihan) Bridge (42-foot channel). Figure 5 is taken from the 2012 Fish and Wildlife Coordination Act Report and shows what the USFWS believe to be the historical change in the location of the freshwater interface from 1875 to the present.

In addition to the harbor deepening projects described above, the Sediment Control Works Project became operational in 1977 just after completion of the 38-foot channel deepening. The Sediment Control Works Project consisted of a Tidegate Structure across Back River and a Sediment Basin downstream of the Tidegate. That project was

designed to concentrate sedimentation outside the navigation channel in a location (Sediment Basin) close to dredged material containment areas.

Another component of the Sediment Control Works Project was a Freshwater Control System (FWCS) to mitigate for increased salinity in the area of the SNWR. The original FWCS included channel modifications in McCoys Cut, Middle River and Little Back River, a main water supply structure off Little Back River, water control structures and supply canals in the Refuge, and a supply canal to the adjacent private landowners. At the request of the USFWS, one component of the system (cutting off a bend in Little Back River), was not constructed. System maintenance problems caused by higher than anticipated salinity levels in Little Back River resulted in detrimental impacts to the SNWR. Personnel at the SNWR were unable to withdraw freshwater (0.5 or less ppt salinity) during periods of low flows and high tides. Periods of low flows in the Savannah River normally occur during the fall months when the SNWR starts filling their impoundments. The USFWS subsequently retrofitted water control structures that rusted and failed. USACE completed rehabilitation of the water control structures in the Refuge portion of the FWCS in 2011.

In addition to problems with the FWCS, the USFWS identified impacts from high salinity levels in Little Back River on freshwater marsh and striped bass habitat. As a result, USACE took the Tidegate structure out of operation in 1991 and closed New Cut in 1992 to reduce salinity levels in the vicinity of the SNWR. Taking the Tidegate structure out of operation and closing New Cut helped to mitigate increases in upstream salinity levels from construction of the 42-foot channel, which was completed in 1994.

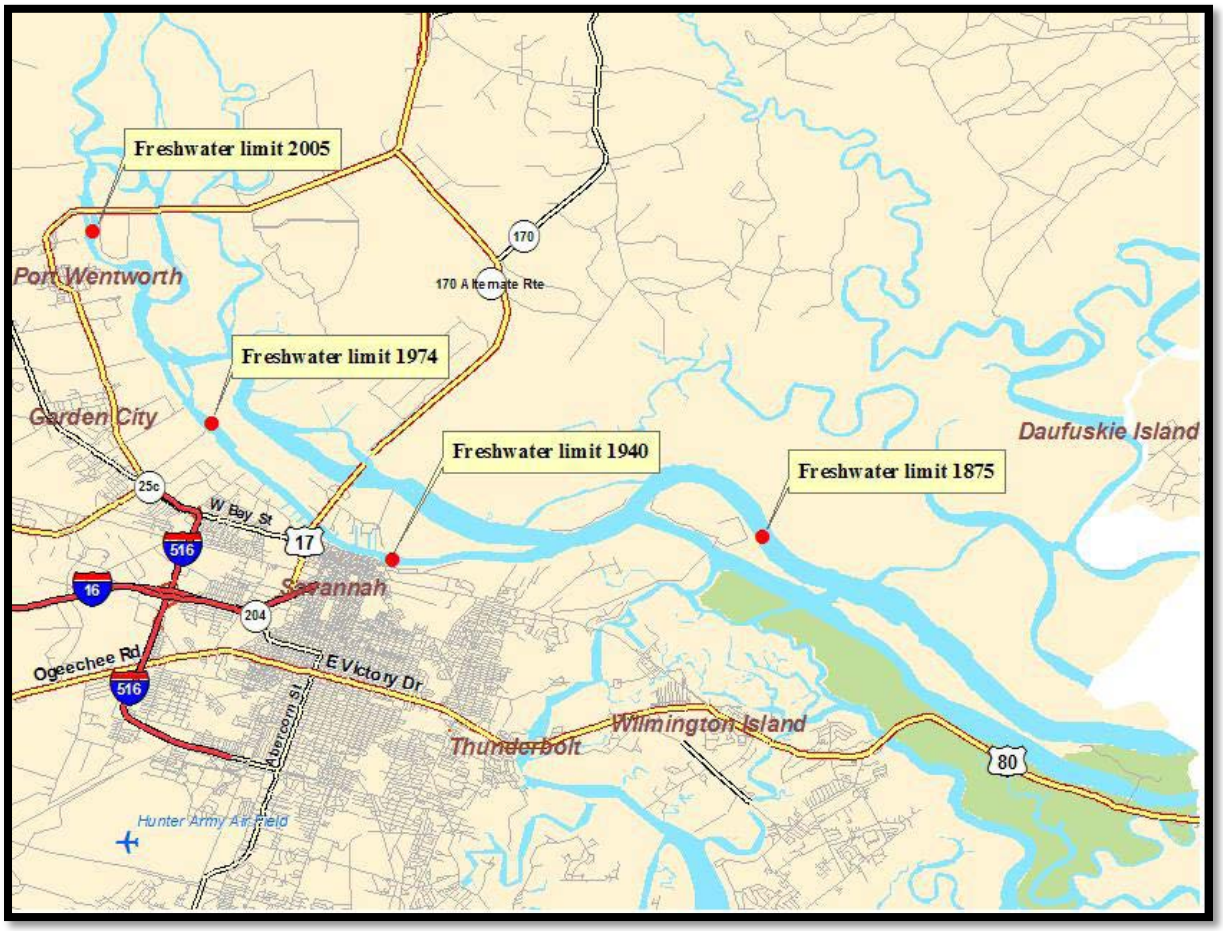

Figure 5: Historical freshwater interface in Savannah Harbor

Summary of Direct and Indirect Effects: The NAA would have no direct or indirect effects on the project area.

The recommended alternative would directly impact the area by improving the wildlife habitats at the SNWR and increasing resiliency in the region. The other construction alternatives would have similar effects on wetlands.

Other Reasonably Foreseeable Effects: The Savannah Harbor Expansion Project (SHEP) identified impacts to approximately 1,777 acres of freshwater wetlands. Appendix C of the Final EIS for SHEP provides the mitigation plan which when fully implemented will meet the no-net-loss policy of the Federal government. The goal of that Federal policy is to balance wetland loss due to economic development with wetlands reclamation, mitigation, and restoration efforts, so that the total acreage of wetlands in the nation does not decrease, but remains constant or increases. This demonstrates that protecting, preserving, and enhancing freshwater wetlands is of great importance to the nation. As the Federal agencies continue to implement that no-net-loss policy in the Savannah River estuary, they will ensure that future projects do not decrease the amount of wetlands in the project area.

Results of the Cumulative Effects Analysis: There appear to be no adverse incremental effects on wetlands resulting from the rehabilitation of SNWR impoundment pools. The recommended alternative would not contribute to cumulative adverse effects on wetlands.

5.2 Threatened, Protected, and Endangered Species

Historical Context and Current Condition: Appendix A discusses the listed species or species of concern in the project area.

Summary of Direct and Indirect Effects: The NAA would have no effect on threatened or endangered species.

The recommended alternative would increase the habitat functionality of the Refuge for protected species. Listed species would continue to use the impoundment pools for foraging and nesting/roosting. The other construction alternatives would have similar effects on threatened, protected, or endangered species.

Other Reasonably Foreseeable Effects: There are no other reasonably foreseeable effects in the area that would impact the species affected by the recommended alternative.

Results of the Cumulative Effects Analysis: There appear to be no adverse incremental effects on threatened, endangered, or species of concern from the rehabilitating the SNWR impoundment pools. The proposed action would not contribute to cumulative adverse effects on protected species.

6.0 Compliance with Environmental Requirements

Through this EA, USACE evaluated and is seeking concurrence to perform construction activities within the Savannah National Wildlife Refuge and use the habitat units produced by the increased wildlife functionality of the Refuge to cover the temporary shortfall of HUs for the Project.

Table 10: Environmental Permits and Approvals

Federal Policy/Statute	Status	NEPA Coordination Timeline
Anadromous Fish Conservation Act, 16 U.S.C. 757, et seq.	Not Applicable.	Not Applicable.
Archaeological and Historic Preservation Act, as amended, 16 U.S.C. 469, et seq.	The recommended alternative is in full compliance with all applicable policies.	Coordinated no effects determination with SC SHPO for 30 days. No response.
Clean Air Act, as amended, 42 U.S.C. 1857h-7, et seq.	EA is being coordinated with appropriate agencies for compliance concurrence.	Draft EA will be sent to EPA for concurrence.
Clean Water Act, as amended (Federal Water Pollution Control Act) 33 U.S.C. 1251, et seq.	EA is being coordinated with appropriate agencies for compliance concurrence.	Draft EA is being coordinated with federal and state natural resource agencies.
Coastal Zone Management Act	EA is being coordinated with appropriate agencies for compliance concurrence.	Draft EA is being coordinated with federal and state natural resource agencies.
Endangered Species Act	EA includes an assessment of impacts on T&E species. EA was coordinated with appropriate agencies for compliance concurrence.	Draft EA is being coordinated with federal and state natural resource agencies.
Executive Orders 12898 and 13045 (Environmental Justice)	EA is being coordinated with appropriate agencies for compliance concurrence.	Comments will be received for 30 days after Public Notice is issued.
Erosion and Sedimentation Control	Erosion Control Plan would be developed before construction begins.	Coordination with Jasper County will be required prior to construction – 30 days.
Estuary Protection Act	EA is being coordinated with appropriate agencies for compliance concurrence.	Draft EA is being coordinated with federal and state natural resource agencies.
Federal Water Project Recreation Act	Not Applicable.	Not Applicable.
Fish and Wildlife Coordination Act	Corps has consulted with the natural resource agencies. EA is being coordinated with appropriate agencies for compliance concurrence.	Draft EA is being coordinated with federal and state natural resource agencies.
Floodplain Management	No Effect.	Not Applicable.
Magnuson-Stevens Act	No work would be performed in wetlands or estuarine waters.	Not Applicable.
Migratory Bird Conservation Act of 1929	EA is being coordinated with appropriate agencies for compliance concurrence.	Draft EA is being coordinated with federal and state natural resource agencies.
Migratory Bird Treaty Act of July 3, 1918	EA will be coordinated with appropriate agencies for compliance concurrence.	Draft EA is being coordinated with federal and state natural resource agencies.
National Environmental Policy Act	Draft EA and FONSI is being coordinated with the public and natural resource agencies.	USACE will respond to the comments and make them available to USACE decision-maker.
Protection of Wetlands	Not Applicable.	Not Applicable.
Stream Buffer Variance	Not Applicable.	Not Applicable.

6.1 Archaeological and Historic Preservation Act

No archaeological sites are known to occur in the impoundments to be improved, therefore no impacts are expected. If any cultural or archaeological resources are discovered during construction, the Corps would cease work until it coordinated with the appropriate agencies.

6.2 Clean Air Act of 1972

No permanent sources of air emissions are part of the NAA or the proposed plan. No air quality permits will be required for this project. The Draft EA is being coordinated with USEPA, the public, and other agencies. Therefore, this project would comply with the Clean Air Act.

6.3 Clean Water Act

There would be no additional discharges into the Savannah River because the proposed alternative will work on existing diked wetland impoundments. Through this EA, USACE requests a modification to the SHNP's 1996 mitigation plan to allow mitigation to temporarily be provided at the SNWR, rather than just within the Navigation Project's DMCAs.

6.4 Coastal Zone Management Act

The proposed action would improve wildlife habitats within the SNWR, but not change operations that are regularly performed within the Refuge. USACE believes the action is fully consistent with the enforceable policies of the Coastal Management Plans of both states.

6.5 Endangered Species Act

USACE has determined that this alternative plan is not likely to adversely affect any listed species or their critical habitat. The Draft EA will be coordinated with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to ensure this project complies with the Act.

6.6 Protection of Children and Environmental Justice

The project will not result in adverse human health or environmental effects, nor would it pose a disproportionate environmental health risk or safety risk to children. The proposed project is in compliance with these Executive Orders.

6.7 Erosion and Sedimentation Control

The construction contractor would develop and implement an erosion and sedimentation control plan, including use of best management practices identified by SC DHEC. The plan will be coordinated with Jasper County to ensure its compliance with the latest guidelines. The proposed project would be in compliance with this section of the Clean Water Act.

6.8 Estuary Protection Act

No alternative would have an adverse effect on estuaries. The proposed action complies with this Act.

6.9 Fish and Wildlife Coordination Act

USACE coordinated with the USFWS and the State natural resource agencies during its evaluation of this action and has coordinated the Draft EA with them for review. USACE will consider the views of those agencies before making its final decision on the proposed action. The project complies with this Act.

6.10 Migratory Bird Conservation Act of 1929

The Draft EA was coordinated with USFWS and SC DNR. Since there are multiple impoundments, construction can occur in up to three pools at one time and not affect migratory birds. If construction on four pools at the same time is required, it will not occur between 15 November and 15 February. Therefore, the project complies with this Act.

6.11 Migratory Bird Treaty Act

As the Refuge will still serve its purpose for migratory waterfowl, the project complies with this Act.

6.12 National Environmental Policy Act

In compliance with the Act, this EA was prepared to evaluate the proposed work. The Draft EA has been coordinated with the public and appropriate natural resource agencies.

6.13 National Historic Preservation Act

The Draft EA was coordinated with the South Carolina State Historic Preservation Office and federally recognized tribes. An action plan will be in place in the event any archaeological or cultural resources are discovered during construction. The proposed project complies with this Act.

7.0 Public and Agency Involvement

The proposed work on the SNWR was coordinated with the USFWS to determine if there were activities that could be performed that would provide the same forms of habitat as those achieved in the Savannah Harbor Dredged Material Containment Areas. The outcome of that coordination was further discussed with federal and state natural resource agencies in a June 2014 meeting. The Corps took input from that meeting into account in its assessment of the condition of the impoundments and the measures that were included in alternative plans.

The Draft Environmental Assessment is being made available to the public and natural resource agencies for 30 days for review and comment, providing further input into the process. The results of that coordination will be included in this section as part of the final EA.

8.0 Conclusions

The proposed action is the performance of specific measures within the Savannah National Wildlife Refuge to enhance wildlife habitats within the Refuge and use of those habitats as a temporary means to meet the wildlife habitat mitigation commitments of the Savannah Harbor Navigation Project. The work would consist of rehabilitating existing freshwater wetland impoundment pools at the SNWR so that they provide more bird habitat than expected if no action is taken.

This action would have no net adverse effects on wetlands, water quality, hazardous or toxic wastes, aquatic resources, threatened or endangered species, or cultural resources. It would not result in any known adverse incremental cumulative impacts on biological or cultural resources. The proposed action would achieve the required 5,200 HUs to recover the temporary mitigation deficit.

9.0 Preparers

This EA and the associated Draft FONSI were primarily prepared by the following individuals:

William Bailey – Physical Scientist
Thomas Jester - Plan Formulator
Nathan Dayan - Biologist
Julie Morgan - Cultural Resources
Lyle Maciejewski - Project Manager

10.0 References

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