FINDING OF NO SIGNIFICANT IMPACT (FONSI)
SAVANNAH HARBOR EXPANSION PROJECT
(Excavation and Placement of Cadmium-Laden Sediments)

Chatham County, Georgia and Jasper County, South Carolina

1. Description of Proposed Action: The Savanah District, U.S. Army Corps of Engineers, Savannah District (CESAS), proposes placement of approximately 4.4 million cubic yards (CY) bulked of cadmium-laden sediments in Dredged Material Containment Area (DMCA) 14A in a moist (inundated) but not flooded condition, with additional placement in DMCA 14B if needed, as part of the Savannah Harbor Expansion Project (SHEP). This proposed action modifies what is described in the July 2012 Final Environmental Impact Statement (FEIS) for SHEP and the October 2012 Record of Decision (ROD). The FEIS and ROD are incorporated herein by reference. There would be no change in the 14 mg/kg criteria to be used for special handling of cadmium-laden sediments, or the method or timing of the dredging. DMCA 14A would be flooded after placement of any excavated sediments until they are subsequently covered, as described in the FEIS. The placement of the cadmium-laden sediments may require multiple contracts over multiple years. The cadmium-laden sediments would be kept moist during their deposition by placing stop logs in the cross dike weirs between DMCAs 14A and 14B to maintain the water height just below the height of the deposited dredged sediments (limited to 6"-12"). This saturation level will limit the cadmium mobility, while allowing the sediments to be worked with equipment as it is placed, and limiting wildlife exposure. As the sediment material is pumped into the DMCA, it will be pushed into the flooded portion of the site, similar to beach nourishment or island creation projects. Several methods could be employed to reduce the use of an individual DMCA by wildlife during the construction period in order to reduce their risk of exposure. These measures are described in the Supplemental Environmental Assessment (SEA). The volume of sediments required for the initial cover/cap is approximately 2 MCY. The cover/cap will come from new work sediments. If additional sediments are required for the cover/cap, sediment could be obtained from the next O&M cycle which is expected within 12 months. New work sediments from Stations 0+000 to 24+000 have been identified as a suitable source for cover/cap material. In lieu of a visible marker placed across the DMCA, a georeferenced elevation would be determined to identify the depth below which no future disturbance would be allowed. If work is ever required below this depth, a protocol to prevent wildlife exposure to the sediment and a method to re-cap the site would have to be included in the work plan.

2. Factors Considered in Determination: CESAS has assessed the impacts of the proposed action on important resources, including wetlands and aquatic resources/fisheries, terrestrial resources, wildlife, threatened, endangered and protected species, cultural, air quality, and water quality. No significant adverse impacts were identified for any of the important resources with the proposed placement design. This updated assessment concludes that this alternative, "may affect, but is not likely to

adversely affect" piping plover, wood stork, and red knot or their critical habitat due to the rarity of piping plover and red knot being in the DMCAs and the seasonality of wood storks in the DMCAs. In addition, there is similar habitat for these species adjacent to DMCA 14A and 14B. The risk of encountering HTRW is low. No impacts were identified that would require compensatory mitigation. The proposed action does not change the impact on the Coastal Zone, air quality, and water quality from those described in the FEIS. No additional fill would be placed in the waters of the US, therefore, an update to the Section 404(b)(1) Evaluation and existing Section 401 approvals are not required. CESAS has concurred with, or resolved, all Fish and Wildlife Coordination Act recommendations. The District has concurred with, or resolved, all comments provided by Federal and state agencies and the public. The impact to Essential Fish Habitat would be the same as those described for the Selected Plan described in the FEIS.

3. Environmental Design Commitments. The following commitments are an integral part of the proposed action:

1. If the proposed action is changed significantly or its construction is not started within one year, Savanah District will reassess potential impacts to Federally-listed threatened or endangered species, and their critical habitat to ensure no adverse impacts would occur.

2. If any unrecorded cultural resources are determined to exist within the proposed project boundaries and ground disturbance is required, no excavation would occur at the site containing the cultural resource until a Savanah District staff archeologist has been notified and additional coordination with the State Historic Preservation Officer has been completed.

3. The minimum distance that the cadmium-laden sediments from Stations 85+000 to 90+000 will be pumped is 4,000 feet to allow for 100% degradation of any clay balls.

4. Bird abatement will be used to reduce the time that birds feed in DMCA 14A and 14B during cadmium-laden sediment placement and during their flooded state before capping.

5. The deposited sediment will be kept moist during their placement to reduce the bioavailability of the cadmium.

6. Water quality testing would still be performed as described in the FEIS.

7. After placement of the cadmium-laden sediments, the DMCA would be flooded (the deposited cadmium-laden sediments would be covered) while awaiting placement of additional cadmium-laden sediments or the cover/cap.

8. The deposited cadmium-laden sediments would be capped with a clean (below 4.0 ppm) two-foot cover/cap of sediment materials. The requirements for the cover/cap material and the required testing would be performed as described in the FEIS.

9. A restriction would be in placed on future construction activities using material from DMCA 14A.

4. Public Involvement. An interagency meeting was held on 25 October 2016. During this meeting, the natural resource agencies were briefed on the alternative placement concept described herein. The proposed action was coordinated with other appropriate Federal, state, and local agencies and businesses, organizations, and individuals through distribution of a draft SEA for their review and comment on December 30, 2016. Twelve comment letters were received during this time. Responses to these comments are included in the appendix to the Final EA.

5. Conclusion. CESAS has assessed the potential environmental impacts of the proposed action. Based on this assessment, a review of the comments made on the SEA, and implementation of the environmental design commitments listed above, CESAS concluded that the proposed action would not result in a significant impact on the human environment. Therefore, an Environmental Impact Statement will not be prepared.

25 July 2017
Date

Marvin L. Griffin, P.E.
Colonel, U.S. Army
Commanding

US Army Corps
of Engineers®
Savannah District

SUPPLEMENTAL
ENVIRONMENTAL ASSESSMENT

SAVANNAH HARBOR EXPANSION PROJECT
(Excavation and Placement of Cadmium-Laden Sediments)

Chatham County, Georgia and Jasper County, South Carolina

July 2017

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SAVANNAH HARBOR EXPANSION PROJECT

(Excavation and Placement of Cadmium-Laden Sediments)

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1.0 Introduction

The U.S. Army Corps of Engineers (USACE), Savannah District (SAS), has prepared this Draft Supplemental Environmental Assessment (SEA) to evaluate the potential impacts of placing cadmium-laden dredged sediments in Dredged Material Containment Areas (DMCAs) 14A and 14B in a moist (inundated) but not flooded condition as part of the Savannah Harbor Expansion Project (SHEP). This SEA supplements July 2012 Final Environmental Impact Statement (FEIS) for the Savannah Harbor Expansion Project (SHEP) and signed Record of Decision (ROD) dated October 26, 2012. The FEIS and ROD are incorporated herein by reference. These documents and the General Revelation Report (GRR) can be found at: (http://www.sas.usace.army.mil/Missions/Civil-Works/Savannah-Harbor-Expansion/)

This SEA covers the placement of cadmium-laden sediments only and not the dredging activity which is covered in the FEIS and has not changed[1]. The thresholds to identify sediments that require this special handling would not change from those described in the FEIS.

This SEA has been prepared in accordance with the National Environmental Policy Act of 1969, Council on Environmental Quality's Regulations (40 CFR 1500-1508), USACE Engineering Regulation ER 200-2-2. This SEA provides sufficient information on the potential adverse and beneficial environmental effects to allow the District Commander, U.S. Army Corps of Engineers, Savannah District, to make an informed decision on the appropriateness of preparing an Environmental Impact Statement (EIS) or signing a Finding of No Significant Impact (FONSI).

1.1 Proposed Action.

There would be no change in the method or timing of the dredging and DMCA 14A will be flooded after placement of any deposited sediment until covering/capping occurs as described in the FEIS. The placement of the cadmium-laden sediments may require multiple contracts over multiple years. The requirement to perform special handling of sediments with cadmium concentrations that exceed 14 mg/kg will not change.

This proposed action modifies what is described in the FEIS Section 5.04.2.2, (Figure 1) and Appendix M Section 7.3.1. The changes fall into two categories (1) refining the channel reaches that contain naturally-occurring cadmium at levels that require special

[1] Items in red box highlight Items from 2012 SHEP FEIS that will not change with this EA.

handling, and (2) keeping the deposited cadmium-laden sediments moist in DMCAs 14A by maintaining the water height in the DMCA just below the elevation of the deposited dredged sediment (limited to 6”-12” below the sediment) rather than flooded. The proposed action (Alternative 10 in table 10) consists of placing approximately 4.4 million cubic yards (CY) bulked of cadmium-laden sediments in DMCA 14A in a moist (inundated) but not flooded condition, with the effluent passing through DMCA 14B, if needed. It includes a reduction in the quantity of sediment (11.7 MCY to 4.4 MCY) that require special handling as of cadmium-laden sediment; Low Level Inundation during placement, rather than a flooded state; and Mitigation (bird abatement) during placement of sediments in DMCAs 14A and during flooded period between placement and capping. The reduced volume of cadmium-laden sediments should allow for these sediments to be placed within one DMCA. If the quantities of cadmium-laden sediment is greater than approximately 5 million CY bulked, both DMCAs 14A and a portion of 14B would be required.

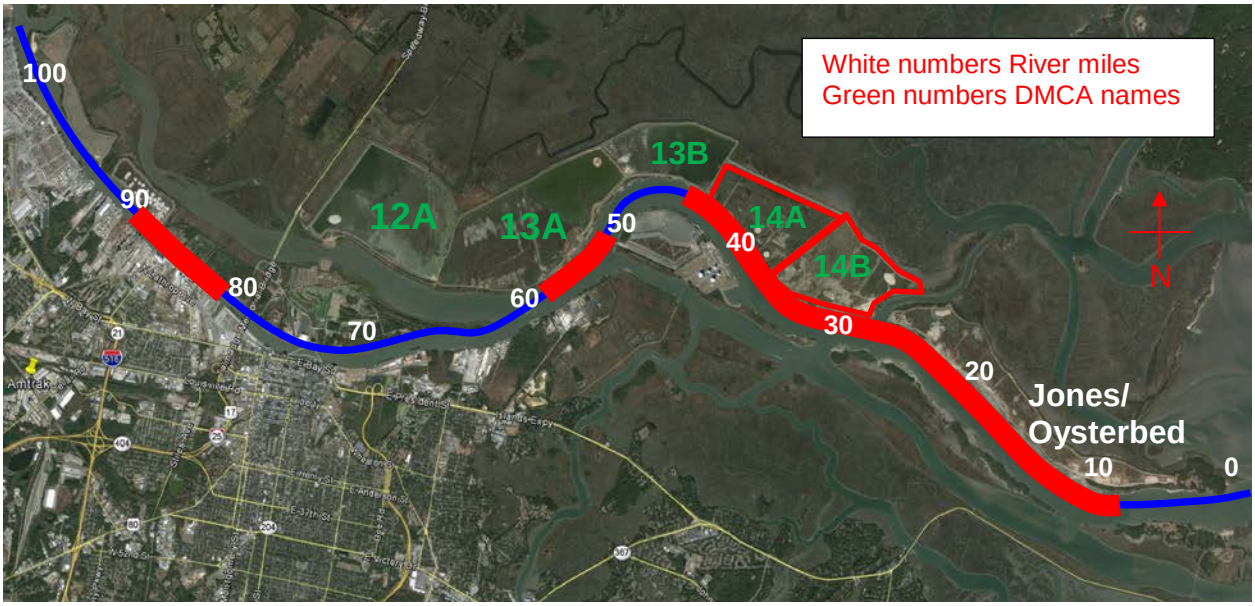


Figure 1: Location of Cadmium-Laden Sediment Requiring Special Handling Based on FEIS

1.1.1 Placement

The cadmium-laden sediments would be kept moist in the DMCA (Figure 2) by placing stop logs in the cross dike weirs between DMCAs 14A and 14B to maintain the water height just below the height to which the dredged material is placed (limited to 6”-12”). This saturation level will limit the drying of the sediments, and thereby the mobility of the cadmium, while still allowing the sediments to be worked with equipment as it is placed. Moist is considered partially saturated. The moisture content should be well below the field capacity of the dredged material and below the content where evaporation starts being restricted by capillary action (approaching the wilting point of the dredged material). This approach would limit wildlife exposure to the deposited cadmium-laden sediments. As the material is pumped into the DMCA, it would be pushed into the flooded portion of the DMCA similar to the procedure used in beach nourishment and

island creation projects. The earth-moving equipment used will be required to have GPS to provide an accurate elevation to be compared with a post Cadmium-laden sediment placement survey (ground-truthed LIDAR or photogrammetry). Elevation +16' is intended to be the upper limit for SHEP Cadmium-laden new work sediments deposited in DMCA14A, which covers the Cd material and clean cap.

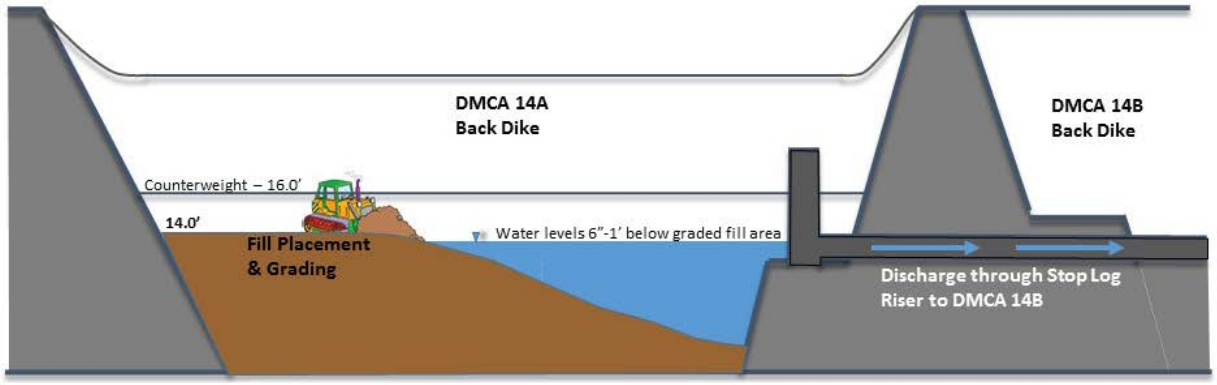


Figure 2: Moist placement of Cadmium Laden Sediments

Based on analyses performed by the USACE Engineer Research and Development Center (ERDC), cadmium levels in leachate from the deposited sediments is never likely to become an issue. The cadmium will oxidize and thus become mobile and bioavailable when the dredged material is deposited and becomes oxidized. However, the depth of oxidation is a function of the deposition and its condition. If allowed to dry and create desiccation cracks, the top two to three feet of the dredged material will likely oxidize. That process would progress further if the site becomes vegetated and root channels and worm holes are created, providing easier access for air to move further down through the soil. Maintaining the water level at the proposed depth would prevent desiccation cracks. Cadmium will be among the last constituents to oxidize, following constituents such as sulfides, nitrites, labile organics, zinc, iron and others.

1.1.2 Wildlife/Bird abatement

Wildlife/Bird abatement would be performed in the DMCAs to reduce the wildlife use of an individual DMCA both during the construction period and before capping. This would minimize their risk of potential exposure to cadmium. Several methods could be employed, as follows:

1. Using noise makers to keep birds off the areas where cadmium-laden sediments have been deposited and distributed until a permanent covering/capping can occur.

2. Use of scarecrows, streamers, fake owls, giant eyes, live raptors, or other visual bird deterrents.

3. Use of handheld and/or automated deterrent lasers.

4. Active human abatement. This would include a person riding an ATV around the placement site on a daily basis during daylight hours using all appropriate means to

prevent birds from feeding and nesting in the placement area. The use of noise makers, and visual deterrents would be expected. The use of a drone to harass the birds over larger area could be evaluated for success.

5. Holding water over the DMCA surface limits the types of species that could potentially be exposed to the cadmium-laden sediments after placement.

6. Spraying herbicides to limit the growth of plants.

USACE would use a multi-pronged approach initially relying on active human abatement (#4) and laser (#3) and finally adding water inundation (#5) after placement. USACE would employ the other identified methods as it deems necessary. The use of automated deterrent laser at night could accomplish the goal of 24-hour coverage. Information from USACE onsite inspectors and a bird abatement team will be used with the planned monitoring to determine if additional actions are needed. The bird abatement success monitoring plan can be found in Appendix A. This plan will help identify if any adaptive management is needed in the bird abatement plan.

1.1.3 Water Level/Quality Control

The method and standards for water quality testing in the DMCA and at the outfalls will not change from what is described in the FEIS. Details of the water quality monitoring plan can be found in the SHEP Final EIS and Appendices H (page 45 Water Quality Monitoring Plan Attachment).

Pipeline dredging results in water accumulating at the sediment deposition site. As sediments are deposited in the DMCA, water is decanted once it meets state standards for acceptability. Water in the DMCA will be first decanted through the weirs on the Savannah River side of DMCA 14A. Flow through those weirs are controlled by wooden stop logs. This method is currently used during the recurring maintenance dredging contracts. The sediments should settle within DMCA 14A without issue, as typically occurs during normal O&M dredging. If water quality testing shows that the water is not suitable for discharge, the water flow will be shifted (Figure 3) to flow from DMCA 14A through newly constructed weirs in the cross dike between DMCAs 14A and 14B and then through the weirs in 14B to the discharge point at Fields Cut on the Atlantic Intracoastal Waterway (AIWW). This approach, with its longer flow path, would provide the decanted water with a longer residence time to enable further settling of suspended materials through DMCA 14B before being discharged into Fields Cut. If flow is rerouted through DMCA 14B, the flooded portion of that DMCA would also be covered/capped unless testing shows that the flow path did not contain water with cadmium over the state standard during the construction period.

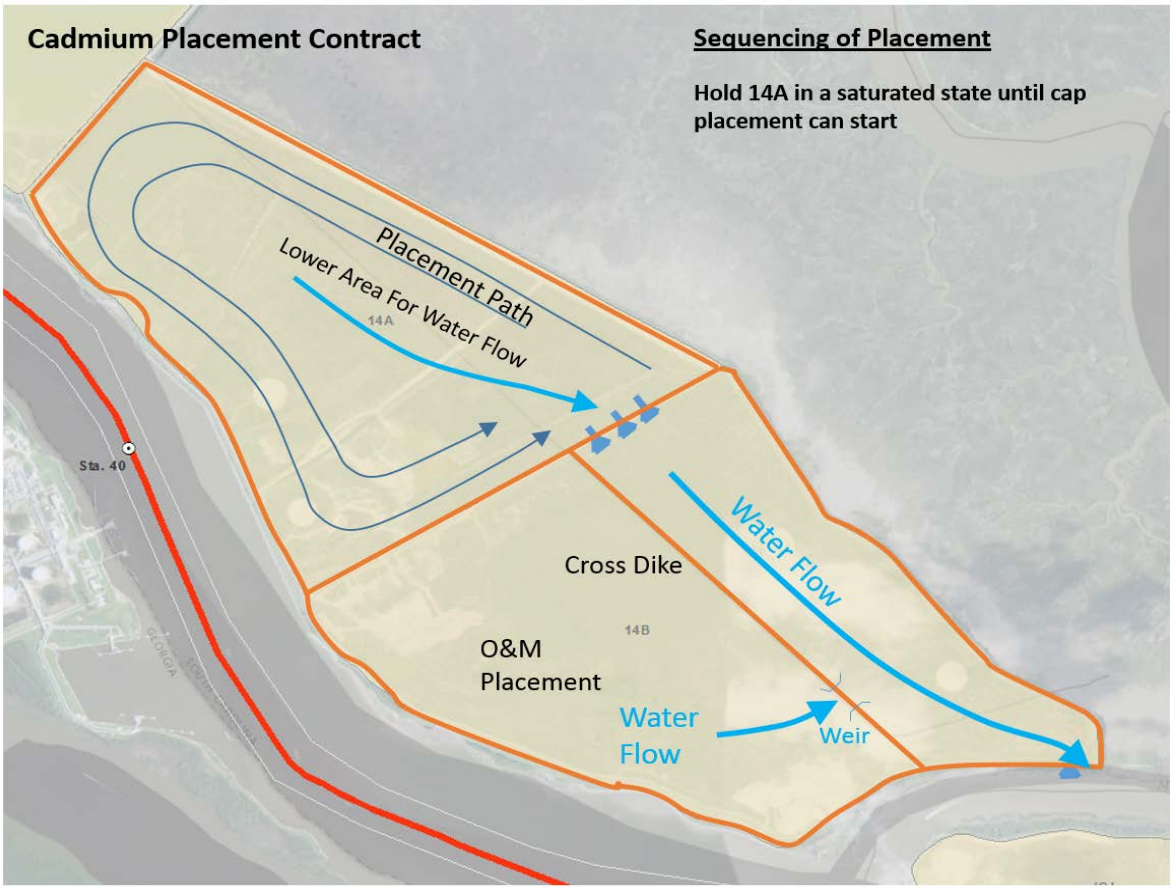


Figure 3: Alternative Water Flow Plath

1.1.4 Flooding DMCA after Placement

After placement of cadmium-laden sediments in DMCA 14A, the height of the stop logs would be increased to flood the site (Figure 4) while awaiting placement of additional cadmium-laden sediments or the cover/cap described in the FEIS.

The elevation of the cadmium-laden sediments and the water will be below the height of the counterweight to maintain the stability of the dike. Pumps or other methods may be required to maintain the water level in the DMCA to compensate for any evaporation or leakage. USACE would have the ability to inundate and provide a depth of approximately 18 inches of water over the Cadmium-laden sediment. This depends on the settlement of the back counterweight and the volume of the Cadmium-laden sediments placed in DMCA 14A. Different rates of consolidation, bulking, and settlement of the back dike affect the allowable depth of water. The addition of the use of bird abatement will mitigate for any depth that does not reach 18 inches.

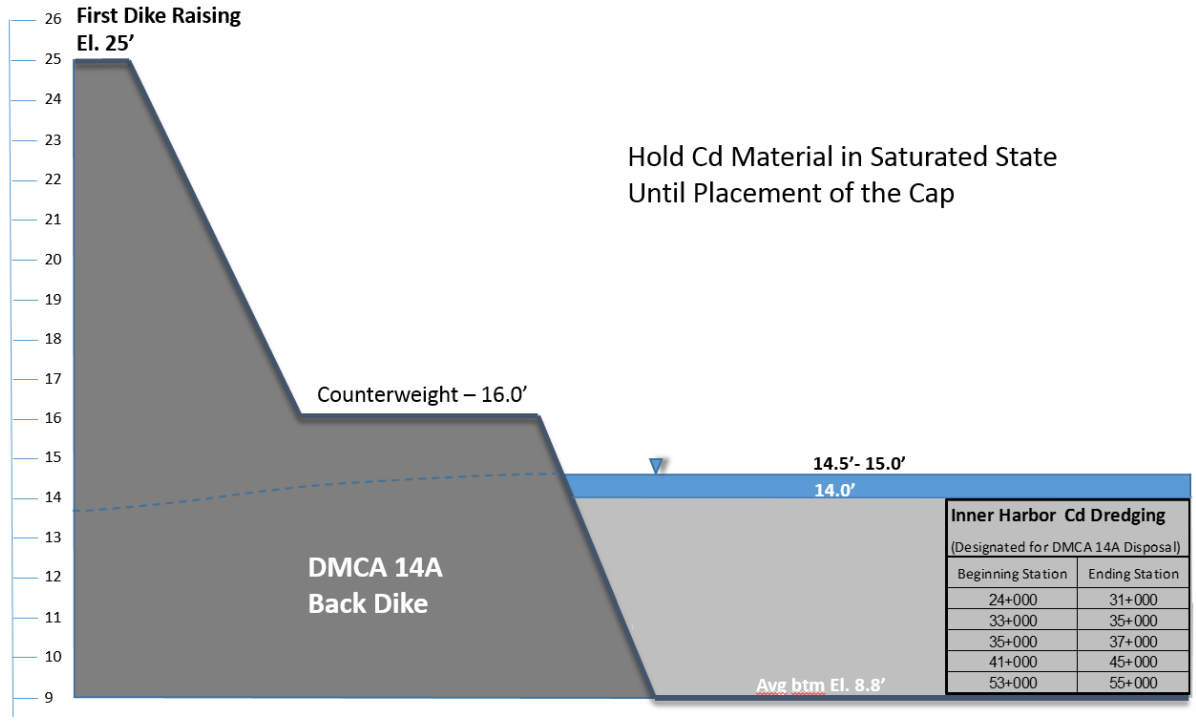


Figure 4: Flooded State of DMCA after Placement of Material

1.1.5 Capping Cadmium-laden sediment

The cadmium-laden sediments would then be covered/capped (Figure 5) with a clean (below 4.0 ppm) two-foot layer of sediments, as described in the FEIS (Section 5.04.2.2). The requirements for the cover material and the required testing would not change.

The volume of sediment required for the initial cover/cap is approximately 2 MCY. The cover will come from excavated SHEP new work sediments. If insufficient suitable new work sediments are available, sediments from the next O&M dredging cycle could be used. Those sediments would be deposited within 18 months. New work sediments from Stations 0+000 to 24+000 have been identified as a suitable source for the cover/cap material. Note the elevation of the cover/cap will be the height of the existing counterweight. The post placement survey would be used to determine the final elevation of the two-foot cover. The earth-moving equipment used will be required to have GPS to provide an accurate elevation to be compared with post placement survey and LIDAR or photogrammetry.

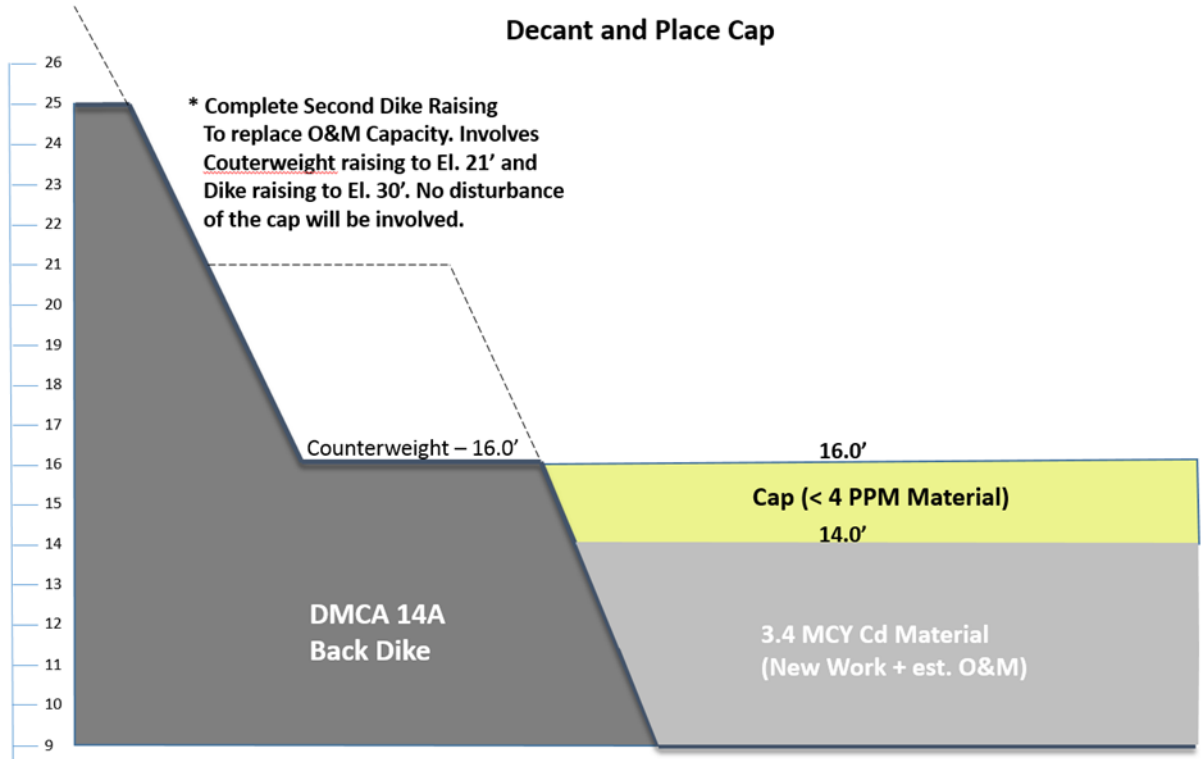


Figure 5: DMCA after Cap*

1.1.6 Restriction of Future Use of Material from DMCA 14A

A restriction on future construction activities using sediments deposited in DMCA 14A would be required as described in Appendix M - Section 7.2 of the FEIS. The deposited cadmium-laden sediments would not be excavated in the future, to ensure they do not become mobile and available to wildlife after the covering/capping operation is complete.

In lieu of a visible marker placed across the disposal areas, a georeferenced elevation would be determined to identify the depth not to be disturbed. There will be two Lidar or photogrammetry surveys (with ground-truthing) taken across the DMCAs, once after placement of the cadmium-laden sediment (prior to the cover/cap) and again after placement of the cover/cap material. In addition, there will be a requirement for the construction equipment to have GPS for elevation control and a post construction survey will be performed. From these three data sources, USACE will identify an elevation and all future construction contracts for that site will stipulate that no excavation would occur below that elevation. It is anticipated that sediments within the DMCA will settle as these materials and additional material are subsequently placed on top of the underlying unconsolidated soft organic soils. With time, this settling (consolidation) will function as an additional factor of safety since the cadmium-laden sediments and cover/cap would have settled below the elevation surveyed. If

excavation is ever required below this depth, a protocol to prevent wildlife exposure to the sediment and re-capping of the site would be included in the work plan.

1.1.7 Existing and Future Monitoring of Wildlife in DMCA

As part of the SHEP, USACE committed to monitoring wildlife use in DMCAs designated to receive new work sediments from the inner harbor. USACE biologists would perform monthly wildlife use surveys in DMCAs 12A, 13A, 13B, 14A, and 14B. These surveys would record all birds and other major vertebrates observed within those DMCAs. USACE has been performing such monitoring and would continue those efforts during placement of SHEP new work sediments and for a minimum of three years after placement is complete. The monitoring would continue as long as other cadmium-related sampling is occurring. In addition, USACE committed to perform avian blood/feather monitoring of birds in the DMCAs designated to receive sediments containing high concentrations of cadmium. Preconstruction monitoring has been performed to develop a baseline data set. Information on this and other SHEP monitoring efforts and results of preconstruction monitoring can be found at http://www.shep.uga.edu/#&panel1-1.

In addition, bird abatement success monitoring will be included as part of this proposed action. That monitoring plan is described in Appendix A.

1.2 Purpose and Need for the Proposed Action.

The purpose and need for SHEP can be found in Section 2.02 of the FEIS.

1.2.1 Purpose of the Action

The purpose of the proposed action is to place cadmium-laden dredged material as part of SHEP in a manner that reduces risk to wildlife without causing dike failure. The location of the proposed action is DMCAs 14A and 14B (Figure 6).

Cadmium has been found to occur naturally in high levels within Miocene soils that would be excavated during the SHEP dredging. Evaluation of the laboratory results indicated that adverse impacts to birds were likely from normal placement of sediments with elevated cadmium levels into the DMCAs. Studies found that sediments with a cadmium concentration of about 29.8 ppm could potentially produce environmental impacts to birds feeding 100 percent of the time in these sediments. When these wet sediments are dried, cadmium becomes much more mobile, with cadmium concentrations as low as 14.0 ppm potentially causing adverse environmental impacts. Details of this analysis can be found in the FEIS and its appendices.

The SHEP FEIS states that all cadmium-laden sediments requiring special handling would be placed in DMCA 14A (if sufficient capacity) or DMCAs 14A and 14B. The sediment would be deposited so that it remains covered with water until after placement of the cover/cap is completed. This material would not be allowed to dewater and/or desiccate until after placement of the cover is complete and cadmium levels in the surface sediments of the DMCA test less than 4 mg/kg.

In 1996, the District developed the Savannah Harbor Long Term Management Strategy and began to hold water in the Dredged Material Containment Areas (DMCAs) to create bird habitats. This approach served as mitigation to compensate for wetland losses that

Figure 6: Location of DMCAs 14A and 14B

resulted from diking DMCA 14A and miscellaneous disposal area operations in South Carolina. The DMCAs now provide nesting habitat for shorebirds and colonial nesting birds and are highly used by wildlife.

1.2.2 Need for Action

After the GRR was completed, CESAS began detailed design work on this project feature. In 2012, CESAS issued a Request for Information (RFI) to the dredging industry to obtain their views on how they would perform the construction to comply with the FEIS requirements. Industry proposed methods included filling the DMCA with enough water to float a barge (4 to 6 feet) inside the containment area to more efficiently isolate and place the sediments prior to application of the two-foot layer of clean covering sediments.

Using 2011, 2014, and 2015 subsurface investigation data (which was not available when the GRR and FEIS were prepared), Savannah District performed engineering analyses of DMCAs 14A and 14B using the industry's approach. The analysis revealed that the containment dikes would exhibit severe stability issues and likely fail during placement of water to create the ponded area. The back dike of DMCA 14A was

identified as a particularly vulnerable site. The 2014 investigation identified the low strength of the underlying soil and poor foundation conditions, which limit the ability to raise dikes and pond water to a substantial depth.
The result of the detailed engineering work conducted after the GRR and FEIS were prepared is that CESAS has recognized that the foundation and dikes at DMCAs 14A and 14B do not have sufficient strength to be able to implement the sediment placement plan identified in the FEIS and GRR. Therefore, some revision to the sediment placement plan is required.

1.3 Authority.

The proposed action would be a modification to the previously-approved Savannah Harbor Expansion Project (SHEP). That project was initially authorized as part of Water Resources Development Act of 1999 (Public Law 106-53, Section 102(b)(9)). The wording of the authorization can be found in Section 2.04 of the FEIS. The project was subsequently reauthorized in the Water Resources Reform and Development Act (WRRDA) (Public Law 113-121, Section 7002) at FY2014 price levels.

1.4 Prior Reports

Dredging and sediment disposal methods for the Savannah Harbor Expansion Project have been addressed in previous environmental documents which were circulated for public and environmental agency review. A list can be found in the FEIS Section 1.05. The following reports have been completed since the above list was prepared:

USACE, Savannah District. January 2012. Savannah Harbor Expansion Project, General Reevaluation Report and Final Environmental Impact Statement (http://tinyurl.com/j8fhuhp). In 2012, the U.S. Army Corps of Engineers, Savannah District, published the final GRR and EIS on a proposed deepening of Savannah Harbor. The study resulted in a project to deepen the inner harbor from the existing depths to 47 feet. Dredged sediment from the channel is being placed in the existing ocean dredged material disposal site and upland disposal areas. This report is herein incorporated by reference.

USACE, Savannah District. September 2013. Savannah Harbor Expansion Project, Environmental Assessment for Modifications to the Raw Water Storage Impoundment (http://tinyurl.com/hvo9lgd). This EA evaluated impacts due to modifications that were needed to the location and design of the Raw Water Storage Impoundment. During the detailed design process, several alternate sites were considered to identify the location that best meets the overall project needs. A parcel near Interstate Highway 95 and the City of Savannah's raw water pipeline was identified as the best location. Engineering and environmental studies were then performed on that site. Construction of this feature is now underway.

2.0 Formulation of Alternatives

Two types of measures were examined as part of plan formulation for this proposed action. They were:

1. Measures that examined the quantity of cadmium-laden sediments that is in the dredging profile.
2. Measures that examined methods of handling and placing the cadmium-laden sediments.

2.1 Quantity Measures

During the SHEP GRR, a subsurface and laboratory investigation identified the levels of cadmium within specific areas in the new work channel deepening sediments. Thirty-eight inner harbor locations were sampled as part of the sediment quality studies presented within Appendix M of the FEIS. Two additional locations have been sampled since these studies; these were collected in August 2015. Borings (Figure 7 through Figure 10) were taken at specific locations and samples were selected at a specific depths.

Samples were collected from each boring and tested for cadmium levels. Multiple samples were collected through the vertical extent of the boring. Samples were collected from approximately 2-foot intervals. For the FEIS, the methodology for determining which sediments would require special handling was based on the cadmium concentrations in the samples. If any measurement within a sediment column (boring) exceed the threshold, the entire vertical column and reach along the length of the river was considered to exceed threshold levels and would require special handling.

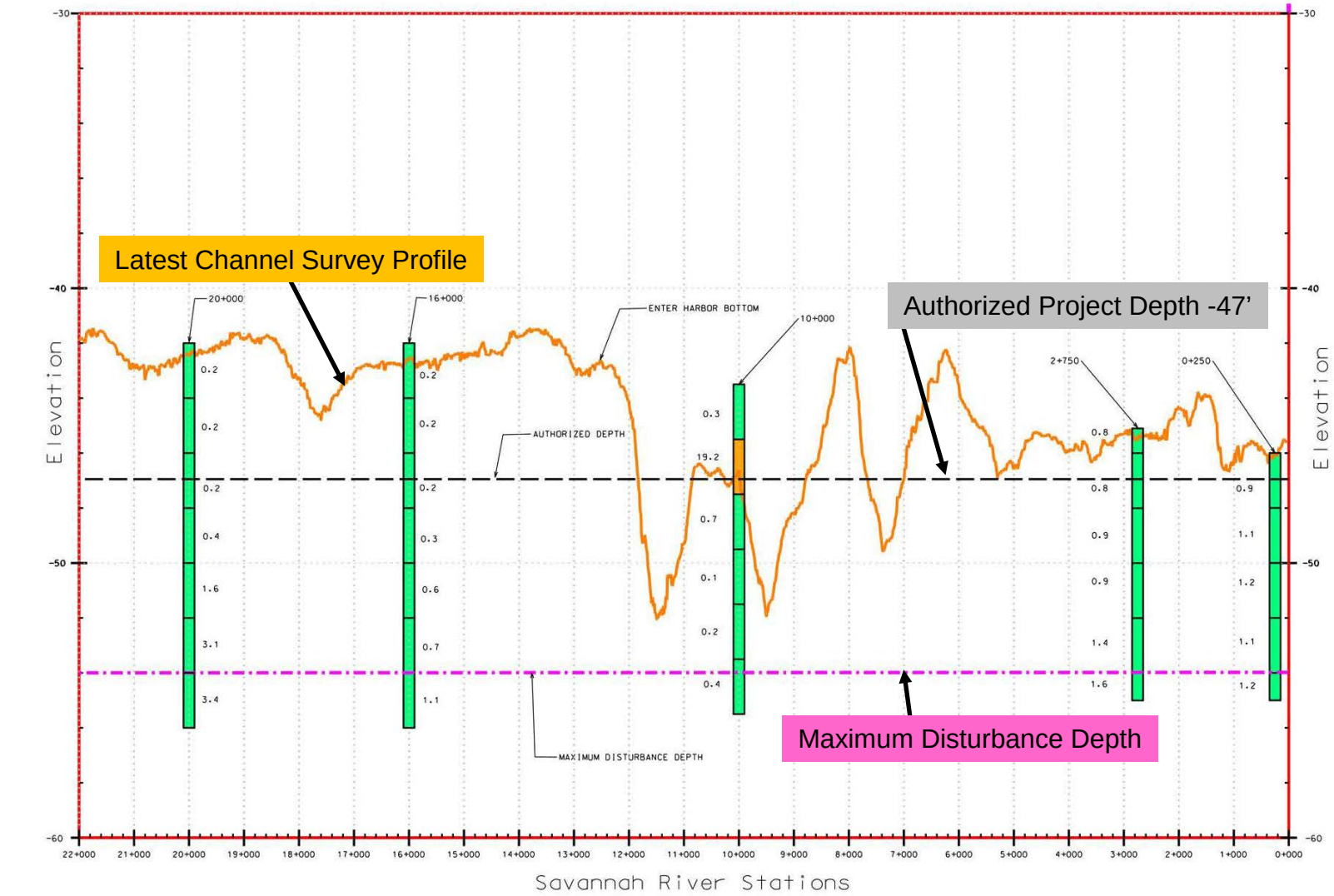
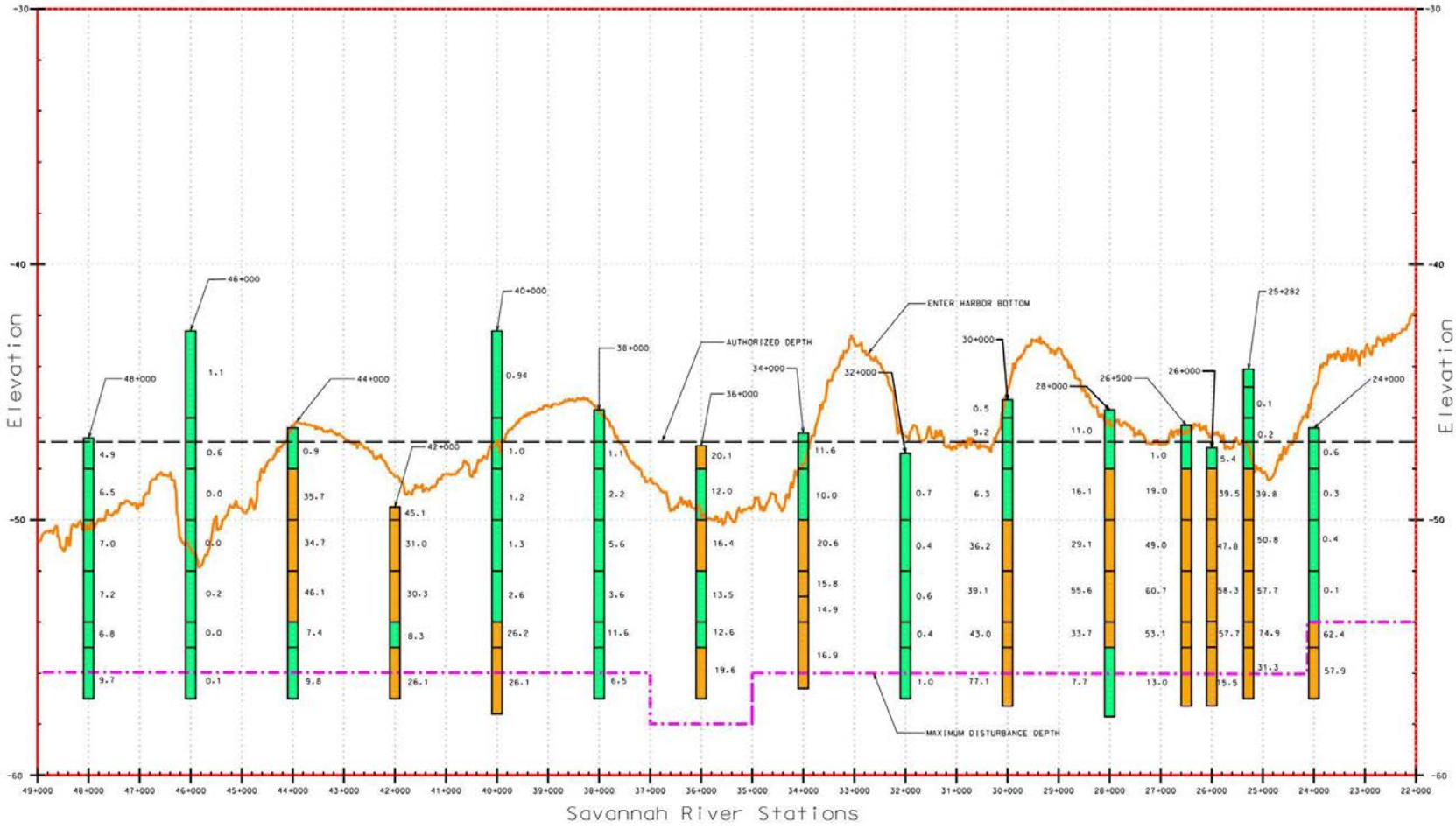


Figure 7: Cadmium in Sediment Samples from Stations 0+000 to 22+000



PROFILE SHOWING CADMIUM CONCENTRATIONS BASED ON CUT STA. 22-49

Figure 8: Cadmium in Sediment Samples from Stations 22+000 to 49+000

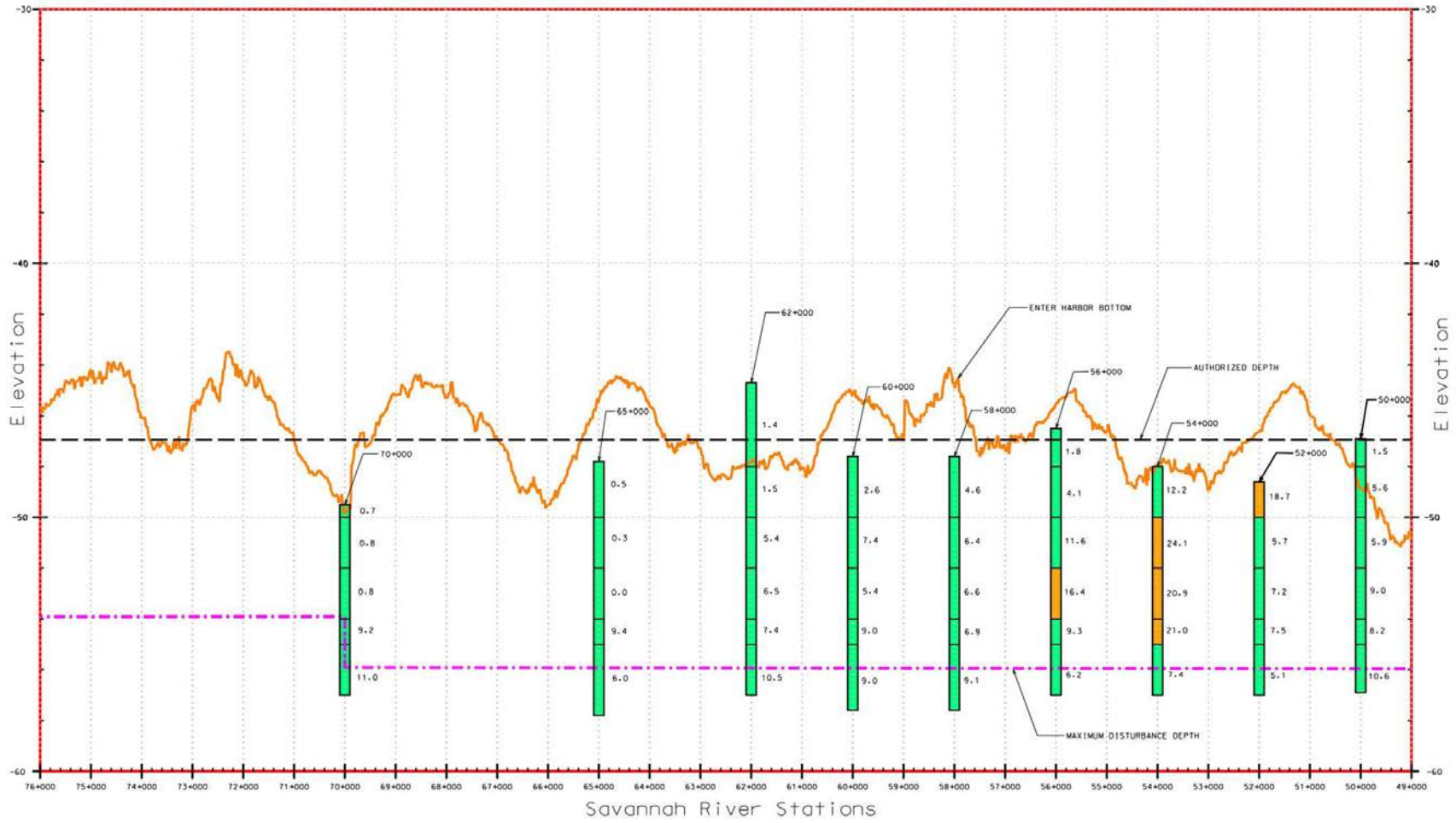
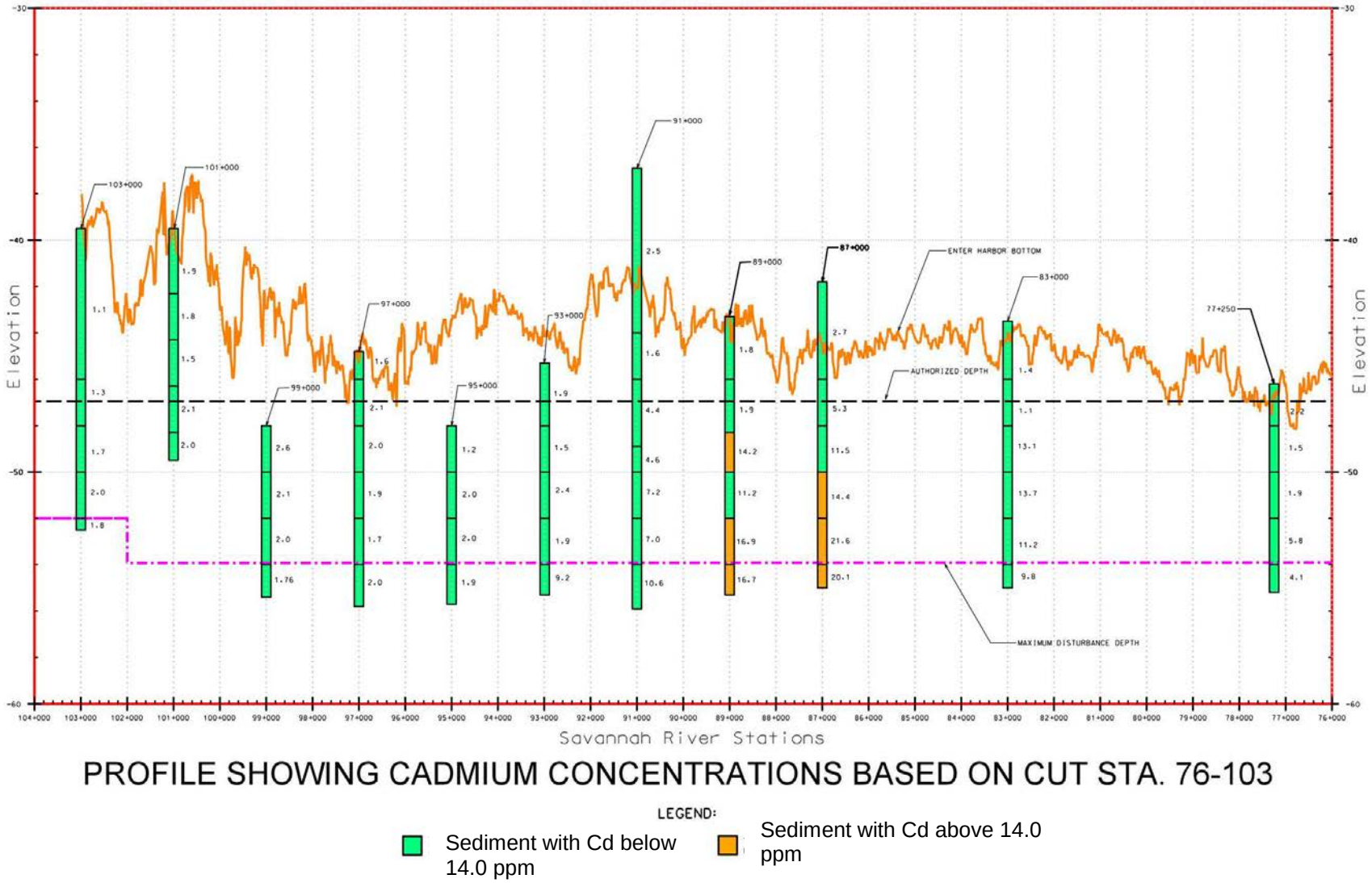


Figure 9: Cadmium in Sediment Samples from Stations 49+000 to 76+000



PROFILE SHOWING CADMIUM CONCENTRATIONS BASED ON CUT STA. 76-103

Figure 10: Cadmium in Sediment Samples from Stations 76+000 to 104+000

This approach was used in recognition that the sediments from the entire column would likely be removed at the same time when a hydraulic cutterhead dredge deepens the channel.

In Table 1, channel stations where sediment samples contain cadmium at 14.0 ppm or greater are shaded in orange. The analysis in the FEIS assumed that a boring represents the content of the sediments for a reach of the channel that extends 50% of the distance to the next boring upstream and 50% of the distance to the next boring downstream.

Table 1: SHEP Inner Harbor Sampling Locations			
0+250	30+000	50+000	83+000
2+750	32+000	52+000	87+000
10+000	34+000	54+000	89+000
16+000*	36+000	56+000	91+000
20+000*	38+000	58+000	93+000
24+000	40+000	60+000	95+000
25+282	42+000	62+000	97+000
26+000	44+000	65+000	99+000
26+500	46+000	70+000	101+000
28+000	48+000	77+250	103+000
* Additional locations sampled in August 2015. Boring locations that had at least one layer with Cadmium levels found to be ≥14.0 ppm			

The SHEP GRR/FEIS contained two separate estimates on the volume of sediment that would need to be managed for exposure to cadmium that exceed the risk-based criteria within the DMCAs:
1. The 2006 evaluations determined that sediments from Channel Stations 17+000 to 45+000 (28,000 channel feet, 4.5 million cubic yards (MCY) in situ) would require special management based on the average cadmium concentrations at each sampling station.
2. Appendix M of the 2012 FEIS determined that sediments from Stations 6+375 to 45+000, 51+000 to 57+000, and 80+125 to 90+000 (54,500 channel feet, 9 MCY in situ) would require special management based on including the sediments within the "disturbed" layers and the potential for deposition of cadmium-laden clay balls that may result from incomplete mixing of sediments during the dredging process at those sample locations that average less than 14 mg/kg but contain a layer that exceeds this limit. This quantity was based on the -48.0 feet MLLW alternative. The depth in the final selected plan was the -47.0 feet MLLW alternative.

During PED, CESAS reexamined the quantity of cadmium-laden sediments that would be dredged and require special handling using the most recent channel bathymetry/survey and information on the project. Additionally, alternate approaches were considered to verify the logic behind the identification of reaches where the

sediments would need special handling. These approaches are described in the following sections.

2.1.1 Authorized Channel Depth

The quantities in the SHEP EIS Appendix M (Sediment Quality Evaluation) were based on the 48-foot project alternative. The project design was refined after the bulk of that analysis was prepared and the 47-foot depth alternative was selected and authorized for construction. This EA uses the authorized depth of 47 feet below MLLW. Using the 48-foot depth overstates the quantity of cadmium-laden sediments that require special handling.

Determining Depth of Disturbance for Authorized Project:
The total required dredging depth within each reach of the channel is comprised of the following increments (Figure 11):

- Authorized navigation depth of channel: -47.0 feet MLLW
- Advance maintenance: varies based on reach (0, 2, 4, or 6 feet)
- Allowable overdepth: 2 feet (allowed for dredging inaccuracies)
- Depth of disturbance: non-pay sediments disturbed but not removed. This depth (approximately 3 feet when using a 30-inch dredge) is calculated based on a mixing zone below the cut depth that may become entrained with cadmium-laden sediments and, therefore, be deposited in a DMCA.

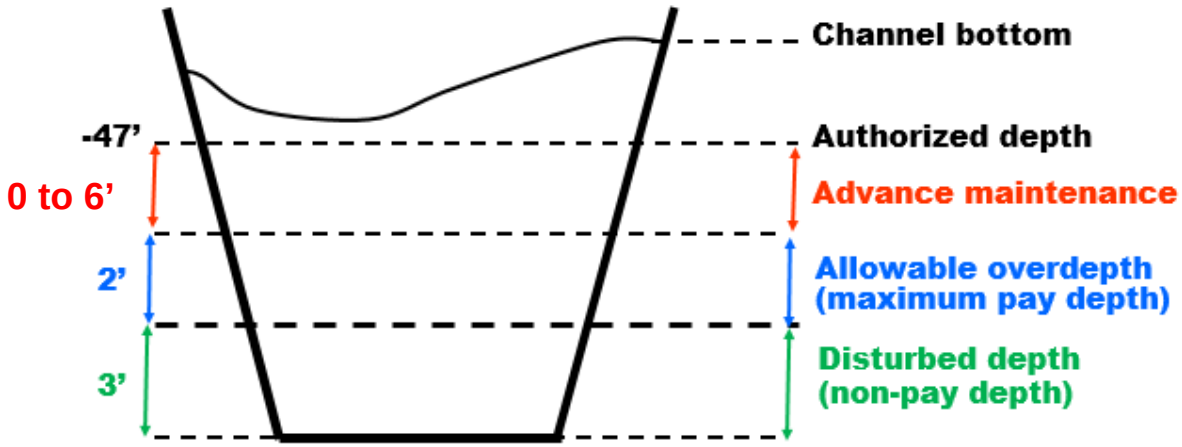


Figure 11: SHEP Inner Harbor Dredging Depth Increments

Table 2 shows the total depth for each reach of the inner harbor as authorized for construction.

Figure 12 shows the updated dredging quantities based on the ranges identified in the GRR and FEIS (Stations 6+375 to 45+000, 51+000 to 57+000, and 80+125 to 90+000) that required special handling. Using the 47-foot depth and the 2014 survey, the revised quantity is 12.6 MCY bulked.

Table 2: SHEP Inner Harbor Dredging Total Depth by Reach					
Reaches	**Authorized Depth***	**Advanced Maintenance#**	**Allowable Overdepth#**	**Depth of Disturbance#**	**Total Depth* of Impact**
0+000 to 24+000	47	2	2	3	54
24+000 to 35+000		4			56
35+000 to 37+000		6			58
37+000 to 70+000		4			56
70+000 to 102+000		2			54
102+000 to 103+000		0			52
*feet at MLLW, #in feet					

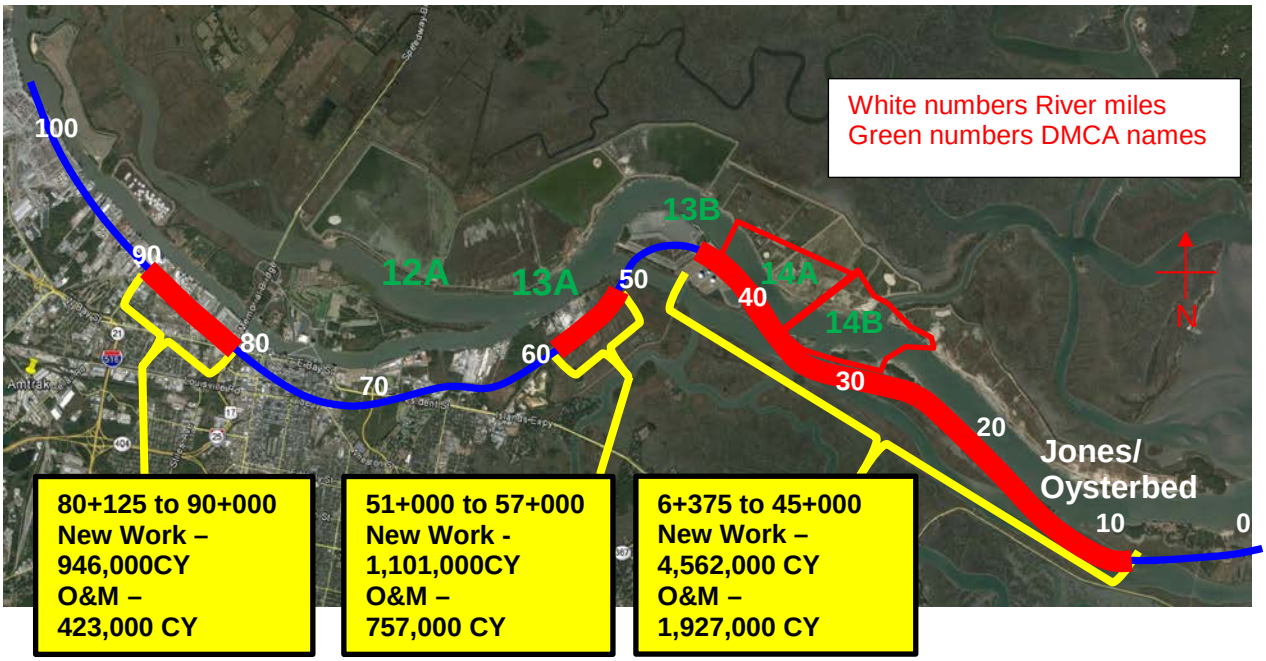


Figure 12: Location of Cadmium-Laden Sediment (CY in situ based on -47 foot and 2011 survey: New Work 6,609,000 & O&M 3,107,000 Total 9,716,000 in situ or 12,630,800 bulked)

A review of the channel geometry with respect to total disturbance depths shows that at Station 24+000 there is an allowable-overdepth transition. From Station 0+000 to 24+000, the allowable overdepth is 2.0 feet. At Station 24+000, the allowable overdepth increases to 4.0 feet upstream to Station 35+000. This transition was not considered in determining the initial ranges that require management; however, the 2015 re-evaluations (including new laboratory data at Stations 20+000 and 16+000) indicate that cadmium-laden sediments will not be encountered downstream of Station 24+000. This data (along with additional analyses discussed later) supports the conclusion that the materials from Station 6+375 to 24+000 do not require to be placed in DMCA 14A and managed as cadmium-laden.

2.1.2 Mathematical Averaging vs. Weighted Averaging

The SHEP EIS Appendix M used mathematical averages to determine the channel reaches that have average cadmium concentrations above 14.0 mg/kg. To determine a more representative bulk concentration consistent with mechanical compositing, weighted averages for each location were developed.

- Mathematical averaging of concentrations considers all sample sizes equal and leads to under-representation of thicker layers of soil and over-represents thinner layers.
- Weighting concentrations of portions of the sediment core to reflect the volume of sediment that each sample represents adjusts each sample interval as a percentage of the overall dredging prism; totaling the intervals results in a weighted average.
- Weighting results in an overall bulk concentration that is more representative of a fully homogenized sample from the full dredging prism. Since the sediments mix when excavated by a cutterhead dredge, this measurement more accurately reflects what is pumped into a DMCA.

CESAS calculated both mathematical average and bulk weighted average concentrations for the 47-foot project depth project for all 40 sediment sample locations in the Inner Harbor. A comparison between the mathematical averages and the weighted averages shows close correlation (Table 3). The mathematical average for the 48 and 47 foot channel depths show 11 samples that average over 14.0 mg/kg of cadmium.

Table 3: Mathematical Averaging vs. Weighted Averaging of Samples

Sample Location	Appendix M Mathematical Average (-48 foot)	Mathematical Average (-47 foot)	Weighted Average (-47 foot)
SH000+250	1.07	1.05	1.05
SH002+750	1.03	0.97	0.98
SH010+000	3.78	3.46	3.90
SH016+000*	0.46	0.35	0.46
SH020+000*	1.30	0.95	1.30
SH024+000	16.85	0.34/20.27**	0.33/12.785**
SH025+282	36.76	36.44	33.86
SH026+000	39.37	37.38	41.91
SH026+500	34.42	32.63	33.53
SH028+000	27.15	25.53	26.04
SH030+000	26.60	30.20	28.23
SH032+000	0.58	0.62	0.61
SH034+000	14.77	14.94	14.86
SH036+000	15.69	15.69	15.53
SH038+000	4.98	5.11	4.22
SH040+000	7.10	8.46	5.03
SH042+000	28.39	28.15	27.61
SH044+000	23.57	22.42	26.19

Table 3: Mathematical Averaging vs. Weighted Averaging of Samples			
Sample Location	**Appendix M Mathematical Average (-48 foot)**	**Mathematical Average (-47 foot)**	**Weighted Average (-47 foot)**
SH046+000	0.32	0.30	0.42
SH048+000	6.76	7.01	6.92
SH050+000	6.45	6.80	6.75
SH052+000	9.25	8.84	8.72
SH054+000	18.18	17.10	17.83
SH056+000	8.42	8.23	8.68
SH058+000	6.46	6.72	6.33
SH060+000	6.44	6.70	5.95
SH062+000	5.00	5.45	4.37
SH065+000	2.94	3.24	2.09
SH070+000	3.78	4.50	3.66
SH077+250	2.99	2.85	2.87
SH083+000	8.25	8.10	7.78
SH087+000	11.91	11.09	9.59
SH089+000	9.89	9.21	8.38
SH091+000	5.02	2.06	3.91
SH093+000	2.71	1.90	1.90
SH095+000	1.77	1.74	1.74
SH097+000	1.88	1.87	1.89
SH099+000	2.16	2.22	2.22
SH101+000	1.84	1.82	1.83
SH103+000	1.57	0.95	1.39
* Additional locations sampled in August 2015. **This location corresponds to a depth of disturbance transition. The first number is for the 54 foot depth the 2nd number is for a 56 foot disturbance.			

The use of mathematical average or bulk weighted average has no effect on the quantity of sediments that warrant special handling.

2.1.3 Clay Balls/Sediment Cohesion

Highly plastic clay sediments may form a ball shape (Figure 13) during the dredging and pipeline transportation process. During the SHEP EIS development, the following concerns were raised:

- Materials would be placed in the DMCA as “clay balls”.
- Cadmium is more strongly associated with the high-clay sediments.
- Clay balls would predominantly exceed the 14 mg/kg cadmium threshold.

Figure 13: Deposition of clay balls in 1994 during placement of channel deepening sediments on Tybee Island

In the GRR and FEIS, sediments at five locations (Stations 10+000, 52+000, 56+000, 87+000, and 89+000) did not exceed the 14 ppm cadmium threshold when averaged over the entire boring, but were included for special handling because an individual layer exceeds the 14.0 ppm threshold and was thought to possess the potential to form cadmium-rich clay balls within a DMCA.

The 2012 GRR/EIS included Station 83+000 in this group, but the District's 2015 reexamination of the cadmium concentration data identified an error in our previous analysis. Cadmium is not present over 14.0 ppm in any layer at that station. As a result, CESAS eliminated this station as requiring special handling in the analysis described in this EA.

The CESAS examined individual core samples (Table 4) and assigned a general sediment type to the sample based on the percent that passed through certain sieve sizes. Clay is defined as sediment finer than 0.002 mm. Sediment samples from Stations 10+000, 52+000, and 56+000 are made up of material that is less than 15% clays; therefore, they are not expected to form clay balls. Sediments samples from Stations 87+000 and 89+000 have layers that are more than 25% clay and could still require special handling based on the possibility of producing clay balls with a cadmium

concentration above 14.0 ppm. No data is available on the sediment type for Station 24+000, so the District continued to include that location in the group that require special handling.

Table 4: Potential Clay Ball Formation Location and Sediment Type							
Location	**Sample Interval (feet mllw)**	**Cadmium Concentration (ppm)**	**Natural Water %**	**Percent Fines (finer than 200 sieve - 0.075mm)**	**Percent Finer than 0.005 mm**	**Percent Finer than 0.002 mm (clay)**	**General Soil Type**
SH010+000	-46.4 to -48	19.200	21.8	21.7	13.6	13.0	Sand
SH024+000	-52 to -54	62.399	No Soil Data Available				
SH024+000	-54 to -55	57.852					
SH052+000	-48 to -50	18.714	53.5	40.9	11.6	7.5	Sand
SH056+000	-52 to -54	16.433	46.8	39.5	11.7	7.5	Sand
SH087+000	-50 to -52	14.408	57.5	57.3	33.2	29.0	Clay
SH087+000	-52 to -54	21.580	53.9	41.9	23.9	21.0	Sand
SH087+000	-54 to - 55	20.140	57.2	41.8	26.3	22.0	Sand
SH089+000	-48 to -50	14.172	47.4	88.2	44.4	38.0	Clay
SH089+000	-52 to -54	16.883	55.5	41.6	23.7	19.0	Sand
SH089+000	-54 to -55	16.683	55.4	59.4	25.5	22.5	Clay

Atterberg limit testing: Members of the project delivery team (PDT) continued to express concerns with the potential formation of clay balls and subsequent deposition within a DMCA as a clay ball (not as a fully slurried material), particularly from sediments between Stations 87+000 and 89+000. These concerns are based on observations during the 1994 harbor deepening. The new work sediments deposited on a beach during the 1994 project were from locations that contained high liquid-limit clays per USCS classification, were pumped relatively short distances (5,000 feet to 10,000 feet), and were not subject to mechanical handling by earth-moving equipment (prior to being photographed).

The new work sediments at Stations 87+000 (-50.0 feet to -52.0 feet) and 89+000 (-48.3 feet to -50.0 feet) exceed 25% clays based on the hydrometer analyses and the District continues to include them for special handling. In order to get a better understanding of behavior of sediment from these two locations, samples were submitted for determination of Atterberg limits. The samples submitted for analysis in 2015 were the same samples used for the initial analyses. The District retrieved them from storage at the Engineers Depot on Hutchison Island in Savannah, Georgia and shipped them to the Environmental and Materials Unit (EMU) in Marietta, Georgia for analyses.

As shown in Table 5, four samples were analyzed for their Atterberg limits: Stations 87+000(E), 87+000(G), 89+000(D), and 89+000(F). Samples from Stations 87+000(E) and 89+000(D) were classified as MH (Sandy Clayey Inorganic Silt High liquid-limit); samples from Stations 87+000(G) and 89+000(F) were classified as SM-H (silty sand with high liquid-limit).

Table 5: Atterberg Limits Determination Results												
		ASTM D422 Percent Passing Sieve								Atterberg Limits		
Boring	Sample	No. 4	No. 10	No. 20	No. 40	No. 60	No. 100	No. 140	No. 200	LL	PL	PI
SH087 (E)	446	100	99.6	98.4	97.8	96.5	92.2	75.5	57.3	172	62	110
SH087 (G)	448	100	99.9	99.4	98.8	98.0	92.4	68.5	41.8	92	45	46
SH089 (D)	439	100	98.2	97.4	97.2	96.8	95.5	92.4	88.2	176	75	101
SH089 (F)	441	100	99.9	99.0	98.1	99.6	89.2	66.0	41.6	102	48	54
Atterberg Limits: LL – Liquid Limit, PL – Plastic Limit, PI – Plastic Index												

During analyses of these samples, the materials Subject Matter Expert made the following observations:

> *"The jars were leftover samples from previous testing and contained some residual moisture within the specimens. The wet method of preparation was conducted by using the USACE blenderized technique. When blenderized, the samples dispersed and processed over the No. 40 sieve relatively easy. Clumping was not a problem with sample processing. When the slurry sample that passed the No. 40 sieve was placed on a Buchner funnel, it was pumped over a high density filter paper within a matter of hours. More difficult or fatter clay soils tend to take a complete day or multiple days to process over the filter paper, yet these samples processed faster than expected.*
>
> *Given the Silty classification of the soil, it should be relatively easy to fluidize, pump, and settle out these materials. The MH soils do hold some significant moisture; note the liquid limits. The as-received moisture of the samples was likely below that of the natural moisture due to long term storage, yet any drop in the collected moisture of these soils would not have affected the testing results."*

The results of these analyses, along with the behavior of the soils during test preparation, led to the conclusion that these soils should easily fluidize and mix during the dredging, pumping, and disposal process.

Predictive Modeling: After these results were presented to the PDT, the team examined a 1994 report on a study performed by the U.S. Army Engineer Waterways Experiment Station (currently known as the Engineer Research and Development Center (ERDC)). This report, titled "Hydraulically Transported Clay Balls," (Richter 1994), documented a study using manufactured soils, and simulated testing to determine pertinent characteristics of soils in order to predict the rate of degradation of clay balls during pipeline transport. The researchers used manufactured laboratory samples to test the behavior of materials with different geotechnical properties and develop a predictive model of how sediments can be expected to respond during the process of hydraulic dredging.

The PDT observed that the materials used in the laboratory study are somewhat different from the SHEP in-situ samples (manufactured vs. in-situ), but it believes they possess sufficiently similar geotechnical properties that the predictive models can be useful to understand how the SHEP sediments are likely to behave.

The District applied ERDC's predictive models, to SHEP sample 87+000(E), which exhibits the highest plasticity index (PI) of the four sediment samples recently tested. Using ERDC's predictive models, the PDT believes that the SHEP sediments represented by sample 87+000(E) will fully slurrify during their transport through a dredge pipeline and would not deposit in the DMCA as a clay ball. The District's analysis is summarized in Table 6.

Table 6: Predictive Model for Rates of Degradation (from "Hydraulically Transported Clay Balls")

Line	Explanation of data	SHEP Sample		Study Samples	
		E-1	E-2	Example 1	Example 2
a.1	in-situ dry density	65.4	65.4	68	85
a.2	plasticity index	110	110	30	50
b.	maximum dry density (estimated)	94	94	85.2	85
c.	relative compaction [(a.1/b)*100]	69.574	69.574	78.812	100
d.1	pipe size (feet)	2.5	2.5	1.33	1.33
d.2	effluent pumping rate (fluid and solid - gal/min)	26,480	26,480	4,000	4,000
d.3	convert gal/min to cf/sec	59.00627	59.00627	8.913333	8.913333
d.4	material production (cy/hr)	1,708	1,708	200	200
e.1	pipe area (square feet)	4.909	4.909	1.389	1.389
e.2	effluent average velocity	12.02066	12.02066	6.415745	6.415745
e.3	material average velocity	2.609632	2.609632	1.079688	1.079688
f.	relative velocity	9.411028	9.411028	5.336057	5.336057
g.	degradation rate by PI, (%/min)	12.38	4.79	13	2.2
h.1	Pipeline length (feet)	23,000	23,000	1,000	600
h.2	pipe length divided by material velocity	8,813.502	8,813.502	926.1937	555.7162
i.	total material transport time, minutes	146.8917	146.8917	15.43656	9.261937
j.	total material degradation, % of initial mass	**1,819**	**704**	**201**	**20**

This analysis indicates that any clay balls within the SHEP sediments represented by sample 87+000(E) should degrade from 700 to 1,800% of their initial mass during their expected 23,000-foot transport to the DMCA.

As part of a risk assessment, the team used these formulas to calculate the minimum distance that these sediments could be pumped before 100% degradation occurs. That distance was determined to range between 1,264 and 3,268 feet, depending on the parameters used. This risk assessment show that clay balls would deteriorate in a much shorter pipe length, thus creating a significant safety factor in the expected 23,000 foot transport to the DMCA.

In addition, some characteristics of dredging that would lead to clay ball degradation are not included in ERDC's 1994 study: destructive actions of a chisel-toothed cutterhead, impacts with the impeller blades on the ladder pump, impacts with the pipeline due to bends and elbows, additional impacts with impeller blades on booster pumps, additional impacts with other materials within the pipe slurry, dragging of clay balls along the bottom of the pipeline, and the erosive effects of a sediment-laden fluid moving faster than the clay balls. Each of these phenomena would lead to greater degradation rates of any clay balls that may be excavated from the river bottom and pumped to a DMCA.

Table 7 summarizes key parameters for the SHEP samples that could be expected to lead to under estimation of degradation rates.

Table 7: Comparison of Parameters that Under Estimate Degradation

Parameter	SHEP Samples	Study Samples
Sample purity (% clay)	41.6 – 88.2	100
Sample density, relative compaction (%)	56 - 82 (Rc of 70 evaluated in predictive model due to highest PI)	80, 100
Natural moisture content (%)	47.4, 55.5, 57.2, 57.5	28.9, 30.5
Sample condition and shape	Hackly, random	Smooth, consistent
Simulation parameters	Will experience cutterhead, main pump, booster pump, pipeline bends, pipeline elbows, and slurry surge effects.	Evaluated degradation due to linear pipeline transport only.
Accumulative effects	Will be experienced throughout the dredging process.	Not experienced in predictive model.

Based on these additional levels of underestimation of degradation rates, there is a significant level of assurance that cadmium-laden clay balls from channel Stations 85+000 to 90+000 would not deposit in a DMCA as long as the pipe distance is more than 4,000 feet.[2]

2.1.4 Conclusion of Sediment Quantity Analysis

Table 8 and Table 9 present the conclusions of the District's recent Sediment Quantity Analysis. These evaluations conclude that 4.4 million CY bulked of cadmium-laden sediments from Station 24+000 to 31+000, 33+000 to 37+000, 41+000 to 45+00, and 53+000 to 55+000 (17,000 feet) should be disposed under the special management procedures (Figure 14).

If the quantity of cadmium-laden sediments is greater than approximately 5 million CY bulked, DMCA 14A and a portion of DMCA 14B would be required.

[2] Blue box stresses the importance of this items and it risk level.

Table 8: Conclusion of Sediment Quantity Analysis		
Method	**Conclusion**	**Recommendation**
Use 47 foot Authorized Channel Depth and 2014 survey	Using the 48-foot depth vs. 47-foot depth overstates the quantities. Use updated surveys.	District would use the dredging quantities based on the authorized 47-foot channel and updated channel surveys.
Use Weighted Averaging	Station 24+000 drops below the 14.0 ppm trigger, but still has a potential issue with clay ball production.	District proposes to use, but no effect on the quantity of sediments for special handling
Reduce level of Advanced Maintenance	There are two sample locations (Station 24+000 and 40+000) where reducing the advanced maintenance by 2 feet would eliminate sediment layers containing cadmium above 14.0 ppm.	District proposes to partially use. No Advance Maintenance depths would be changed because high shoaling rates require use of advance maintenance to effectively maintain navigation depths. Reexamination of the transition at Station 24+000 shows that downstream sediments would not need special handling
Reduction of Depth of Mixing	There are two sample locations (Stations 24+000 and 40+000) where reducing this disturbance depth would reduce the amount of cadmium-laden sediments that would be mixed with the cleaner upper layers. If the lower layer were not disturbed, the weighted average cadmium concentration for the whole sample may be below the 14.0 ppm threshold.	District proposes not to use. District Construction and Operations staff believe that a contract that limits the size of the dredge to below a 30-inch dredge is likely to result in significantly higher construction costs.
Clay Ball Analysis	Sediment samples from Stations 10+000, 52+000, and 56+000 are comprised of material that is less than 15% clays; therefore, they are not expected to form clay balls. Sediment samples from Stations 87+000 and 89+000 have layers that are more than 25% clay, but using the formula in the report titled “Hydraulically Transported Clay Balls” any clay balls that form would degrade over the 23,000 foot pumping distance.	District proposes to use. With the identification of Station 10+000, 52+000, and 56+000 as not likely to produce clay balls; Stations 87+000 and 89+000 as degrading any clay balls that may form if they are pumped more than 4,000 feet; and reexamination of the transition at Station 24+000, sediments between Stations 6+375 to 24+000 are identified as not requiring special handling
Reexamination of Stations 80+125 to 85+000	Station 83+000 was originally included as a site from which clay balls could have high cadmium levels. A reexamination of the cadmium concentration data eliminated this station because there is no layer over 14.0 ppm.	District proposes to eliminate this range from requiring special handling. Since the weighted average of this station is above 4.0 ppm, it would not be used as cover/cap material.

Table 9: Inner Harbor Cadmium Dredging (Designated for DMCA 14A Disposal)						
Beginning Station	**Ending Station**	**Length (feet)**	**Volume of Cadmium Sediments (cy)**	**Volume of O&M Sediments (cy)**	**Total Volume (cy)**	**Total Bulked Volume (cy)**
24+000	31+000	7,000	1,018,067	424,203	1,442,270	1,874,951
33+000	35+000	2,000	222,134	86,535	308,669	401,270
35+000	37+000	2,000	228,791	156,950	385,741	501,463
41+000	45+000	4,000	531,988	219,211	751,199	976,559
53+000	55+000	2,000	396,830	115,048	511,877	665,440
Total		**17,000**	**2,397,810**	**1,001,947**	**3,399,756**	**4,419,683**

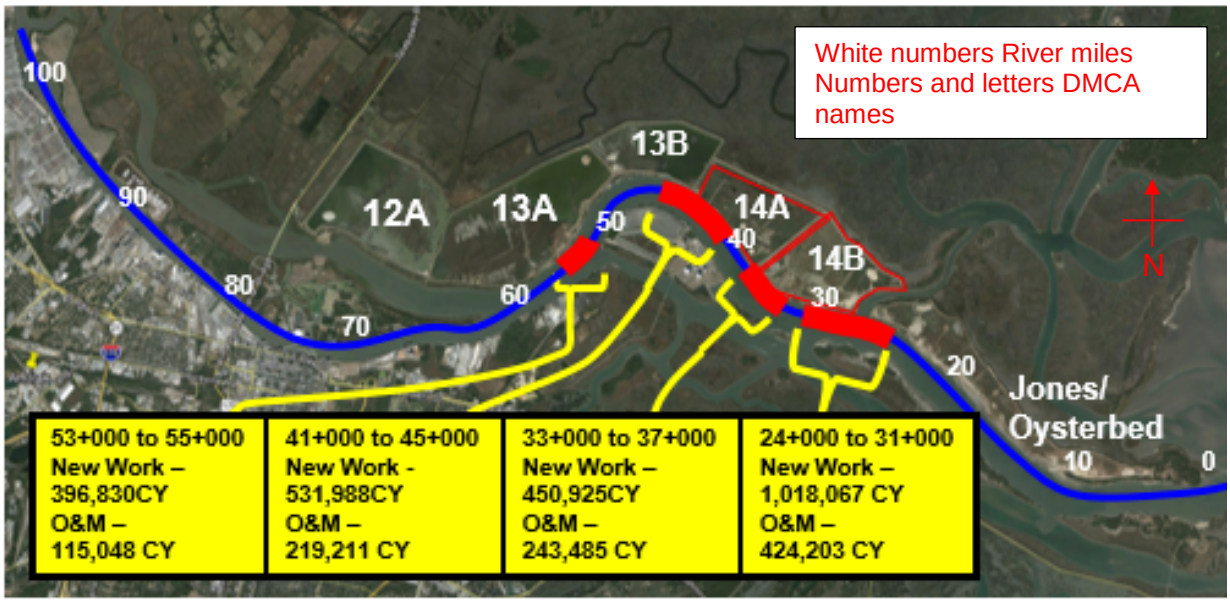


Figure 14: Approximate Location of Cadmium-laden sediment requiring Special Handling.

2.2 Cadmium Placement and Handling Measures

In response to the findings described in Section 1.2, a series of alternatives were developed that would either modify the sediment placement plan or strengthen the DMCA dikes. The overall goal of all the plans was to continue to meet the intent of isolating the cadmium-laden new work deposited sediments from contact with bird populations. This includes keeping the deposited sediment from drying until it is covered with cleaner sediments.

2.2.1 Initial Array of Alternatives

Table 10 describes ten alternatives the District considered in its initial array, as well as the rational for eliminating or carrying each alternative forward.

Table 10: Initial Screening of Alternatives			
Alternative	**Description**	**Eliminated**	**Rational**
Alternative 1 – No Special Handling	This alternative would use typical dredging and handling techniques for placement of all the SHEP new work sediments, including the Cadmium-laden sediments. The sediments would be placed in the closest DMCA. The deposited sediments would be allowed to dry out and would not be capped. Compensatory mitigation would be required for impacts to wildlife exposed to the cadmium-laden sediment.	Yes	This alternative does not meet the intent of the GRR/FEIS to limit contact with wildlife and would require compensatory mitigation. Larger numbers of wildlife would be exposed to the cadmium-laden sediments for a longer duration if they are not handled in a special manner and reused for dike raising material in all DMCAs. The cost of the mitigation has not been calculated at this time. This alternative was screened out based on the continued exposure of wildlife to cadmium and the expected high cost of mitigation.
Alternative 2/NAA – 2012 SHEP GRR/FEIS Selected Plan	This alternative is the sediment placement plan described in the 2012 SHEP GRR and FEIS and would place all cadmium-laden sediments in DMCAs 14A and 14B. The sediment would be deposited so that it remains covered with water until after placement of the cover/cap is complete. The cadmium-laden sediments would not be allowed to dewater and/or desiccate until after placement of the cover/cap.	No	After coordination with the dredging industry and additional information became available on the foundation and stability of the DMCA 14A and 14B dikes, CESAS Engineering determined that there would be a very high risk of dike failure if the new work sediments are deposited in the DMCAs as described in the GRR and FEIS. That failure risk is primarily the result of stability issues associated with the dike foundation. If this predicted failure occurs, cadmium-laden sediments would either flow into adjacent wetlands or into a river. This would violate existing environmental clearances for SHEP, as well as potentially flowing onto non-project lands. This alternative has a high risk of failure based on updated engineering analyses. If the failure occurs, there is a high potential for environmental and real estate damage to occur. This alternative is carried forward because it is the authorized alternative (No Action alternative).

Table 10: Initial Screening of Alternatives			
Alternative	**Description**	**Eliminated**	**Rational**
Alternative 3 – Modified DMCAs 14A and 14B Dike Design to Comply with GRR/FEIS	This alternative would place all cadmium-laden sediments in DMCAs 14A and 14B. The sediment would be deposited so that it remains covered with water until after placement of the cover/cap is complete. The cadmium-laden sediments would not be allowed to dewater and/or desiccate until after placement of the cover/cap. This alternative includes actions to improve the strength of the dike foundations. Due to the present low foundation strength, the dikes would have to be modified to be able to hold the required depth of water. This could be done by using staged construction to increase the width of the counterweight to the inside of the dike in combination with multi-layer geotextile. This would be followed by the dike raising using soil admixtures to improve strength. A geomembrane would be used on the inside slope of the dike and counterweight to stop erosion due to wave action and increase the seepage path. An alternative method to strengthen the dike would be the use of soil replacement methods for the unsuitable foundation materials. The method envisioned would be cased replacement due to issues with excavation of the existing foundation material. This would be followed by reconstruction of the dike/raising.	Yes	An initial cost for complete foundation improvements of DMCA 14A is $351M. The cost to improve the foundations at both DMCA 14A and 14B is estimated at $627M. The cost to perform this work at DMCA 14A is close to half the approved cost of the entire SHEP project. The cost would approach that of the entire project if work at both DMCA 14A and 14B are included. If only the back dike of DMCA 14A is strengthened and risk is assumed for the cross and front dikes, the cost would be reduced to $58M. The partial dike improvement alternative cost is approximately an order of magnitude above the originally estimated cost to raise the DMCA 14A dikes. The risk due to environmental impacts from failure of the cross and front dikes was determined to be lower and more than acceptable. This alternative should be screened out as not being viable due to cost, but is kept as a baseline for costs to implement inundation method described in the GRR/FEIS.
Alternative 4 - Pump Cd Material into Modified Geo-Textile Tubes	This alternative would use oversized geotextile tubes to contain all cadmium-laden sediments. The tubes would be located in DMCA 14A and would not require a cap due to the isolation provided by the geotextile. This alternative is based on a project by ERDC to contain contaminated sediments.	Yes	The geotube alternative was estimated to cost $283M for 8 mcy bulked of sediments and $600M for 17 mcy sediment bulked. This alternative was screened out as not being viable due to cost.

Table 10: Initial Screening of Alternatives			
Alternative	**Description**	**Eliminated**	**Rational**
Alternative 5 – Alternative Disposal Site – LNG or other sites not subject to mitigation	This alternative would use the LNG sediment disposal sites (Figure 1) across the Savannah River channel from DMCA 14A. The LNG facility has two disposal cells that total approximately 220 acres. The volume that could feasibly be placed in one cycle at LNG would be approximately 1.6-1.8 mcy bulked. Capping of the LNG cells or compensatory mitigation would not be required for impacts to wildlife because the LNG disposal areas are drained as soon as possible and are not operated to provide bird habitats.	Yes	Due to the small size of LNG sediment disposal sites, there would be limited sediment storage capacity. To fit all SHEP new work sediments material in the LNG site would require between 4 and 10 dike raises. That effort would far exceed the time line of the project and would significantly raise dredging costs. This alternative was screened out as not being viable due to the size of the area and cost.
Alternative 6 – Combination of LNG site and DMCAs 14A and 14B (to reduce quantity in DMCAs)	This alternative would use the LNG disposal sites as a supplemental site to reduce the sediment storage volume requirements at DMCAs 14A and 14B. Because of the low DMCA dike foundation strengths, Savannah District typically limits the height of a dike raising to 5 feet. Due to the desired limited construction time frame, performing the dredging and sediment deposition over many years to allow multiple dike raisings is not acceptable. Therefore, a scenario is needed that allows the dredging and sediment deposition to occur within a limited time frame. This alternative may allow for use of just DMCA 14A with only 2 dike raisings. Compensatory mitigation may be required for impacts to wildlife that are exposed to the cadmium-laden sediments that is not capped.	Yes	Use of the LNG sediment disposal sites may be viable if there is less than a million cubic yards of sediment remaining to be deposited after a first filling cycle of DMCA 14A or if DMCA 14A could be limited to one raising. Depending on the actual placement method (Alternative 1, 9 or 10) in the DMCAs mitigation, may or may not be needed. Fewer wildlife resources use the LNG disposal sites and those sites are drained as soon as sediments are deposited, resulting in minimal value of that site to birds. Therefore, no mitigation costs would be expected for SHEP use of those sites. Water quality standards require turbid water within a DMCA to be held until the clarity improves and any contaminants drop out. Due to the size and configuration of the LNG sediment disposal sites, the residence time of the water is short. Meeting the water quality standards with use of a 30-inch pipeline dredge may limit their productivity caused by periodic shutdowns to allow the sediments to sufficiently clarify. These shutdowns would significantly drive up the price of dredging the cadmium-laden sediments. This alternative was screened out due to potential water quality issues and cost.

Table 10: Initial Screening of Alternatives			
Alternative	**Description**	**Eliminated**	**Rational**
Alternative 7 – Offshore disposal (ODMDS)	This alternative would place the cadmium-laden sediments in the Savannah Ocean Dredged Material Disposal Site instead of in DMCAs 14A and 14B.	Yes	The placement of inner harbor new work sediments in the ODMDS was deemed unacceptable due to level of cadmium (0.04 ppm) in those materials. This material most likely would not meet the requirements of Section 103 of Marine Protection, Research, and Sanctuaries Act (MPRSA). This alternative was screened out as not being viable due to environmental factors.
Alternative 8 – Placement in the Sediment Basin upstream of the weir and DMCAs 14A and 14B	This alternative would be to place the cadmium-laden sediments from Station 80+125 to 90+000 in the Sediment Basin instead of placing them in DMCAs 14A and 14B. A rock weir and fill area are planned as part of the Sediment Basin component of SHEP. Some sediments were already planned for placement in the area just upstream of the rock sill as part of SHEP and the remainder of the Sediment Basin would be allowed to fill through natural processes. This alternative would allow for the deposition of approximately 1.37 mcy bulked of the cadmium-laden sediments.	Yes	The sediments to be used as fill for the submerged berm in the Sediment Basin under SHEP are required to be 75% sand with cadmium levels below 0.04 ppm. Of the cadmium-laden sediments, only those near Station 10+000 meet the grain size standard. The placement of cadmium-laden sediments in the Sediment Basin was deemed unacceptable due both the percent grain size and their level of cadmium. This alternative was screened out as not being viable due to environmental factors.

Table 10: Initial Screening of Alternatives			
Alternative	**Description**	**Eliminated**	**Rational**
Alternative 9 – Finger Dikes inside DMCAs 14A and 14B (Place and Cap by specified locations)	This alternative would use traditional dredging methods to place cadmium-laden sediments in the DMCA, but use finger dikes to keep the deposited sediment in specified areas that can be covered relatively quickly and kept wet. This approach would use a combination of geotextiles and earth fill to create 'finger dikes' within the DMCA as part of the 2nd required dike rising. These areas would essentially create smaller impoundment areas within the DMCA that could be worked and covered in smaller increments of time to limit exposure to the birds. Based on average production rates of the expected 30-inch pipeline dredge, 50-acre areas would require about two weeks to fill 5 feet deep and a 75-acre area would require about 3 weeks to fill to a 5 foot depth. Based upon the size of DMCA 14A, this alternative breaks the site into 10 cells, which would average 60-65 acres in size and two cells in the back of 14B. These cells would be capped with clean sediment material as soon as possible. This alternative uses one dredge that would alternate between the cadmium-laden sediment the clean cap sediments. This alternative requires 2 moves of the dredge for each cell. The use of two dredges simultaneously one for the cadmium-laden sediment and one for the cap was considered, but determined to be too costly because one would be on standby for significant time. No bird abatement plan is included with this alternative. The PDT examined refinement opportunities to reduce overall exposure to the cadmium-laden sediments. The following methodologies were discussed: 1. Use low ground pressure bulldozers with GPS to allow movement of sediments deposited at the head section to minimize the time between pumping and leveling the sediments. 2. Use sprinklers on the areas where the sediments have been leveled until a permanent cover/cap can be placed. 3. Use a membrane over the leveled areas until a permanent cover/cap can be placed.	No	This alternative meets the intent of the GRR/FEIS to limit contact with wildlife. No additional mitigation (No Bird Abatement Plan) should be needed depending on the final construction methodologies selected. This alternative will be carried forward for further analysis.

Table 10: Initial Screening of Alternatives			
Alternative	**Description**	**Eliminated**	**Rational**
Alternative 10 – No Finger Dikes, Low Level Inundation, then Cover/Cap, with Wildlife Mitigation	This alternative would use typical dredging and handling techniques for placement of the cadmium-laden sediments in DMCAs 14A. The deposited sediments would be placed in single layers and be kept moist by placing stop logs in the weirs to maintain the water height just below the placement height of the dredged material. After sediment placement is finished within a DMCA, the height of the stop logs would be increased to entirely flood the site. This layer would then be capped with a clean (below 4.0 ppm) two foot cover/cap of material per the FEIS. Compensatory mitigation could be required for the impact to wildlife exposed to the deposited sediments during placement of the cadmium-laden sediment until flooding or covering occurs. If it is determined that flooding of the site after placement and before covering/capping cannot occur, the amount of compensatory mitigation would be greater due to the increased duration of impacts. During this process and prior to final covering/capping, various methods to reduce uptake of the cadmium by wildlife (Bird Abatement Plan) will be used. The cover/cap will come from new work material if available, but O&M sediments from the next dredging cycle (expected within 24 months) could supplement the new work cover.	No	This alternative meets the intent of the placement design approved in the GRR/FEIS to limit contact with wildlife. This approach provides the most efficient engineering placement methods without risking dike failure. Mitigation actions (Bird Abatement Plan) would be needed to minimize potential impacts to birds. The costs for that mitigation would depend on the amount of time the deposited sediments are available to wildlife. This alternative will be carried forward for further analysis.

2.2.2 Final Array of Alternatives

Two alternatives to the proposed action (Alternative 10) were considered in detail. These alternatives are: No-action (FEIS Plan), and the use of finger dikes (Alternative 9) to keep the deposited sediment in specified areas that can be covered relatively quickly and kept wet. The proposed action is Alternative 10 and is described in detail in Section 1.1 of this document.

2.3 No Action Alternative (FEIS Plan).

The NAA is the sediment placement plan described in the 2012 SHEP GRR and FEIS (FEIS Plan) in Section 5.04.2.2 of the FEIS, and Appendix M Section 7. The FEIS Plan would place all cadmium-laden sediments in DMCAs 14A and 14B. The sediment would be deposited so that it remains covered with water until after placement of the cover/cap is complete. The cadmium-laden sediments would not be allowed to dewater and/or desiccate until after placement of the cover/cap.

Due to the draft of the floating barge and its discharge equipment onboard, there is a need to hold 4-6 feet of water in the DMCA above the level of sediment placement. Both DMCAs 14A and 14B would have to be used in an attempt to reduce the risk of dike failure. In DMCA 14A, the counter weight, and back dike would have to be elevated. In DMCA 14B, the back dike would have to be elevated. The risk of dike failure would shift in time from when the cadmium sediments are deposited to when the covering/capping sediments are deposited stage if four feet of water is used. That shift would occur when the sediment and water level needed to float the barge for the head section reaches the top of the dike's counter weight. If the contractor uses six feet of water, the risk of failure would remain during placement of the cadmium-laden sediments.

2.4 Finger Dike Alternative (Alternative 9).

Under this alternative, finger dikes would be constructed to keep the sediment in specified areas that can be covered relatively quickly and kept wet. This approach would use a combination of geotextiles and earth fill to create 'finger dikes' within the DMCAs 14A and 14B as part of the 2nd required dike rising. These areas would essentially create smaller impoundment areas within the DMCAs that could be worked and covered in smaller increments of time to limit exposure to the birds. Based on average production rates of the expected 30-inch pipeline dredge, 50-acre areas would require about two weeks to fill 5-feet deep and a 75-acre area would require about 3 weeks to fill to a 5-foot depth. Based upon the size of DMCA 14A, this alternative would break the site into 10 cells, which would average 60-65 acres in size. These cells would be covered/capped with clean sediment material as soon as possible. This alternative assumes one dredge that would alternate between the cadmium-laden sediment and the clean covering/cap sediments. This alternative requires 2 dredge moves for each cell. No bird abatement plan is included with this alternative.

If sufficient sediment material is mined from inside DMCA 14A to build the finger dikes, there may be enough capacity for all of the Cadmium-laden sediment to be placed in DMCA 14A. If not, both DMCAs will have to be used and covered/capped. Based on

recent topographic survey data, all of DMCA 14A and part of 14B (Figure 15) would be required. This would increase the cost of this alternative. The alternative would require splitting the back side of DMCA 14B with another dike (into two cells) to contain the material and allow for settling.

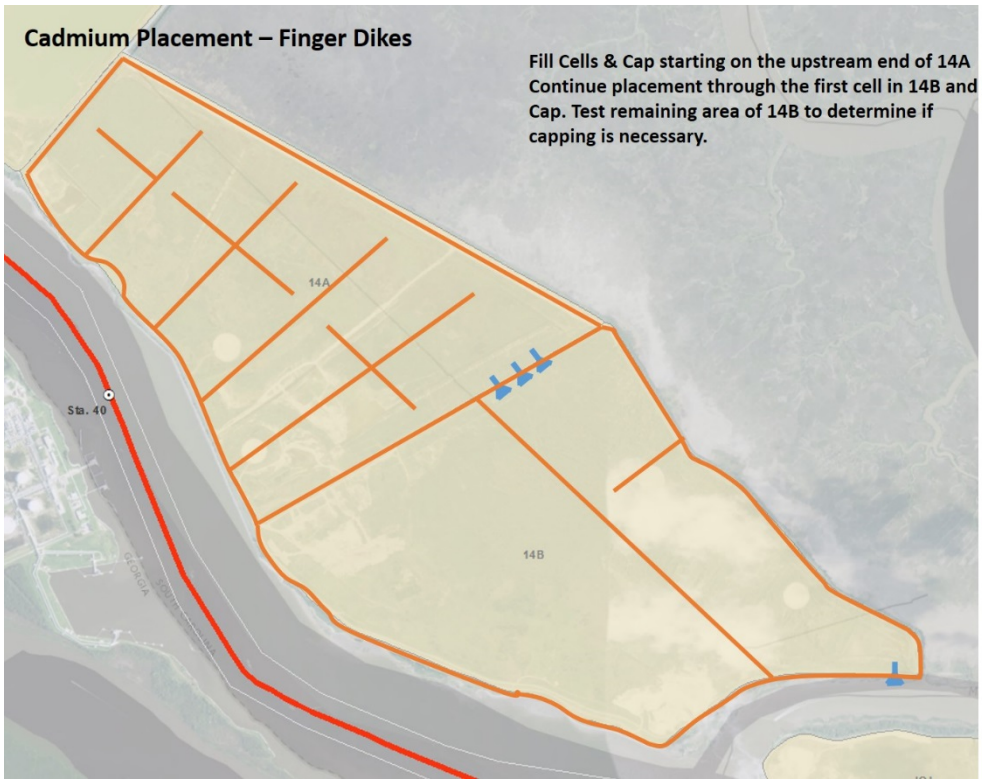


Figure 15: Alternative 9 Finger Dikes

3.0 Affected Environment

3.1 General

The affected environment is described in detail in Section 4.0 of the FEIS. The method of dredging has not changed, therefore this document does not describe any of the resources that could be affected by the dredging operation.

Seven existing upland Confined Disposal Facilities (CDFs) are located along the northern border of the channel along much of its length. All of the CDFs are diked for deposition of dredged sediments; therefore, most of their terrestrial habitats are maintained in an early stage of succession. Salt marsh borders most of these CDFs and mainland in the project area. Additional information in this section describes the resources that could be affected by placement of sediments in DMCAs 14A and 14B (Figure 5) only. DMCA 14A and 14B are 815 and 765 acres in size, respectively.

3.2 Relevant Resources

This section contains a description of relevant resources that could be impacted by the project. SHEP FEIS (2012) and all pertinent information is hereby incorporated by

reference. The important resources described in this section are those recognized by laws, executive orders, regulations, and other standards of National, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. The following resources have been considered and found to not be affected by the alternatives under consideration: Bottomland Hardwood Forest, Water Bodies, Socio-Economic, Environmental Justice, and Recreational Resources.

3.2.1 Wetlands

Section 4.08 of the FEIS describes the wetlands found in the SHEP area. Estuarine emergent wetlands can be found adjacent to, but outside the northern dike of DMCAs 14A and 14B. Because of the use and management of DMCAs 14A and 14B, wetlands do not form on the inside of the dikes.

3.2.2 Aquatic Resources /Fisheries

The habitat for aquatic resources in DMCAs 14A and 14B are very limited and transient by the nature of what the area is used for and how it is managed. The benthic communities are early successional and typically do not develop into a productive and diverse community before they are dried out. The water column is primarily used by insect larvae. Reptiles (turtles and alligators) and amphibians (frogs and salamanders) can be found using flooded areas.

3.2.3 Essential Fish Habitat

Section 4.05 of the FEIS describes the Essential Fish Habitat (EFH) found in the SHEP area. While EFH is not present within the DMCAs, EFH adjacent to DMCAs 14A and 14B are estuarine emergent wetlands, intertidal flats, and estuarine water column.

3.2.4 Terrestrial Resources

Section 4.07.4.1 of the FEIS describes the flora of the DMCAS. These are dominated by common reed (*Phragmites communis*), broundsel (*Baccharis halimifolia*), *Tamarisk* species, and other early successional species.

3.2.5 Wildlife

Section 4.07.4.2 to 4.07.4.7 of the FEIS describes the flora including birds of the DMCAS. The following is an updated list of migratory birds that have been seen in the DMCAs (based on monitoring for the Long Term Management Strategy (LTMS) of the DMCAs): American kestrel, American bittern, bald eagle, black rail, black skimmer, Chuck-will's-widow, common ground-dove, gull-billed tern, Henslow's sparrow, LeConte's sparrow, least bittern, lesser, yellow legs, loggerhead shrike, marbled, godwit, Mississippi kite, Nelson's sparrow, painted bunting, peregrine falcon, prairie warbler, prothonotary warbler, red knot, saltmarsh sparrow, seaside sparrow, sedge wren, short-billed dowitcher, short-eared owl, wallow-tailed kite, wimbrel, Wilson's plover, and wood thrush.

3.2.6 Threatened And Endangered Species

Section 4.09 of the FEIS describes the threatened and endangered (T&E) species that could be found in SHEP area. An updated list (Table 11) for DMCAs 14A and 14B was

generated using the Information for Planning and Conservation (IPAC) website (https://ecos.fws.gov/ipac/). For information on the species visit the species profile in Table 11.

3.2.7 Cultural Resources

Section 4.10 of the SHEP FEIS defines the Area of Potential Effects for SHEP and also identifies previously disturbed areas that require no additional investigation. The existing dredged sediment placement sites are listed as previously disturbed requiring no further investigation. Justification for eliminating further work is based on the depth of overburden, which may be 30 feet or more.

Six historic sites have been recorded in the riverbank near DMCAs 14A and 14B. One site, a small flat boat, was determined potentially eligible for the National Register of Historic Places. There are no recorded sites within DMCA 14A or 14B, but the sites have high probability (Seramur et al, 2010) to contain historic and prehistoric intact buried cultural horizons below the deposited dredged material based on research conducted for GA DOT in 2009. Researchers reviewed a 1937 aerial photograph of what is now DMCAs 14A and 14B and identified several possible hammocks across the area. Features within the disposal areas are similar to those where prehistoric sites have been recorded and DMCAs 14A and 14B are classified as having a high probability to contain historic and prehistoric intact buried cultural horizons below the deposited dredged material.

3.2.8 Air Quality

Section 4.03 of the FEIS describes the air quality found in the SHEP area. Jasper County, the location of DMCAs 14A and 14B, is in compliance with the National Ambient Air Quality Standard based on South Carolina Department of Health and Environmental Controls air quality website.

3.2.9 Water Quality

Section 4.02 of the FEIS describes the water resources found in the SHEP area.

Table 11: **Threatened and Endangered**					
Common Name	**Scientific Name**	**Status**	**Critical Habitat Designated**	**Species Profile**	**Found in or adjacent to DMCAs 14A and 14B**
Frosted Flatwoods Salamander	*Ambystoma cingulatum*	T	Y	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=D013	Not documented in or adjacent to DMCA
Kirtland's Warbler	*Setophaga kirtlandii*	E	N	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B03I	Not documented in or adjacent to DMCA
Piping Plover	*Charadrius melodus*	T	Y	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B03I	Rare
Red-cockaded Woodpecker	*Picoides borealis*	E	N	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B04F	Not documented in or adjacent to DMCA
Wood Stork	*Mycteria American*	T	N	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06O	Seasonally
Red knot*	*Calidris canutus rufa*	T	N	https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B0DM	Rare
Shortnose Sturgeon	*Acipenser brevirostrum*	E	N	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E00B	In river adjacent to DMCAs
Atlantic Sturgeon	*Acipenser Oxyrinchus oxyrinchus*	E	Proposed	http://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E0A7	Not documented in or adjacent to DMCA
American Chaffseed	*Schwalbea americana*	E	N	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2I4	Not documented in or adjacent to DMCA
Canby's Dropwort	*Oxypolis canbyi*	E	N	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2EL	Not documented in or adjacent to DMCA
Pondberry	*Lindera melissifolia*	E	N	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2CO	Not documented in or adjacent to DMCA
West Indian Manatee	*Trichechus manatus*	E	Y	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A007	In river adjacent to DMCAs
Kemp's Ridley sea turtle	*Lepidochelys kempii*	E	N	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C00O	Not documented in or adjacent to DMCA
Leatherback sea turtle	*Dermochelys coriacea*	E	Y	http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C00F	Not documented in or adjacent to DMCA
*Red knot has been seen at the DMCAs but did not appear on the IPAC search.					

4.0 ENVIRONMENTAL CONSEQUENCES

Environmental Consequences of SHEP are described in Section 5.00 of the FEIS. There are no change in impacts from dredging, placement of non-cadmium-laden sediments or any of the approved mitigation features.

4.1 Wetlands

Future Conditions with No Action (FEIS Plan)

With implementation of the FEIS Plan (NAA), there is a high risk of direct impact to adjacent wetlands if the dike fails due to the method of placement. Up to 4.4 MCY of cadmium-laden sediments and approximately 2,000 acre feet of water would flood out of the DMCAs and cover existing wetlands. Approximately 250 acres (based on volume of water and material in the DMCA) of wetlands could be covered with sediment, ranging in thickness from a few inches up to 5 feet. This is a change from what is in Section 5.01 of the FEIS where the placement of dredged sediments in a DMCA was not expected to impact wetlands. If recovery of the cadmium-laden sediments is deemed necessary, additional impacts to wetlands could occur during clean up.

Future Conditions with the Finger Dike Alternative or the Proposed Action

With implementation of either the Finger Dike Alternative or the proposed action, no additional impact to wetlands will occur. This is consistent with the impacts that were described for the plan selected in the FEIS.

4.2 Aquatic Resources/Fisheries

Future Conditions with No Action (FEIS Plan)

With implementation of the FEIS Plan (NAA), there is a high risk of direct impact and indirect impacts to aquatic resources using the wetlands next to the dike if that dike fails as a result of the sediment placement. Some aquatic species would be buried, while others would be displaced. The temporary turbidity plume would impact filter feeding mollusks and sight feeding fish. This is a change from what is in Sections 5.03 and 5.17 of the FEIS, where the placement of dredged sediments in a DMCA was not expected to adversely impact aquatic resources and fisheries.

Future Conditions with the Finger Dike Alternative or the Proposed Action

With implementation of the Finger Dike Alternative or the proposed action, the impact to aquatic resources would be the same as those described for plan selected in the FEIS. There is a low risk of direct or indirect impacts to aquatic resources using the wetlands next to the dike since dike failure is not expected.

4.3 Essential Fish Habitat

Future Conditions with No Action (FEIS Plan)

With implementation of the FEIS (NAA), there is a high risk of direct impact to adjacent EFH (Estuarine Emergent Wetlands, Intertidal Flats, and Estuarine Water Column). The existing estuarine Emergent Wetland and Intertidal Flats could have an additional 5 feet of sediment placed on them if a dike fails. The existing marsh elevation adjacent to the back dike of DMCA 14A and 14B ranges in height from approximately 5 feet to -2 feet Mean Low Water (MLW). Depending on the amount and volume of sediments that escape, and where it settles, some of the wetlands could be above the normal high tide (8 feet MLW), but would be expected to be below the Spring High tide (10 feet MLW). This could reduce the amount of EFH long term. The impact to Estuarine Water Column from the turbidity plume would be temporary and would last only a few tidal cycles. This is a change from what is in Section 5.14 of the FEIS, where the placement of dredged sediments in a DMCA was not expected to adversely impact EFH.

Future Conditions with the Finger Dike Alternative or the Proposed Action

With implementation of the Finger Dike Alternative or the proposed action, the impact to EFH would be the same as those described originally for the plan selected in the FEIS (Table 4-7 and Section 5.14). There would be a low risk of direct or indirect impacts to EFH using the wetlands next to the dike, since dike failure is not expected.

4.4 Terrestrial Resources

Future Conditions with No Action (FEIS Plan)

With implementation of the FEIS Plan (NAA), there are no expected impacts to terrestrial resources since the area adjacent to the northern dikes are wetlands.

Future Conditions with the Finger Dike Alternative or the Proposed Action

With implementation of the Finger Dike Alternative or the proposed action, the impact to Terrestrial Resources would be the same as those described for the NAA.

4.5 Wildlife

Future Conditions with No Action (FEIS Plan)

With implementation of the FEIS Plan (NAA), wildlife using the northern dikes or adjacent wetlands could be directly impacted if water and sediment is released from a DMCA suddenly through a breach. They could also be impacted indirectly in the short term if they are temporary displaced from the wetlands adjacent to the dike. There could be a long term impact to wildlife from species feeding on the released cadmium-laden sediments. This is a change from what is in Sections 5.04 and 5.08 of the FEIS where the placement of dredged sediments in a DMCA was expected to have minimal impact on wildlife.

Future Conditions with the Finger Dike Alternative

With implementation of the Finger Dike Alternative, the impact to wildlife would be similar to those described for the plan selected in the FEIS (Section 5.11). There is a slightly higher risk that wildlife could bioaccumulate cadmium in their system since the entire area will not be flooded and each cell would be covered/capped after filling. These impacts will be mitigated by keeping the area moist.

Future Conditions with the Proposed Action

With implementation of the proposed action, the impact to wildlife would be similar to those described for the plan selected in the FEIS (Section 5.08.4.2 and 5.08.4.3). There is a slightly higher risk that wildlife could bioaccumulate cadmium in their system since the area would not be fully flooded until after completion of the sediment placement. These impacts would be mitigated by keeping the DMCA moist, and using bird abatement during the sediment placement operations. After the initial placement of the cadmium-laden sediments, the deposition area would be flooded with a small amount of water, which will reduce the risk to wildlife back down to the level described in FEIS.

4.6 Threatened and Endangered Species

Future Conditions with No Action (FEIS Plan)

With implementation of the FEIS Plan (NAA), T&E species (piping plover, wood stork and red knots) using the northern dikes or adjacent wetlands could be directly impacted if water and sediment are released suddenly from a DMCA through a breach. They could also be indirectly impacted in the short term if they are temporary displaced from wetlands adjacent to the dike. There would be a long term adverse impact to T&E species that feed on the (uncovered) released cadmium-laden sediment. There would be a high potential to bioaccumulate the cadmium in to their system. This alternative would require formal consultation with the U.S. Fish and Wildlife service. This is a change from what is in Section 5.11 of the FEIS where the placement of dredged sediments in a DMCA resulted in a determination that the project “may affect, but is not likely to adversely affect” T&E Species or their critical habitat.

Future Conditions with the Finger Dike Alternative

With implementation of the Finger Dike Alternative, the impact to T&E Species (piping plover, wood stork, and red knot) would be the similar to those described for the original Selected Plan in the FEIS (Section 5.11). There is a slightly higher risk that these birds could bioaccumulate cadmium in their system since the DMCA would not be flooded and each cell would be covered/capped after filling. These impacts will be mitigated by keeping the DMCA moist during placement. This document serves as an update to the existing Biological Assessment (Appendix B of the FEIS). This updated assessment concludes that this alternative, “may affect, but is not likely to adversely affect” piping plover, wood stork, and red knot or their critical habitat due to the rarity of piping plover

and red knot being in the DMCAs and the seasonality of wood storks in the DMCAs. In addition, there is similar habitat for these species adjacent to DMCA 14A and 14B.

No change is expected in impacts to T&E Species or their critical habitat that are under the jurisdiction of the National Marine Fisheries Service.

Future Conditions with the Proposed Action

With implementation of the proposed action, the impact to T&E Species (piping plover, wood stork, and red knot) would be the similar to those described for the plan selected in the FEIS (Section 5.11). There is a slightly higher risk that these birds could bioaccumulate cadmium in their system since the DMCA would not be fully flooded until after completion of the sediment placement. These impacts would be mitigated by keeping the DMCA moist, and using bird abatement during the sediment placement operations. After the initial placement of the cadmium-laden sediments, the DMCA would be flooded with a small amount of water, which will reduce the risk back down to the level described for the selected plan in FEIS.

This document serves as an update to the existing Biological Assessment (Appendix B of the FEIS). This updated assessment concludes that this alternative, “may affect, but is not likely to adversely affect” piping plover, wood stork, and red knot or their critical habitat due to the rarity of piping plover and red knot being in the DMCAs and the seasonality of wood storks in the DMCAs. In addition, there is similar habitat for these species adjacent to DMCA 14A and 14B.

No change is expected in impacts to T&E Species or their critical habitat that are under the jurisdiction of the National Marine Fisheries Service.

4.7 Cultural Resources

Future Conditions with No Action (FEIS Plan)

With implementation of the FEIS Plan (NAA), there are no expected impacts to cultural resources if a breach occurs since there are no known cultural sites adjacent to the northern dike of DMCAs 14A or 14B. The dredge pipe will be placed outside of the site boundary on the riverbank to avoid impacting the site discussed in Section 3.2.7 (small boat). The 2009 Research recommended conducting archival research to find evidence of historic structures and then conducting geoprobe coring to identify buried surfaces. Archaeological monitoring of ground-disturbing activities was recommended in addition to conducting annual bank surveys.

Placement of cadmium sediments within DMCA 14A would not preclude the use of a geoprobe. The sediment recovered with the probe would be placed in a sealed tube which would prevent contact with wildlife. If the hole does not self-seal, then adjacent sediments would have to be placed in it.

Future Conditions with the Finger Dike Alternative or the Proposed Action

With implementation of the Finger Dike Alternative or the proposed action, the impact to cultural resources would be the same as those described for the Selected Plan in the FEIS (Section 5.12). The dredge pipe will be placed outside of the site boundary on the riverbank to avoid impacting the site discussed in Section 3.2.7 (small boat). The 2009 Research recommended conducting archival research to find evidence of historic structures and then conducting geoprobe coring to identify buried surfaces. Archaeological monitoring of ground-disturbing activities was recommended in addition to conducting annual bank surveys.

Placement of cadmium sediments within DMCA 14A would not preclude the use of a geoprobe. The sediment recovered with the probe would be placed in a sealed tube which would prevent contact with wildlife. If the hole does not self-seal, then adjacent sediments would have to be placed in it.

4.8 Air Quality

Future Conditions with No Action (FEIS Plan), the Finger Dike Alternative, and the Proposed Action

With implementation of the any of the final three alternatives, the impact to Air Quality would be the same as those described for the plan selected in the FEIS (Section 5.06). None of these alternatives would cause an increase in greenhouse gases.

4.9 Water Quality

Future Conditions with No Action (FEIS Plan)

With implementation of the FEIS Plan (NAA), there is a high risk of direct adverse impact to water quality if a breach in a dike occurs. Impacts to water columns from the turbidity plume would be temporary and would only last through a few tidal cycles. Violation of a Dissolved Oxygen or other water quality standard could occur, depending on conditions in the DMCA and receiving waters at the time of the breach. This is a change from what is in Section 5.02 of the FEIS where the placement of dredged sediments in a DMCA was not expected to impact water quality.

Future Conditions with the Finger Dike Alternative or the Proposed Action

With implementation of the Finger Dike Alternative or the proposed action, the impact to water quality would be the same as those described for the plan selected in the FEIS (Section 5.02).

4.10 Cumulative Impacts

The Council on Environmental Quality's (CEQ) regulations (40 CFR 1500-1508) implementing the procedural provisions of the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.) define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of

what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7)". Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time."

Jasper Ocean Terminal

The Jasper Ocean Terminal (JOT) Joint Venture, a partnership between the Georgia Ports Authority (GPA) and the South Carolina Ports Authority (SCPA), has proposed to develop a state-of-the-art marine container terminal on the northern bank of the Savannah River. USACE Charleston District (SAC) is preparing an Environmental Impact Statement (EIS) to assess the potential social, economic, and environmental effects associated with the construction and operation of the proposed JOT (http://www.jasperoceanterminaleis.com/) in Jasper County, South Carolina. Information included in that EIS will serve as the basis for the Corps' evaluation of the proposed marine container terminal pursuant to Section 10 of the Rivers and Harbors Act (RHA) and Section 404 of the Clean Water Act (CWA). The proposed location of the terminal included DMCA 14A and 14B. USACE Savannah District will make a determination under Section 408 of the Rivers and Harbors Act if this action would result in an acceptable impact to the existing Federal navigation project. JOT Joint Venture is aware of the plan to place cadmium-laden sediments in these DMCAs and that they would be responsible for future construction activity that could expose this cadmium-laden sediments. The JOT designers have been supportive of the placement of SHEP new work sediments on DMCA 14A since that placement would decrease the amount of fill they would need when they construct a container terminal. If the JOT is built over the cadmium-laden sediments, the paving and structures would serve as a harder cap than the additional sediments USACE would place on the site in future years.

Future Conditions with No Action (FEIS Plan)

With implementation of the FEIS Plan (NAA), there could be an increase in cumulative impacts if a breach in a dike occurs, beyond those described in the FEIS. The release of cadmium into the ecosystem would add to the existing cadmium that can be found in the surrounding area. Cadmium found in blood, gizzard contents and on-site potential prey (preconstruction monitoring http://www.shep.uga.edu) indicate that cadmium is currently bioavailable to birds that forage at the DMCAs and nearby sites. Analyses of kidney and liver tissues from avifauna at the DMCAs indicate that these species are being exposed to and accumulating cadmium from some location used in their life history.

Future Conditions with the Finger Dike Alternative or the Proposed Action

With implementation of the Finger Dike Alternative or the proposed action, there should be no change in cumulative impacts from those described for the plan selected in the FEIS (Appendix L of FEIS).

5.0 COORDINATION (Relevant agencies)

The draft EA and Finding of No Significant Impact (FONSI) were coordinated with appropriate Federal, state, and local interests, as well as environmental groups and other interested parties. Federal and state agencies and NGO's that were contacted during the evaluation or that received a copy of the EA for review were as follows:

U.S. Department of Interior; Fish and Wildlife Service
U.S. Environmental Protection Agency
U.S. Department of Commerce, National Marine Fisheries Service
Natural Resources Conservation Service, State Conservationist
Advisory Council on Historic Preservation
S.C. Department of Health and Environmental Control
S.C. Department of Natural Resources
S.C. Historic Preservation Officer

Comments from the public and detailed responses can be found in Appendix B. The following is a list of major responses or clarifications in this document:

- Upper limit of placement of SHEP cadmium-laden new work sediments including the cap will be elevation of +16 feet. Additional clean new work or O&M sediments could be placed on top of the cap.
- Existing and new bird monitoring efforts have been added to the document.
- USACE estimates approximately 18 inches of water could be held over the cadmium-laden sediments.
- Clarification on oxidation and leachability of cadmium in sediments based on analyses performed by ERDC. USACE concluded that the likelihood of the cadmium being oxalated and thus available in a soluble form is very low.
- A detailed Success Monitoring of Bird Abatement plan has been added to the document (Appendix A).
- Threatened and Endangered species section was updated and concludes that this alternative, "may affect, but is not likely to adversely affect" piping plover, wood stork, and red knot or their critical habitat due to the rarity of piping plover and red knot being in the DMCAs and the seasonality of wood storks in the DMCAs. In addition, there is similar habitat for these species adjacent to DMCA 14A and 14B.
- Clarification of definition of moist.
- The use of automated deterrent laser at night could accomplish the goal of 24-hour coverage.
- USACE has determined that Alternative 10 is still the proposed action based on:
  1. the risk of oxidation of the cadmium is low
  2. bird abatement over DMCA 14A can be accomplished
  3. the T&E species that are known to use the DMCA rare or seasonal
  4. the reduced area that would require capping in Alternative 10.
  5. the higher cost of Alternative 9 due to use of both DMCAs and needing to cap both.

6.0 MITIGATION

The appropriate application of mitigation is to formulate an alternative that first avoids adverse impacts, then minimizes adverse impacts, and lastly, compensates for unavoidable impacts.

The proposed action (Alternative 10) avoids adverse impacts by:

1. Requiring pumping distance to be greater than 4,000 feet to allow for 100% degradation of any clay balls from certain reaches of the channel.
2. Keeping the DMCA flooded between sediment placements and final covering/capping.
3. Capping the deposited cadmium-laden sediments with clean sediment.
4. Restricting future use of the cadmium-laden sediments (and covering/capping sediments) that are deposited in DMCAs 14A and 14B.

The proposed action minimizes adverse impacts by:

1. Reducing the risk of dike failure.
2. Keeping the cadmium-laden sediments moist until they are covered/capped to reduce bioavailability.
3. Using bird abatement to reduce the time that birds feeding in DMCA 14A and 14B during sediment placement could be exposed to sediments with elevated cadmium levels (bird abetment techniques are discussed in section 1.1.2).

Compensatory mitigation is not warranted for the potential impacts to wildlife that may be exposed to the deposited cadmium-laden sediments until those sediments are flooded and covering/capping occurs. If it is determined that flooding of the site immediately after sediment placement and before covering/capping cannot occur, compensatory mitigation would be required. During the sediment deposition process and prior to final covering/capping, the District would use various methods (Bird Abatement Plan) to reduce the potential uptake of cadmium by wildlife.

7.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

7.1 Existing Environmental Evaluations and Approvals That Do Not Require An Update

The following environmental evaluations and compliances would not change from what is in the FEIS due to the proposed action and do not require an update:

1. The Section 404(b)(1) (Appendix H of the FEIS) - no additional fill would be placed in the waters of the US.
2. Air Quality (Appendix K of the FEIS) – no significant change in equipment would be used or an increase in their hours of operation.
3. Section 401(Appendix Z of the FEIS) - no additional fill would be placed in the waters of the US, no additional dredging, the method to control water quality in DMCA would not change. Normal operation of the DMCAs does not require a National Pollution Discharge Elimination System Permit.

4. Coastal Zone Management Act (Appendix J of FEIS) - no additional fill would be placed in the waters of the US, no additional dredging, dredged material placement would still occur with the existing DMCAs.

7.2 Environmental Compliances Requiring An Update

Environmental compliance for the proposed action would be achieved upon the following actions:

- The Draft EA and Finding of No Significant Impact (FONSI) was released to for public review on December 30, 2016, and was coordinated with the appropriate agencies, organizations, and individuals for their review and comments;
- U.S. Fish and Wildlife Service (USFWS) confirmed in an e-mail dated June 22, 2017 that the proposed action would not be likely to adversely affect any endangered or threatened species or their critical habitat;
- States of South Carolina and Georgia Historic Preservation Officer their letters dated January 24, 2017 and January 25, 2017 respectively concurred with the District's Determination of No Effect on cultural resources;
- USFWS Fish and Wildlife Coordination Act recommendations were accepted or resolved per an e-mail dated June 22, 2017 ; and
- The NMFS in a letter dated January 23, 2017 stated "NMFS has reviewed both documents and has no objection to the proposed action (Alternative 10). We accept the conclusion that the proposed action would have no additional impacts to EFH."

The proposed action would not be implemented until the action achieves full environmental compliance with applicable laws and regulations, as described above. Table 12 show compliance with Executive Orders.

Table 12: Compliance of the Proposed Action with Executive Orders

Executive Orders	Number	Compliance Status
Equal Opportunity	11246	In Compliance
Protection and Enhancement of Environmental Quality	11514/11991	In Compliance
Protection and Enhancement of the Cultural Environment	11593	In Compliance
Convict Labor	11755	In Compliance
Floodplain Management	11988	In Compliance
Protection of Wetlands	11990	In Compliance

Table 12: Compliance of the Proposed Action with Executive Orders		
Executive Orders	**Number**	**Compliance Status**
Federal Compliance with Pollution Control Standards	12088	In Compliance
Environmental Effects Abroad of Major Federal Actions	12114	In Compliance
Federal Compliance with Right-To-Know Laws and Pollution Prevention	12856	In Compliance
Federal Actions to Address Environmental Justice and Minority and Low-Income Populations	12898	In Compliance
Implementation of the North American Free Trade Agreement	12889	In Compliance
Energy Efficiency and Water Conservation at Federal Facilities	12902	In Compliance
Federal Acquisition and Community Right-To-Know	12969	In Compliance
Protection Of Children from Environmental Health Risks and Safety Risks	13045	In Compliance
Environmental Justice	12898	In Compliance
National Invasive Species Council	13112	In Compliance
Responsibilities of Federal Agencies to Protect Migratory Birds	13186	In Compliance

8.0 CONCLUSION

The proposed action (Alternative 10) consists of (1) refining the channel reaches that contain naturally-occurring cadmium at levels that require special handling, and (2) keeping the deposited cadmium-laden sediments moist in DMCAs 14A and 14B by maintaining the water height in the DMCA just below the elevation of the deposited dredged sediment (limited to 6”-12”). Savannah District has assessed the environmental impacts of the proposed action and determined that the proposed action would have no additional impact to wetlands, aquatic resources, EFH, terrestrial resources, air quality, cultural resources, water quality, or cumulative impacts than those described for the plan selected in the FEIS. The impacts to wildlife and T&E species would be the similar to those described in the FEIS. There is a slightly higher risk that wildlife could bioaccumulate cadmium in their system since the DMCA will not be fully flooded until after completion of the sediment placement. These impacts will be

mitigated through bird abatement. This updated assessment concludes that this alternative, “may affect, but is not likely to adversely affect” piping plover, wood stork, and red knot or their critical habitat due to the rarity of piping plover and red knot being in the DMCAs and the seasonality of wood storks in the DMCAs. In addition, there is similar habitat for these species adjacent to DMCA 14A.

9.0 PREPARED BY

This EA and the associated draft FONSI were prepared by Nathan Dayan, Biologist, with relevant sections prepared by: Julie Morgan - Cultural Resources; Laurie Sattler - Project Manager; Laura Williams and Tracy Hendren – Engineering; and Matthew Delano – Geology. The address of the preparers is: Savannah District, U.S. Army Corps of Engineers, 100 West Oglethorpe Avenue, Savannah, Georgia 31401-0889

10.0 REFERENCES

Seramur, Keith C., Daphne Owens, Daniel E. Battle, Michael O'Driscoll, Anthony Love, John T. Thacker, and Jim Pomfret. 2010. Archival Research and Geoarchaeology Investigation to Prepare a Cultural Resource Management Plan for 12,000 Acres Between Wright River and the Mouth of the Savannah River, Jasper County, South Carolina. Report prepared for Georgia Department of Transportation.

Richter, Stephen D., Dov Leshchinsky. 1994. Dredging Research Program Hydraulically Transported Clay Balls. Department of the Army, Waterways experiment Station. DRP-94-1. http://www.dtic.mil/get-tr-doc/pdf?AD=ADA280413.

Appendix A

Success Monitoring of Bird Abatement

Success Monitoring of Bird Abatement

Challenges:

- DMCA is approximately 650 acres.
- Seasonal changes in numbers and species of birds at DMCA.
- Time period from beginning of dredging to the end of capping may range from 15 to 30 months.
- T&E Species (piping plover, wood stork, and red knots) have been seen at the DMCAs
- No human deterrent or monitoring at night.

Monitoring by contractor:

- Each monitoring would report: # birds observed landed within the DMCA, type of birds (wading, duck, etc.), and activity (feeding, resting, etc.).
- Piping plovers, wood storks, and red knots would be specifically identified and counted.
- At dawn and two additional times during the day, stationary monitoring would occur from one of the four sides. This monitoring will be performed for a minimum for 30 minutes. Only one side will be monitored in a day. A different side will be used the next day. This metric will be known as **Contractor Daily** (CD1, CD2, and CD3). CD1 will be collected at dawn. Every 5th day, the cycle will repeat and three values will be calculated.
- This information will be collected at all times during the day by all members of the abatement team as abatement is being performed. This is not limited to a single location and is a roving event. A daily running total of: (1) # birds observed landed within the DMCA, (2) # birds actively deterred by human (birds that leave the DMCA after being harassed), and (3) ratio of observed to deterred (estimate of success to effort) will be calculated. This metric will be known as **Contractor Running Daily Total** (CRDT). The contractor will calculate the % change in the CRDT from previous day.

Monitoring by USACE staff:

- USACE staff will regularly perform an independent check on birds within the DMCA to check the performance of the abatement program.
- Each monitoring would report: # of birds observed landed within the DMCA, and type of birds.
- Quality Assurance (QA) once a day (not associated with contractor monitoring and preferably from a different side) stationary monitoring would occur from one of the four sides. This monitoring will be performed for a minimum for 30 minutes. Only one side will be monitored in a day. A different side will be used the next day. This metric will be known as **USACE Daily** (UD). Every 5th day, the cycle will repeat and a percent change for that side can be calculated.

- USACE PD-Environmental staff will perform monthly stationary monitoring of the DMCA from 6 predetermined locations. This monitoring will be performed for a minimum for 30 minutes at each of the locations. This metric will be known as **USACE Monthly** (UM1, UM2, UM3, UM4, UM5, and UM6). The % change for the total DMCA will be calculated. Piping plovers, wood storks, and red knots would be specifically identified and counted.

  Table 1 summaries the monitoring events.

Table 1: Summary of Monitoring events	
Event	**When evaluated**
Contractor	
CD (1, 2, and 3) Side 1	Every 4th day
CD (1, 2, and 3) Side 2	Every 4th day
CD (1, 2, and 3) Side 3	Every 4th day
CD (1, 2 ,and 3) Side 4	Every 4th day
CRDT	Daily
USACE	
UD Side 1	Every 4th day
UD Side 2	Every 4th day
UD Side 3	Every 4th day
UD Side 4	Every 4th day
UM (1, 2, 3, 4, 5, and 6)	Once a month

Evaluation of Abatement Effectiveness:

Trigger points for changes in abatement program (adaptive management)

Contractor:
1. Every day the contractor will examine the CD (1, 2, and 3) and the CRDT to determine if the # of birds within the DMCA is changing and whether the abatement efforts appear to be effective. If a lack of a percent decrease occurs, the contractor will consider whether a change in the methods of abatement or amount of effort may be warranted. The migration history (attached table) will be considered, since the number and types of birds using a DMCA has historically varied over the course of a year.

Two different values using the CD data would calculated and examined daily. They would be:

- a CD morning comparison every 5th day
- a CD total every 5th day
- a reduction over the day for the CD viewing

To evaluate the CD the application of 4 days of appropriate reduction (Table 2) would be used to compare the previous day for that side. There is abatement going on the whole time over the whole area not just the side being covered.

Table 2: Percent Decrease Not Expected to Trigger Evaluation of Present Methods of Abatement		
Initial # of birds	**Percent Decrease**	**Range of birds**
1 - 25	90%	0 - 3
26 - 100	70%	8 - 30
101 - 200	60%	40 - 80
201 -500	50%	101 - 250
>500	40%	<300
CD will be compared daily against the previous time that side was counted. CRDT will be compared daily against the CRDT from the previous day. UD will be compared weekly against itself and against the CD for that week. UM will be compared monthly against itself.		

The CRDT would provide two items that are comparable daily. The total number of birds seen and a daily percent efficiency of birds seen being abated into leaving the DMCA. The total number seen will be compared with the previous day and be evaluated using percent reductions from table 2. The daily percent efficiency of CRDT should be greater than 85 percent.

If the contractor thinks that change to the abatement activities may be warranted, They will implement the changes that are within his responsibility (level of effort).

If the contractor thinks that change to the abatement program may be warranted, he will:

a. notify PD staff that a change may be warranted.
b. set up a meeting with PD within 24 hours of notification
c. propose changes in abatement program that he believes would allow those efforts to be more effective and propose them to PD staff.

If a change does not appear to be warranted based on migration, the contractor will:

a. provide a rational why migrating species are assumed to be leading to either an increase or preventing a decrease in bird numbers.

2. Once a week the contractor will provide data sheets and summary to QA and PD staff. Example data sheet follows.

Example data sheets - Contractor:

CD									
Day	Side	CD morning	Success from Previous morning for side	CD2	CD3	Total CD for day	Success from Previous day for side	Success inside today	Need to contact USACE
1	1								
2	2								
3	3								
4	4								
5	1								
6	2								
7	3								
8	4								

CRDT						
Day	Seen	Success from Previous day	Left the DMCA	% success to effort	Success today	Need to contact USACE
1						
2						
3						
4						
5						
6						
7						
8						

CRDT and CD combined			
Day	Need to contact USACE -CRDT	Need to contact USACE -CD	Need to contact USACE - combined
1			
2			
3			
4			
5			
6			
7			
8			

USACE:

1. Once a week, the USACE Quality Assurance inspector will send the **USACE Daily** (UD) report to PD staff and the contractor. PD staff will determine if the observations match the contractor's reports or require a conversation with the contractor. Migration history will be considered. Example of weekly UD data sheet below.

If a conversation is needed, PD staff will request the contractor set up a meeting within 24 hours of the request.

2. Once a month, PD staff will perform its **USACE Monthly** (UM) monitoring. PD staff will determine if the lack of a percent decrease in # birds observed landed within the DMCA requires a conversation with the contractor. Migration history will be considered. The data and summary report will be provided to the USACE QA and the contractor within a week of collection. Example of yearly UM data sheet below.

If a conversation is needed, PD staff will request the USACE Quality Assurance inspector set up a meeting with the contractor within 24 hours of the request.

3. Based on federal fiscal year, PD staff will prepare quarterly and annual reports that include summaries of all data collected by the contractor and USACE. This will be provided to the contractor and posted to SHEP monitoring website.

4. PD staff will:

    a. provide USFWS any and all data when requested.
    b. coordinate with USFWS on any change to abatement methods being used.

Example data sheets - USACE:

UD				
Day	Side	UD	Success from Previous day	Abatement Contractor on Site
1				
2				
3				
4				
5				
6				
7				
Total for Week				

UM									
Month	Date	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6	Location 7	Total
Oct									
% Change from previous month									
Nov									
% Change from previous month									
Dec									
% Change from previous month									
Jan									

% Change from previous month								
Feb								
% Change from previous month								
Mar								
% Change from previous month								
Apr								
% Change from previous month								
May								
% Change from previous month								
Jun								
% Change from previous month								
Jul								
% Change from previous month								
Aug								
% Change from previous month								
Sep								
% Change from previous month								

Species	January	February	March	April	May	June	July	August	September	October	November	December		Notes:
Common Birds Species within DMCAS														
Black-bellied Whistling-Duck														Highest bird counts for this species occurs in September
Gadwall														Migration starts in November and ends in May ; the highest bird counts for this species occurring between November and early April
Mottled Duck														Occurs year round and breeds with the highest bird counts in August and with reduced numbers from early November through mid-February
Blue-winged Teal														Most abundant bird counts occurs between late August and mid-November
Northern Shoveler														Migrations starts in September and ends in mid to late April; Highest bird counts for this species occurs between early October and early April
Green-winged Teal														Migrations start in early October and end in late March/mid-April; Highest bird counts for this species occurs between late October and early April
Ring-necked Duck														Highest bird counts for this species occurs between early November through mid-December
Lesser Scaup														Highest bird counts for this species occurs between early November and mid-April
Bufflehead														Highest bird counts for this species occurs between mid-November and mid-March
Hooded Merganser														Highest bird counts for this species occurs between mid-November and late January
Ruddy Duck														Highest bird counts for this species occurs between mid-November and late March
Pied-billed Grebe														Rare in summer, major spring movement occurs between early February to mid-March, major fall movement occurs between mid-August and early October
Horned Grebe														Winter resident, highest bird counts for this species occurs in January
American White Pelican														This bird species can be seen throughout the year
Brown Pelican														This bird species is mainly seen flying over the disposal areas or on the adjacent Savannah or Black Rivers.
Double-crested Cormorant														Occurs year round and breeds with the highest bird counts in from early October to early January and with reduced numbers from mid-January to mid-March
Anhinga														Occurs year round and breeds with the highest bird counts occurs from late April to mid-November and with reduced numbers from November to mid-March
Great Blue Heron														Occurs year round in small numbers
Great Egret														Occurs year round and breeds, highest bird counts for this species occurs from early May to late October, with peaks in mid-May and August
Snowy Egret														Occurs year round and breeds, highest bird counts for this species occurs from early march to mid-November with peaks in early-May and August through mid-September
Little Blue Heron														Occurs year round and occasionally breeds
Tricolored Heron														Occurs year round and breeds, reduced numbers occur between mid-September and mid-November
Cattle Egret														Highest bird counts for this species occurs between late July and early October
Green Heron														Summer resident and does breed in small numbers. Highest bird counts for this species occurs between late March and early September
Black-crowned Night-Heron														Occurs year round and is a rare breeder
White Ibis														Occurs year round and is a rare breeder, lowest bird count numbers for this species occurs between late January and mid-May
Glossy Ibis														Occurs year round and is a rare breeder, highest bird counts for this species occurs between late May and early September
Black Vulture														Occurs year round
Turkey Vulture														Occurs year round and is a rare breeder
Osprey														Seen throughout the year in small number and is a rare breeder.
Bald Eagle														Occurs year round but in small numbers
Northern Harrier														Common winter visitor, highest bird counts for this species occurs between mid-October and mid-February
Sharp-shinned Hawk														Occurs in small numbers most of the year except late spring and early summer
Cooper's Hawk														Occurs in small numbers most of the year except late spring and early summer
Red-tailed Hawk														Occurs year round, does not commonly breed, and has reduced numbers between mid-March through early August
Common Gallinule														Occurs year round and breeds, reduced numbers occur between late November and late March
American Coot														Occurs year round and breeds, the major fall movement into the area occurs in October and the major spring movement out of the area occurs in April. Numbers for this species are reduced between mid-May and late September
Black-bellied Plover														Occurs year round with reduced numbers between mid-May to mid-august
Wilson's Plover														Summer resident and breeder
Semipalmated Plover														Occurs year round with reduced numbers between late December and early February and most of October and has higher numbers between late April and mid-May and mid-August and early October
Killdeer														Occurs year round and breeds, with reduced numbers between late March and mid-June
Black-necked Stilts														Summer resident and breeder, is rare in the winter, numbers are ususally greatly reduced after mid-September
American Avocet														Occurs year round, movement into the area begins in mid-June and movement out of the disposal sareas occurs from late February to late April. Reduced numbers occur between early May and early June
Spotted Sandpiper														Migrant species, most abundent between May and late August
Greater Yellowlegs														Occurs year round with reduced numbers from mid-April to late June
Lesser Yellowlegs														Occurs year round with reduced numbers between late May and early June. Highest numbers occur between late February to early May and from late July to mid-September
Willet														Summer resident and breeder, rare in winter
Ruddy Turnstone														Occurs year round in small numbers with highest bird counts occuring between mid to late May and mid-August through mid-September
Semipalmated Sandpiper														Abundent migrant, largest numbers occur between late April and early June in the spring and from late July to late September in the fall
Western Sandpiper														Occurs year round with numbers greatly reduced in the summer. The highest bird counts for this species occurs between mid-August to late April
Least Sandpiper														Occurs year round with numbers reduced in the summer, highest numbers occur in the month of April.
White-rumped Sandpiper														Migrant species, more abundent and regular in the spring versus the fall
Pectoral Sandpiper														Highest bird counts for this species occurs in the spring between mid-march and late April
Dunlin														Common winter visitor, rare in the summer, major movement of brids apprear to occur in mid-May and late October/early November
Stilt Sandpiper														Migrant species, have been spotted in all months at the disposal areas, some birds spend the winter
Short-billed Dowitcher														This species is present all year long. The major spring movement occurs in early to mid-May and the major fall movement occurs in July
Long-billed Dowitcher														This species is more commonly seen in the winter. The major spirng movement out of the disposal areas occurs in April and the major fall movement into the disposal areas occurs from late September through October
Wilson's Snipe														This species is a mainly a winter resident within the disposal areas
Bonaparte's Gull														This species is mainly a winter resdient within the disposal areas, rarely seen in the summer
Laughing Gull														This species occurs year round and breeds around the May timeframe
Ring-billed Gull														This species occurs year round and are most abundent from early Novemver to late April
Herring Gull														This species is mainly a winter resdient within the disposal areas
Least Tern														This species is a summer resident within the disposal areas and breeds between late April and early August
Gull-billed Tern														This species is a summer resident within the disposal areas and breeds between late April and early August
Caspian Tern														This species occurs year round with high counts occruing between mid-June to late October
Forster's Tern														This species occurs year round
Royal Tern														This species occurs year round with high counts occruing between mid-May to mid-August and smaller counts occuring between early October and late April
Black Skimmers														This species is a summer resident within the disposal areas and breeds between late April and mid to late August
Rare, Threatened, and Endangered Species within DMCAs														
Piping Plover														Rarely seen in the disposal areas
Red Knot														Rare migrant, can be seen in the Spring or the Fall
Wood Stork														Visits most of the year except for late winter to early spring. Most abundant counts occur between early July and late October
Legend														
	times when bird species is present within the disposal areas													
	times when the bird count for the bird species is expected to be the highest													

Appendix B

Public Comments and Reponses

Organization/Public	Comment	Response
Georgia Environmental Protection Division	The Georgia EPD has reviewed the proposal and has no comment or objection.	Thank you for your response that GA DNR-EPD has no objection to the proposed action.
National Marine Fisheries Service	NMFS has reviewed both documents and has no objection to the proposed action (Alternative 10). We accept the conclusion that the proposed action would have no additional impacts to EFH.	Thank you for your response that NOAA Fisheries concurs that no additional impacts to EFH would occur.
South Carolina Department of Archives and History	The State Historic Preservation Office (SHPO) is providing comments to the Corps pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR 800. Consultation with the SHPO is not a substitution for consultation with Tribal Historic Preservation Offices, other Native American tribes, local governments, or the public.	USACE separately coordinated with Native American Tribes, the local government and the public.
	We have reviewed the Draft SEA as requested. Based on the information on pages 43-45, there do not appear to be any expected impacts to cultural resources.	Thank you for your response that SCDAH agrees that no cultural resources are likely to be affected by the proposed action, no further action is needed.
Georgia Historic Preservation Division	Based on the additional information provided, HPD concurs that the containment areas have a high probability of containing historic properties, some of which may be eligible for listing in the National Register of Historic Places (NRHP). However, it is HPD's opinion that no historic properties that are listed or eligible for listing in the NRHP will be affected by this portion of the proposed undertaking, as defined in 36 CFR Part 800.4(d)(1), due to the scope of work and previous disturbances.	Thank you for your response that GA DNR-HPD agrees that no listed historic properties would be affected by the proposed action, no further action is needed.
International Paper	International Paper agrees with the conclusions and recommendations of the SEA to identify the locations of cadmium-laden material requiring special handling.	Thank you for your response that IP agrees with the conclusions and recommendation of the SEA.
Jasper Ocean Terminal Joint Venture	In 2011 and 2012, The Jasper Ocean Terminal Joint Project Office (now Joint Venture) worked with the USACE to develop an opportunity plan to encourage preferential placement of all SHEP material into DMCA 14A to benefit the proposed Jasper Ocean Terminal project. A letter from Colonel Jeffrey Hall to the Joint Project Office dated January 9th, 2012 (copy attached) confirmed USACE conceptually supports the proposed opportunity plan and further assured that all alternatives to maximize the volume of new work dredged material placed into DMCA 14A would be evaluated.	Thank you for your response and providing this information. Responses to individual comments follows.

Organization/Public	Comment	Response
	1. Request the supplemental EA clarify 1) if dike capacity has been evaluated for the placement of additional clean (i.e. non-cadmium laden) sediment above the proposed post-cap elevation of +16 ft and 2) if the project intends to place additional new work material within DMCA 14A beyond the described placement of cadmium laden sediments and the clean cap to a nominal elevation of +16 ft, as indicated.	+16' is intended to be the limit for SHEP new work in DMCA14A, which covers the Cd material and clean cap. After SHEP, the DMCA will be utilized for O&M material placement above the material place during SHEP.
	Does the proposed operation preclude or otherwise restrict placement of additional new work material in DMCA 14A if the dikes are determined to have sufficient capacity to support?	Additional new work or O&M material could be placed on top of the clean cap and could require future dike raises
	Request section 1.1.1 or 1.1.5 be revised to provide the opportunity for future placement of clean new work material if determined to be technically feasible. To this end, the Joint Venture is interested in evaluating this opportunity further and may be interested in providing funds to offset incremental cost differences between placement in 14A and disposal sites selected by the project based on lowest cost, if the JV determines the benefits to the JOT project justify the expenditure.	Sections 1.1.1 and 1.1.5 do not limit any future material from being placed in the DMCA. The Corps cannot accept funding for construction from JOTJV.
	Section 1.1.6 (pg 9) indicates that future excavation into the cadmium placement strata will be prohibited. The last sentence on Pg 9 indicates that protocols may be identified to permit excavation if needed. The current Jasper Ocean Terminal concept proposes significant excavation along the southern edge of 14A and 14B to create a deep draft berthing area and turning basin. This excavation extends into the DMCA interiors and will likely encounter the cadmium-laden material placed by this proposed plan. Request Section 1.1.6, Section 6.0 (proposed action effect #4), and the FONSI be revised to acknowledge the likelihood of future excavation activities, or provide an opportunity for the Joint Venture to coordinate the placement of cadmium-laden material to locations within 14A/B that are at a lower risk of being exposed in the future.	The information in the red box in section 1.1.6 restricts the use of the material for future construction. The last sentence that paragraph leaves open the disturbance of the material if protocols are put into place to prevent wildlife exposure. This text does not prevent JOTJV from moving the material in the future or coordinating alternate placement at JOTJV cost. There is no need to revise the FONSI. Additional information on possible Cumulative impacts from JOT project will be added to the EA.
U.S. Environmental Protection Agency	Please find attached EPA's comments on the SHEP Cadmium Laden Disposal SEA.	Thank you for your response. Responses to individual comments follow.

Organization/Public	Comment	Response
	The EPA recently learned that the Disposal Material Containment Area (DMCA) where the cadmium laden sediment will be disposed could be used as the location for the proposed Jasper Ocean Terminal (JOT). The EPA recommends the USACE briefly discussed the relationship of the proposed JOT and the cadmium laden sediment DMCA as well as the development of the Charleston District and Savannah District's EIS.	A discussion on JOT was added to the cumulative impact section of the EA.
	On page 6, the USACE discusses the water quality and states, "As sediments are deposited in the DMCA, water is decanted once it meets state standards for acceptability." However, there is no discussion of the USACE acquiring a National Pollution Discharge Elimination System (NPDES) permit and it is hard to determine if the state intends to require a NPDES permit. Also, the EPA is concerned that there is no discussion regarding the pollutant that they are testing to meet state water quality standards. The EPA notes that there does not appear to be a thorough description of how the USACE intends to manage the decanted water in the preferred alternative. Recommendation: The EPA recommends that the USACE better describe whether or not they intend to obtain a NPDES permit. Additionally, the EPA recommends that the USACE provide more detail regarding the water quality standard that the USACE is trying to meet in the Final SEA. The EPA further recommends that the USACE better explain how they intend to manage the decanted water in the Final SEA.	The DMCAs do not require a NPDES permit. The 401 permits for the SHEP project can be found in Appendix Z. The alternative placement methods did not change any of the methods of decanting the water or the pollutants or water quality parameters that are being tested. Details of the water quality monitoring plan can be found in the SHEP Final EIS and Appendices H (page 45 Water Quality Monitoring Plan Attachment) which has been incorporated by reference into the EA.

Organization/Public	Comment	Response
	The EPA is concerned that the current methodology of evaluating the cadmium laden sediment did not analyze the sediments in a moist condition versus completely inundated. The EPA recommends expanding the consideration of ecological receptors that could become exposed to inundated sediments and sediments that are moist/low-level inundated, but not entirely anoxic. Additionally, the EPA recommends that the USACE appropriately evaluate the moist/low-level inundation sediment conditions and describe any associated impacts to the relevant bird species in the Final SEA.	USACE does not consider this to be a change from what was analyzed in the FEIS and Appendix M Sediment Quality evaluation. Sediment probing shorebirds were part of the initial evaluation. Section 5.5 of Appendix M states "Potential contaminant impacts related to sediments held in a wet state within a DMCA were found to exist only for birds that feed within a DMCA 100 percent of the time. This would refer primarily to nesting black-necked stilts and their young. To minimize environmental risk, high cadmium sediments should be managed in a way that excludes exposure to nesting black-necked stilts. The marsh wren was used the most sensitive indicator species for when sediment is dry and was the basis for the 4.0 mg/kg clean cap target.

Organization/Public	Comment	Response
	The EPA has concerns regarding the risk assessment used in the SEA. The EPA recommends that the USACE reevaluate the risks to birds and other receptors using a conceptual site model that considers other potential routes of exposure/receptors and risks to sediment-probing birds having a diet that consists of worms, detritivore insects, etc. using the bioaccumulation relationship from the EPA Ecological Soil Screening Guidance (EPA 2005). The EPA recommends that using the EPA Ecological Screening Guidance (EPA 2005) will account for the likely greater degree of cadmium bioavailability in sediments held in the moist or slightly inundated condition. The potentially higher degree of risk to birds could be factored into design of management alternatives or types of monitoring. The EPA also recommends that the USACE better describe their rationale and analysis for determining that the risk to birds was "slightly higher". Given that there is a "slightly higher" risk that birds could be exposed to cadmium in the moist state (versus inundated state), the EPA further recommends that the USACE conduct monitoring to ensure receptors are not being exposed to cadmium. The EPA recommends the USACE document any monitoring commitments in the Finding of No Significant Impact (FONSI). Additionally, the EPA recommends that the USACE also describe any risks associated with fish and shellfish that could potentially be exposed to cadmium in the Final SEA.	USACE considers the existing conceptual site model sufficient to evaluate the changes from the modified placement plan. The EA address the higher degree of risk and includes the bird abatement as mitigation for this risk. USACE does not expect any change in impacts to fish and shellfish in the disposal area or in the adjacent waters. We added a reference to the existing 14a monitoring section 1.1.7.
U.S. Fish and Wildlife Service – February 2, 2017	We submit the following comments in accordance with provisions of the Endangered Species Act (ESA) of 1973, as amended; (16 U.S.C. 1531 et seq.) and the Fish and Wildlife Coordination Act (48 Stat. 40l, as amended; 16 U.S.C. 661 et seq.).	Thank you for your response. Responses to individual comments follow.

Organization/Public	Comment	Response
	In reviewing the FEIS, we found the condition of the DMCA(s) described as 'flooded' but no water depth indicated. The four to six-foot water depth may act as a wildlife/bird abatement condition by limiting bird foraging activity and by theoretically limiting sediment oxidation and the subsequent release of cadmium. The flooding described in the SEA (six to twelve inches) seems to create a situation that may be attractive to various bird species, a shallow-water wetland. Multiple migratory birds, including wading birds and ducks, could potentially forage in six to twelve inches of water, thus increasing the likelihood of exposure to cadmium-laden sediments and/or cadmium-laden prey species.	USACE would have the ability to inundate and provide a depth of approximately 18 inches of water over the Cd-laden material. This depends on the settlement of the back counterweight and the volume of the Cd placed in DMCA 14A. Different rates of consolidation, bulking, and settlement of the back dike affect the allowable depth of water. The addition of the use of bird abatement will mitigate for any depth that does not reach 18 inches.
	The Service has no comment on refining the channel reaches of high cadmium sediments.	Thank you for your response that USFWS has no comment on refining the channel reaches that require special handling.

Organization/Public	Comment	Response
	The USACE will attempt to keep the dredged sediments moist by keeping the water level six to twelve inches below the level of the sediments being placed in the DMCA(s). Is the USACE confident that sediment oxidation will not be occurring during the operations? It is the Service's assessment that oxidation that accompanied the drying of sediments in earlier investigations was the primary mechanism leading to the increased cadmium solubility. It seems as though the USACE is focused on preventing sediments from drying, as opposed to preventing sediments from being oxidized. We estimate that some degree of oxidation may occur in moist sediment, particularly considering its movement and manipulation once in the DMCA. During the placement of sediments on the surface of the DMCA, it seems that oxidation may very likely occur, particularly in the surficial sediment. This may lead to greater than expected cadmium solubility and increased cadmium water concentrations.	The ERDC document addresses leachate concerns in the response to comments section. As it states, leachate is never likely to become an issue. Cadmium will become oxidized and thus mobile and bioavailable as the dredged material becomes oxidized. However, the depth of oxidation is a function of the deposit and its condition. If allowed to dry and create desiccation cracks and to become vegetated and create root channels as well as worm holes, the top two to three feet of the dredged material will become oxidized; the rest of the dredged material will remain in a reduced condition until sufficient oxygen can diffuse through the profile to satisfy the demand. Cadmium will be among the last constituents to be oxidized following constituents such as sulfides, nitrites, labile organics, zinc, iron and others. Oxidized cadmium in leachate will be reduced as it passes through the dredged material that is still in a reduced condition. Oxidation is most rapid the dredged material becomes dry because it has more surface area and larger pores to allow more exchange of air and greater diffusion of oxygen to the reaction sites and is not restricted by diffusion rates through water. The moisture content should be well below the field capacity of the dredged material and below the content where evaporation starts being restricted by capillary action (approaching the wilting point of the dredged material).

Organization/Public	Comment	Response
	Additionally, the flooding (0.5-1.0 feet) of potentially oxidized cadmium-laden sediment following the completion of the dredging activities prior to cap placement may lead to greater cadmium solubility than expected. Has this possibility been considered by the USACE?	USACE has determined that the likelihood of the Cadmium being oxalated and thus become available in a soluble form is very low.
	The wildlife/bird abatement section describes actions to reduce wildlife use of the DMCA(s) during the construction period. These include holding water over the DMCA surface, and active human abatement methods such as riding an ATV around the site and operating a drone. USACE would employ methods identified in the SEA as it deems necessary. The Service opines that this is very subjective. The Service recommends that there be wildlife monitoring at a more frequent level than as currently described in the FEIS, including bird use benchmarks to measure the success of the abatement program and to trigger additional abatement actions. Consideration should be given to an adaptive management program for the wildlife abatement program. If the abatement program is not meeting designated success criteria for a period of time, an adaptive management strategy should be designated in the dSEA.	The use of a multi-pronged approach allows for adaptively managing the amount and method of bird abatement. A detailed Success Monitoring of Bird abatement plan has been added to the document. Information from the QA and bird abatement team will be used with the planned monitoring to determine if additional actions are needed.
	The Service opines that wildlife abatement on the 815 acre DMCA 14A will be difficult. It will be even more difficult if abatement must additionally occur on the adjacent 765 acre DMCA 14B. Resident birds become familiar with abatement methods and hazing becomes less effective with time. Is the USACE confident that wildlife abatement techniques will be successful over such a large area of inundation for an extended period of time?	The use of a multi-pronged approach ensures confidence that successful bird abatement can occur. In the addition recent studies have shown the use of laser can be used on large areas to haze birds. The proposed alternative should only require Cadmium-laden sediments to be placed in DMCA 14A. Furthur coordination with USFWS has led to a development of A detailed Success Monitoring of Bird abatement plan. This plan has been added to the EA as Appendix A.
	As a periphery comment, anecdotal information concerning drone use is that the legal requirements to become a drone operator are lengthy and time-consuming. The requirements must be started many months in advance of the anticipated use of the drone.	All legal issues with drone use will be considered.

Organization/Public	Comment	Response
	Flooding the DMCA between high cadmium sediment placement events and after sediment placement would include flooding with six inches to twelve inches of water over the sediments as shown in figure 3 of the SEA. This creates shallow water foraging habitat for many waterfowl and wading bird species. The Service recommends increasing the flooding depth to 2.5 feet. This is deeper than most waterfowl and wading birds use (with the exception of grebe and diving duck species). We opine that this is a more effective abatement technique than the six to twelve inches of water proposed.	USACE would have the ability to inundate and provide a depth of approximately 18 inches of water over the Cd-laden material The addition of the use of bird abatement will mitigate for any depth that does not reach 18 inches.
	The USACE considered Alternative 9 in the SEA. It involved constructing finger dikes within DMCA 14A to create 10 cells averaging 60-65 acres each with subsequent capping of each cell as it is filled as soon as possible thereafter. This alternative would have smaller areas of high cadmium sediments exposed at any time. We opine that the smaller areas would make wildlife/bird abatement (if deemed necessary from wildlife monitoring) easier and potentially more effective. The smaller areas would have less surface area exposed at any time should sediment oxidation be a concern This alternative combine with wildlife/bird abatement, while more costly than as considered in the SEA, would seem to have less risk of cadmium exposure to wildlife. The Service recommends further consideration of this proposal.	USACE has determined that Alternative 10 is still the proposed action based on: 1. the risk of oxidation of the Cadmium is low 2. bird abatement over DMCA 14A can be accomplished 3. the T&E species that are known to use the DMCA rare or seasonal 4. the reduced area that would require capping in Alternative 10. 5. the higher cost of Alternative 9 due to use of both DMCAs and needing to cap both.
	Based on our above comments and questions, we cannot concur with your ESA determination and Draft Finding of No Significant Impact for the proposed action at this time.	This updated assessment concludes that this alternative, “may affect, but is not likely to adversely affect” piping plover, wood stork, and red knot or their critical habitat due to the rarity of piping plover and red knot being in the DMCAs and the seasonality of wood storks in the DMCAs. In addition there is similar habitat for these species adjacent to DMCA 14A and 14B.
South Carolina Department of Natural Resources	The South Carolina Department of Natural Resources (SCDNR) has reviewed the Draft Supplemental Environmental Assessment (SEA) referenced above and offers the following comments.	Thank you for your response. Responses to individual comments follow.
	1. SCDNR concurs with the Corps’ revised analysis of the volume of cadmium laden sediments that will require special handling as part of SHEP.	Thank you for your response.

Organization/Public	Comment	Response
	2. SCDNR recognizes the Corps' need to develop an alternate plan for disposing cadmium-laden sediments in DMCAs 14A and 14B due to the risk of dike failure under the currently authorized plan; however, we recommend that Alternative 9 be implemented rather than Alternative 10 because it would more effectively limit the exposure of birds and other wildlife to cadmium-laden sediments. Both the spatial and temporal extent of exposure would be substantially less with Alternative 9, which, in turn, would eliminate the need for bird abatement.	USACE has determined that Alternative 10 is still the proposed action based on: 1. the risk of oxidation of the Cadmium is low 2. bird abatement over DMCA 14A can be accomplished 3. the T&E species that are known to use the DMCA rare or seasonal 4. the reduced area that would require capping in Alternative 10. 5. the higher cost of Alternative 9 due to use of both DMCAs and needing to cap both.
	3. Due to the large size of disposal areas 14A and 14B (815 acres and 765 acres, respectively), the bird abatement plan described for Alternative 10 would likely be very costly and ultimately ineffective. It should also be noted that, if it were successfully implemented, the bird abatement plan would effectively eliminate the entire DMCA as useable bird habitat while abatement was being conducted. This is in stark contrast to Alternative 9, which includes no bird abatement plan, thus leaving most of the DMCA undisturbed and available to birds except for the 60- to 65-acre cell where work is ongoing.	The use of a multi-pronged approach ensures confidence that successful bird abatement can occur. In the addition recent studies have shown the use of laser can be used on large areas to haze birds. The proposed alternative should only require Cadmium-laden sediments to be placed in DMCA 14A.
	4. Although a detailed cost analysis is not provided for any of the alternatives considered, it would seem that any additional cost of moving the dredge more frequently, as required under Alternative 9, would be offset by the high cost of bird abatement that would be required under Alternative 10. Furthermore, Alternative 9 would achieve the same goal of preventing dike failure as Alternative 10.	The higher cost of Alternative 9 due to use of both DMCAs and needing to cap both.

Organization/Public	Comment	Response
	5. The currently authorized plan (Alternative 2) would have substantially reduced wildlife exposure to cadmium-laden sediments by flooding these areas with 4 to 6 feet of water. The relatively deep water would also have reduced the risk of predation by terrestrial predators on nesting seabirds and their offspring. Maintaining the cadmium-laden sediments in a "moist" rather than "flooded" condition, as required by Alternative 10, might actually encourage foraging by shorebirds, thus increasing their exposure to cadmium. Subsequently covering these sediments with only 6 to 12" of water might also encourage foraging by waterfowl and wading birds, thus increasing their level of exposure, as well. The shallower water would also provide less of a deterrent to terrestrial predators.	Nesting will not be allowed in 14A during this placement Cadmium-laden sediment. USACE would have the ability to inundate and provide a depth of approximately 18 inches of water over the Cadmium-laden sediment. This depends on the settlement of the back counterweight and the volume of the Cd placed in DMCA 14A. Different rates of consolidation, bulking, and settlement of the back dike affect the allowable depth of water. The addition of the use of bird abatement will mitigate for any depth that does not reach 18 inches.
	6. The SEA does not include any discussion of how the different alternatives would affect the Corps' current obligation to provide bird habitat within the DMCAs as compensatory mitigation for wetland impacts that resulted from impounding DMCA 14A in 2006. As part of the Savannah Harbor Navigation Project, the Corps committed to providing an annual average of 1,769 units of migratory bird habitat, including 1,245 acres of foraging habitat for waterfowl and shorebirds, 74 acres for bare ground nesting, and 450 acres for wetland nesting. During the past four years, the Project has failed to provide the required number of habitat units due to operational issues. The Corps now expects that the Project will provide less than its commitment until 2019, when dike raising operations in the DMCAs will allow the Corps to meet the mitigation requirements once again. As stated in an earlier Draft EA1 addressing this issue, the Corps' ability to provide wildlife habitat in the DMCAs may also be adversely affected by the Savannah Harbor Expansion Project (SHEP). The Draft SEA for the current proposed action should describe in detail how each of the three alternatives retained after the initial screening would affect the Corps' obligation to provide bird habitat in the DMCAs as compensatory mitigation for past wetland losses. A quantitative estimate of future deficits in habitat units that would occur under each alternative should be included, as well.	All alternatives including No action accomplish the required bird habitat in other DMCAs. DMCA 14A and 14B will be taken out of the rotation to produce habitat value during the Cadmium-laden sediment placement.
	7. Until these comments are adequately addressed, SCDNR cannot concur with the Draft Finding of No Significant Impact for the Proposed Action.	Thank you for your response.

Organization/Public	Comment	Response
South Carolina Department of Health and Environmental Control	The South Carolina Department of Health and Environmental Control (SCDHEC) appreciates the opportunity to comment on the Draft Supplemental Environmental Assessment (SEA) referenced above and our Bureau of Water and Office of Ocean and Coastal Resource Management are submitting the following joint comments for your review and consideration.	Thank you for your response and providing this information. Responses to individual comments follow.
	The proposed alternative greatly reduces the possible risk of dike failure and associated possible cadmium laden soil dispersal to the adjacent waters. The SEA acknowledges that there is slightly higher risk of birds and other wildlife to be exposed to cadmium in this alternative as the area will not be fully inundated. Several methods of bird abatement were cited but no effectiveness or suitability and level of risks of the different methods were discussed. This needs to be more clear and the effectiveness of the preferred method/methods in similar situations, if any, needs to be cited.	The use of a multi-pronged approach allows for adaptively managing the amount and method of bird abatement. In the addition recent studies have shown the use of laser can be used on large areas to haze birds. Information from the QA and bird abatement team will be used with the planned monitoring to determine if additional actions are needed.
	The FEIS, Appendix M, Sec. 7.3.1, refers to the original plan for keeping the disposal area in a "'ponded' state (inundated)" while the current FONSI in the third paragraph of the Project Description states the proposed change would keep the area in a "moist (inundated) but not flooded condition." It is confusing and incorrect to use "inundated" as synonymous with both the original "ponded" and proposed "moist" conditions. Thus, we recommend another description for the "moist" condition.	Moist is considered Partially saturated. The moisture content should be well below the field capacity of the dredged material and below the content where evaporation starts being restricted by capillary action (approaching the wilting point of the dredged material).
Savannah River Maritime Commission	The Savannah River Maritime Commission hereby adopts the comments provided by the South Carolina Department of Health and Environmental Control (DHEC), attached hereto as Exhibit 1, regarding the United States Army Corps of Engineers, Savannah District's Draft Supplemental Envirom11ental Assessment (Draft SEA), dated December 30, 2016, concerning (1) the refinement of channel reaches that contain naturally-occurring cadmium at levels that require special handling, and (2) keeping the deposited cadmium-laden sediments moist in DMCAs 14A and 14B by maintaining water height just below the elevation of the dredged sediments, rather than flooded.	Thank you for your response and providing this information. Please see response to comments under SCDHEC.

Organization/Public	Comment	Response
Coastal Group of the Georgia Sierra Club	I am writing on behalf of the Coastal Group of the Georgia Sierra Club and appreciate the opportunity to comment on the Draft Supplemental Environmental Assessment (EA): Excavation and Placement of Cadmium-Laden Sediments that alters the original plan for handling cadmium-laden sediments as described in the July 2012 Final Environmental Impact Statement (FEIS) for the Savannah Harbor Expansion Project (SHEP) and the October 2012 Record of Decision (ROD).	Thank you for your response and providing this information. Responses to individual comments follow
	Birds are highly motivated by food and the abundance of food in the DMCAs attracts large flocks. Birds are also known to become habituated to human noise and activity. It is likely that birds will find the abundance of food enticing enough to withstand efforts to scare them away. The EA should acknowledge this and discuss the efficacy of the listed bird abatement methods, some of which are commonly known to be ineffective. For example, I have often seen birds perched atop the heads of fake owls.	The use of a multi-pronged approach allows for adaptively managing the amount and method of bird abatement. In the addition recent studies have shown the use of laser can be used on large areas to haze birds. Information from the QA and bird abatement team will be used with the planned monitoring to determine if additional actions are needed.
	Even if active human abatement were proven effective, it could be impractical to employ people to do this all day.	The use of automated deterrent laser at night could accomplish the goal of 24 hour coverage.
	The EA also assumes that birds do not feed at the DMCAs at night. Have any nighttime surveys been done which support this assumption?	The use of automated deterrent laser at night could accomplish the goal of 24 hour coverage.
	The Coastal Group respectfully asks that you thoroughly research and evaluate both the practicality and efficacy of the proposed bird abatement methods before preparing the Final Supplemental EA. Without strong evidence that the available methods will work, we ask that you reject Alternative 10 and adopt Alternative 9 which addresses the structural problems without creating a need to chase birds from the site. And lastly, we ask that the public be provided an opportunity to read and comment on the Final Supplemental EA.	USACE has determined that Alternative 10 is still the proposed action based on: 1. the risk of oxidation of the Cadmium is low 2. bird abatement over DMCA 14A can be accomplished 3. the T&E species that are known to use the DMCA rare or seasonal 4. the reduced area that would require capping in Alternative 10. 5. the higher cost of Alternative 9 due to use of both DMCAs and needing to cap both.

Organization/Public	Comment	Response
Georgia Department of Natural Resources Coastal Management Program	The Georgia Coastal Management Program (GCMP) concurs that the proposed action, placing cadmium-laden dredged sediments in Dredged Material Containment Areas (DMCAs) 14A & 14B in a moist (inundated) but not flooded condition as part of the Savannah Harbor Expansion Project (SHEP), does not change the direct and indirect impact on the coastal zone that were described in the SHEP FEIS and no updates to the SHEP CZM concurrence letter are needed.	Thank you for your response and providing this information.
Southern Environmental Law Center	The Southern Environmental Law Center (SELC) submits these comments on behalf of the Savannah Riverkeeper, South Carolina Wildlife Federation, and South Carolina Coastal Conservation League. SELC has reviewed the U.S. Army Corps of Engineers' (Corps) Draft Supplemental Environmental Assessment (Draft SEA) for modifications to the excavation and placement of cadmium-laden sediments as part of the Savannah Harbor Expansion Project (SHEP). Based on this review, SELC does not agree with the Draft Finding of No Significant Impact and urges the Corps to further evaluate the sediment disposal alternatives, and possibly consider and implement Alternative 9 instead of the Proposed Action Alternative 10.	Thank you for your response. Responses to individual comments follow.
	The moist sediment conditions during sediment placement, where water is 6"-12" below the elevation of the deposited material, may encourage foraging by shorebirds. The flooded sediment conditions between and after sediment placement, where water is 6"-12" above the elevation of the deposited material, may be attractive for many migratory species, including wading birds and waterfowl. In both conditions, predators are more likely to be attracted to the area than they would have been if the sediments were covered in 4 to 6 feet of water.	USACE would have the ability to inundate and provide a depth of approximately 18 inches of water over the Cd-laden material. This depends on the settlement of the back counterweight and the volume of the Cd placed in DMCA 14A. Different rates of consolidation, bulking, and settlement of the back dike affect the allowable depth of water. The addition of the use of bird abatement will mitigate for any depth that does not reach 18 inches.

Organization/Public	Comment	Response
	In addition, as the FWS points out, moist sediment conditions during placement may still allow sediments to be oxidized, even if they are not dried out. This could lead to increased cadmium solubility and increased cadmium water concentrations. Once the DMCA is flooded between and after sediment placement, cadmium solubility could increase even more, and the quality of water discharging to the Savannah River could decrease. If the water contains enough cadmium, the Corps' proposal to reroute water to discharge at Fields Cut may not be enough to protect water quality in the Savannah River. The Corps should study the possibility of oxidation in the proposed alterative and the potential effects on cadmium mobility and water quality.	The ERDC document addresses leachate concerns in the response to comments section. As it states, leachate is never likely to become an issue. Cadmium will become oxidized and thus mobile and bioavailable as the dredged material becomes oxidized. However, the depth of oxidation is a function of the deposit and its condition. If allowed to dry and create desiccation cracks and to become vegetated and create root channels as well as worm holes, the top two to three feet of the dredged material will become oxidized; the rest of the dredged material will remain in a reduced condition until sufficient oxygen can diffuse through the profile to satisfy the demand. Cadmium will be among the last constituents to be oxidized following constituents such as sulfides, nitrites, labile organics, zinc, iron and others. Oxidized cadmium in leachate will be reduced as it passes through the dredged material that is still in a reduced condition. Oxidation is most rapid the dredged material becomes dry because it has more surface area and larger pores to allow more exchange of air and greater diffusion of oxygen to the reaction sites and is not restricted by diffusion rates through water. The moisture content should be well below the field capacity of the dredged material and below the content where evaporation starts being restricted by capillary action (approaching the wilting point of the dredged material).

Organization/Public	Comment	Response
	It will be difficult to ensure that abatement is successful over such a large area (815 or 1,580 acres) of attractive foraging habitat. This is especially true because resident birds are likely to become accustomed to, and less deterred by, hazing tactics over time. The Corps 2 should develop a more detailed monitoring and benchmarking strategy to measure the success of the abatement program and trigger additional actions if necessary. In addition, the Corps should develop a detailed cost analysis of the program. We concur with the SCDNR that the cost of an effective abatement program is likely to rival any extra costs associated with implementing Alternative 9. It would be helpful if the Corps provided examples of similar situations where abatement tactics have successfully kept wildlife away from large areas of shallow wading land. These examples might be useful for developing an appropriate benchmarking strategy and cost analysis.	The use of a multi-pronged approach allows for adaptively managing the amount and method of bird abatement. In the addition recent studies have shown the use of laser can be used on large areas to haze birds. The proposed alternative should only require Cadmium-laden sediments to be placed in DMCA 14A Information from the QA and bird abatement team will be used with the planned monitoring to determine if additional actions are needed.
	As part of the Savannah Harbor Navigation Project, the Corps made a long-term commitment to provide 1,769 habitat units on average, per year within the DMCAs as compensatory mitigation for past wetland losses-1,245 acres for shorebird and waterfowl feeding, 74 acres for bare ground nesting, 450 acres for wetland nesting. The Project has failed to provide the committed habitat units since 2013 and the Corps expects this deficit to run until 2019. The Corps does not discuss how Alternative 10 will impact its ability to meet this revised 2019 goal, but it is likely that the bird abatement program in Alternative 10 would make all of DMCA 14A, and possibly all of DMCA 14B unavailable for bird habitat until a permanent covering is put in place. The Draft SEA should address how each of the proposed alternatives would affect the Corps' obligation to provide bird habitat.	All alternatives including No action accomplish the required bird habitat in other DMCAs. DMCA 14A and 14B will be taken out of the rotation to produce habitat during the Cadmium-laden sediment placement.

Organization/Public	Comment	Response
	Employing the finger dikes proposed in Alternative 9 is likely a better solution than Alternative 10, and we request that the Corps study it in more detail. Alternative 9 would expose much smaller areas of sediment to birds and other wildlife at any one time (60 to 65-acres versus 815 or 1,580 acres). It would also prevent sediment oxidation and leave most of DMCAs 14A and 148 undisturbed to provide habitat units. A detailed cost analysis is not provided for any of the alternatives, but we concur with the SCDNR that any extra costs associated with implementing Alternative 9-for example, due to moving the dredge multiple times-is likely to be offset by the cost of an effective abatement program for Alternative 10.	USACE has determined that Alternative 10 is still the proposed action based on: 1. the risk of oxidation of the Cadmium is low 2. bird abatement over DMCA 14A can be accomplished 3. the T&E species that are known to use the DMCA rare or seasonal 4. the reduced area that would require capping in Alternative 10. 5. the higher cost of Alternative 9 due to use of both DMCAs and needing to cap both.
U.S. Fish and Wildlife Service – June 22, 2017	The Savannah District, U.S. Army Corps of Engineers (USACE), has prepared a Supplemental Environmental Assessment (SEA) dated June 2017 to evaluate the potential impacts of modified actions concerning the of placing cadmium-laden dredged sediments in Dredged Material Containment Areas (DMCAs) 14A and 14B as part of the Savannah Harbor Expansion Project (SHEP). The proposed action includes keeping the deposited cadmium-laden sediments moist in DMCA 14A by maintaining the water height just below the elevation of the deposited dredged sediment rather than flooded and mitigation (bird abatement).	Thank you for your response. Responses to individual comments follow.

	The SEA does not indicate that the changes proposed would change the impacts to listed species. The SEA does state that there is a slightly higher risk that listed birds could bio accumulate cadmium in their system since the DMCA would not be fully flooded continuously. The USACE Endangered Species Act (ESA) determination for the piping plover, wood stork, and red knot is "may affect, but is not likely to adversely affect" due to the rarity of piping plover and red knot being in the DMCAs and the seasonality of wood storks in the DMCAs. In addition, the USACE states that there is similar habitat for these species adjacent to DMCA 14A and 14B. The proposed project changes described in the SEA do not change our ESA section 7 concurrence. The determination is no change from the SHEP final EIS. The bird abatement to mitigate the potential impact of high cadmium sediments will include abatement of the listed species mentioned above if they are present in the DMCA. We do not consider the abatement mitigation to rise to the level of 'take' in the form of harassment. Harass is defined by the U.S. Fish and Wildlife Service as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. The abatement should never meet this definition. During this action, this DMCA(s) will not provide quality habitat for any of the normal behaviors mentioned for any of these species. However, the adjacent DMCAs are managed for the benefit of wildlife. Under the Savannah Harbor Long Term Management Strategy bird habitats have been created in the DMCAs as mitigation to compensate for harbor maintenance impacts. These DMCAs now provide nesting habitat for shorebirds and colonial nesting birds and are highly used by wildlife. Any bird abated from the project DMCA(s) has access to	Thank you for your concurrence from USFWS that this project "may affect, but is not likely to adversely affect" due to the rarity of piping plover and red knot being in the DMCAs and the seasonality of wood storks in the DMCAs, and the determination that the bird abatement plan does not rise to the level of 'take'.

Organization/Public	Comment	Response
	quality habitats in the adjacent and nearby DMCAs and adjacent expanses of salt marsh. Creeks in salt marsh are a common and frequently used foraging habitat for wood storks.	
	On February 2, 2017, the U.S. Fish and Wildlife Service provided comments on an earlier draft of the dSEA under the ESA and the Fish and Wildlife Coordination Act (FWCA). In Appendix B of the SEA the USACE has responded to the comments made under the FWCA.	These changes include: 1. adding Appendix A - a monitoring plan for the success of the bird abatement that includes success criteria, 2. adding historical bird migration data, 3. clarify the maximum depth of flooding achievable without risking failure of the dikes, 4. provided more information on USACE ERDC evaluation of the low likelihood of cadmium oxidizing and then being incorporated into the water column, 5. additional information on why Alternative 10 is still the proposed action, and 6. providing more information on the use of the DMCA by the piping plover, red knot and wood stork.

From:	Larson, Jeff
To:	Dayan, Nathan S CIV USARMY CESAS (US)
Cc:	BAILEY, William G CIV USARMY CESAS (US); Weinstein, Bennett; Wiedl, Stephen
Subject:	[EXTERNAL] Draft supplemental assessment/cadmium disposal/SHEP
Date:	Monday, January 23, 2017 1:49:56 PM

Nathan:

The Georgia EPD has reviewed the proposal and has no comment or objection. Thank you.

Jeff Larson
Assistant Branch Chief
404-308-8062

Sent from my iPhone

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

January 23, 2017 F/SER47:CC/pw

(Sent via Electronic Mail)

Col. Marvin Griffin, Commander
Savannah District Corps of Engineers
100 W. Oglethorpe Avenue
Savannah, Georgia 31402-0889

Attention: Nathan Dayan

Dear Colonel Griffin:

NOAA's National Marine Fisheries Service (NMFS) reviewed the *Draft Supplemental Environmental Assessment (SEA)* and *Draft Finding of No Significant Impact (FONSI)* for the Savannah Harbor Expansion Project (SHEP) issued on December 30, 2016. The SEA and the FONSI are focused on potential impacts of placing dredged cadmium-laden sediments in Dredged Material Containment Areas as part of SHEP. NMFS has reviewed both documents and has no objection to the proposed action (Alternative 10). We accept the conclusion that the proposed action would have no additional impacts to EFH.

NMFS appreciates the opportunity to provide these comments. Please direct related correspondence to the attention of Cindy Cooksey at our Charleston Area Office. She may be reached at (843) 762-8610 or by e-mail at Cynthia.Cooksey@noaa.gov.

Sincerely,

/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: COE, Nathan.S.Dayan@usace.army.mil
F/SER4, David.Dale@noaa.gov
F/SER47, Cynthia.Cooksey@noaa.gov

EST. 1905
SOUTH CAROLINA DEPARTMENT OF
ARCHIVES & HISTORY

Transmitted via E-Mail

January 24, 2017

Ms. Julie Morgan
Archaeologist, Planning Division
Corps of Engineers, Savannah District
Hartwell Project
5625 Anderson Highway
Hartwell, GA 30643

Re: Savannah Harbor Expansion Project, Draft Supplemental Environmental Assessment (SEA), Excavation and Placement of Cadmium-Laden Sediments
Jasper Counties, South Carolina
SHPO Project No. 03-VM0063

Dear Ms. Morgan:

We received a letter from William G. Bailey on January 5, 2017 regarding the above-referenced project. The State Historic Preservation Office (SHPO) is providing comments to the Corps pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR 800. Consultation with the SHPO is not a substitution for consultation with Tribal Historic Preservation Offices, other Native American tribes, local governments, or the public.

We have reviewed the Draft SEA as requested. Based on the information on pages 43-45, there do not appear to be any expected impacts to cultural resources.

Thank you for the opportunity to provide comments. If you have any questions, please contact me at (803) 896-6168 or ejohnson@scdah.sc.gov.

Sincerely,

Elizabeth M. Johnson

Elizabeth M. Johnson
Director, Historical Services, D-SHPO
State Historic Preservation Office

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION

MARK WILLIAMS
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

January 25, 2017

William G. Bailey
Chief, Planning Division
Savannah District, Corps of Engineers
100 West Oglethorpe Avenue
Savannah, Georgia 31401-3604
Attn: Julie Morgan, Archaeologist

RE: Savannah Harbor Navigation Channel Project
Chatham County, Georgia
HP-911120-001

Dear Mr. Bailey:

The Historic Preservation Division (HPD) has received the additional information submitted concerning the above referenced undertaking. Our comments are offered to assist the US Army Corps of Engineers (USACE) in complying with provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) and are in accordance with the programmatic agreement (PA) for the above referenced undertaking that HPD signed November 22, 2011.

The current submitted information includes an assessment to evaluate the potential impacts of placing cadmium-laden dredging sediments in containment areas as part of the Savannah Harbor Expansion Project. Based on the additional information provided, HPD concurs that the containment areas have a high probability of containing historic properties, some of which may be eligible for listing in the National Register of Historic Places (NRHP). However, it is HPD's opinion that no historic properties that are listed or eligible for listing in the NRHP will be affected by this portion of the proposed undertaking, as defined in 36 CFR Part 800.4(d)(1), due to the scope of work and previous disturbances.

This letter evidences consultation with our office for compliance with Section 106 of the NHPA for this portion of the project. It is important to remember that any changes to this portion of the project, as it is currently proposed, may require additional consultation. HPD encourages federal agencies to discuss such changes with our office to ensure that potential effects to historic properties are adequately considered in project planning.

Please refer to project number **HP-911120-001** in any future correspondence regarding this project. If we may be of further assistance, please do not hesitate to contact me at (770) 389-7851 or jennifer.dixon@dnr.ga.gov.

Sincerely,

Jennifer Dixon, MHP, LEED Green Associate
Program Manager
Environmental Review & Preservation Planning

JEWETT CENTER FOR HISTORIC PRESERVATION
2610 GA HWY 155, SW | STOCKBRIDGE, GA 30281
770.389.7844 | FAX 770.389.7878 | WWW.GEORGIASHPO.ORG

INTERNATIONAL PAPER

SAVANNAH MILL
P. O. Box 570
Savannah, Georgia 31402

January 27, 2017

Mr. Nathan Dayan (PD)
Department of the Army
Savannah District, Corps of Engineers
100 West Oglethorpe Avenue
Savannah, GA 30401-3604

Re: Comments on the *"Draft Supplemental Environmental Assessment (SEA), Savannah Harbor Expansion Project, Excavation and Placement of Cadmium-Laden Sediments), December 2016"*

Dear Mr. Dayan:

The purpose of this letter is to provide comments on the Draft SEA for the excavation and placement of cadmium sediments dated December 2016. On December 30, 2016, a public notice was issued and comments are due by noon on February 3, 2017.

International Paper agrees with the conclusions and recommendations of the SEA to identify the locations[1] of cadmium-laden material requiring special handling. These locations are summarized in the following table.

Location of Cadmium-laden Material Requiring Special Handling	
Beginning Station	**Ending Station**
24+000	31+000
33+000	37+000
41+000	45+000
53+000	55+000

International Paper appreciates the opportunity to review and provide comments. International Paper supports the Savannah Harbor Expansion Project as it is important to maintain a competitive, viable Port and the economic growth of our community.

Sincerely,

Dave Castro
Mill Manager

cc: Chris Rogge, International Paper
Brittany Robinson, International Paper

[1] The locations in the Savannah Harbor where sediments require special handling are identified in Table 9 and Figure 13 of the SEA.

From:	CESAS-PD, SAS
To:	Dayan, Nathan S CIV USARMY CESAS (US)
Cc:	Sattler, Laurie F CIV USARMY CESAS (US); Armetta, Robin E CIV USARMY CESAS (US); Davis, Spencer W CIV USARMY CESAS (US)
Subject:	FW: Comments regarding the Draft SEA /FONSI for SHEP Cadmium-laden sediment placement plan.
Date:	Wednesday, February 01, 2017 4:45:15 PM
Attachments:	USACE-Letter-2012-Opportunity.pdf

From: Gage, Jon [mailto:JGage@moffattnichol.com]
Sent: Wednesday, February 01, 2017 3:44 PM
To: CESAS-PD, SAS <CESAS-PD.SAS@usace.army.mil>
Cc: DMARCHAND@gaports.com; Rieger, Michael <MRieger@moffattnichol.com>
Subject: [EXTERNAL] Comments regarding the Draft SEA /FONSI for SHEP Cadmium-laden sediment placement plan.

To whom it may concern,

The following comments regarding the draft supplemental environmental assessment for the Savannah Harbor Expansion Project (Excavation and Placement of Cadmium-Laden Sediments), dated December 2016. These comments are provided on behalf of the Jasper Ocean Terminal Joint Venture.

The 2010 SHEP General Re-evaluation Report (GRR) identified that new work material generated by SHEP would be placed into DMCAs 14A and 14B. In 2011 and 2012, The Jasper Ocean Terminal Joint Project Office (now Joint Venture) worked with the USACE to develop an opportunity plan to encourage preferential placement of all SHEP material into DMCA 14A to benefit the proposed Jasper Ocean Terminal project.

A letter from Colonel Jeffrey Hall to the Joint Project Office dated January 9th, 2012 (copy attached) confirmed USACE conceptually supports the proposed opportunity plan and further assured that all alternatives to maximize the volume of new work dredged material placed into DMCA 14A would be evaluated.

Comments:

1. Request the supplemental EA clarify 1) if dike capacity has been evaluated for the placement of additional clean (i.e. non-cadmium laden) sediment above the proposed post-cap elevation of +16 ft and 2) if the project intends to place additional new work material within DMCA 14A beyond the described placement of cadmium-laden sediments and the clean cap to a nominal elevation of +16 ft, as indicated.

2. Does the proposed operation preclude or otherwise restrict placement of additional new work material in

DMCA 14A if the dikes are determined to have sufficient capacity to support?

3. Request section 1.1.1 or 1.1.5 be revised to provide the opportunity for future placement of clean new work material if determined to be technically feasible. To this end, the Joint Venture is interested in evaluating this opportunity further and may be interested in providing funds to offset incremental cost differences between placement in 14A and disposal sites selected by the project based on lowest cost, if the JV determines the benefits to the JOT project justify the expenditure.

4. Section 1.1.6 (pg 9) indicates that future excavation into the cadmium placement strata will be prohibited. The last sentence on Pg 9 indicates that protocols may be identified to permit excavation if needed. The current Jasper Ocean Terminal concept proposes significant excavation along the southern edge of 14A and 14B to create a deep draft berthing area and turning basin. This excavation extends into the DMCA interiors and will likely encounter the cadmium-laden material placed by this proposed plan. Request Section 1.1.6, Section 6.0 (proposed action effect #4), and the FONSI be revised to acknowledge the likelihood of future excavation activities, or provide an opportunity for the Joint Venture to coordinate the placement of cadmium-laden material to locations within 14A/B that are at a lower risk of being exposed in the future.

If you have any questions regarding these comments, please do not hesitate to contact me.

Sincerely,

Jon

Jon Gage, P.E.

Moffatt & Nichol

2 East Bryan Street, Suite 501

Savannah, GA 31401

912-231-0044

jgage@moffattnichol.com <mailto:jgage@moffattnichol.com>

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

Executive Office

JAN 09 2012

Mr. Doug Marchand
Executive Advisor
Jasper Ocean Terminal Joint Project Office
Post Office Box 1687
Savannah, Georgia 31402

Dear Mr. Marchand:

I refer to my letter to you dated December 28, 2011, and subsequent discussions regarding the US Army Corps of Engineers' (USACE) commitment to a continued working relationship with the Joint Project Office (JPO) as you prepare plans for the Jasper Ocean Terminal (JOT). Specifically, I want to confirm USACE conceptually supports the JPO's recently proposed "Opportunity Plan." That plan calls for maximizing the placement of dredged materials from the Savannah Harbor Expansion Project (SHEP) into Dredged Material Containment Area (DMCA) 14A and continued Operations and Maintenance use of both DMCAs 14A and 14B. The November 2010 version of the SHEP General Reevaluation Report stated that new work sediments would be deposited into DMCAs 14A and 14B. The latest version of the report states that the new work sediments could be placed in DMCA 14A alone if detailed design work indicates this is feasible. This is in keeping with our mutual goal to beneficially use dredged material to maximize the DMCAs' useful capacities and consider needs of a future JOT.

The only limiting factor to maximizing DMCA 14A usage is the rear dike elevation. Without additional funding and time for consolidation before the SHEP inner harbor dredging commences, the necessary dike elevation cannot be obtained. With this in mind, my staff looks forward to the continuing exchange of ideas with your engineering consultant, Moffat & Nichol, aimed at using new and existing technologies to maximize the DMCAs' capacity. As the JPO has indicated, the strategic placement of dredged materials could significantly reduce site development costs for a proposed Jasper Ocean Terminal. I will ensure that my staff thoroughly evaluates all alternatives to maximize the volume of new work dredged material placed into DMCA 14A.

If you have any questions or concerns regarding the contents of this letter, please contact me at (912) 652-5226 or Mr. Alan Garrett of the Savannah District's Civil Works Projects Branch at (912) 652-5172.

Sincerely,

Jeffrey M. Hall
Colonel, US Army
Commanding

From:	Higgins, Jamie
To:	Dayan, Nathan S CIV USARMY CESAS (US); BAILEY, William G CIV USARMY CESAS (US)
Cc:	Higgins, Jamie; Militscher, Chris; Holliman, Daniel
Subject:	[EXTERNAL] SHEP Cadmium Laden Disposal SEA
Date:	Thursday, February 02, 2017 4:36:06 PM
Attachments:	ACE.SHEP Cadmium Disposal SEA.2017.final.pdf

Bill/Nathan,

Please find attached EPA's comments on the SHEP Cadmium Laden Disposal SEA. We had one of our ecological risk assessors from our Superfund Division look at the SEA and the comments are very technical. Let us know if you would like for us to explain our comments in a conference call. Also, we are available to provide extensive technical assistance to expeditiously resolve any of our comments.

Thanks,

Jamie

Jamie Higgins

EPA Region 4

NEPA Program Office

Sam Nunn Atlanta Federal Center

61 Forsyth Street, SW

Atlanta, GA 30303

404-562-9681

Higgins.jamie@epa.gov

Savannah Harbor Expansion Project
Excavation and Placement of Cadmium-Laden Sediments
Supplemental Environmental Assessment (SEA)
EPA Technical Review Comments
February 2016

The EPA has reviewed the draft SEA and two other supporting documents (Environmental Impact Statement, Appendix M, Sediment Quality Evaluation (USACE 2012) and Savannah Harbor Expansion Project Phase II Evaluation (EA 2008)). Our comments are detailed below:

Jasper Ocean Terminal:
The EPA recently learned that the Disposal Material Containment Area (DMCA) where the cadmium laden sediment will be disposed could be used as the location for the proposed Jasper Ocean Terminal (JOT). There is currently an Environmental Impact Statement (EIS) being developed by the Charleston District, US Army Corps of Engineers (USACE) for the Section 404 Clean Water Act (CWA) permit action for the proposed JOT, which is triggering the NEPA action. The Section 404 CWA permit applicant is the Georgia Port Authority and the SC Port Authority. The EPA notes that there is no discussion regarding this proposed project and the cadmium laden sediment disposal site in the SEA.

Recommendation: The EPA recommends the USACE briefly discussed the relationship of the proposed JOT and the cadmium laden sediment DMCA as well as the development of the Charleston District and Savannah District's EIS.

NPDES Permitting:
On page 6, the USACE discusses the water quality and states, "As sediments are deposited in the DMCA, water is decanted once it meets state standards for acceptability." However, there is no discussion of the USACE acquiring a National Pollution Discharge Elimination System (NPDES) permit and it is hard to determine if the state intends to require a NPDES permit. Also, the EPA is concerned that there is no discussion regarding the pollutant that they are testing to meet state water quality standards. The EPA notes that there does not appear to be a thorough description of how the USACE intends to manage the decanted water in the preferred alternative.

Recommendation: The EPA recommends that the USACE better describe whether or not they intend to obtain a NPDES permit. Additionally, the EPA recommends that the USACE provide more detail regarding the water quality standard that the USACE is trying to meet in the Final SEA. The EPA further recommends that the USACE better explain how they intend to manage the decanted water in the Final SEA.

Evaluation of Cadmium Laden Sediment in Semi-moist State:
The EPA is concerned that the current methodology of evaluating the cadmium laden sediment did not analyze the sediments in a moist condition versus completely inundated. It is EPA's understanding that the USACE did not consider revising their conceptual model to evaluate the

exposures to birds more thoroughly by factoring in the types of birds likely to be exposed if the cadmium-laden sediments are covered by water or if the cadmium-laden sediments are not covered by water. Under the scenario where the sediments are held in a moist condition (not covered by water), the EPA is concerned that the Dredge Material Containment Areas (DMCA) could attract sediment-probing birds that feed on earthworms, spiders and other invertebrate prey that could colonize the area over time. Birds with this style of feeding and diet are potentially at greater risk from cadmium exposure under moist/low-level inundated sediment conditions than if the sediments were covered by water. In other words, the moist state of the sediment might attract different species of birds then the originally evaluated inundated state. When considering the potential risk to birds exposed to moist sediments, the conceptual site model should include the exposure of birds to earthworms, detritivore insects, and spiders. Literature studies of uptake of cadmium into soil invertebrates living in moist soils have shown uptake occurs in soils having calcium carbonate exchangeable fractions similar to those observed in the tests of dried sediments. The EPA is concerned that the SHEP Phase II Sediment Evaluation (EA 2008) did not consider the uptake of cadmium in the invertebrates that make up the diet of the variety of birds that are likely to forage in the DMCA. The adverse ecological risk could, therefore, be potentially greater than what was assumed in the original EA (2008). The EA (2008) mainly considered uptake of cadmium into herbivorous insects when evaluating risks to insectivorous terrestrial birds. The SEA did not explicitly evaluate the birds exposed to the sediments under the proposed alternatives, but instead relied on the conclusions of the FEIS. The receptors evaluated in the FEIS and supporting documents as exposed to cadmium in moist soils/sediments were assumed to inhabit or forage in a saltwater marsh.

The USACE evaluated receptors that prefer to forage on mud flats and on inundated sediments as if birds were exposed to cadmium in flooded sediments in the SHEP Phase II Sediment Evaluation. USACE (2012) and EA (2008) evaluated the sediment-probing bird under the scenario of keeping sediments inundated (covered by several feet of water). The scenario that considered sediments covered by water used site-specific data for cadmium bioaccumulation in *Nereis virens* [*Alitta virens*]. Because the sediments evaluated in the tests on the marine Polychaete [worms] were not exposed to air, cadmium remained tightly bound to the sediments, was sparingly soluble in sediment pore water, and was absent from the exchangeable fraction. Consequently, uptake of cadmium into the marine Polychaete was limited. The flooded sediments, to which the aquatic-dependent wildlife were assumed to be exposed, were characterized by sediment pore water data and sequential extraction procedure (SEP) data measured from intact subsurface sediment from sediment cores obtained from the channel bottom. These sediments demonstrated low cadmium bioavailability consistent with anoxic conditions.

The SHEP Phase II Sediment Evaluation (EA 2008) concluded (Page 5-5):

“While metals occur naturally in soils and sediments, the chemical changes that occur as the dredged material is transported from anoxic (no oxygen) channel bottom conditions to the ‘oxic’ conditions at the upland placement site may cause changes in chemical form. Oxidation may lead

to the release of metals. Therefore, identifying and quantifying the chemical form of metals in both wet and dry conditions is important for understanding their bioavailability, bioaccumulation potential, and toxicity."

The SHEP Phase II Sediment Evaluation (EA 2008) and EIS Appendix M (USACE 2014) concluded that the sediment-probing bird (Spotted sandpiper; *Actitis macularius*) and carnivorous wading bird (Great blue heron; *Ardea herodias*) were not at risk on account of having modeled their exposure to contaminants in prey based on site-specific measurements of uptake of cadmium in Polychaetes. The concentrations of cadmium in the sediment pore water and in the bioavailable fractions of the SEP data indicated that only a small fraction of the cadmium present in the anoxic sediments was available for uptake into prey items consumed by birds. If the cadmium-laden sediments taken from the bottom of the channel were placed in a moist, but not covered by water condition in a DMCA, the cadmium might become as available to sediment-probing birds and herons/egrets. The SHEP Phase II Sediment Evaluation recommended that sediments be kept wet to reduce the bioavailability of heavy metals. However, the degree of wetness or the depth of water necessary to maintain the desired redox conditions was not evaluated in the EA (2008) document or in the FEIS.

Recommendation: The EPA recommends expanding the consideration of ecological receptors that could become exposed to inundated sediments and sediments that are moist/low-level inundated, but not entirely anoxic. Additionally, the EPA recommends that the USACE appropriately evaluate the moist/low-level inundation sediment conditions and describe any associated impacts to the relevant bird species in the Final SEA.

Ecological Risk Assessment:

The EPA has concerns regarding the risk assessment used in the SEA. In the EA Appendix M, only the Marsh wren (*Cistothorus palustris*) was shown to exceed the risk level associated with the lowest observable adverse effect level (LOAEL). However, the conceptual site model of exposure to the insectivorous bird (Marsh wren) considered birds whose diet was composed of herbivorous insects. Section 10.2.4.e of EA (2008) indicated that a bioaccumulation factor for cadmium into the diet of insect-eating birds and mammals was modeled assuming a trophic transfer factor of 1.1 available from Laskowski (1991), which the SHEP Phase II Sediment Evaluation described as indicating insect tissues are likely to contain 110 percent of the concentration present in plant tissue consumed by the insect. Laskowski (1991) did not report the 1.1 transfer factor used in the assessment, they included a table of factors compiled from literature studies ranging from 0.21 to 6.25, with an average of 2.17. The EPA has a concern that the transfer factor from Laskowski (1991) for uptake of cadmium in plants to herbivorous insects is not directly interpretable from the paper.

The EPA notes that there was no site-specific information was available for uptake of cadmium in sediments/soils to invertebrates under the conditions of sediment chemistry likely to be present in the DMCA under the alternatives considered in the draft SEA. Pore water data and sequential extraction data was collected for intact sediments from sediments cores collected from

the bottom of the channel, but no tests of cadmium bioavailability were performed on sediments to simulate conditions of materials placed in a DMCA and kept moist or covered by a shallow depth of water. The degree to which cadmium in sediments is available to insectivorous birds under either the covered by water scenario or the not covered by water scenario is uncertain. In absence of site-specific data, it is recommended that a conservative model for uptake of cadmium into the diet of wildlife from EPA (2005) (Please see references) be used instead of the Laskowski (1991) paper when evaluating the potential risks to birds foraging on invertebrates.

The draft SEA did not revise the ecological risk assessment to consider the anticipated changes to the exposure to birds, fish, or other wildlife under the proposed alternative. The draft SEA relied on the FEIS and supporting documents. However, these documents did not consider exposure to cadmium in spiders, millipedes, and flies in the diet of the insectivorous bird. As previously noted, the exposure assessment for the insectivorous bird did not consider exposure to sediment-probing birds, such as the Spotted sandpiper, having a diet consisting primarily of earthworms, spiders, millipedes, and flies. Literature studies of cadmium accumulation in the tissues of terrestrial invertebrates conclude greater degrees of uptake into invertebrates in the diets of the receptors likely to become exposed to moist or low-level inundated sediments than was previously assumed in the FEIS when sediments were assumed to be covered by water.

The EPA notes that several authors have published studies of cadmium uptake into terrestrial invertebrates. Several studies have reported a greater potential for cadmium to accumulate in the tissues of invertebrates in the diet of birds than was assumed under inundated conditions. Figure 1 (attached) plots the data and bioaccumulation equations published in the literature in comparison with the concentrations in wetland/terrestrial invertebrates assumed by the USACE in EA (2008). The concentration of cadmium in the diet of the wren for the low cadmium composite is similar to the concentrations observed in herbivorous insects and beetles. However, other kinds of insects and spiders in the diet of birds have much higher concentrations than was assumed. Several papers related the uptake of cadmium to measurements of soil properties controlling cadmium bioavailability. Cadmium bioavailability in dredged sediments from the Savannah Harbor removed from the harbor and placed on the surface of the DMCA is predicted to be similar to bioavailability of cadmium in the literature studies of uptake into soil invertebrates. The EPA Ecological Soil Screening Guidance (EPA 2005) appears to be an appropriately conservative model compared to the results of literature studies for important prey items (Figure 1).

The draft SEA concluded that there was a slightly higher risk that wildlife could accumulate harmful levels of cadmium in their systems before the DMCA is fully flooded after completion of sediment placement. In addition, the SEA concluded that the proposed alternative, “may affect, but is not likely to adversely affect” Piping plover (*Charadrius melodus*), Wood stork (*Mycteria americana*), or their critical habitat. The draft SEA did not reevaluate the potential risks to birds or other receptors under the proposed alternative nor did the evaluation consider the changes to the cadmium bioavailability in sediments under the moist/low-level inundation condition relative to the inundation condition (6- to 12-inches of water) or the flooded condition.

The basis for the conclusion that the risks to birds are "slightly higher" was not provided in the draft SEA. The draft SEA incorporated a conclusion relative to the potential effect of the alternative on Piping plover or Wood stork. However, the EPA notes that there was no analysis or justification for the conclusion regarding threatened or endangered species was provided.

The EPA also notes that birds were the most sensitive receptor in this case; however, there is a potential that the second most sensitive receptors could be fish and shell fish. The EPA is concerned that fish and shell fish could also be at risk of exposure to cadmium. The EPA is unsure if fish and shellfish were considered in the ecological risk assessment. As noted in recent studies (Pious et al 2009 and Prokob et al 2003), there appears to be an increased bioavailability and leaching of cadmium from dredged sediments placed in upland disposal facilities that could potentially impact fish and shellfish.

Recommendation: The EPA recommends that the USACE reevaluate the risks to birds and other receptors using a conceptual site model that considers other potential routes of exposure/receptors and risks to sediment-probing birds having a diet that consists of worms, detritivore insects, etc. using the bioaccumulation relationship from the EPA Ecological Soil Screening Guidance (EPA 2005). The EPA recommends that using the EPA Ecological Screening Guidance (EPA 2005) will account for the likely greater degree of cadmium bioavailability in sediments held in the moist or slightly inundated condition. The potentially higher degree of risk to birds could be factored into design of management alternatives or types of monitoring. The EPA also recommends that the USACE better describe their rationale and analysis for determining that the risk to birds was "slightly higher". Given that there is a "slightly higher" risk that birds could be exposed to cadmium in the moist state (versus inundated state), the EPA further recommends that the USACE conduct monitoring to ensure receptors are not being exposed to cadmium. The EPA recommends the USACE document any monitoring commitments in the Finding of No Significant Impact (FONSI). Additionally, the EPA recommends that the USACE also describe any risks associated with fish and shellfish that could potentially be exposed to cadmium in the Final SEA.

As a Cooperating Agency under NEPA, the EPA offers our technical assistance and expertise to the USACE in any evaluations to expeditiously move the project forward.

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February 2, 2017

Colonel Marvin L. Griffin
U. S. Army Corps of Engineers
Planning Division
100 West Oglethorpe Avenue
Savannah, Georgia 31401-0889
Attention: Mr. Nathan S. Dayan

Re: USFWS File Number 2017-0265

Dear Colonel Griffin:

The U. S. Fish and Wildlife Service (Service) has reviewed the U. S. Army Corps of Engineers (USACE) draft Supplemental Environmental Assessment (SEA) and draft Finding of No Significant Impact (FONSI) for modifications to the excavation and placement of cadmium-laden sediments that is part of the Savannah Harbor Expansion Project (SHEP). The proposed action is located in Jasper County, South Carolina and Chatham County, Georgia. The USACE requests comments on the SEA and FONSI. We submit the following comments in accordance with provisions of the Endangered Species Act (ESA) of 1973, as amended; (16 U.S.C. 1531 *et seq.*) and the Fish and Wildlife Coordination Act (48 Stat. 40l, as amended; 16 U.S.C. 661 *et seq.*).

The USACE states that the proposed action modifies what is described in the July 2012 Final Environmental Impact Statement (FEIS) for SHEP in Section 5.04.2.2, and Appendix M Section 7.3.1. The changes fall into two categories (1) refining the channel reaches that contain naturally-occurring cadmium at levels that require special handling, and (2) modifying the special handling of the cadmium-laden sediment. The USACE calculates that refining the channel reaches will result in a reduction in the quantity of sediment (11.7 million cubic yards [MCY] to 4.4 MCY) that would require special handling as cadmium-laden sediment. The reduced volume of cadmium-laden sediments should allow for these sediments to be placed within one DMCA; 14A. If the quantity of cadmium-laden sediment is greater than

approximately 5 million CY bulked, both DMCA 14A and a portion of DMCA 14B would be required.

The special handling would keep the sediments moist during placement and would include wildlife/bird abatement during placement of sediments in the DMCA(s). The water height in the DMCA during placement would be maintained six to twelve inches below the elevation of the deposited dredged sediment rather than maintaining flooded conditions throughout the DMCA. The USACE states that this saturation level will limit the cadmium mobility while allowing the sediments to be worked with equipment as it is placed and will limit wildlife exposure. As the sediment material is pumped into the DMCA, it will be pushed into the flooded portion of the site, similar to beach nourishment or island creation projects. Several possible methods of wildlife/bird abatement are described in the SEA. The DMCA(s) would be flooded after placement of excavated sediments until they are subsequently covered. The SEA illustrates this as being a depth of six to twelve inches of water over the sediment (SEA - figure 3). Placement of the cadmium-laden sediments may occur over multiple years.

General Comments

In discussions with the USACE concerning the handling of the high cadmium sediment, the understanding of Service personnel was that four to six feet of water would be on the sediments during placement. This condition is reflected in the SEA with the mention of a floating barge requiring four to six feet of water. In reviewing the FEIS, we found the condition of the DMCA(s) described as 'flooded' but no water depth indicated. The four to six-foot water depth may act as a wildlife/bird abatement condition by limiting bird foraging activity and by theoretically limiting sediment oxidation and the subsequent release of cadmium. The flooding described in the SEA (six to twelve inches) seems to create a situation that may be attractive to various bird species, a shallow-water wetland. Multiple migratory birds, including wading birds and ducks, could potentially forage in six to twelve inches of water, thus increasing the likelihood of exposure to cadmium-laden sediments and/or cadmium-laden prey species.

The SEA has been drafted as a result of the USACE concern for possible DMCA dike failure if four to six feet of water is used in the DMCA(s) as proposed in the FEIS. We understand this concern. We have questions as to whether the proposed changes will change the risk of cadmium exposure to wildlife. These questions follow with our comments.

The Service has no comment on refining the channel reaches of high cadmium sediments.

Specific Comments

Section 1.1.1 The USACE will attempt to keep the dredged sediments moist by keeping the water level six to twelve inches below the level of the sediments being placed in the DMCA(s). Is the USACE confident that sediment oxidation will not be occurring during the operations? It is the Service's assessment that oxidation that accompanied the drying of sediments in earlier investigations was the primary mechanism leading to the increased cadmium solubility. It seems as though the USACE is focused on preventing sediments from drying, as opposed to preventing sediments from being oxidized. We estimate that some degree of oxidation may occur in moist

sediment, particularly considering its movement and manipulation once in the DMCA. During the placement of sediments on the surface of the DMCA, it seems that oxidation may very likely occur, particularly in the surficial sediment. This may lead to greater than expected cadmium solubility and increased cadmium water concentrations. Additionally, the flooding (0.5-1.0 feet) of potentially oxidized cadmium-laden sediment following the completion of the dredging activities prior to cap placement may lead to greater cadmium solubility than expected. Has this possibility been considered by the USACE?

Section 1.1.2 The wildlife/bird abatement section describes actions to reduce wildlife use of the DMCA(s) during the construction period. These include holding water over the DMCA surface, and active human abatement methods such as riding an ATV around the site and operating a drone. USACE would employ methods identified in the SEA as it deems necessary. The Service opines that this is very subjective. The Service recommends that there be wildlife monitoring at a more frequent level than as currently described in the FEIS, including bird use benchmarks to measure the success of the abatement program and to trigger additional abatement actions. Consideration should be given to an adaptive management program for the wildlife abatement program. If the abatement program is not meeting designated success criteria for a period of time, an adaptive management strategy should be designated in the dSEA.

The Service opines that wildlife abatement on the 815 acre DMCA 14A will be difficult. It will be even more difficult if abatement must additionally occur on the adjacent 765 acre DMCA 14B. Resident birds become familiar with abatement methods and hazing becomes less effective with time. Is the USACE confident that wildlife abatement techniques will be successful over such a large area of inundation for an extended period of time?

As a periphery comment, anecdotal information concerning drone use is that the legal requirements to become a drone operator are lengthy and time-consuming. The requirements must be started many months in advance of the anticipated use of the drone.

Section 1.1.4 Flooding the DMCA between high cadmium sediment placement events and after sediment placement would include flooding with six inches to twelve inches of water over the sediments as shown in figure 3 of the SEA. This creates shallow water foraging habitat for many waterfowl and wading bird species. The Service recommends increasing the flooding depth to 2.5 feet. This is deeper than most waterfowl and wading birds use (with the exception of grebe and diving duck species). We opine that this is a more effective abatement technique than the six to twelve inches of water proposed.

<u>Additional Comments</u>

The USACE considered Alternative 9 in the SEA. It involved constructing finger dikes within DMCA 14A to create 10 cells averaging 60-65 acres each with subsequent capping of each cell as it is filled as soon as possible thereafter. This alternative would have smaller areas of high cadmium sediments exposed at any time. We opine that the smaller areas would make wildlife/bird abatement (if deemed necessary from wildlife monitoring) easier and potentially more effective. The smaller areas would have less surface area exposed at any time should

sediment oxidation be a concern This alternative combine with wildlife/bird abatement, while more costly than as considered in the SEA, would seem to have less risk of cadmium exposure to wildlife. The Service recommends further consideration of this proposal.

Based on our above comments and questions, we cannot concur with your ESA determination and Draft Finding of No Significant Impact for the proposed action at this time.

We appreciate the opportunity to comment on this project. We invite discussion with our toxicologist, Dr. Anthony Sowers, regarding our concerns and possible ideas for further discussion. If you have any further questions, please contact our Coastal Georgia Sub Office staff biologist, Bill Wikoff, at 912-832-8739 extension 5.

Sincerely,

For Donald W. Imm, PhD.
State Supervisor/Project Leader

cc: Savannah NWR, USFWS, Hardeeville, South Carolina
Kay Davy, NMFS, Fort Lauderdale, Florida
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February 2, 2017

Colonel Marvin L. Griffin
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ATTN: Mr. Nathan Dayan (PD)

RE: Draft Supplemental Environmental Assessment
Savannah Harbor Expansion Project
(Excavation and Placement of Cadmium-Laden Sediments)
Chatham County, Georgia and Jasper County, South Carolina

Dear Colonel Griffin:

The South Carolina Department of Natural Resources (SCDNR) has reviewed the Draft Supplemental Environmental Assessment (SEA) referenced above and offers the following comments.

Background: The Draft SEA supplements the Final Environmental Impact Statement (FEIS), General Reevaluation Report (GRR), and signed Record of Decision (ROD) for the Savannah Harbor Expansion Project (SHEP). The purpose of the proposed action is to place cadmium-laden sediments that will be dredged as part of SHEP in a manner that reduces risk to wildlife without causing dike failure in Dredged Material Disposal Areas (DMCAs) 14A and 14B.

The Draft SEA describes ten alternatives for the disposal of these cadmium-laden sediments. Seven of the ten alternatives were eliminated during the initial screening evaluation due to one or more factors, including a high cost of construction, high cost of mitigation, high risk of dike failure, or unacceptable risk to wildlife from exposure to

cadmium-laden sediments. Three alternatives were retained for further evaluation: Alternative 2 (the "Selected Plan" in the 2012 SHEP GRR/FEIS); Alternative 9 (Finger Dikes inside DMCAs 14A and 14B – Place and Cap by specified locations); and Alternative 10 (the Proposed Action). These are discussed in greater detail below. Although it is not specifically stated in the SEA, all three alternatives would include a reduction in the quantity of cadmium-laden dredged material that would require special handling (from 11.7 MCY to 4.4 MCY). This reduction is a result of refining the channel reaches that contain naturally-occurring cadmium at concentrations that require special handling ([Cd] > 14 ppm).

Alternative 2 (the 2012 SHEP GRR/FEIS "Selected Plan"): This alternative is the currently authorized sediment placement plan described in the 2012 SHEP GRR and FEIS. Under this plan, all cadmium-laden sediments would be placed in DMCAs 14A and 14B and would remain covered with enough water (4 to 6 feet) to float a barge inside the containment area in order to more efficiently place and isolate these sediments before they are covered with a 2-foot layer of "clean" ([Cd] < 4 ppm) sediments. The cadmium-laden sediments would not be allowed to dewater and/or desiccate until after placement of the cover/cap is completed. Recent engineering work conducted after the GRR and FEIS were completed shows that the containment dikes surrounding DMCAs 14A and 14B would become unstable and would likely fail while flooding these areas with the 4 to 6 feet of water required to float a barge and minimize wildlife exposure to the cadmium-laden sediments. Therefore, the Corps has determined that this alternative cannot be implemented as originally planned and must be revised.

Alternative 9 (Finger Dikes inside DMCAs 14A and 14B – Place and Cap by specified locations): This alternative would place cadmium-laden sediments in DMCAs 14A and 14B and would use 'finger dikes' to contain the sediments in smaller areas that can be kept wet and capped with clean sediments relatively quickly. This approach would use a combination of geotextiles and earth fill to create the finger dikes within the DMCAs as part of the second required dike raising. These finger dikes would effectively create small impounded areas within the DMCAs that could be filled and capped within a shorter period of time than the other alternatives. This would reduce the length of time wildlife would be exposed to cadmium-laden sediments placed in each cell. Based upon the size of DMCA 14A, this alternative would divide the site into 10 cells, each of which would average 60-65 acres in size. This alternative would use one dredge that would alternate between reaches with cadmium-laden sediments and reaches with clean sediments that would be used for capping. No bird abatement plan is included with this alternative, since sediments will be kept wet (thus, limiting the mobility and bioavailability of the cadmium) and the cells will be capped as soon as possible after they are filled. As noted in the SEA, this alternative would not be as efficient in placing the sediment as either Alternative 2 or Alternative 10 since it would require moving the dredge twice for each cell; however, the SEA does not include a comparative cost analysis or any other rationale for eliminating Alternative 9.

Alternative 10 (Proposed Action): This alternative would place cadmium-laden sediments from SHEP into DMCAs 14A and 14B, and maintain these sites in a "moist" (saturated) rather than "flooded" (inundated) condition. During placement of cadmium-laden sediments, the water height in the DMCA would be maintained at 6"–12" below the elevation of the deposited dredged material in order to limit the drying of the sediments, and thereby the mobility of the cadmium, while still allowing the sediments to be worked with equipment as it is placed. Following the placement of cadmium-laden sediments, but before adding additional cadmium-laden sediments or capping them with clean sediments, the site would be flooded with 6"-12" of water above the elevation of the deposited dredged material in order to limit the exposure of wildlife to the cadmium-laden sediments. The cadmium-laden sediments would then be capped with a two-foot layer of clean sediments. The combined elevation of the cadmium-laden sediments and clean cap would be below the height of the counterweight in order to maintain stability of the dike. During and after placement of cadmium-laden sediments, but before capping, a "wildlife/bird abatement" (hazing) plan would be implemented to reduce wildlife use of the DMCA. The Corps would use a multi-pronged approach, initially relying on water inundation and active human disturbance. The Corps might employ other abatement methods as needed, including noise makers; visual deterrents such as scarecrows, streamers, fake owls, or giant eyes; live raptors; drones; or spraying herbicides to limit the growth of plants.

Comments and Conclusions:

1. SCDNR concurs with the Corps' revised analysis of the volume of cadmium-laden sediments that will require special handling as part of SHEP.

2. SCDNR recognizes the Corps' need to develop an alternate plan for disposing cadmium-laden sediments in DMCAs 14A and 14B due to the risk of dike failure under the currently authorized plan; however, we recommend that Alternative 9 be implemented rather than Alternative 10 because it would more effectively limit the exposure of birds and other wildlife to cadmium-laden sediments. Both the spatial and temporal extent of exposure would be substantially less with Alternative 9, which, in turn, would eliminate the need for bird abatement.

3. Due to the large size of disposal areas 14A and 14B (815 acres and 765 acres, respectively), the bird abatement plan described for Alternative 10 would likely be very costly and ultimately ineffective. It should also be noted that, if it were successfully implemented, the bird abatement plan would effectively eliminate the entire DMCA as useable bird habitat while abatement was being conducted. This is in stark contrast to Alternative 9, which includes no bird abatement plan, thus leaving most of the DMCA undisturbed and available to birds except for the 60- to 65-acre cell where work is ongoing.

4. Although a detailed cost analysis is not provided for any of the alternatives considered, it would seem that any additional cost of moving the dredge more frequently, as required under Alternative 9, would be offset by the high cost of bird abatement that would be required under Alternative 10. Furthermore, Alternative 9 would achieve the same goal of preventing dike failure as Alternative 10.

5. The currently authorized plan (Alternative 2) would have substantially reduced wildlife exposure to cadmium-laden sediments by flooding these areas with 4 to 6 feet of water. The relatively deep water would also have reduced the risk of predation by terrestrial predators on nesting seabirds and their offspring. Maintaining the cadmium-laden sediments in a "moist" rather than "flooded" condition, as required by Alternative 10, might actually encourage foraging by shorebirds, thus increasing their exposure to cadmium. Subsequently covering these sediments with only 6 to 12" of water might also encourage foraging by waterfowl and wading birds, thus increasing their level of exposure, as well. The shallower water would also provide less of a deterrent to terrestrial predators.

6. The SEA does not include any discussion of how the different alternatives would affect the Corps' current obligation to provide bird habitat within the DMCAs as compensatory mitigation for wetland impacts that resulted from impounding DMCA 14A in 2006. As part of the Savannah Harbor Navigation Project, the Corps committed to providing an annual average of 1,769 units of migratory bird habitat, including 1,245 acres of foraging habitat for waterfowl and shorebirds, 74 acres for bare ground nesting, and 450 acres for wetland nesting. During the past four years, the Project has failed to provide the required number of habitat units due to operational issues. The Corps now expects that the Project will provide less than its commitment until 2019, when dike raising operations in the DMCAs will allow the Corps to meet the mitigation requirements once again. As stated in an earlier Draft EA[1] addressing this issue, the Corps' ability to provide wildlife habitat in the DMCAs may also be adversely affected by the Savannah Harbor Expansion Project (SHEP). The Draft SEA for the current proposed action should describe in detail how each of the three alternatives retained after the initial screening would affect the Corps' obligation to provide bird habitat in the DMCAs as compensatory mitigation for past wetland losses. A quantitative estimate of future deficits in habitat units that would occur under each alternative should be included, as well.

7. Until these comments are adequately addressed, SCDNR cannot concur with the Draft Finding of No Significant Impact for the Proposed Action.

[1] USACE. 2016. Savannah Harbor Navigation Project Mitigation Recovery, Chatham County, Georgia and Jasper County, SC. Draft Environmental Assessment, November, 2016. 38 pp.

SCDNR appreciates the opportunity to comment on the Draft SEA for SHEP. If you have any questions regarding these comments, please contact me by phone (843-953-9305) or by e-mail (wendtp@dnr.sc.gov).

Sincerely,

Priscilla H. Wendt

Priscilla H. Wendt
Office of Environmental Programs

Cc: USACE-Charleston District
SCDHEC/ OCRM
SCDHEC/EQC
SRMC
USFWS
NOAA/NMFS

Healthy People. Healthy Communities

February 2, 2017

Colonel Marvin L. Griffin
U.S. Army Corps of Engineers
Savannah District
100 West Oglethorpe Avenue
Savannah, GA 31401-3640

Attention: Mr. Nathan Dayan (PD)

Re: Draft Supplemental Environmental Assessment
Savannah Harbor Expansion Project (SHEP) - Excavation and Placement of Cadmium-Laden Sediment

Dear Colonel Griffin:

The South Carolina Department of Health and Environmental Control (SCDHEC) appreciates the opportunity to comment on the Draft Supplemental Environmental Assessment (SEA) referenced above and our Bureau of Water and Office of Ocean and Coastal Resource Management are submitting the following joint comments for your review and consideration.

Background:

The purpose of the proposed action is to place cadmium-laden dredged material as part of SHEP in a manner that reduces risk to wildlife without causing dike failure. The changes fall into two categories (1) refining the channel reaches that contain naturally-occurring cadmium at levels that require special handling, and (2) keeping the deposited cadmium-laden sediments moist in Dredged Material Disposal Areas (DMCA)14A and 14B by maintaining the water height in the DMCA just below the elevation of the deposited dredged sediment (limited to 6"-12") *rather than flooded*. Ten proposed action plans were considered. The proposed action (Alternative 10) consists of placing approximately 4.4 million cubic yards (CY) bulked of cadmium-laden sediments in DMCA 14A in a moist (inundated) but not flooded condition, with the effluent passing through DMCA 14B, if needed.

The cadmium-laden sediments would be kept moist in the DMCA by placing stop logs in the cross dike weirs between DMCAs 14A and 14B to maintain the water height just below the height to which the dredged material is placed (limited to 6"-12"). This saturation level will limit the drying of the sediments, and thereby the mobility of the cadmium, while still allowing the sediments to be worked with equipment as it is placed. This approach would limit wildlife exposure to the deposited cadmium-laden sediments. As the material is pumped into the DMCA, it would be pushed into the flooded portion of the DMCA similar to the procedure used in beach nourishment and island creation projects. Wildlife/Bird abatement would be performed in the DMCAs to reduce the wildlife use of an individual DMCA during the construction period. This would minimize their risk of potential exposure to cadmium.

The result of the detailed subsurface engineering work conducted after the GRR and FEIS were prepared is that CESAS has recognized that the foundation and dikes at DMCAs 14A and 14B do not have sufficient strength to be able to implement the sediment placement plan identified in the FEIS and GRR. Therefore, some revision to the sediment placement plan is required.

The quantities in the SHEP EIS Appendix M (Sediment Quality Evaluation) were based on the 48-foot project alternative. The project design was refined after the bulk of that analysis was prepared and the 47-foot depth alternative was selected and authorized for construction. This EA uses the authorized depth of 47 feet below MLLW. Using the 48-foot depth overstates the quantity of cadmium-laden sediments that require special handling. Furthermore, with new data and additional analyses the quantities of cadmium laden sediment to be placed were revised. This include identification of reaches where the sediments would need special handling through new data and analysis.

Comments:

The proposed alternative greatly reduces the possible risk of dike failure and associated possible cadmium laden soil dispersal to the adjacent waters. The SEA acknowledges that there is slightly higher risk of birds and other wildlife to be exposed to cadmium in this alternative as the area will not be fully inundated. Several methods of bird abatement were cited but no effectiveness or suitability and level of risks of the different methods were discussed. This needs to be more clear and the effectiveness of the preferred method/methods in similar situations, if any, needs to be cited.

The FEIS, Appendix M, Sec. 7.3.1, refers to the original plan for keeping the disposal area in a "'ponded' state (inundated)" while the current FONSI in the third paragraph of the Project Description states the proposed change would keep the area in a "moist (inundated) but not flooded condition." It is confusing and incorrect to use "inundated" as synonymous with both the original "ponded" and proposed "moist" conditions. Thus, we recommend another description for the "moist" condition.

SCDHEC appreciates the opportunity to comment on the Draft SEA. If you have any questions regarding these comments, please contact me by phone at 803-898-3105 or by e-mail at prestohs@dhec.sc.gov.

Sincerely,

Heather Preston, Director
Division of Water Quality
Bureau of Water

Cc: USACE – Charleston District
SCDHEC – OCRM
SCDNR
Savannah River Maritime Commission

Savannah River Maritime Commission

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W. Dean Moss, Jr.
Chairman

February 3, 2017

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100 West Oglethorpe Avenue
Savannah, Georgia 31401

ATTN: Mr. Nathan Dayan (PD)
Nathan.S.Dayan@usace.army.mil

RE: Draft Supplemental Environmental Assessment
Savannah Harbor Expansion Project
(Excavation and Placement of Cadmium-Laden Sediments)

Dear Colonel Griffin,

The Savannah River Maritime Commission hereby adopts the comments provided by the South Carolina Department of Health and Environmental Control (DHEC), attached hereto as Exhibit 1, regarding the United States Army Corps of Engineers, Savannah District's Draft Supplemental Environmental Assessment (Draft SEA), dated December 30, 2016, concerning (1) the refinement of channel reaches that contain naturally-occurring cadmium at levels that require special handling, and (2) keeping the deposited cadmium-laden sediments moist in DMCAs 14A and 14B by maintaining water height just below the elevation of the dredged sediments, rather than flooded. Should you have any questions regarding these comments, please do not hesitate to contact me.

Very truly yours,

Savannah River Maritime Commission

Dean Moss (EIC)

William D. "Dean" Moss, Jr.
Chairman

cc: USACE – Charleston District
SCDHEC
SCDNR

EXHIBIT 1

dhec
Healthy People. Healthy Communities

February 2, 2017

Colonel Marvin L. Griffin
U.S. Army Corps of Engineers
Savannah District
100 West Oglethorpe Avenue
Savannah, GA 31401-3640

Attention: Mr. Nathan Dayan (PD)

Re: Draft Supplemental Environmental Assessment
Savannah Harbor Expansion Project (SHEP) - Excavation and Placement of Cadmium-Laden Sediment

Dear Colonel Griffin:

The South Carolina Department of Health and Environmental Control (SCDHEC) appreciates the opportunity to comment on the Draft Supplemental Environmental Assessment (SEA) referenced above and our Bureau of Water and Office of Ocean and Coastal Resource Management are submitting the following joint comments for your review and consideration.

Background:

The purpose of the proposed action is to place cadmium-laden dredged material as part of SHEP in a manner that reduces risk to wildlife without causing dike failure. The changes fall into two categories (1) refining the channel reaches that contain naturally-occurring cadmium at levels that require special handling, and (2) keeping the deposited cadmium-laden sediments moist in Dredged Material Disposal Areas (DMCA)14A and 14B by maintaining the water height in the DMCA just below the elevation of the deposited dredged sediment (limited to 6"-12") *rather than flooded.* Ten proposed action plans were considered. The proposed action (Alternative 10) consists of placing approximately 4.4 million cubic yards (CY) bulked of cadmium-laden sediments in DMCA 14A in a moist (inundated) but not flooded condition, with the effluent passing through DMCA 14B, if needed.

The cadmium-laden sediments would be kept moist in the DMCA by placing stop logs in the cross dike weirs between DMCAs 14A and 14B to maintain the water height just below the height to which the dredged material is placed (limited to 6"-12"). This saturation level will limit the drying of the sediments, and thereby the mobility of the cadmium, while still allowing the sediments to be worked with equipment as it is placed. This approach would limit wildlife exposure to the deposited cadmium-laden sediments. As the material is pumped into the DMCA, it would be pushed into the flooded portion of the DMCA similar to the procedure used in beach nourishment and island creation projects. Wildlife/Bird abatement would be performed in the DMCAs to reduce the wildlife use of an individual DMCA during the construction period. This would minimize their risk of potential exposure to cadmium.

The result of the detailed subsurface engineering work conducted after the GRR and FEIS were prepared is that CESAS has recognized that the foundation and dikes at DMCAs 14A and 14B do not have sufficient strength to be able to implement the sediment placement plan identified in the FEIS and GRR. Therefore, some revision to the sediment placement plan is required.

The quantities in the SHEP EIS Appendix M (Sediment Quality Evaluation) were based on the 48-foot project alternative. The project design was refined after the bulk of that analysis was prepared and the 47-foot depth alternative was selected and authorized for construction. This EA uses the authorized depth of 47 feet below MLLW. Using the 48-foot depth overstates the quantity of cadmium-laden sediments that require special handling. Furthermore, with new data and additional analyses the quantities of cadmium laden sediment to be placed were revised. This include identification of reaches where the sediments would need special handling through new data and analysis.

Comments:

The proposed alternative greatly reduces the possible risk of dike failure and associated possible cadmium laden soil dispersal to the adjacent waters. The SEA acknowledges that there is slightly higher risk of birds and other wildlife to be exposed to cadmium in this alternative as the area will not be fully inundated. Several methods of bird abatement were cited but no effectiveness or suitability and level of risks of the different methods were discussed. This needs to be more clear and the effectiveness of the preferred method/methods in similar situations, if any, needs to be cited.

The FEIS, Appendix M, Sec. 7.3.1, refers to the original plan for keeping the disposal area in a "'ponded' state (inundated)" while the current FONSI in the third paragraph of the Project Description states the proposed change would keep the area in a "moist (inundated) but not flooded condition." It is confusing and incorrect to use "inundated" as synonymous with both the original "ponded" and proposed "moist" conditions. Thus, we recommend another description for the "moist" condition.

SCDHEC appreciates the opportunity to comment on the Draft SEA. If you have any questions regarding these comments, please contact me by phone at 803-898-3105 or by e-mail at prestohs@dhec.sc.gov.

Sincerely,

Heather Preston

Heather Preston, Director
Division of Water Quality
Bureau of Water

Cc: USACE – Charleston District
SCDHEC – OCRM
SCDNR
Savannah River Maritime Commission

From: CESAS-PD, SAS
To: Dayan, Nathan S CIV USARMY CESAS (US)
Cc: Armetta, Robin E CIV USARMY CESAS (US)
Subject: FW: RE: Draft Supplemental EA): Excavation and Placement of Cadmium-Laden Sediments
Date: Friday, February 03, 2017 12:07:02 PM

From: karengrainey [mailto:karengrainey@bellsouth.net]
Sent: Friday, February 03, 2017 11:32 AM
To: CESAS-PD, SAS <CESAS-PD.SAS@usace.army.mil>
Subject: [EXTERNAL] RE: Draft Supplemental EA): Excavation and Placement of Cadmium-Laden Sediments

ATTN: Mr. Nathan Dayan

Dear Mr. Dayan,

I am writing on behalf of the Coastal Group of the Georgia Sierra Club and appreciate the opportunity to comment on the Draft Supplemental Environmental Assessment (EA): Excavation and Placement of Cadmium-Laden Sediments that alters the original plan for handling cadmium-laden sediments as described in the July 2012 Final Environmental Impact Statement (FEIS) for the Savannah Harbor Expansion Project (SHEP) and the October 2012 Record of Decision (ROD).

We first learned about the Supplemental EA in an article published in the Savannah Morning News on January 31. The article listed an assortment of methods to be used to protect birds from exposure to cadmium by preventing them from feeding in the Dredged Material Containment Areas (DMCAs) during construction. Seeking assurance that the proposed bird abatement methods are effective I decided to read the Supplemental EA to learn more about what appeared to be a bizarre and ineffective plan. It was disappointing to find no evaluation of the effectiveness of the methods listed.

The EA states “USACE would use a multi-pronged approach, initially relying on water inundation (#4) and active human abatement (#3). USACE would employ the other identified methods as it deems necessary.” Active human abatement (#3) is described as “a person riding an ATV around the placement site on a daily basis during daylight hours using all appropriate means to prevent birds from feeding and nesting in the placement area. The use of noise makers, and visual deterrents would be expected. The use of a drone to harass the birds over larger area could be evaluated for success.”

Birds are highly motivated by food and the abundance of food in the DMCAs attracts large flocks. Birds are also known to become habituated to human noise and activity. It is likely that birds will find the abundance of food enticing enough to withstand efforts to scare them away. The EA should acknowledge this and discuss the efficacy of the listed bird abatement methods, some of which are commonly known to be ineffective. For example, I have

often seen birds perched atop the heads of fake owls.

Even if active human abatement were proven effective, it could be impractical to employ people to do this all day.

The EA also assumes that birds do not feed at the DMCAs at night. Have any nighttime surveys been done which support this assumption?

The Coastal Group respectfully asks that you thoroughly research and evaluate both the practicality and efficacy of the proposed bird abatement methods before preparing the Final Supplemental EA. Without strong evidence that the available methods will work, we ask that you reject Alternative 10 and adopt Alternative 9 which addresses the structural problems without creating a need to chase birds from the site. And lastly, we ask that the public be provided an opportunity to read and comment on the Final Supplemental EA.

Sincerely,

Karen Grainey

Chair

Coastal Group of the Georgia Sierra Club

316 Tanglewood Road

Savannah, GA 31419

912-961-6190 (home)

912-596-2052 (mobile)

From:	Moore, Kelie
To:	Dayan, Nathan S CIV USARMY CESAS (US)
Cc:	Andrews, Jill; Smith, Bradley; Burgess, Karl
Subject:	[EXTERNAL] RE: SHEP - Notice of Availability of a Draft Supplemental Environmental Assessment (UNCLASSIFIED)
Date:	Monday, February 06, 2017 1:18:46 PM

The Georgia Coastal Management Program (GCMP) concurs that the proposed action, placing cadmium-laden dredged sediments in Dredged Material Containment Areas (DMCAs) 14A & 14B in a moist (inundated) but not flooded condition as part of the Savannah Harbor Expansion Project (SHEP), does not change the direct and indirect impact on the coastal zone that were described in the SHEP FEIS and no updates to the SHEP CZM concurrence letter are needed.

Kelie Moore
Federal Consistency Coordinator
Coastal Resources Division
(912) 264-7218 | (912) 262-2334
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GEORGIA DEPARTMENT OF NATURAL RESOURCES

-----Original Message-----
From: Dayan, Nathan S CIV USARMY CESAS (US) [mailto:Nathan.S.Dayan@usace.army.mil]
Sent: Thursday, December 29, 2016 8:54 AM
To: Andrews, Jill <Jill.Andrews@dnr.ga.gov>; Anthony Sowers <anthony_sowers@fws.gov>; Arega, Feleke <aregaf@dhec.sc.gov>; BAILEY, William G CIV USARMY CESAS (US) <William.G.Bailey@usace.army.mil>; Booth, Elizabeth <Elizabeth.Booth@dnr.ga.gov>; Smith, Bradley <Bradley.Smith@dnr.ga.gov>; Chuck Hayes <Chuck_Hayes@fws.gov>; Claude Jackson (CJackson@dot.ga.gov) <CJackson@dot.ga.gov>; Cynthia Cooksey (Cynthia.Cooksey@noaa.gov) <Cynthia.Cooksey@noaa.gov>; Dean Harrigal <HarrigalD@dnr.sc.gov>; DiNovo, Rheta <dinovorg@dhec.sc.gov>; 'donald_imm@fws.gov'; Felicia Sanders <SandersF@dnr.sc.gov>; Heather Preston (prestohs@dhec.sc.gov) <prestohs@dhec.sc.gov>; Higgins, Jamie <Higgins.Jamie@epa.gov>; hmoorer@gaports.com; Holliman, Daniel <Holliman.Daniel@epa.gov>; Holly Gaboriault <holly_t_gaboriault@fws.gov>; Larson, Jeff <Jeff.Larson@dnr.ga.gov>; Welte, Jennifer <Jennifer.Welte@dnr.ga.gov>; 'Kay Davy' <kay.davy@noaa.gov>; Moore, Kelie <Kelie.Moore@dnr.ga.gov>; Pace.Wilber@noaa.gov; Parkin Hunter <phunter@scag.gov>; 'Paul Conrads' <pconrads@usgs.gov>; Lamarre, Paul <Paul.Lamarre@dnr.ga.gov>; perryb@dnr.sc.gov; rlowell@willoughbyhoefer.com; Russell Webb <russell_webb@fws.gov>; Shaw_Davis@fws.gov; 'Somerville, Eric' <Somerville.Eric@epa.gov>; Tom Gallo <tomgallo@wqr-inc.com>; Trey Daniell (rdaniell@dot.ga.gov) <rdaniell@dot.ga.gov>; Wade Cantrell <CANTREWM@dhec.sc.gov>; 'wdmossjr@gmail.com'; wendtp@dnr.sc.gov; Wikoff, Bill <bill_wikoff@fws.gov>; Williams, Blair N. <williabn@dhec.sc.gov>
Subject: SHEP - Notice of Availability of a Draft Supplemental Environmental Assessment (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Good morning all,

Savannah District announces the availability to the public of a Draft SEA and Draft FONSI concerning the placement cadmium-laden dredged material as part of SHEP in a manner that reduces risks to wildlife from potential dike failure. Copies of the documents can be downloaded from the District website at Blockedhttp://www.sas.usace.army.mil/About/DivisionsandOffices/PlanningDivision/PlansandReports.aspx. This SEA supplements the July 2012 Final Environmental Impact Statement (FEIS) for the Savannah Harbor Expansion

Project (SHEP) and the October 2012 Record of Decision (ROD).

This link will be up tomorrow the 30th. Please provide comments by February 03, 2017. If you have any questions, comments or concerns please contact me.

Thank you
Nathan Dayan
Environmental Team Leader
USACE - Savannah District
912-652-5172

CLASSIFICATION: UNCLASSIFIED

SOUTHERN ENVIRONMENTAL LAW CENTER

Telephone 843-720-5270 | 463 KING STREET, SUITE B, CHARLESTON, SC 29403-7204 | Facsimile 843-414-7039

February 16, 2017

Colonel Marvin L. Griffin
U.S. Army Corps of Engineers
Savannah District
100 West Oglethorpe Avenue
Savannah, GA 31401

Re: Draft Supplemental Environmental Assessment for the Savannah River Expansion Project, Excavation and Placement of Cadmium-Laden Sediments

Dear Colonel Griffin:

The Southern Environmental Law Center (SELC) submits these comments on behalf of the Savannah Riverkeeper, South Carolina Wildlife Federation, and South Carolina Coastal Conservation League. SELC has reviewed the U.S. Army Corps of Engineers' (Corps) Draft Supplemental Environmental Assessment (Draft SEA) for modifications to the excavation and placement of cadmium-laden sediments as part of the Savannah Harbor Expansion Project (SHEP). Based on this review, SELC does not agree with the Draft Finding of No Significant Impact and urges the Corps to further evaluate the sediment disposal alternatives, and possibly consider and implement Alternative 9 instead of the Proposed Action Alternative 10.

Background:

The purpose of the proposed action in the Draft SEA is to "place cadmium-laden dredged material as part of SHEP in a manner that reduces risk to wildlife without causing dike failure." Cadmium can pose environmental impacts to birds that are exacerbated when wet sediments are dried and oxidized. In those conditions, cadmium becomes more mobile.

The mitigation plan selected in the Final Environmental Impact Statement (FEIS) would have placed cadmium-laden sediments in Dredged Material Disposal Areas (DMCAs) 14A and 14B, covered the sediments with 4 to 6 feet of water to float a barge inside the area to more efficiently place and isolate the sediments, covered the sediments with a 2-foot "cap" of sediments, and then allowed the sediments to be dewatered and desiccated once the cap was in place. This plan is called into question in the Draft SEA because a recent engineering analysis revealed that containment dikes would "exhibit severe stability issues and likely fail during placement of [the 4 to 6 feet of] water to create the ponded area."

The Draft SEA describes ten alternatives for disposal of 4.4 million cubic yards of cadmium-laden sediments, including the mitigation plan selected in the FEIS (Alternative 2) and seven alternatives that were eliminated due to high cost of construction, high cost of mitigation,

high risk of dike failure, or unacceptable environmental impacts. The other two alternatives were not eliminated. Alternative 10, which is the proposed action, would involve placing cadmium-laden sediments in DMCA 14A (815 acres) and, if necessary, 14B (765 acres). The sediments would be kept moist during placement, with water 6"-12" below the elevation of the deposited material, and would be flooded between sediment placements and until the DCMA is capped, with water 6"-12" above the elevation of the deposited material. During and after sediment placement, the Corps would use "abatement" strategies—including using noise makers, visual deterrents, active human abatement, water saturation, and herbicides—to limit bird exposure. Alternative 9 would involve creating ten 60 to 65-acre "finger dikes" within DMCAs 14A and 14B using geotextiles and earth fill, and then placing cadmium-laden sediments in the smaller impounded dike areas and filling and capping them as soon as possible. This alternative would involve moving the dredge twice for each cell, but would expose birds to cadmium-laden sediments for much smaller increments of time.

Comments Regarding Alternative 10:

We understand the need to develop an alternative plan for disposing of cadmium-laden sediments in DMCA 14A and 14B given the risk of dike failure under the current plan. However, we have several concerns about Alternative 10. Many of these same concerns were expressed in comments submitted by the South Carolina Department of Natural Resources (SCDNR) and the Fish and Wildlife Service (FWS).

1. *The proposed sediment containment water depth is problematic.*

The moist sediment conditions during sediment placement, where water is 6"-12" below the elevation of the deposited material, may encourage foraging by shorebirds. The flooded sediment conditions between and after sediment placement, where water is 6"-12" above the elevation of the deposited material, may be attractive for many migratory species, including wading birds and waterfowl. In both conditions, predators are more likely to be attracted to the area than they would have been if the sediments were covered in 4 to 6 feet of water.

In addition, as the FWS points out, moist sediment conditions during placement may still allow sediments to be oxidized, even if they are not dried out. This could lead to increased cadmium solubility and increased cadmium water concentrations. Once the DMCA is flooded between and after sediment placement, cadmium solubility could increase even more, and the quality of water discharging to the Savannah River could decrease. If the water contains enough cadmium, the Corps' proposal to reroute water to discharge at Fields Cut may not be enough to protect water quality in the Savannah River. The Corps should study the possibility of oxidation in the proposed alterative and the potential effects on cadmium mobility and water quality.

2. *The bird abatement tactics described in the Draft SEA are not clearly defined and there is no evidence that they will be effective.*

It will be difficult to ensure that abatement is successful over such a large area (815 or 1,580 acres) of attractive foraging habitat. This is especially true because resident birds are likely to become accustomed to, and less deterred by, hazing tactics over time. The Corps

should develop a more detailed monitoring and benchmarking strategy to measure the success of the abatement program and trigger additional actions if necessary. In addition, the Corps should develop a detailed cost analysis of the program. We concur with the SCDNR that the cost of an effective abatement program is likely to rival any extra costs associated with implementing Alternative 9. It would be helpful if the Corps provided examples of similar situations where abatement tactics have successfully kept wildlife away from large areas of shallow wading land. These examples might be useful for developing an appropriate benchmarking strategy and cost analysis.

3. *The Draft SEA does not consider how different alternatives would affect the Corps' commitment to provide habitat units within the DMCAs.*

As part of the Savannah Harbor Navigation Project, the Corps made a long-term commitment to provide 1,769 habitat units on average, per year within the DMCAs as compensatory mitigation for past wetland losses—1,245 acres for shorebird and waterfowl feeding, 74 acres for bare ground nesting, 450 acres for wetland nesting. The Project has failed to provide the committed habitat units since 2013 and the Corps expects this deficit to run until 2019. The Corps does not discuss how Alternative 10 will impact its ability to meet this revised 2019 goal, but it is likely that the bird abatement program in Alternative 10 would make all of DMCA 14A, and possibly all of DMCA 14B unavailable for bird habitat until a permanent covering is put in place. The Draft SEA should address how each of the proposed alternatives would affect the Corps' obligation to provide bird habitat.

Comments Regarding Alternative 9:

Employing the finger dikes proposed in Alternative 9 is likely a better solution than Alternative 10, and we request that the Corps study it in more detail. Alternative 9 would expose much smaller areas of sediment to birds and other wildlife at any one time (60 to 65-acres versus 815 or 1,580 acres). It would also prevent sediment oxidation and leave most of DMCAs 14A and 14B undisturbed to provide habitat units. A detailed cost analysis is not provided for any of the alternatives, but we concur with the SCDNR that any extra costs associated with implementing Alternative 9—for example, due to moving the dredge multiple times—is likely to be offset by the cost of an effective abatement program for Alternative 10.

Conclusion:

We do not agree with the Corps' Draft Finding of No Significant Impact. The new proposed water depth is likely to attract birds, lead to increased cadmium exposure for those birds, and lessen water quality. The Corps has not demonstrated that the bird abatement plan will successfully reduce exposure to cadmium, or that rerouting the flow path of discharge to Fields Cut will sufficiently control the amount of cadmium that enters the Savannah River. We ask that the Corps study the wildlife health and water quality impacts of each alternative in more detail, and also assess the impact of each alternative on the Corps' commitment to provide bird habitat units. We believe that further assessment will reveal that Alternative 9 is the more appropriate option to achieve the proposed goal of "plac[ing] cadmium-laden dredged material as part of SHEP in a manner that reduces risk to wildlife without causing dike failure."

Thank you for considering our comments on the Draft SEA. Please do not hesitate to contact us with any questions, or if you wish to discuss this matter with us.

Sincerely,

Christopher K. DeScherer
Managing Attorney, Charleston Office
Southern Environmental Law Center
(843) 720-5270
cdescherer@selcsc.org

cc: Tonya Bonitatibus, Savannah Riverkeeper
Ben Gregg, South Carolina Wildlife Federation
Rikki Parker, South Carolina Coastal Conservation League

From:	Wikoff, Bill
To:	Dayan, Nathan S CIV USARMY CESAS (US)
Cc:	Andrews, Jill; Anthony Sowers; BAILEY, William G CIV USARMY CESAS (US); Booth, Elizabeth; Cynthia Cooksey (Cynthia.Cooksey@noaa.gov); Felicia Sanders; Heather Preston (prestohs@dhec.sc.gov); Higgins, Jamie; Holly Gaboriault; Kay Davy; Moore, Kelie; Pace.Wilber@noaa.gov; Paul Conrads; perryb@dnr.sc.gov; rlowell@willoughbyhoefer.com; Somerville, Eric; Wade Cantrell; wendtp@dnr.sc.gov; Donald Imm; wdmossjr@gmail.com
Subject:	[Non-DoD Source] Re: SHEP - Supplemental Environmental Assessment - Cadmium Sediment Placement
Date:	Thursday, June 22, 2017 5:17:28 PM

The Savannah District, U.S. Army Corps of Engineers (USACE), has prepared a Supplemental Environmental Assessment (SEA) dated June 2017 to evaluate the potential impacts of modified actions concerning the of placing cadmium-laden dredged sediments in Dredged Material Containment Areas (DMCAs) 14A and 14B as part of the Savannah Harbor Expansion Project (SHEP). The proposed action includes keeping the deposited cadmium-laden sediments moist in DMCA 14A by maintaining the water height just below the elevation of the deposited dredged sediment rather than flooded and mitigation (bird abatement).

The SEA does not indicate that the changes proposed would change the impacts to listed species. The SEA does state that there is a slightly higher risk that listed birds could bio accumulate cadmium in their system since the DMCA would not be fully flooded continuously. The USACE Endangered Species Act (ESA) determination for the piping plover, wood stork, and red knot is “may affect, but is not likely to adversely affect” due to the rarity of piping plover and red knot being in the DMCAs and the seasonality of wood storks in the DMCAs. In addition, the USACE states that there is similar habitat for these species adjacent to DMCA 14A and 14B.

The proposed project changes described in the SEA do not change our ESA section 7 concurrence. The determination is no change from the SHEP final EIS. The bird abatement to mitigate the potential impact of high cadmium sediments will include abatement of the listed species mentioned above if they are present in the DMCA. We do not consider the abatement mitigation to rise to the level of ‘take’ in the form of harassment. Harass is defined by the U.S. Fish and Wildlife Service as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. The abatement should never meet this definition.

During this action, this DMCA(s) will not provide quality habitat for any of the normal behaviors mentioned for any of these species. However, the adjacent DMCAs are managed for the benefit of wildlife. Under the Savannah Harbor Long Term Management Strategy bird habitats have been created in the DMCAs as mitigation to compensate for harbor maintenance impacts. These DMCAs now provide nesting habitat for shorebirds and colonial nesting birds and are highly used by wildlife. Any bird abated from the project DMCA(s) has access to quality habitats in the adjacent and nearby DMCAs and adjacent expanses of salt marsh. Creeks in salt marsh are a common and frequently used foraging habitat for wood storks.

On February 2, 2017, the U.S. Fish and Wildlife Service provided comments on an earlier draft of the dSEA under the ESA and the Fish and Wildlife Coordination Act (FWCA). In Appendix B of the SEA the USACE has responded to the comments made under the FWCA.

Thank you.

Bill Wikoff fish and wildlife biologist

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