Savannah Harbor Expansion Project
Flow Rerouting Mitigation Plan – Sediment Basin Weir and Fill Modification

Draft Supplemental Environmental Assessment
Unique ID: SEAX-202-00-K6P-1740070392

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT
100 WEST OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401

February 2025

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Flow Rerouting Mitigation Plan – Sediment Basin Weir and Fill Modification
Draft Supplemental Environmental Assessment

Lead Agency	U.S. Army Corps of Engineers, Savannah District100 West Oglethorpe Ave Savannah, GA 31401
Project Location	Jasper County, SC Chatham County, GA
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How to Comment Mailed comments must be post-marked by March 27, 2025.	Email Comments to: CESAS-Planning@usace.army.mil Mail Comments to: U.S. Army Corps of Engineers, Savannah District ATTN: Alex Metz, Planning Branch 100 West Oglethorpe Ave. Savannah, GA 31401
Public Comment Period Ends	March 27, 2025
Unique ID	SEAX-202-00-K6P-1740070392

DRAFT FINDING OF NO SIGNIFICANT IMPACT

Savannah Harbor Expansion Project
Flow Rerouting Mitigation Plan – Sediment Basin Weir and Fill Modification
Draft Supplemental Environmental Assessment
Chatham County, GA and Jasper County, SC

The U.S. Army Corps of Engineers, Savannah District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The draft Supplemental Environmental Assessment (SEA) dated February 2025, addresses the opportunity to modify the flow rerouting mitigation plan (Plan 6a) as outlined in the Savannah Harbor Expansion Project (SHEP) 2012 Final Environmental Impact Statement (FEIS), Appendix C: Mitigation Planning. This modification is needed to incorporate additional modeling and monitoring data and account for changed environmental conditions in the Savannah River in Chatham County, GA and Jasper County, SC. The final recommendation will be documented in the final SEA and Finding of No Significant Impact (FONSI), if applicable.

The draft SEA, incorporated herein by reference, evaluated a no action and the proposed action that demonstrate the need to modify flow rerouting Plan 6a identified in the 2012 SHEP FEIS Appendix C: Mitigation Planning. The preferred alternative is the proposed action which is summarized below:

- The preferred alternative consists of modifying Plan 6a as described in the 2012 SHEP FEIS to omit the construction of the sediment basin weir and fill. The USACE is considering the omission of the sediment basin weir and fill from the flow rerouting plan for several reasons, which include: the considerable cost and constructability risks identified with the construction and installation of the sediment basin weir and fill and the designation of critical habitat for the endangered Atlantic sturgeon. Moreover, additional data and updated models indicate that the flow rerouting measures already constructed from Plan 6a are meeting mitigation requirements outlined in the 2012 SHEP FEIS for the conversion of freshwater wetlands without implementing the sediment basin weir and fill mitigation measure. The mitigation benefits from the sediment basin weir and fill are predicted to be less than what was determined in the 2012 SHEP FEIS, while additional adverse effects from construction of the sediment basin weir and fill have been identified.

In addition to a “no action” alternative, the USACE evaluated one other alternative, the proposed action. The alternatives included the no action alternative (construct the sediment basin weir and fill as intended in the 2012 SHEP FEIS) and the proposed action, which is the preferred alternative, to modify the flow rerouting mitigation plan to omit the sediment basin weir and fill mitigation measure.

For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the proposed action are listed in Table 1:

Table 1: Summary of Potential Effects of the Proposed Action

	Less than significant effects	Less than significant effects as a result of mitigation*	Resource unaffected by action
Socioeconomics	☐	☐	☒
Recreation	☐	☐	☒
Noise	☐	☐	☒
Land Use	☐	☐	☒
Visual resources	☐	☐	☒
Navigation	☐	☐	☒
Real Estate	☐	☐	☒
Hydrology and Hydraulics	☐	☐	☒
Water Quality	☐	☐	☒
Wetlands	☐	☐	☒
Sediments, Soils, and Geology	☐	☐	☒
Aquatic Biological Resources	☐	☐	☒
Terrestrial Biological Resources	☐	☐	☒
Protected Species	☐	☐	☒
Essential Fish Habitat	☐	☐	☒
Historical and Cultural Resources	☐	☐	☒
Air Quality	☐	☐	☒

The preferred alternative is a means to avoid or minimize adverse environmental effects from construction of the sediment basin weir and fill as included in Plan 6a in the 2012 SHEP FEIS.

No compensatory mitigation is required as part of the preferred alternative.

A 30-day public comment period for the draft SEA and FONSI was initiated in February 2025. All comments submitted during the public comment period will be responded to in the Final SEA and FONSI, as appropriate.

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers determined that the proposed action will have no effect on federally listed species or their designated critical habitat under both U.S. Fish and Wildlife Service and National Marine Fisheries Service jurisdiction.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers determined that the proposed action will have no effect on historic properties.

Pursuant to the Clean Water Act of 1972, as amended, there will be no discharge of dredged or fill material associated with the proposed action; therefore, the Clean Water Act Section 404(b)(1) Guidelines evaluation is not applicable.

A Section 401 Water Quality Certification from the Georgia Environmental Protection Division or from the South Carolina Department of Environmental Services is not required because there will be no discharge into the navigable waters as a result of the proposed action.

The proposed action will not result in adverse, direct impacts to wetlands because flow re-routing features already constructed are providing the required mitigation for effects to wetlands from SHEP. The proposed action also avoids adverse impacts to ESA-listed species and their critical habitat. Therefore, the proposed action is the Least Environmentally Damaging Practicable Alternative (LEDPA).

A determination of consistency with the Georgia Coastal Zone Management program pursuant to the Coastal Zone Management Act of 1972 was obtained by the Georgia Department of Natural Resources Coastal Resources Division on January 25, 2011. A determination of consistency with the South Carolina Coastal Zone Management program pursuant to the Coastal Zone Management Act was obtained from the South Carolina Department of Health and Environmental Control Office of Ocean and Coastal Resources Management on November 15, 2011. The proposed action is consistent with the enforceable policies of the states' Coastal Zone Management programs.

All applicable environmental laws have been considered and coordination with appropriate agencies and officials will be completed prior to release of the final SEA and FONSI, if appropriate.

Technical, environmental, economic, and cost effectiveness criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the proposed action would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

_____
Date

_____
Ronald Sturgeon, PMP
Commander, Corps of Engineers
District Commander

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1. Introduction

The U.S. Army Corps of Engineers, Savannah District (USACE) has prepared this draft Supplemental Environmental Assessment (SEA) to the 2012 Savannah Harbor Expansion Project (SHEP) Final Environmental Impact Statement (FEIS) to evaluate the impacts from the proposed modification (omission of the sediment basin weir and fill) to the SHEP flow rerouting plan 6a. This draft SEA also evaluates impacts from the no action alternative which is to construct the sediment basin weir and fill. This SEA was prepared in compliance with the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 *et seq*., and in accordance with Council on Environmental Quality (CEQ) implementing regulations for NEPA, 40 C.F.R. §§ 1500-1508, and the U.S. Army Corps of Engineers implementing regulations for NEPA, 33 C.F.R. Part 230. This document details the alternative development process, as well as the analysis of impacts related to the proposed modification of the flow rerouting plan (Plan 6a) identified in the 2012 SHEP FEIS Appendix C: Mitigation Planning (Mitigation Plan).

The FEIS for the SHEP was completed in July 2012 and the Record of Decision (ROD) was signed on October 26, 2012. The 2012 SHEP FEIS and ROD are incorporated herein by reference. These 2012 documents and the General Re-evaluation Report (GRR) can be found at: (http://www.sas.usace.army.mil/Missions/Civil-Works/Savannah-Harbor-Expansion/).

The SHEP was authorized for construction through the Water Resources Development Act (WRDA) of 1999, P.L. 106-53, and is currently in the construction phase. The 2012 SHEP FEIS addressed the deepening of the Savannah Harbor Federal navigation channel from a depth of -42 feet to -47 feet Mean Lower Low Water (MLLW) and included the mitigation and monitoring features for the deepening, detailed in the Mitigation Plan and Appendix D: Monitoring and Adaptive Management Plan (Monitoring and Adaptive Management Plan), respectively.

In the Mitigation Plan, flow rerouting measures were identified to mitigate for impacts to freshwater wetlands. Plan 6a was selected for implementation and identifies a suite of measures intended to reduce the conversion of freshwater wetlands to brackish wetlands, an expected impact of the SHEP. All flow rerouting measures have been constructed except for the rock weir and fill measure in the Back River, also referred to as the submerged sill or the sediment basin weir and fill.

The sediment basin weir and fill feature was originally intended to divert saltwater up the Front River and decrease salinity on the Back River, therefore preserving the overall area of tidal freshwater wetlands present in the Savannah River estuary. However, construction of the sediment basin weir and fill is being reconsidered for the following reasons:

- Existing flow rerouting measures are currently exceeding the original mitigation goals without construction of the sediment basin weir and fill

- Construction of the sediment basin weir and fill would not substantially reduce salinity intrusion
- The USACE would conduct post-construction monitoring plan to continue to evaluate the impacts to resources from the construction of SHEP. Cost-effective measures to mitigate for any additional impacts, should they be observed, have already been identified in the Monitoring and Adaptive Management Plan
- In 2021, the estimated construction cost of the sediment basin weir and fill is approximately three times greater the original estimate for the entire Plan 6a
- Sediment composition creates considerable cost and engineering risks
- The sediment basin has naturally filled to 70% of the intended design fill and is functioning as intended without construction of a structure in the Back River
- The intended location of the sediment basin weir and fill has been listed as critical habitat for the Atlantic sturgeon since the publication of the 2012 SHEP FEIS.

For these reasons, this SEA has been prepared to evaluate the environmental impacts and cost effectiveness of a no action alternative (NAA) of constructing the sediment basin weir and fill and a proposed action alternative (AA) of modifying Plan 6a to omit the sediment basin weir and fill.

1.1. Background

The SHEP included the deepening of the Savannah Harbor Federal navigation channel from a depth of -42 feet to -47 feet MLLW. Given the proximity of the navigation channel to sensitive estuarine resources, engineering and environmental studies were conducted to identify the environmental impacts that would be expected from the project and ensure those impacts will be offset through mitigation and monitoring. One finding of those studies was that the deepening of the Savannah Harbor was predicted to convert tidal freshwater wetlands into brackish wetlands due to increased salinity in the upper estuary. Plan 6a identified two types of actions that would be implemented to mitigate for the indirect adverse impacts to wetlands: flow rerouting features and the acquisition and preservation of existing bottomland hardwoods. The flow rerouting features include: a diversion structure at McCoys Cut, the closure of the western arm at McCoys Cut, deepening at McCoys cut, the closure of Rifle Cut, the removal of the Tidegate in the Back River, and the construction of the sediment basin weir and fill (Figure 1).

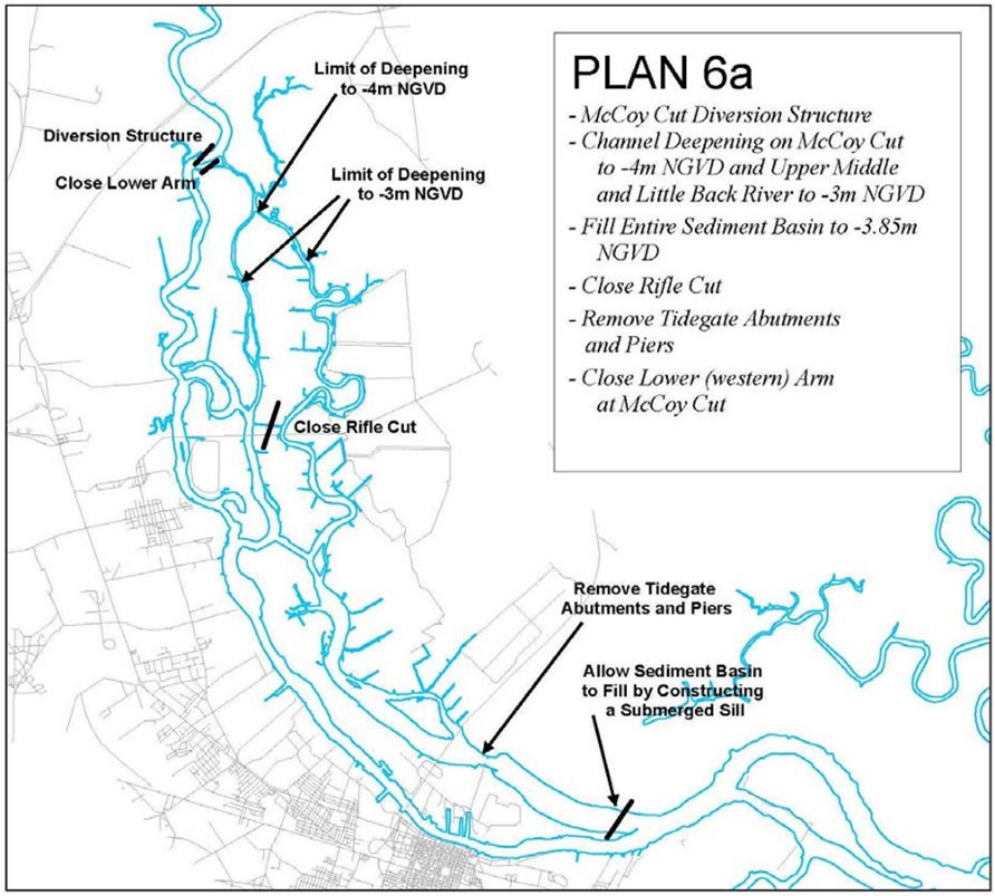

Figure 1. Flow Rerouting Plan 6a Identified in 2012 SHEP FEIS.

The diversion at McCoys Cut consists of two structures on either side of the river. The structures were intended to divert water flow down through McCoys Cut into the Back and Middle Rivers. The western arm of McCoys Cut was closed by constructing a plug at one end; this closure resulted in a small dead-end creek extending from the Savannah River. The deepening at McCoys cut included the deepening of both the Little Back and Middle Rivers through McCoys Cut to allow more freshwater flow into the rivers. The closure of Rifle Cut was accomplished by constructing a plug on the Middle River end of Rifle Cut. Filling Rifle Cut at one end resulted in the remainder of the cut functioning as a small dead-end creek with its opening on the Back River. The Tidegate and its abutments have been removed so that tidal flows are no longer restricted in the Back River. Construction of the above measures was completed in April 2020. The sediment basin weir and fill has not yet been constructed.

Deepening was predicted to result in indirect adverse impacts to 1,177 acres of tidal freshwater wetlands without implementation of Plan 6a. Implementing Plan 6a was predicted to reduce those adverse impacts to 223 acres. Acquisition and preservation of tidal freshwater wetlands was the selected mitigation measure to offset the predicted, unavoidable conversion of 223 acres of tidal freshwater wetlands. Using the Savannah District Regulatory SOP, it was determined that the preservation requirement for predicted impacts was 2,245 acres to be acquired and transferred to the USFWS

Savannah National Wildlife Refuge. The USACE consulted the USFWS to select parcels within the Refuge's Acquisition Plan that would provide the desired habitat type desired as mitigation. Ultimately, 2,331.8 acres were transferred to the Refuge from 2015-2017, an overage of 86.6 acres. The USACE and the USFWS are still coordinating to resolve the overage. The Acquisition of Wetland Mitigation Lands Final Report is available at: https://www.sas.usace.army.mil/Portals/61/docs/lakes/SHEPLandAcquisitionReport051617.pdf

1.2. Sediment Basin Weir and Fill Conceptual Design

The original concept of the sediment basin weir and fill (Figure 2) contained a submerged stone broad berm constructed at the confluence of the Back River and the Front River and 1.2 million cubic yards of suitable (sandy) fill material. Figure 3 depicts an artistic rendering of the proposed sediment basin weir and fill. The original design plans are included in Section VI in the Mitigation Plan from the 2012 SHEP FEIS and Section 9: Alternative Plan Evaluation: Mitigation Planning in the GRR provide preliminary information regarding the mitigation measure.

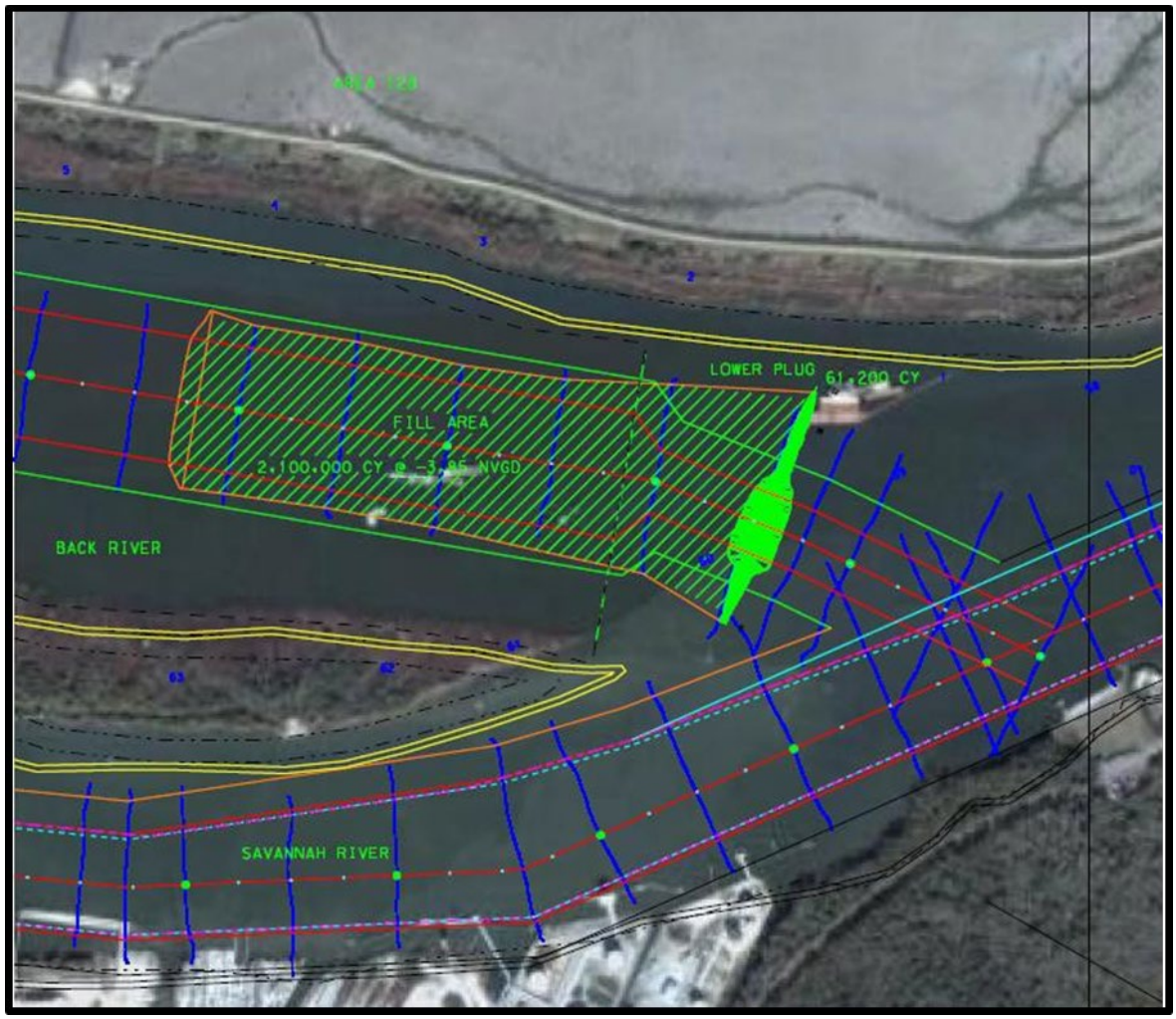

Figure 2. Conceptual Design of the sediment basin weir and fill (USACE, 2012a)

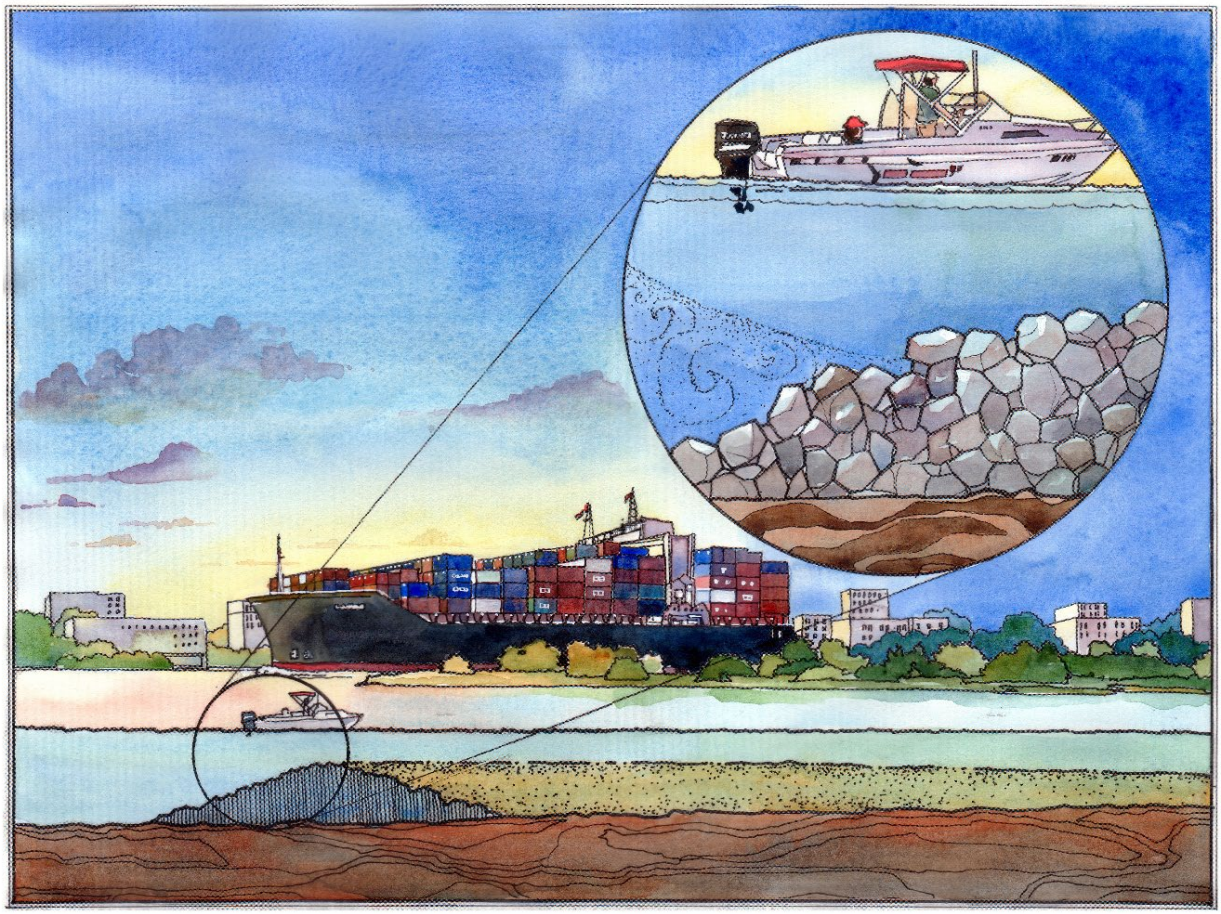

Figure 3. Rendering of the Rock Weir and Berm Concept Design

In fiscal year (FY) 2015, the USACE completed the 65% design for the sediment basin weir and fill. Due to a funding restriction, further work was paused until adequate funding was sourced. In 2021, the Savannah District completed the 95% design of the sediment basin weir and fill. Changes from the 65% design to 95% design included moving the sediment basin weir and fill further upriver due to concerns with hydrology and shear stresses. The FY21 cost estimate for construction of the 95% design of the sediment basin weir and fill was $125.6 million. Given the high cost, the USACE contracted GHD, an engineering firm, to model the effectiveness of the sediment basin weir and fill in preventing salinity intrusion upriver, assess alternate design layouts, and determine the impacts to freshwater wetlands under these scenarios. GHD also investigated local hydraulics that may influence the structure and surrounding environment (GHD 2022).

In 2022, the USACE presented the findings of the 2022 GHD investigation to state and federal agency stakeholders to discuss the results and determine what mitigation is appropriate in accordance with the Monitoring and Adaptive Management Plan.

As a result of that meeting, resource agencies requested additional modeling for wetlands impacts, dissolved oxygen (DO) impacts, and Habitat Suitability Index (HSI)

modeling to determine what the impacts would be if the sediment basin weir and fill was not constructed. Between 2023 and 2024, GHD developed a Sediment Basin Modeling and Habitat Suitability Index Evaluation Report (GHD 2024). The Impact Analysis (Appendix A) incorporates the GHD 2024 report to assess effectiveness and need for construction of the sediment basin weir and fill.

1.3. Proposed Federal Action

The USACE is proposing to modify Plan 6a identified in the 2012 SHEP FEIS Mitigation Plan to omit the sediment basin weir and fill measure.

1.4. Purpose and Need for Proposed Action

The purpose of the proposed action is to modify Plan 6a to avoid unnecessary costs and environmental impacts that would occur with construction of the sediment basin weir and fill.

The proposed action is needed to address the challenges that were identified during the development of 95% design of the sediment basin weir and fill, including constructability and substantial cost risks due to uncertainties in sediment composition and depth. The natural fill in the sediment basin was primarily silty/ploughy material. Plough material is also known as fluid mud. During the 95% design, the USACE collected field data on this material to inform construction costs. There is uncertainty how this material would behave as the large rocks for the rock weir are placed during construction, whether it would disperse during placement or in effect act as pillow and require equipment/dredging to clear the material. The depth that the rocks will sink to at the river bottom is also uncertain, as well as how the rock will behave after construction, i.e. continue to settle or shift. However, it would not be known until actual construction if clearing the material would be necessary or even effective. And given the nature of the material, the depth of the material required to reach the bed river bottom could not be definitively determined, resulting in additional uncertainties regarding the amount of rock needed to construct the rock weir to the required elevation.

Additionally, the 2022 GHD report identified challenges related to the stability of the fill in the Back River. The 2022 GHD report also indicated that the sediment basin weir and fill measure would not perform as intended and create only a marginal benefit for freshwater wetlands.

Furthermore, the proposed action is needed as environmental conditions have changed since 2012. Recent surveys revealed that fill in the sediment basin has naturally reached an equilibrium at approximately 70% of the designed capacity since dredging of the basin was discontinued in 2005. In addition, the Back River was designated as critical habitat for Atlantic sturgeon, which are listed as endangered pursuant to the Endangered Species Act (ESA), 16 U.S.C. § 1531 *et seq*.

Best available data demonstrate that the 2012 SHEP FEIS mitigation commitments will still be fulfilled in a cost-effective and environmentally beneficial manner with the omission of the sediment basin weir and fill from Plan 6a. Additionally, any impacts

identified during post-construction monitoring can be mitigated for using more cost-effective adaptive management measures identified in the SHEP Monitoring and Adaptive Management Plan to ensure that mitigation obligations are met, if necessary.

1.5. Location and Description of Project Area

The project area is located in Chatham County, Georgia and Jasper County, South Carolina (Figure 4). These counties lie in the Coastal Plain physiographic province in Georgia and South Carolina. The Savannah River bisects the two counties and serves as the boundary between Georgia and South Carolina. The Savannah River enters the study area flowing in a generally southeasterly direction before emptying into Atlantic Ocean just north of Tybee Island. A series of barrier islands, intervening salt marshes, and tidal rivers separate the mainland areas of Georgia and South Carolina from the ocean.

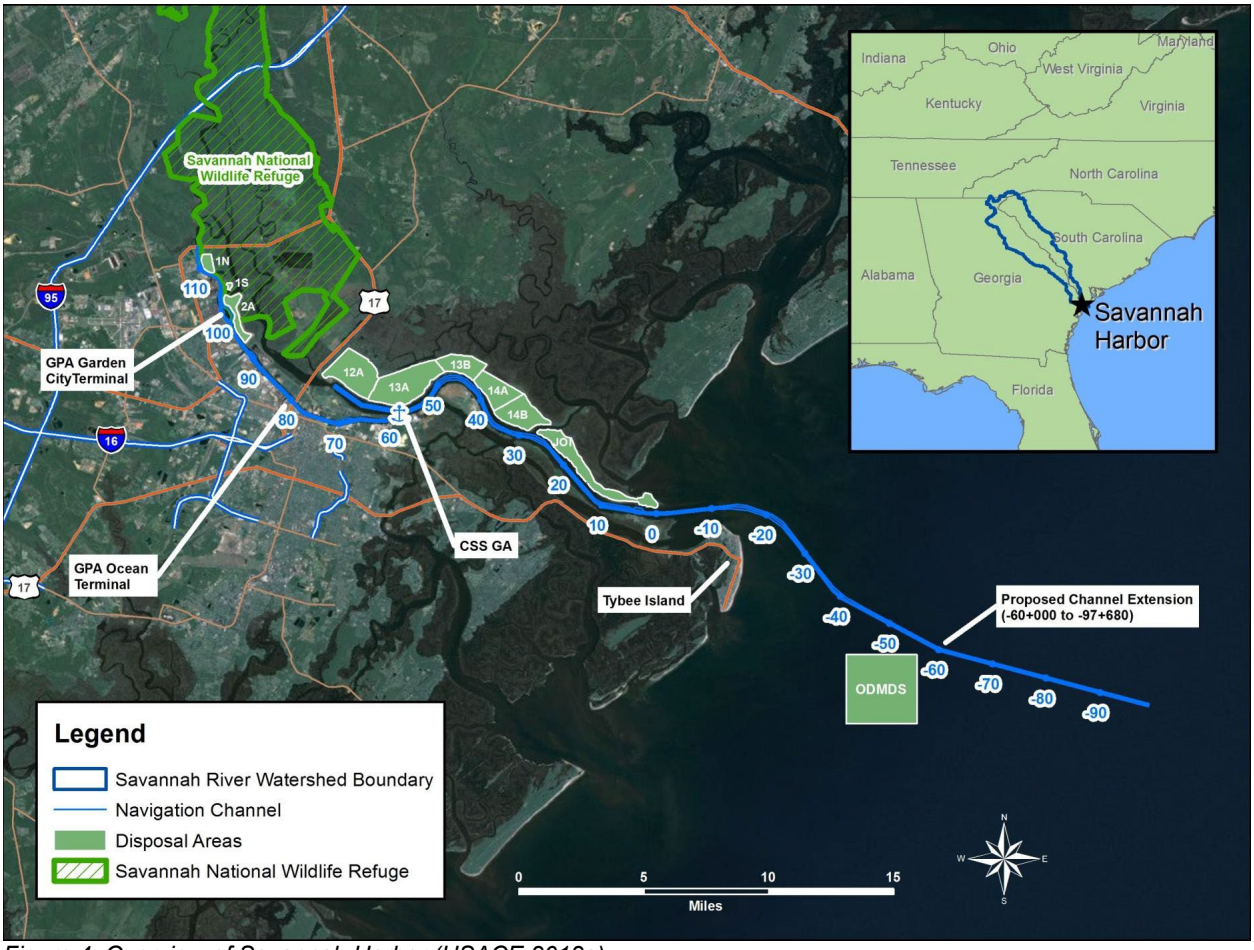

Figure 4. Overview of Savannah Harbor (USACE 2012a)

1.5.1. Existing Facilities/Navigation Channel

The Savannah Harbor navigation channel is approximately 38 miles long, from the upstream river limit (station 103+000) to the end of the ocean bar channel station (-97+680B). The ocean bar navigation channel is -49 feet MLLW deep and 564 feet wide,

extending from the Atlantic Ocean (station -97+680B) to the channel between the jetties (station -14+000B). The ocean bar channel continues at -47 feet MLW and 464 feet wide from the jetties (station -14+000B) to the harbor entrance north of Tybee Island (station 0+000). From the harbor entrance (station 0+000) to the upstream limit (station 103+000), the river navigation channel continues at -47 feet MLW and 464 feet wide. The King Island Turning Basin, the eight berths at the Garden City Terminal, three channel bend wideners, and two meeting areas are also all at a depth of -47 feet MLW.

1.6. Project Authority

The SHEP was conducted under authority provided by the Congress of the United States pursuant to the WRDA of 1999, Section 101(b)(9).

1.7. Agency Coordination

The USACE has conducted extensive coordination regarding proposed changes to the sediment basin weir and fill mitigation feature. This section provides a summary of that coordination.

In the spring and summer of 2021, the USACE completed preliminary coordination with state and federal agencies on the updated 95% design for the sediment basin weir and fill. This coordination included disclosing changes from the conceptual design in the SHEP FEIS to the 95% design, including relocation of the rock weir within the Back River and the need for tie-ins that extended onto the banks on either side. The purpose of this coordination was to determine the need for additional permitting and consultation related to the design changes. The USACE conducted a wetlands delineation and eastern black rail acoustic surveys in response to requests from resource agencies.

Given construction uncertainties that were identified during the 95% design, the USACE contracted additional modeling efforts to evaluate the 95% design and presented those findings to resource agencies (GHD 2022). These additional modeling efforts raised questions regarding the effectiveness of the sediment basin weir and fill. In discussions between the USACE, agencies, and stakeholders, it was collectively determined that additional modeling was needed to confirm findings and to evaluate potential impacts to other resources, such as essential fish habitat. In April 2023, the USACE held a Habitat Suitability Index (HSI) Workshop with the agencies to discuss the HSI modeling criteria. There was a consensus among agencies to maintain the same criteria used for the 2012 SHEP FEIS evaluation and to evaluate the HSI using both 1997 and 2021 flows. Agencies wanted 1997 flows to be used to maintain consistency with evaluations from the 2012 SHEP FEIS, and 2021 flows were used as 2021 represents the statistically “most average” present-day (2023) flow year. Additionally, National Marine Fisheries Service (NMFS) emphasized the need to ensure that the appropriate criteria determined through ESA Section 7 consultation for shortnose sturgeon were applied. These criteria were documented in Attachment 1 of Appendix P of the 2012 SHEP FEIS. Furthermore, in 2023 the USACE invited stakeholders to review and provide input on the scope of the HSI modeling effort. Upon consensus of the modeling parameters, USACE contracted with GHD to conduct additional modeling.

The USACE conducted a stakeholder workshop in January 2024 to discuss the results of hydrodynamic, water quality, and habitat suitability modeling. The USACE reviewed hydrodynamic model updates and received feedback on how to best present wetlands, HSI, and water quality results in the GHD 2024 report.

The USACE facilitated coordination meetings with state and federal agencies on June 4 and July 9, 2024, to discuss evaluation of the Proposed Action (AA) and NAA. Agencies were also given the opportunity to identify constraints related to the development of alternatives, review preliminary alternatives, and provide feedback on proposed impacts analyses.

The USACE and the United States Fish and Wildlife Service (USFWS) held an additional meeting on November 20, 2024, to discuss the proposed action and results of the wetlands impact analysis within the Savannah National Wildlife Refuge.

Finally, the USACE holds quarterly and annual stakeholder meetings to present findings from the ongoing environmental monitoring for SHEP. The status of the evaluation of the proposed action and NEPA process has been briefed at the monitoring meetings. Presentations from the quarterly and annual meetings are posted to the SHEP monitoring website: *shep.uga.edu*.

A more detailed list of agencies and persons consulted is in Section 6.2. Agency correspondence is included in Appendix D.

1.8. Prior Reports and Studies

Previous NEPA, design, planning, and monitoring reports related to the SHEP are summarized below.

USACE. 2012. Savannah Harbor Expansion Project – Final Environmental Impact Statement and General Reevaluation Report. In 2012, the Savannah District prepared a GRR and FEIS which evaluated engineering, environmental, and economic acceptability of various alternatives for addressing the existing and future navigation issues. These alternatives are based on deepening the Savannah Harbor navigation channel in increments from the existing depth of 42-feet MLW up to 47-feet MLW, including the “No Action” alternative. The GRR and the FEIS serve as decision documents regarding whether to implement the authorized deepening. Dredged sediment from the channel is being placed in the existing ocean dredged material disposal site and upland disposal areas. The report included mitigation and monitoring obligations for this effort in the Mitigation Plan and the Monitoring and Adaptive Management Plan. This report is herein incorporated by reference and is available online at https://www.sas.usace.army.mil/Missions/Civil-Works/Savannah-Harbor-Expansion/.

Tetra Tech, Inc. 2015. Hydrodynamic and Water Quality Modeling Report for the Savannah Harbor, Georgia – Final Report. Tetra Tech was contracted to update the Environmental Fluid Dynamics Code (EFDC) and Water Quality Analysis Simulation

Program (WASP) models of the Savannah Harbor and River systems. The models were used to monitor the SHEP environmental mitigation features and navigation channel dredging in the Savannah Harbor and evaluate how these activities impact salinity and DO. The models were updated to ensure they provided a good representation of the then-current and future conditions in the Savannah Harbor during SHEP construction activities. Additional calibration and validation to more recent continuous hydrodynamic and water quality data confirmed that the model could represent seasonal conditions in the Savannah Harbor under a multiple flow conditions. This report is herein incorporated by reference and is available online at https://shep.uga.edu/reports.html.

USACE. 2018. Supplemental Environmental Assessment for Savannah Harbor Expansion Project – Modification of McCoys Cut Feature. The proposed action was the modification of Section 5.1.2.3 of the Mitigation Plan in the 2012 SHEP FEIS for the McCoys Cut feature. The modifications to the McCoys Cut feature consisted of (1) dredging an additional 2,600 feet in the Middle River to achieve the intended flow needed to fulfill the SHEP's mitigation requirements, and (2) increasing the dredging depth at the mouth of Union Creek by four feet to account for potential future shoaling. The proposed action also consisted of using the excavated sediments to create approximately nine acres of wetlands and placing the remaining 100,000 cubic yards of sediment in either a portion of the Sediment Basin (another flow re-routing feature of the SHEP) or in an existing upland DMCA. This report is herein incorporated by reference and is available online at https://www.sas.usace.army.mil/Missions/Planning-Branch/Plans-and-Reports/. The McCoy's Cut feature was completed in April 2020.

GHD. 2022. Sediment Basin Modeling for Savannah Harbor Expansion Project – Final Modeling Report. GHD was contracted to update the hydrodynamic models to analyze the proposed sediment basin weir and fill in the post-harbor-deepening condition. The first goal was to understand the effectiveness of the sediment basin weir and fill in preventing salinity intrusion upriver, assess alternative design layouts, and determine the potential impacts to freshwater wetlands. The second goal was to see how local hydraulics may influence scour and erosion of the structure and surroundings. As part of the modeling effort, the updated hydrodynamic model was used to evaluate the impact of varying Sediment Basin weir heights and extending the fill area. The modeling demonstrated that a change in depth of the sediment basin weir and fill results in a marginal increase in salinity intrusion, particularly on the Little Back River. An increase in the length of the fill template, from 2,000 feet of fill to the full Sediment Basin (approximately 8,500 ft), results in substantive reduction in salinity intrusion on the Little Back River. Changes on the Middle and Front Rivers for both are small to negligible. The overall result of the modeling efforts demonstrated that there are numerous challenges associated with the proposed sediment basin weir and fill. This report is herein incorporated by reference and is available online at https://shep.uga.edu/reports.html.

Clemson University, Dr. Jamie Duberstein, principal investigator. 2014-2023. Wetland Vegetation Communities and Interstitial Salinity Conditions in the Upper Savannah River Tidal Floodplain During the Savannah Harbor Expansion Project.

Monitoring pre-construction (2014-2015) and during construction (2015-present) follows the methodology identified in the 2012 SHEP FEIS. Wetland vegetation communities and interstitial salinities are monitored at 12 sites within the upper estuary. No major shifts in vegetative communities or salinity conditions have been identified from 2014 through 2023, indicating that flow rerouting measures have so far met the objective of preventing or mitigating for the conversion of freshwater wetlands. Annual marsh monitoring reports are available at: https://shep.uga.edu/reports.html and are herein incorporated by reference.

GHD. 2024. Sediment Basin Modeling and Habitat Suitability Index Evaluation for SHEP – Final Report. GHD was contracted with completing additional hydrodynamic modeling to confirm findings in the 2022 report. Additional modeling was needed to re-run the HSI modeling for various species, and to analyze potential changes to DO between the AA (no weir or fill) and NAA (weir and 95% design fill). The updated analysis was intended to help USACE, and partner agencies make an informed decision about whether or not to construct the sediment basin weir and fill. The updated HSI models indicated that the percentage change in suitable habitat area between the AA and NAA is small in most cases. The updated DO zonal analysis indicates that installing the Sediment Basin weir and 95% design fill (NAA) yields slightly higher zonal DO values in the Back and Little Back Rivers, while the zonal DO values are constant in the Middle River and almost constant throughout the Front River. The magnitude of change was small across modeled flow scenarios. This report is herein incorporated by reference and is available online at https://shep.uga.edu/reports.html.

2. Alternatives

This section describes the alternatives development process and provides a more detailed description of the NAA and AA.

2.1. Alternatives Development

The USACE considered a suite of factors including modeling and monitoring data, environmental impacts/benefits, and constructability as part of the development process for the alternatives.

Initial scoping of potential alternatives involved interagency meetings with stakeholders from various state and federal agencies, as well as several non-governmental organizations. The scoping involved identifying constraints to screen alternatives.

During early coordination, constraints were identified to be used in the evaluation of the alternatives. These constraints are summarized below:

- Avoid adverse impacts to critical habitat for Atlantic Sturgeon.
- Avoid conflicts with the Settlement Agreement and environmental permitting related to the SHEP.
- Avoid or minimize effects to other species and habitats, including striped bass.
- Avoid or minimize impacts to water quality. The already completed flow re-routing measures as well as other mitigation measures included in the Mitigation Plan were constructed to offset water quality impacts from SHEP.

The USACE also conducted a thorough analysis of the monitoring and modeled data to determine if other mitigation measures, such as preservation of wetlands should be included in the proposed action. Appendix A contains the detailed analysis that supported the development of the proposed action.

2.2. No Action Alternative (NAA)

The NAA involves construction of the sediment basin weir and fill across the Back River near the Front River to facilitate the natural fill of sediment in the Back River (Figure 5). The 95% design included construction of the rock weir in the Back River upriver of the confluence of the Front River and Back River where velocities and eddy currents would be less likely to damage the structure. The sill would be constructed with a crest elevation of -9.5 ft MLLW to match the depth of the river just upstream of the Tidegate. The sill would fill the entire throat of the basin and extend up the Back River 2,700 feet when measured at the top. The bottom of the sill would exceed 2,700 feet in length due to the sloping nature of the deposited sediments. Roughly 65,000 cubic yards of rock would be needed to construct this weir. The rock weir is designed with tie-ins that extend up both banks of the river, which are needed for stability.

Approximately 2.1 million cubic yards of fill would be needed to expand the narrow rock weir into an effective submerged sill. The USACE originally intended to use suitable new work sediments excavated during the channel deepening to construct the sill. A

new sediment source would have to be identified to construct the sill since “new work” dredging has already been completed. The sediment placement would occur during the fall and winter months to minimize impacts to water quality and spawning fish.

Figure 5. Overview of the location of the sediment basin weir and fill.

2.3. Proposed Action Alternative

The proposed action is to modify the Plan 6a, as detailed in the 2012 SHEP FEIS Mitigation Plan, to omit the sediment basin weir and fill. The USACE is not updating any other elements of the Mitigation Plan and the Monitoring and Adaptive Management Plan for SHEP through this action. Under the proposed action, the USACE would not construct the sediment basin weir and fill and would commence post-construction monitoring elements.

The best available modeling and monitoring data indicates that the constructed flow rerouting measures are currently meeting mitigation objectives without construction of the sediment basin weir and fill. As the USACE is currently meeting the objectives of the mitigation plan, no additional wetland mitigation features are included in the proposed action.

Under the proposed action, the USACE would continue to implement the Monitoring and Adaptive Management Plan of the 2012 SHEP FEIS, which includes 10 years of post-construction monitoring. The USACE would also continue to apply the adaptive management process outlined in the Monitoring and Adaptive Management Plan of the 2012 SHEP FEIS. This includes post-construction monitoring and adaptive management requirements if impacts beyond those protected are observed during post-construction monitoring. The adaptive management measures identified in the 2012 SHEP FEIS include but are not limited to:

- Enlarging the diversion structure at the mouth of McCoys Cut,
- Enlarging the deepened area at McCoys Cut, Middle, and Back Rivers,
- Constructing a diversion structure at the junction of the Middle and Back Rivers, and
- Acquisition of additional bottomland hardwoods/freshwater wetlands.

2.4. Alternatives Eliminated from Detailed Analysis

One of the alternatives that was considered but eliminated from detailed analysis was modifying Plan 6a and acquiring additional freshwater wetlands. The USACE conducted a thorough wetlands impact analysis to determine the extent of any remaining wetland mitigation requirements. This analysis incorporated information from updated water quality and hydrodynamic models and data from marsh monitoring reports. The conclusion of this analysis is that the USACE is currently meeting the mitigation requirements, and acquisition of additional freshwater wetlands is not warranted. The detailed analysis on impacts to wetlands is in Appendix A.

Additionally, acquisition of additional freshwater wetlands is already an adaptive management measure identified in the 2012 SHEP FEIS and can be implemented in the post-construction phase of the project if monitoring data suggests that it is necessary. Continued implementation of the Monitoring and Adaptive Management Plan is included in the proposed action; therefore, a separate alternative is not necessary.

Additional monitoring measures were suggested by resource agencies during early coordination. An evaluation of those monitoring measures is found in Section 5.3 Environmental Commitments.

2.5. Comparison of Alternatives

Table 1. Summary Comparison *of the No Action Alternative and the Action Alternative*

	No Action Alternative	**Action Alternative (Proposed Action)**
Change to Mitigation Plan	No change to Flow Rerouting Mitigation Plan 6a	Omit the sediment basin weir and fill from Flow Rerouting Mitigation Plan 6a
Direct Wetland Impacts	0.16 Acres	0 Acres
Impact to Critical Habitat	Yes	No

Construction Cost	$125.6 million (FY21 Cost estimate)	$0
Wetlands Converted to Tidal Freshwater*	50-124 Acres	0 Acres
Direct Impact to Fish Habitat	Minor, adverse	None
Indirect Impacts to Fish Habitat	Minor, beneficial	None
Impact to benthic softbottom habitat	Minor, adverse	None
Impact to water quality (Dissolved Oxygen)	Minor, beneficial	None
Impacts to Hydraulics	Increased shear stresses and sediment transport on the Back River	None
Impacts to Cultural/Historic Resources	None anticipated	None
Impacts to Terrestrial Habitat	Minor, adverse	None

3. Affected Environment and Environmental Consequences

3.1. Resources Dismissed from Detailed Analysis

The USACE does not anticipate any effects to socioeconomics, recreation, noise, land use, visual resources, navigation, and real estate from either the No Action Alternative or the proposed action. These resources have been dismissed from detailed analysis (Table 2). Relevant resources are considered in more detail below.

Table 2. Environmental Resources Dismissed from Detailed Analysis

Resource	Reason for Dismissal
Socioeconomics	There would be no impacts to socioeconomics under both the NAA and the proposed action.
Recreation	Under the NAA, the sediment basin area would be temporarily restricted, but conditions would not change post-construction. Therefore, impacts would be negligible. There would be no impacts to recreation under the proposed action. It has been dismissed from further analysis.
Noise	The project area within the Back River near the Savannah River and downtown Savannah is a populated area with multiple residential and commercial developments along the shoreline. The Savannah River is an important navigational channel and port; noises associated with shipping barges and vessel traffic are prevalent. For the NAA, noise associated with construction of the sediment basin weir and fill would be temporary and negligible in nature. The proposed action would result in no changes to the noise producing activities and current noise levels. Therefore, noise has been dismissed from further analysis.
Land Use	Land adjacent to and near the project area is comprised predominately of undeveloped areas consisting of islands, marshes, upland confined dredged sediment placement facilities, and other undeveloped sites. Neither the NAA nor the proposed action would change the general land use in the area. Therefore, it is dismissed from further analysis.
Visual Resources	During construction of the NAA, the equipment used to construct the sediment basin weir and fill would be visible, resulting in a temporary change in the visual aesthetic. The proposed action would result in no changes the visual landscape in the area. Therefore, it is dismissed from further analysis.
Navigation	Neither the NAA nor the proposed action would change the long-term ability for recreational boats to navigate the river. Under the NAA, there may be construction

	equipment in the channel during the construction of the sediment basin weir and fill, but the impact would be temporary and negligible as boats can navigate around the equipment. Therefore, it is dismissed from further analysis.
Real Estate	The acquisition of real estate interests or permissions would not be needed for either alternative; therefore, it is dismissed from further analysis.
Terrestrial Biological Resources	The terrestrial environment will not be impacted with or without construction of the sediment basin weir and fill. No upland construction would occur under the NAA or AA.

3.2. Hydrology and Hydraulics

3.2.1. Affected Environment

All flow rerouting measures have been completed, with the exception of the sediment basin weir and fill. These measures have effectively routed freshwater into the Middle and Back Rivers. The USACE stopped dredging the sediment basin in 2005 and has allowed it to naturally fill in. Natural fill has likely reached a natural equilibrium and plateaued at approximately 70% of design according to quarterly bathymetric monitoring surveys (Figure 6).

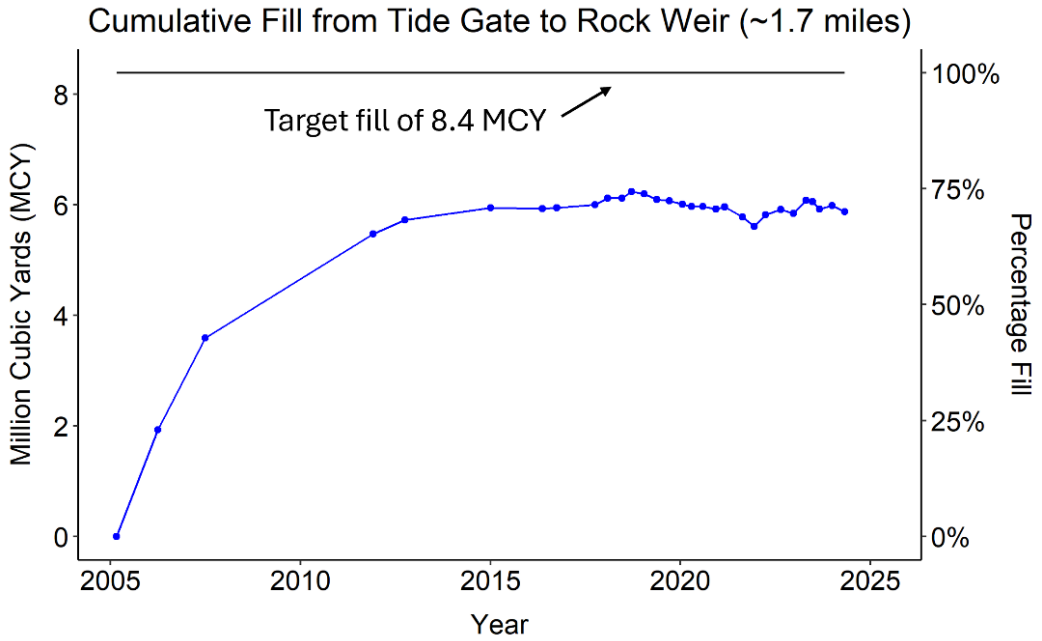

Figure 6. Estimated sediment basin fill from 2005 to present. Fill is currently at around 6 Million Cubic Yards (MCY), approximately 70% of the targeted 8.4 MCY.

The 2024 GHD Report compared the NAA and Proposed Action by using the hydrodynamic model, EFDC, assuming a base existing condition of 70% fill in the sediment basin.

3.2.2. Environmental Consequences of No Action Alternative

Construction of the sediment basin weir and fill would alter water velocities in this area and create shear stresses at the weir location. Shear stress is the measure of the force of the water on a solid, such as the rock weir. The most elevated shear stresses would be expected to occur on the northern side of the upstream face of the weir. Elevated shear stresses may result in erosion as the model results showed the potential for fine pebbles to be mobilized due to elevated velocities. The fill material, which is 75% sand, is expected to mobilize approximately 25% of the time (during median flows) with the construction of a weir at elevation -9.5ft MLLW; however, it is expected that this mobilized sediment would stay trapped behind the weir. Overall, the NAA would have negligible to minor adverse impacts to hydrology and hydraulics, due to temporary turbidity (suspension of solid particles in the water) from mobilization and scour.

3.2.3. Environmental Consequences of Proposed Action

The proposed action resulted in considerably less shear stresses than the NAA. The proposed action has minimal scour potential, and the fill material is mobilized less than 25% of the time during median flows. Furthermore, the USACE would conduct post-construction monitoring to evaluate the effectiveness of the constructed flow rerouting measures and would apply adaptive management measures, as applicable. Therefore, the proposed action is not anticipated to have a significant impact to hydrology.

3.3. Water Quality

The water quality conditions and subsequent impacts analysis is summarized below. The detailed analysis of the water quality modeling results is found in Appendix A.

3.3.1. Affected Environment

Section 4.02 of the 2012 SHEP FEIS describes the water resources found in the SHEP area. DO and salinity are the primary water quality parameters of concern related to SHEP. When compared to preconstruction modeling results from the 2012 SHEP FEIS, DO concentrations are similar or improved since construction of the SHEP, particularly at higher temperatures (Figure 7).

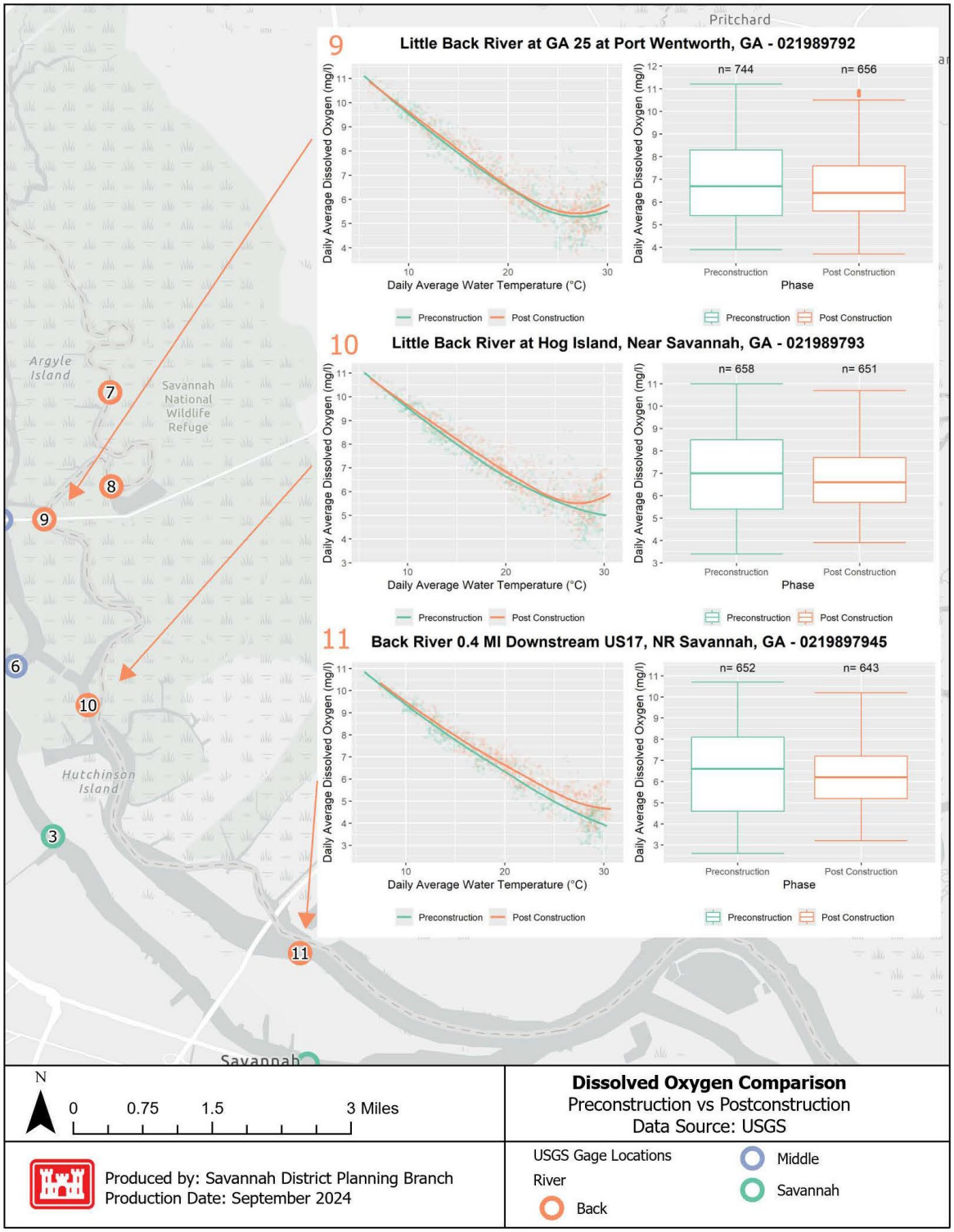

Figure 7. Pre-deepening and post-deepening dissolved oxygen concentrations at USGS gages within the zones that may be affected by the proposed action.

3.3.2. Environmental Consequences of No Action Alternative

A marginal increase in DO is anticipated from the construction of the submerged sill. Of the 20 spatial zones analyzed within the project area (Figure 8), there are six zones that are likely to be affected by the construction of the weir. Zones BR01, BR02, BR03, LBR01, LBR02, and LBR03 are all anticipated to have minimal increases in DO.

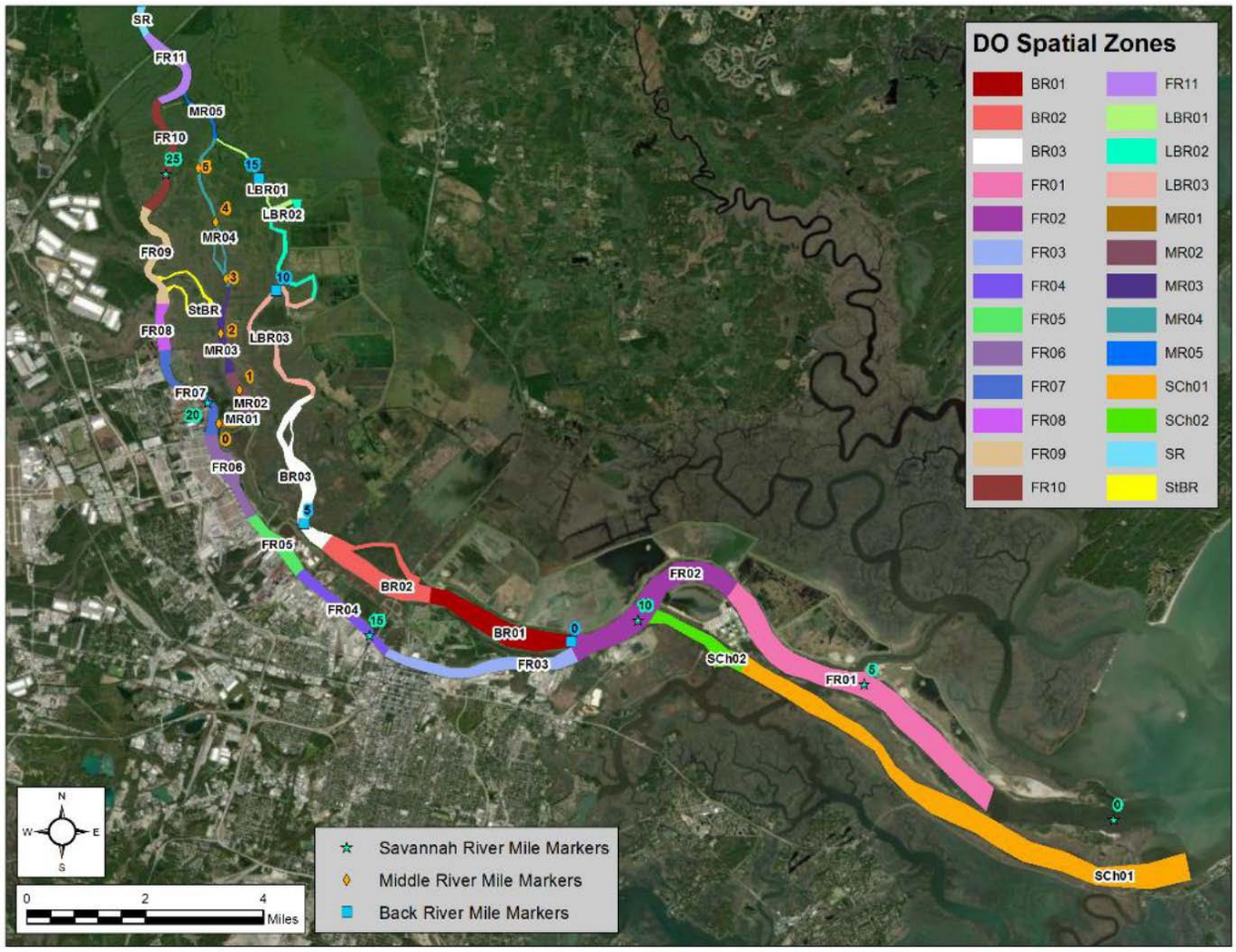

Figure 8. Map of zone delineation of Savannah Estuary Computational Grid in the Front, Middle, and Back Rivers.

Zone BR01 is expected to see a 3% increase, while zones BR02, BR03, LBR02, and LBR03 are expected to see a 1% increase. Despite modeled minimal increases to DO, temporary adverse impacts to water quality are likely due to turbidity during construction. Suspended sediments are anticipated to increase during the construction of the sediment basin weir and fill within the project area. Construction of the weir and fill would temporarily agitate sediment in that area and some of the sediment placed into the basin will also be agitated, causing the suspended sediments to increase. However, post-construction the project area is expected to return to natural conditions within a 24-hour tidal cycle. Modeling identified the possible need for the repeated placement of fill material to replace eroded material and retain effectiveness of the submerged sill.

Recurring placement of fill material would cause recurring adverse impacts to water quality, particularly turbidity. The timing of recurring placement would be dependent upon the rate of scouring within the basin. Impacts to salinity are discussed in more detail under Section 3.4. As with construction, the impacts from the periodic placements would be temporary and minor, as water quality would be expected to return to natural conditions within a single tidal cycle. Overall, the NAA would have minor adverse impacts to water quality from construction and long-term minor beneficial effects to DO.

3.3.3. Environmental Consequences of Proposed Action

Under the proposed action, DO and salinity are anticipated to remain unchanged from existing conditions. Similar or increased DO concentrations observed since the completion of the deepening in 2022 (Figure 7) indicate that the already constructed mitigation measures are currently meeting their habitat and water quality objectives. This is likely due to DO injection at the two injection plants (an existing mitigation measure identified in the 2012 SHEP FEIS) and increased freshwater flows on the Little Back and Back Rivers. This suggests that the mitigation objective of preventing decreased DO concentrations is currently being met without the construction of the sediment basin weir and fill. Therefore, the proposed action is not anticipated to have an adverse effect to DO. Impacts to salinity are discussed in more detail under Section 3.4. Because no construction is proposed, no impacts to turbidity are anticipated. Overall, no adverse effects to water quality are anticipated from the proposed action.

3.4. Wetlands

The wetland communities and impacts to wetlands are briefly summarized in the sections below. A more detailed analysis is found Appendix A.

3.4.1. Affected Environment

The Savannah River estuary contains a large quantity of wetlands consisting of various fresh (palustrine), brackish (estuarine), and salt vegetation communities. A detailed breakdown of wetland communities is available in Section 4 of the 2012 SHEP FEIS. These wetlands provide ecosystem services such as water filtration, erosion prevention, nutrient sequestration, and flood control. These wetlands also provide vital habitat for diversity of wildlife including various protected bird and fish species.

In the 2012 SHEP FEIS, the USFWS identified tidal freshwater marshes as being the most critical natural resource in the estuary and the resource that would require mitigation. In the 2024 GHD report and Appendix A, potential impacts to wetland resources were assessed using the same prioritization of tidal freshwater wetlands and methodology as the 2012 SHEP FEIS. Salinity is the primary determining factor in the conversion of tidal freshwater marshes, so the effect of each alternative on salinity was analyzed to characterize impacts to freshwater wetlands.

The original modeling of Plan 6a predicted an unavoidable conversion (loss) of 223 acres of tidal freshwater wetlands. This predicted conversion was mitigated for via preservation of freshwater wetlands transferred to the USFWS. The most recent modeling efforts show that rather than a loss of 223 acres, SHEP construction and flow rerouting features have resulted in an increase of tidal freshwater wetlands by 296 acres (Figure 9). This demonstrates that the original mitigation objectives of the

mitigation plan are being met without the construction of the sediment basin weir and fill, and that the original mitigation objectives of Plan 6a are currently being exceeded.

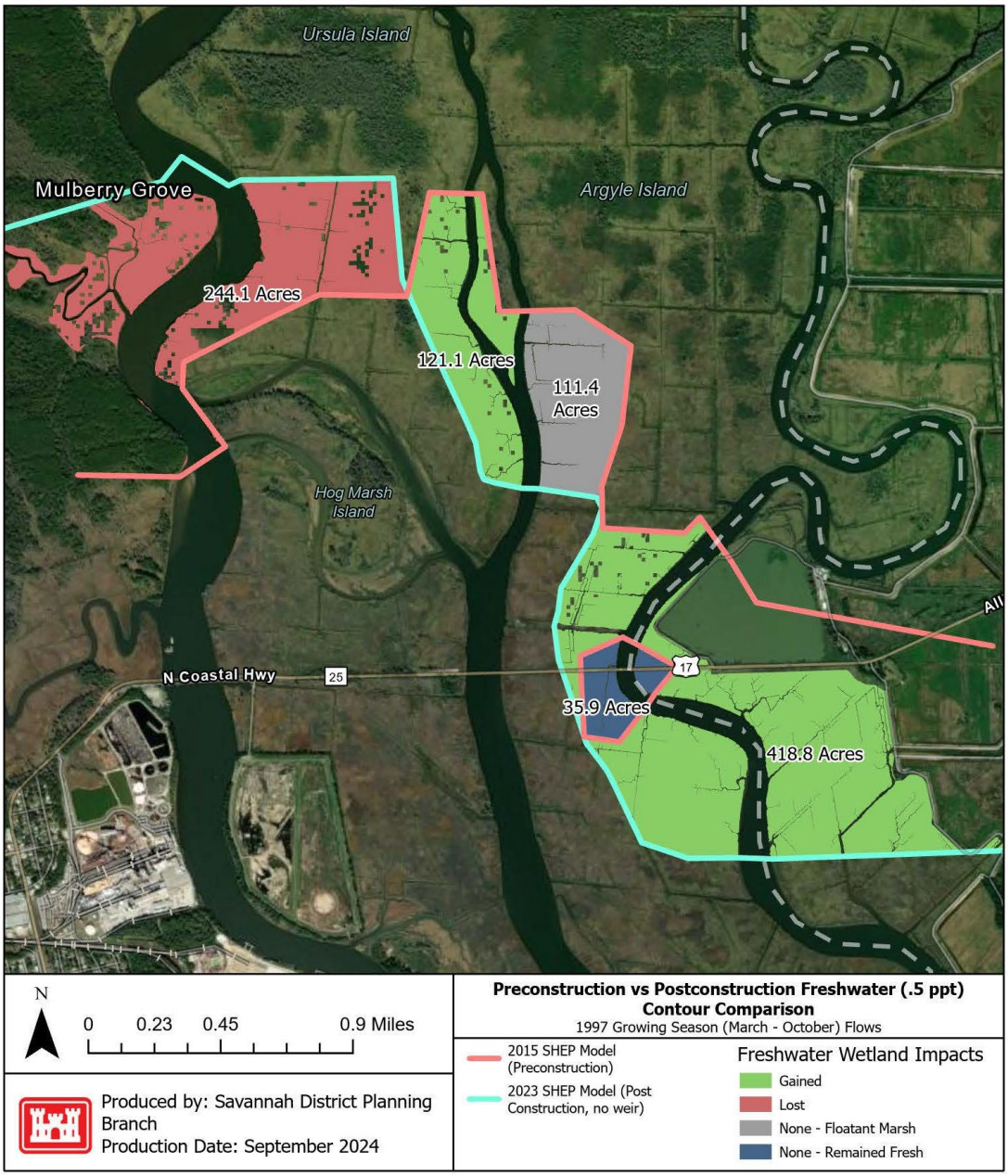

Figure 9. Comparison of pre-deepening and post-deepening salinity contours indicative of wetland communities (brackish vs freshwater).

3.4.2. Environmental Consequences of No Action Alternative

The NAA (construction of the sediment basin weir and fill) would result in direct, adverse impacts to wetlands due to construction of the tie ins required to support the weir structure. The USACE conducted a wetland delineation in 2021 at the location of the tie-ins and determined that construction of the sediment basin weir and fill would result in the direct permanent loss of 0.16 acres of estuarine wetlands.

The NAA would also result in indirect impacts to wetlands in the form of conversion of brackish wetlands (estuarine) to freshwater (palustrine) wetlands in the Back River by redirecting saltwater from the Back River to the Front River. These impacts would vary under different flow conditions, but average flow conditions would result in the impacts identified in Table 1 as vegetation communities shift over time in response to the salinity change.

Table 3. Impacts of NAA on tidal freshwater wetlands under modeled flow conditions.

Flow Conditions	Acres of Wetlands Converted from Brackish to Freshwater
1997 (Identified as most average flow year in 2012 SHEP FEIS)	124
2021 (Identified as most average flow year as of 2024)	50

Overall, the NAA would have a minor, adverse, direct impact to brackish wetlands and minor, beneficial impacts to freshwater wetlands.

3.4.3. Environmental Consequences of Proposed Action

The proposed action would avoid direct, adverse impacts to wetlands, and would not result in the marginal conversion of brackish to tidal freshwater wetlands identified under the NAA. However, the most recent salinity modeling (GHD 2024) shows that the constructed flow rerouting measures have resulted in the conversion of approximately 296 additional acres of brackish wetlands to freshwater wetlands compared to pre-construction conditions and that the original mitigation objectives of the SHEP Mitigation Plan are currently being exceeded under the proposed action.

The proposed action will have no direct impact to wetlands and will not affect the USACE's ability to meet the mitigation objectives identified in the 2012 SHEP FEIS. Therefore, the proposed action will not have a negative effect on wetlands. Additional analysis of wetlands modeling and monitoring data are available in Appendix A.

3.5. Sediment/Soils/Geology

3.5.1. Affected Environment

Chatham County is located within the Lower Atlantic Coastal Plain Physiographic region, where a majority of the soils have a sandy surface layer over loamy or sandy subsoil or underlying layers. From land surface to a depth of roughly 500 feet, sediments in this region consist of unconsolidated to somewhat indurated beds of sand and clay of Holocene (recent) and Miocene age to indurated limestones of Oligocene and Eocene age. Within the Savannah Harbor, sediments consist of a mixture of sands, silts, and clays; silt is the predominant material in the sediment basin. Generally, soils at the river bottom exhibit lower consistency than the deeper soils. The bottom soils are often very loose and semi-liquid and can extend from the bottom of the river channel to a few inches to several feet deep.

3.5.2. Environmental Consequences of No Action Alternative

Construction of the rock weir will likely cause temporary turbid conditions within the project area during construction due to the thick layer of silt along the riverbed. This layer of fine silt ranges from 2.5 ft on the fringe of the channel to as deep as 23.2 ft in the middle of the Back River channel. As the rock weir is constructed, this silt layer will be heavily disturbed, and silt is expected to be suspended into the water column which would affect water quality. The suspended silt would also be slow to settle and may prolong turbid conditions.

The deep silt layer is a constraint on construction, due to material sinking to an undetermined depth. There is a concern that the volume of material needed to construct the rock weir will be greater than anticipated, particularly in the middle of the channel where the silt layer extends the deepest. As noted above, the bottom soils of the Savannah River are often very loose and semi-liquid and can extend from the bottom of the river channel to a few inches to several feet deep. There is uncertainty regarding the depth of the semi-liquid bottom layer and uncertainty about how this material will behave when solid rock is placed on it. Therefore, it is uncertain the volume of rock that would be required to ensure the required elevation is met.

Uncertainty in the volume of rock that would be required to construct the weir to the required height adds considerable cost risk, and the potential for sinking of rock material after construction adds risk of requiring additional construction costs in the future. Overall, the NAA will have a moderate adverse effect to sediment in the study area, as the impact is expected to be reoccurring in the long-term given the potential need for periodic replacement of sediment behind the weir due to scour.

3.5.3. Environmental Consequences of Proposed Action

Not constructing the sediment basin weir and fill will have no effect on the geology or sediments within the project area. Geology and sediments will remain unchanged from existing conditions. The proposed action would avoid the impacts identified under the NAA.

3.6. Aquatic Biological Resources

3.6.1. Affected Environment

The project area is located near a vast network of rivers and estuaries between mainland Georgia and South Carolina. The habitat is primarily marine influenced, flushing with the tides semidiurnally, with marine water input from the Atlantic Ocean and freshwater inputs from the rivers to the north and south.

This area within the lower Savannah River watershed supports an abundant, diversified migratory fish community. Common fish species include American shad, redbreast sunfish, channel catfish, largemouth bass, black crappie, yellow perch, bluegill, striped mullet, and redear sunfish. Other species found within the project area include diadromous fish (those fish that spend portions of their life cycles partially in fresh water and partially in salt water), such as striped bass, blueback herring, and shortnose and Atlantic sturgeon. The catadromous (fish that migrate down river to the sea to spawn) American eel has also been documented within the project area. Due to the marine influence, the area also contains fish species such as sea trout, bluefish, redfish, mullet,

flounder, whiting, sheepshead, black drum, red drum, croaker, stingrays, speckled trout, King mackerel, and Spanish mackerel.

Several dolphin and shark species are present within the project area. The Atlantic bottle-nosed dolphin is the predominant resident species of dolphin and common shark species include bonnet head, Atlantic blacktip, tiger, and lemon.

Macrobenthic invertebrates inhabiting the proposed project area range from species used directly by humans for food, such as shrimp, crabs, oysters, and clams to other species such as polychaetes, crustaceans, mollusks, and other less well known, but valuable species that make up the remainder of the food chain. A variety of species of phytoplankton and zooplankton populate the open water areas.

The 2012 SHEP FEIS utilized binary (pass/fail) HSI modeling to assess impacts to fish and aquatic biological resources from SHEP. This process was in the 2024 report to assess the long-term impacts of the NAA and AA. This analysis is described in more detail in Appendix A. These species can serve as indicators of habitat suitability for most species within the project area. As referenced in the water quality section above, model results and gage data both show an overall increase in dissolved oxygen in post construction conditions, likely attributed primarily to dissolved oxygen injection and flow rerouting, though other factors such as improved discharges throughout the system could also have an influence on water quality improvements. These water quality improvements overall result in improved habitat quality for the assessed species using the same methodology utilized for the 2012 FEIS. The new modeling results imply that the flow rerouting measures are working as intended, even without construction of the sediment basin weir and fill. Additional analysis is available in Appendix A.

3.6.2. Environmental Consequences of No Action Alternative

HSI results indicate that the NAA, when compared with the proposed action, would result in 11.3% more habitat for American shad under the August 2021 50th percentile flow conditions, however, a closer look at the HSI inputs showed habitat deemed unsuitable in the proposed action scenario were very close (within .2 mg/l) to the threshold of 4 mg/l. The use of a binary model resulted in this habitat being identified as unsuitable for American shad, however, this small exceedance over the threshold likely has little impact to the species and showcases a limitation of binary (pass/fail) HSI models.

The NAA would also result in a marginal increase of suitable habitat for juvenile shortnose sturgeon, striped bass eggs, and striped bass spawning habitat versus existing conditions. The NAA also resulted in a slightly higher quantity of suitable habitat for American shad versus the proposed action, but it is unlikely to result in significant increases in suitable habitat for most species. The construction of the sediment basin weir and fill would result in minor indirect benefits for some species but would directly impact existing habitat within the sediment basin and potentially create a barrier to migration for the endangered Atlantic sturgeon and other anadromous species. Overall, the NAA would have minor beneficial indirect impacts for habitat some species and minor direct impacts to habitat for other species from periodic placement of fill in the Back River.

3.6.3. Environmental Consequences of Proposed Action

The proposed action would not result in the marginal improvements to fish habitat for the American shad and juvenile shortnose sturgeon provided by the No Action Alternative. However, those marginal gains are likely overestimated due to the use of a binary HSI models as described above.

Comparisons of the proposed action (representing current, existing conditions) to pre-deepening conditions (pre-construction HSI modeling completed for the 2012 SHEP FEIS) shows improved conditions for most species and life stages assessed (Table 5). This is likely due to the improved freshwater flows, DO concentrations, and salinity migration discussed above in sections 3.3 and 3.4.

Overall, the proposed action would not result in adverse impacts to striped bass habitat or other aquatic habitat in the study area in its existing condition, and the improvements in habitat that are a result of the already completed mitigation measures are expected to persist. In addition, the proposed action would avoid the direct impacts to habitat that were identified under the NAA from construction activities.

3.7. Protected Species

3.7.1. Affected Environment

The ESA requires regulation of activities affecting plants and animals that are Federally listed as endangered or threatened. The ESA also provides for the designation and regulation of critical habitat of ESA-listed species. The USFWS and the NMFS each have regulatory responsibilities for ESA-listed species under their jurisdiction.

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. §§ 703-712) prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the USFWS.

The Bald and Golden Eagle Protection Act (BGEPA) of 1940 (16 U.S.C. § 668-668d) prohibits anyone from "taking" bald or golden eagles, including their parts, nests, or eggs without a permit issued by the Secretary of the Interior. Bald and golden eagles are located in the project area. Bald and golden eagles can be susceptible to take from construction activities. There are several Birds of Conservation Concern (BCC) in the area. BCC identifies the migratory and non-migratory bird species beyond ESA-listed species that represent high conservation priorities.

In accordance with the MBTA and the BGEPA, the USFWS's Information, Planning, and Consultation System (IPaC) identified 35 species of birds that are protected within the project area, including the American bald eagle (USFWS 2024).

The Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. §§ 1361-1407) established a national policy to prevent marine mammal species and population stocks from declining beyond the point where they are no longer significant functioning elements of their ecosystems. The MMPA protects all marine mammals, and the ESA provides additional protection to marine mammals listed as Federally threatened or endangered. Three federal entities share responsibility for implementing the MMPA:

- NMFS—responsible for the protection of whales, dolphins, porpoises, seals, and sea lions.

• USFWS—responsible for the protection of walrus, manatees, sea otters, and polar bears.

• Marine Mammal Commission—provides independent, science-based oversight of domestic and international policies and action of federal agencies addressing human impacts on marine mammals and their ecosystems.

ESA-listed Species Potential Occurrence within the Project Area

The USFWS's IPAC indicated several ESA-listed species potentially within the project area. These included a total of four endangered species, one proposed endangered species, six threatened species, and one candidate species. Table 4 identifies the USFWS ESA-listed species occurring within the lower Savannah watershed basin, which encompasses the sediment basin project area. One of these species are also under NMFS jurisdiction which is indicated with an asterisk.

Table 4. USFWS ESA-Listed Species Occurring within the Project Area (Project Code 2025-0015737).

Category	**Common Name**	**Scientific Name**	**Federal Status**	**Critical Habitat Designated (Yes/No)**
Mammals	Tricolored Bat	*Perimyotis subflavus*	Proposed Endangered	No
Mammals (Marine)	West Indian Manatee	*Trichechus manatus*	Threatened	Yes, Project Area outside designated critical habitat
Birds	Eastern Black Rail	*Laterallus jamaicensis ssp. Jamaicensis*	Threatened	No
Birds	Piping Plover	*Charadrius melodus*	Threatened	Yes, Project Area outside designated critical habitat
Birds	Red-cockaded Woodpecker	*Picoides borealis*	Endangered	No
Birds	Wood Stork	*Mycteria americana*	Threatened	No
Reptiles	Eastern Indigo Snake	*Drymarchon couperi*	Threatened	No
Reptiles	Green Sea Turtle*	*Chelonia mydas*	Threatened	Yes, Project Area outside designated critical habitat
Insects	Monarch Butterfly	*Danaus plexippus*	Candidate	No

Plant	American Chaffseed	*Schwalbea americana*	Endangered	No
Plant	Canby's Dropwort	*Oxypolis canbyi*	Endangered	No
Plant	Pondberry	*Lindera melissifolia*	Endangered	No
*Species also under the NMFS Jurisdiction Note: List developed from the USFWS, IPaC Website				

NMFS ESA-listed species were assessed using the NMFS Threatened and Endangered Species List for the States of Georgia and South Carolina (NMFS 2024a; NMFS 2024b). The NMFS ESA-listed species potentially within the project area include a total of ten endangered species and four threatened species. Table 5 identifies NMFS species occurring within the sediment basin project area. The species also listed under USFWS jurisdiction are indicated with an asterisk.

Table 5. NMFS ESA-Listed Species Occurring within the States of Georgia and South Carolina

Category	**Common Name**	**Scientific Name**	**Federal Status**	**Likely Occurrence in Project Area**
Mammal	North Atlantic Right whale*	*Eubalaena glacialis*	Endangered	No
Mammal	Sei whale	*Balaenoptera borealis*	Endangered	No
Mammal	Blue whale	*Balaenoptera musculus*	Endangered	No
Mammal	Sperm whale	*Physeter macrocephalus*	Endangered	No
Mammal	Fin whale	*Balaenoptera physalus*	Endangered	No
Reptile	Kemp's Ridley sea turtle	*Lepidochelys kempii*	Endangered	Yes-occasional occurrences
Reptile	Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	No
Reptile	Loggerhead sea turtle	*Caretta caretta*	Threatened	Yes-occasional occurrences
Reptile	Leatherback sea turtle**	*Dermochelys coriacea*	Endangered	No
Reptile	Green sea turtle**	*Chelonia mydas*	Threatened	Yes-occasional occurrences
Fish	Oceanic Whitetip shark	*Carcharhinus longimanus*	Threatened	No

Fish	Giant manta ray	*Manta birostris*	Threatened	No
Fish	Atlantic sturgeon*	*Acipenser oxyrinchus oxyrinchus*	Endangered	Yes
Fish	Shortnose sturgeon	*Acipenser brevirostrum*	Endangered	Yes
*Critical Habitat for this species found within Chatham County or adjacent coastal water ** Species under both USFWS and NMFS jurisdiction that nest in Georgia Note: List developed by NOAA Fisheries Southeast Region Protected Resources Division, using the Threatened and Endangered Species Directory for Georgia, Southeast U.S. and the Threatened and Endangered Species Directory for South Carolina, Southeast U.S.				

NOAA ESA-listed species that may occur in the project area include Atlantic and shortnose sturgeon. The Savannah River, including the Back River, up to the New Savannah Bluff Lock and Dam is designated critical habitat for Atlantic sturgeon. There are no nesting or critical habitats for sea turtle species in the project area. Because the project area is within a riverine system, sea turtle species such as Hawksbill, and Leatherback would not be located within the project area. Green, Kemp's Ridley, and Loggerhead turtles may occur, but such occurrences are rare that far up the estuary. All other listed species in Table 5 inhabit deep water and open ocean areas and would not occur within the project area.

3.7.2. Environmental Consequences of No Action Alternative

Under the NAA, the USACE would construct the sediment basin weir and fill in the Back River which would affect but not adversely affect the shortnose sturgeon, Atlantic sturgeon, and Atlantic sturgeon critical habitat. The placement of the rock weir would permanently destroy 8.26 acres of soft substrate and the placement of the fill would temporarily affect 50.5 acres of soft substrate. Despite the permanent loss of soft substrate, the best available information suggests that Atlantic sturgeon use this portion of the Back River infrequently (B. Post, SCDNR, pers. comm. to A. Herndon, NMFS 2020), preferring instead to use the Front River. As noted by NMFS, "We suspect that preferential selection is because sturgeon [sic] are able to find sufficient resources in other portions of the river system. Thus, we anticipate sturgeon will still be able to find sufficient areas of soft substrate elsewhere in the critical habitat unit," (NMFS 2020; SERO-2017-00596).

Anticipated changes to salinity within this portion of the critical habitat unit are not expected to exceed the salinity tolerances for Atlantic sturgeon (0.5 to 30 parts per thousand). The placement of sediment in the Back River will affect depth, but a minimum required depth of at least 1.2 meters will be maintained. Flow will be continuous at all times during the periods in which any sturgeon life stage would be present in the river. Therefore, the effects on salinity and depths required by Atlantic sturgeon and their critical habitat would be insignificant.

Potential impacts to shortnose and Atlantic sturgeon may occur from sediment being discharged into the Back River. These impacts may include movement obscuration from turbidity plumes or injury from the descending sediment. The placement of material in the sediment basin could create turbidity plumes that may obstruct Atlantic and shortnose sturgeon movement; however, the effect would be insignificant. Sturgeon swim speeds would allow them to avoid a descending sediment plume, and even if temporarily enveloped in a sediment plume, the possibility of injury or burial is discountable. Effects to sturgeon from sediment placement in the Back River are further minimized by low usage of sturgeon in the Back River. Monitoring for Atlantic and shortnose sturgeon indicates that sturgeon utilize the Back River much less than the Front River (Post et al. 2020). The USACE has determined that the construction of the sediment basin weir and fill may affect but is not likely to adversely affect the South Atlantic Distinct Population Segment (DPS) of Atlantic sturgeon or shortnose sturgeon. The USACE also determined that the NAA is likely to adversely affect Atlantic sturgeon critical habitat (South Atlantic Unit 3-Savannah River) because of the permanent loss of 8.26 acres of soft substrate.

The eastern black rail is an ESA-listed species under USFWS jurisdiction that may be affected by the construction of the sediment basin weir and fill. The locations of the tie-ins have potential habitat for this species. During site visits in 2021, the USACE performed audio surveys for eastern black rail and received no response. It is unlikely that the species occurs in the study area. West Indian manatees may also be present within the sediment basin study area. The USACE would follow the agreed upon West Indian manatee construction conditions for Georgia. In addition, any West Indian manatees in the vicinity have the ability to migrate away from the construction. The USACE has determined that the NAA activities “may affect, but not likely to adversely affect” West Indian manatees. No other habitat for the other species is in the vicinity of the sediment basin weir and fill. The USACE has determined no effect to the other USFWS ESA-listed species under the NAA.

While there may be some migratory birds or shorebirds in the project vicinity, the USACE would limit construction to fall and winter months avoiding nesting season. There is abundant adjacent foraging habitat and only negligible impacts to migratory birds are anticipated.

3.7.3. Environmental Consequences of Proposed Action

Under the proposed action, the USACE would not be constructing the sediment basin weir and fill within the project area and therefore there would be no effect to ESA-listed species and their critical habitat or other protected species under USFWS or NMFS jurisdiction. The proposed action avoids adverse effects to Atlantic sturgeon critical habitat that would occur under the NAA. The proposed action also avoids adverse effects to movement of sturgeon species in the Savannah River estuary that would occur under the NAA. As indicated, improvements to habitat for aquatic species is occurring from the already constructed mitigation features; therefore, the proposed action would have no effect to ESA-listed species under NMFS jurisdiction.

There would be no indirect, adverse impacts anticipated by omitting the construction of the sediment basin weir and fill from Plan 6a. Not constructing the sediment basin weir

and fill would avoid effects to West Indian manatee and other USFWS species. Therefore, the USACE has made a determination of no effect to ESA-listed species or other protected species.

3.8. Essential Fish Habitat

3.8.1. Affected Environment

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. § 1801 *et seq.*) of 1976 defines essential fish habitat (EFH) as those waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity. The MSA is the primary law responsible for governing marine fisheries management in U.S. federal waters and aims to promote conservation, reduce bycatch, and rebuild overfished industries. Appendix B is the detailed EFH assessment pursuant to MSA. The following information summarizes that analysis.

Within the project area, EFH adjacent to the sediment basin weir and fill project area includes estuarine water column, unconsolidated bottom, estuarine emergent wetlands, and palustrine emergent wetlands.

Managed fish species occurring in the project area are included in Table 6.

Table 6. NMFS, SAFMC, and MAFMC managed species potentially located in placement area.

Common Name	Scientific Name	Function	Life Stage Use(s)	Fisheries Management Plan
Blacktip shark	*Carcharhinus limbatus*	Refuge, Forage, Nursery	Juvenile, Adult, Neonate	NMFS Highly Migratory Species
Bluefish	*Pomatomus saltatrix*	Refuge	Juvenile	MAFMC Bluefish
Gray snapper; Gag grouper	*Lutjanus griseus* (Gray snapper) *Mycteroperca microlepis* (Gag Grouper)	Forage	ALL	SAFMC Snapper Grouper
Penaeid Shrimp (Brown, Pink, and White Shrimp)	*Penaeus aztecus (Brown Shrimp)* *Penaeus duorarum (Pink Shrimp)* *Penaeus setiferus (White Shrimp)*	Refuge, Forage, Nursery	ALL	SAFMC Coastal Migratory Pelagics
Summer flounder	*Paralichthys dentatus*	Forage	Juvenile, Larvae	MAFMC Summer Flounder, Scup, Black Sea Bass

3.8.2. Environmental Consequences of No Action Alternative

The construction of the sediment basin weir and fill would result in adverse effects to

EFH. Construction activities associated with the sediment basin weir and fill would have direct and indirect effects to the estuarine water column, unconsolidated bottom, estuarine emergent wetlands, and palustrine emergent wetlands. The estuarine water column would have slightly higher DO concentrations due to the construction of the sediment basin weir and fill. However, there may be ongoing, temporary impacts to the water column by turbidity from reoccurring sediment placements. The NAA would directly impact 8.26 acres of unconsolidated bottom because the materials used to construct the sediment basin weir would permanently convert unconsolidated bottom to hardened structure. Additionally, 50.5 acres of unconsolidated bottom would be covered by fill activities. The impacts due to fill may be reoccurring as additional fill material may be required to maintain the function and integrity of the weir as sheer stresses created by the weir mobilized fill material. Construction of the sediment basin weir and fill would require construction of tie-ins that would directly impact 0.16 acres of estuarine wetlands. The construction activities would also result in indirect conversion of estuarine wetlands to palustrine wetlands, which was the intended goal of the flow rerouting mitigation measures.

In addition to the impacts to EFH, the construction of the sediment basin weir and fill would have minor adverse impacts on managed species in the area. These species have the ability to migrate to other adjacent habitat to avoid direct impacts like construction and turbidity. Indirect dredging and placement impacts, such as reduced water quality due to temporary increases in turbidity levels for activities such as feeding or spawning may also occur; however, these impacts would be short-term (within 12-24 hours) and minor in nature as the Back River is naturally turbid due to tidal and riverine influences. Once the USACE completes placement activities, any turbidity would quickly dissipate given the riverine/tidal currents. The placement of sediment as part of the fill activities may adversely affect infaunal and bottom-dwelling organisms at the site by smothering immobile organisms, (*e.g.,* invertebrate prey species) or forcing mobile animals (*e.g.,* benthic oriented fish species) to migrate from the area. However, natural disturbances are common in coastal environments so faunal communities are resilient to many kinds of periodic disturbances. Recovery is normal for healthy saltmarsh habitats if the disturbance event is under the critical threshold and if there are adjacent unaffected habitats that can serve as a source for colonists (McCall 2012). The direct impact from the construction of the rock weir would be long-term and permanent. The direct impact from the fill would be minor and long-term (approximately 2 years) and would reoccur with subsequent fill activities.

3.8.3. Environmental Consequences of Proposed Action

The proposed action would not change current conditions and would have no significant adverse effects on EFH, managed species, or habitat associated with managed species. The proposed action would not reduce either the quality or quantity of EFH in the project area. By not constructing the sediment basin weir and fill, productive estuarine marshes and benthic habitat, particularly useful for the managed species, will not change from current conditions and will not differ substantially from those evaluated in the 2012 SHEP FEIS and its EFH assessment. In addition, HSI results showed very small changes to habitat suitability due to the proposed action (-2.5% and -0.6% for 1997 an 2021 flows, respectively).

The proposed action would avoid recurring, temporary adverse effects to water quality from periodic placement of fill and would have no adverse effect to the water column compared to current conditions. In addition, the proposed action removes the planned impact to estuarine emergent wetlands and unconsolidated bottom within the project area.

3.9. Historical and Cultural Resources

3.9.1. Affected Environment

The National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. §§ 470a-470w-6 *et. seq.*) regulates the identification and protection of historic resources, including archeological resources, at the federal level and indirectly at the state and local level. The NHPA authorizes several tools to carry out preservation activities. One is the National Register of Historic Places (NRHP), the official federal inventory of districts, sites, buildings, structures, and objects significant on a national, State or local level in American history, architecture, archeology, engineering and culture. Another is a review process, known as Section 106 (54 U.S.C. § 306108) after its location in the original law, to ensure that federal agencies consider the effects of federally licensed, assisted, regulated, or funded activities on historic properties listed or eligible for listing on the NRHP. If it is determined an activity will cause an adverse effect, measures to avoid, mitigate, or minimize adverse effects will be documented in either a Memorandum of Agreement (MOA) or a Programmatic Agreement (PA).

Tidewater Atlantic Research, Inc. conducted archaeological surveys in the project area in the early 1990s (1992-1994). In 1992, one portion of the Back River had been surveyed through remote sensing and low water surveys. The survey area included the Back River, from mouth of the sediment basin at its juncture with the Savannah Harbor navigation channel to the lower end of Hog Island in the Little Back River. The survey identified 31 archaeological sites. Sixteen were identified as wrecks or abandoned vessels, and one was identified as a pre-historic site. The remaining sites were related to historic rice plantations.

In 1993 and 1994 additional surveys were conducted to determine the historical significance of the previous recorded resources identified during the 1992 survey. A number of sites were determined to be eligible for inclusion in the NRHP. These sites include the Fig Island Channel Site, Mansfield/Shaftsbury Plantation-9CH685 (Back River, GA), Poplar Grove Plantation-38JA203 (Back River, SC), Shubra Plantation-38JA204 (Back River, SC). One property, Pennyworth Island (Back River, GA), is pending formal nomination to the NRHP.

3.9.2. Environmental Consequences of No Action Alternative

The USACE completed consultation as part of Section 106 and does not anticipate adverse impacts to cultural resources within or near the project area as a result of construction. Per the SHEP PA executed in February 2012, additional investigations would be necessary in this area if the weir were to be constructed. If investigations identified cultural resources in the study area, the USACE would follow the 2012 SHEP PA in identifying means or methods to avoid or minimize effects to cultural resources.

3.9.3. Environmental Consequences of Proposed Action

Under the proposed action, the USACE would omit the sediment basin weir and fill from Plan 6a and would not begin construction. Because current conditions would remain unchanged and the area would not be disturbed, the proposed action would not adversely affect cultural resources. Under the proposed action, fulfillment of this PA stipulation would not be necessary. Therefore, there would be no effect to historic properties and no further work would be recommended. On January 8, 2025, Georgia State Historic Preservation Office (SHPO) concurred with this determination and that no modification to the PA would be necessary. Consultation with South Carolina SHPO is ongoing, and responses will be included in the final SEA, if applicable. The USACE does not anticipate impacts to cultural resources.

3.10. Air Quality

3.10.1. Affected Environment

The Clean Air Act of 1972 (42 U.S.C. § 7401 et. seq.) identified and established the National Ambient Air Quality Standards (NAAQS) for a number of criteria pollutants in order to protect public health and welfare. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. The United States Environmental Protection Agency (EPA) has set NAAQS for six principal pollutants, which are called criteria pollutants. The criteria pollutants include ozone (O_3), carbon monoxide (CO), suspended particulate matter (PM), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb).

Regions are classified as “in attainment” or “unclassified” if the NAAQS have not been exceeded. If the NAAQS have been exceeded, the region is classified as “nonattainment” for the criteria pollutants. Once designated as nonattainment, the region can achieve an attainment status after three years of data showing non-exceedance of the standard. When an area is reclassified from nonattainment to attainment, it is designated as a “maintenance area,” indicating the requirement to establish and enforce a plan to maintain attainment of the standard. The proposed action is located in Chatham County, GA and Jasper County, SC and are in attainment with all NAAQS.

Air quality in Chatham County is monitored by the Air Protection Branch of the Georgia Environmental Protection Division (GADNR-EPD), while the South Carolina Department of Environment and Water monitors air quality in Jasper County.

3.10.2. Environmental Consequences of No Action Alternative

Under the NAA, temporary construction activities during installation of the sediment basin weir and fill would contribute to short-term air pollutant emissions from the construction equipment. Diesel engines are commonly used in construction activities and are known to emit large quantities of nitrogen oxides, particulate matter, carbon, and other air pollutants. Emissions produced in the construction phase of the NAA would be limited in quantity and duration. A Greenhouse Gas (GHG) Emissions analysis was conducted for the construction of the sediment basin weir and fill.

Temporary emissions from the construction of the sediment basin weir and fill include tailpipe combustion emissions from the construction vehicles, equipment, barges, and worker commuter vessels. These emissions are calculated using the Fuel Volume and Mileage GHG Emissions Calculator. The GHG Emissions Calculator uses unique emission factors for various fuel types to calculate GHG emissions based on volume of fuel used for the project. Emission factors for CO_2, CH_4, and N_2O are multiplied by gallons of fuel burned to provide an estimate of emissions for the proposed action. GHG analysis for the sediment basin weir and fill assumes all fuel used during construction is diesel due to construction equipment commonly being diesel powered. Using diesel for GHG analysis also provides the highest estimation of GHG emissions.

Fuel volumes for the construction of the sediment basin weir and fill is estimated to be approximately 1,497,008 gallons. Emissions from construction is estimated to be 15,284.1 metric tons of CO_2, 1.5277 metric tons of CH_4, and 1.4049 metric tons of N_2O (Table 7).

Table 7. Estimated Project Emission in Metric Tons

	CO_2	CH_4	N_2O
Construction equipment (non-road)	15,255	1.5091	1.4045
Barges and commuter vessels	29.139	0.018579	0.00048518
Total	15,284.1	1.5277	1.4049

Modeled results from the construction of the sediment basin weir and fill predict a conversion of brackish wetlands (estuarine) to freshwater wetlands (palustrine). Wetlands are a carbon sink with freshwater wetlands sequestering approximately 30% more carbon annually than brackish wetlands (Villa and Bernal, 2018). The 2021 flow conditions predict a conversion of 50 acres of brackish wetlands to freshwater wetlands due to the construction of the sediment basin weir and fill which would result in an approximate increased sequestration of 11,774 metric tons of carbon per year. Modeled results based on 1997 flows predict an increase of 124 acres of freshwater wetlands which would result in an approximate increased sequestration of 29,199 metric tons of carbon per year due to wetland conversion.

Potential effects due to fugitive dust generation from construction activities would also be short-term, localized, and would be minimized by the implementation of the air quality Best Management Practices (BMPs) identified in the 2012 SHEP FEIS. Under the NAA, adverse impacts to air quality would be minor and temporary.

3.10.3. Environmental Consequences of Proposed Action

Under the proposed action, there would be no changes to the existing environment. Thus, no additional sources of pollutant emissions would occur. The USACE does not anticipate impacts to air quality.

4. Cumulative Effects

The result of cumulative effects include the proposed action when added to other past, present, and reasonably foreseeable projects or actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over time. The USACE conducted a thorough evaluation of cumulative effects in the 2012 SHEP FEIS, see section 5.15. The cumulative effects analysis focused on six concerns: wetlands, fisheries, DO, groundwater resources, endangered species, and Tybee Island sediment transport. The cumulative effects analysis from the 2012 SHEP FEIS is incorporated by reference. The proposed action will not contribute to cumulative effects greater than those evaluated in the 2012 SHEP FEIS.

The Savannah Container Terminal, a proposed container terminal located on Hutchinson Island, is a reasonably foreseeable project in the study area, but given that the proposed action is to not construct a structure, and impacts are not significant, cumulative effects from the proposed action are not anticipated.

5. Compliance with Relevant Environmental Laws, Statutes and Executive Orders

This section provides documentation on how the proposed action for the modification of the 2012 SHEP FEIS Mitigation Plan to omit the construction of the sediment basin weir and fill complies with all applicable Federal environmental laws, statues, and executive orders.

5.1. Statutes

5.1.1. Clean Air Act of 1972, as amended (42 U.S.C. § 7401 *et. seq*.)

The Clean Air Act of 1970 (CAA), as amended, established a comprehensive program for improving and maintaining air quality throughout the United States. The intent of the Act is achieved through permitting of stationary sources, restriction of toxic substance emissions from stationary and mobile sources, and the establishment of National Ambient Air Quality Standards. Noise pollution is addressed through Title IV of the Act. Modifying the mitigation plan would not substantially change the effects that were outlined in the 2012 SHEP FEIS. The area is in attainment and the proposed action would not affect attainment status.

5.1.2. Clean Water Act of 1971, as amended (33 U.S.C. § 1251 *et. seq.*)

The Clean Water Act (CWA) governs the release of pollutants into waterways. Section 401 requires certification from the state that a discharge to waters of the United States in that state would not violate the states' water quality standards. EPA retains jurisdiction in limited cases. The Georgia Department of Natural Resources (GADNR) Environmental Protection Division (EPD) issued Georgia's 401 Water Quality Certification (WQC) for the SHEP on February 16, 2011. The South Carolina Department of Health and Environmental Control (SCDHEC) Board issued the 401 WQC on November 15, 2011. As noted in the November 15, 2011, 401 WQC, adoption of the November 10, 2011, settlement agreement by the SCDHEC Board, authorized issuance of the 401 WQC. USACE has been coordinating the proposed action with GADNR-EPD and South Carolina Department of Environmental Services (SCDES), previously known as SCDHEC. The USACE has determined that the proposed action would not require an updated or modified Section 401 certification from the GADNR-EPD or the SCDES, and the proposed project will be conducted in accordance with existing Section 401 certifications. The USACE is coordinating this determination with GADNR-EPD and SCDES and will include their responses in the final SEA, if applicable.

Section 404 regulates the discharge of dredged or fill material into waters of the United States. The USACE has permitting responsibility under Section 404 of the CWA. However, the USACE does not issue itself a 404 permit for discharges of dredged or fill material, but the USACE does apply the 404(b)(1) guidelines (40 C.F.R. Part 230). Only when there is no practicable alternative would any discharge of fill material occur in waters of the United States, including wetlands. Modifying Plan 6a identified in the Mitigation Plan of the 2012 SHEP FEIS will not result in the discharge of dredged material into waters of the United States and will not impact wetlands. The proposed action represents the least environmentally damaging practicable alternative. Therefore,

modifying Plan 6a to omit the construction of the sediment basin weir and fill complies with the 404(b)(1) guidelines.

5.1.3. Coastal Zone Management Act of 1972, as amended (16 U.S.C. § 1451 *et. seq.*)

Federal Consistency Determinations under the CZMA for the SHEP were provided on January 25, 2011, by GADNR Coastal Resources Division (CRD), and on November 15, 2011, by SCDHEC-Office of Ocean and Coastal Resource Management (OCRM). The USACE consulted with the Georgia Coastal Management Program (GCMP) and South Carolina Coastal Zone Management Program (SCCZMP) to determine if additional compliance was needed regarding CZMA. In accordance with the CZMA, the USACE has determined that the proposed action would be carried out in a manner which is fully consistent with the enforceable policies of the GCMP and SCCZMP.

In an email dated November 4, 2024, GADNR-CRD stated “no additional CZMA federal consistency documentation will be required for not building the sediment basin weir and fill since any impacts to coastal resources and uses arising from that mitigation measure will be mitigated by alternative measures, so there is no reasonably foreseeable net increase to effects above what was originally concurred with.” This correspondence can be found in Appendix D.

The response from SCCZMP will be included in the final SEA, if applicable.

5.1.4. Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et. seq.*)

In accordance with Section 7(a)(2) of ESA, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed species within NMFS and USFWS jurisdiction. Any incidental take as a result of the construction, operation, and maintenance of the SHEP has been coordinated between NMFS, USFWS, and the USACE.

Formal consultation with USFWS for the SHEP concluded April 28, 2011. For this effort, the USACE will coordinate the effect findings in this Draft SEA and FONSI with USFWS. USFWS responses will be included in the final SEA, if applicable.

Formal consultation with NMFS for the SHEP concluded with a biological opinion (BO) issued on November 4, 2011 and amendments issued September 23, 2013 and October 13, 2017. The USACE has determined no effect to NMFS ESA-listed species from the proposed action. The USACE will provide the draft SEA to NMFS for review during the public comment period.

5.1.5. Fish and Wildlife Coordination Act of 1958, as amended (16 U.S.C. §§ 661-665; 665a; 666; 666a-666c *et. seq.*)

The Fish and Wildlife Coordination Act (FWCA) directs federal agencies to prevent the loss and damage to fish and wildlife resources; specifically, wildlife resources shall be given equal consideration in light of water-resource development programs. Consultation with the USFWS is required when activities result in the control of, diversion or modification to any natural habitat or associated water body, altering habitat quality or quantity for fish and wildlife. For the SHEP, USFWS provided a FWCA report on March 7, 2011. All coordination under this Act is in accordance with the 2011 report.

The USACE will provide the draft SEA to USFWS for comment and will include any comments relative to FWCA in the final SEA, if applicable. The USACE has been coordinating the proposed action with USFWS.

5.1.6. Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended (16 U.S.C. § 1801 *et. seq.*)

The MSA is designed to actively conserve and manage fishery resources found off the coasts of the United States, and to support international fishery agreements for the conservation and management of highly migratory species. The MSA established procedures designed to identify, conserve, and enhance EFH for fisheries regulated under a federal fisheries management plan. Federal agencies must consult with the NMFS on all federal actions authorized, funded, or carried out by the agency that may adversely affect EFH.

For the SHEP, the consultation for EFH was conducted jointly with ESA consultation, as indicated in the letter dated January 25, 2011, from the NMFS Habitat Conservation Division. Because this action alters what was agree upon in the 2011 consultation, the USACE submitted an EFH evaluation to NOAA Fisheries on 11 December 2024. NMFS reviewed the EFH assessment and provided a response on 29 January 2025. NMFS offered no EFH Conservation Recommendations pursuant to Section 305(b)(2) of the MSA. NMFS responses will be included in Appendix D.

5.1.7. Marine Mammal Protection Act of 1972, as amended (16 U.S.C. § 1361 *et. seq.*)

This MMPA established a federal responsibility to conserve marine mammals within waters of the United States. With certain specified exceptions, the MMPA establishes a moratorium on the taking and importation of marine mammals, as well as products taken from them, and establishes procedures for waiving the moratorium and transferring management responsibility to the states. Marine mammals (or their parts) could potentially occur in the project area. The proposed action would not result in any effects on marine mammals as no construction would occur that may affect marine mammals.

5.1.8. National Environmental Policy Act of 1969, as amended (42 U.S.C. § 4321 *et. seq.*)

This draft SEA satisfies the requirements of NEPA. The USACE will release this Draft SEA and FONSI for a 30-day public comment period. Additionally, the USACE is seeking concurrence from the four cooperating agencies of the 2012 SHEP FEIS on the selection of a preferred alternative. Cooperating agencies include, Department of Interior (USFWS), Department of Commerce (NMFS), EPA, and the Georgia Department of Transportation, Georgia Ports Authority.

5.1.9. National Historic Preservation Act of 1966, as amended (16 U.S.C. § 470 *et. seq.)*

Section 106 of the NHPA requires agencies to consider the potential effects of their projects and undertakings on historic properties eligible for, or listed on, the NRHP. Historic properties include archaeological sites or historic structures or the remnants of sites or structures. To determine the potential effect of the project on known or unknown

historic properties, the following items are analyzed: the nature of the proposed activity and its effect on the landscape; the likelihood that historic properties are present within a project area; whether the ground is disturbed by previous land use activities and the extent of the disturbance, and listings of known archeological or historic site locations, including site data bases and areas previously surveyed or listings of sites on the NRHP. Because there will be no construction under the proposed actions and current conditions at the site will not change. The USACE has determined that there is no effect to historic properties posed by this undertaking.

On December 9, 2024, the USACE consulted with all parties (State Historic Preservation Offices/Tribal Historic Preservation Offices) regarding the decision to not construct the sediment basin weir and fill as a mitigation measure of the 2012 SHEP FEIS. Per the SHEP PA executed in February 2012, cultural resources investigations were necessary in this area if the weir was to be constructed. Due to this change, the USACE determined that there will be no effect to historic properties and no further work is recommended. Fulfillment of this stipulation is no longer necessary due to construction not proceeding.

One letter response was received from the Catawba Indian Nation on January 6, 2025. The Catawba had no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas. If, however, Native American artifacts and/or human remains are located, the Catawba wished to be notified. An additional letter was received from GA SHPO on January 8, 2025, stating concurrence with the USACE not constructing the weir and that a modification to the PA is not required. Consultation with SC SHPO is ongoing, and responses will be included in the final SEA, as applicable.

5.2. Executive Orders

5.2.1. Executive Order 13751, Invasive Species

Federal agencies are required to combat the introduction or spread of invasive species in the United States. This order defines invasive species as “any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health.” The proposed action would have no impact on the spread of invasive species.

5.2.2. Executive Order 11990, Protection of Wetlands

The purpose of this executive order is to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. In planning their actions, federal agencies are required to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. The proposed action would not adversely impact wetlands.

5.3. Summary of Environmental Commitments

Environmental commitments identified in the 2012 SHEP FEIS remain intact, including the measures identified in the Mitigation Plan and the Monitoring and Adaptive Management Plan. An excerpt from the Monitoring and Adaptive Management Plan summarizing the monitoring and adaptive management decision making process is below:

> *"After construction of the project is complete, the adaptive management decision process would become more focused on the long-term mitigation features of the project. The coordination process between the Corps and the Cooperating Agencies and the state natural resource agencies during the Post-Construction Monitoring phase of the project would be much the same as in the Construction phase. Some of the post-construction monitoring efforts would be conducted over 10 years. Should one agency request it, a meeting would be held at the end of each year between the Corps, the Cooperating Agencies, and the state natural resource agencies to discuss the new data that would be available or the implementation of an adaptive management measure if the data indicates that to be required. Meetings between the Corps and the agencies could be held more frequently if the need arises. At the end of the Post-Construction monitoring period, the Corps would review and consolidate the reports of the various monitoring efforts. The consolidated report would contain pertinent information from the various reports, focusing on issues which the Corps believes are most critical to decisions on the need to modify the navigation project or the mitigation plan. The report would identify whether the Corps believes that any modifications are warranted and recommendations on what modifications should occur. That report should be available within six months of receipt of the last monitoring report and within one year of the end of the Post-Construction monitoring.*
>
> *The Corps would coordinate that draft report with the Cooperating Agencies and the state natural resource agencies. The agencies would review the draft report for 30 days and provide their comments at a meeting that the Corps would host on this issue. The Corps would consider the comments and revise the report if necessary.*
>
> *The Corps would then issue a final monitoring report for public comment. The Corps would review the public's comments and prepare a decision document. It would provide that document to the Cooperating Agencies (USFWS Region 4, EPA Region 4, NOAA-Southeast Regional Office, and GPA/GA DOT) for review prior to the Federal agencies (including the Corps) making a joint decision on whether any modifications are warranted. Each of the Federal agencies must concur that a specific modification is warranted for that measure to be implemented. After the agencies' joint decision, the Corps would notify the public of the agencies' final determination."*

During early coordination for the proposed action, several ideas were shared regarding potential new monitoring elements to include. The USACE has determined the monitoring elements proposed were redundant to other elements already included in the Monitoring and Adaptive Management Plan:

- Additional bathymetric surveys
- Additional years of post-construction sturgeon monitoring
- Additional water quality monitoring stations
- Reassess Pre-construction and Post-construction 0.5 ppt salinity contours with updated models

6. Public Involvement and Coordination

Early and continuous coordination with the general public and appropriate federal, state, and local agencies is an essential part of the environmental process to determine the scope of environmental documentation, the level of analysis, potential impacts and avoidance, minimization, and/or related environmental requirements. Agency consultation for this project has been accomplished through a variety of methods.

This Draft SEA and FONSI will be issued for a 30-day public comment period. Review comments will be requested from federal and state agencies, as well as various interested parties. Responses to public comments will be included in Appendix C.

6.1. Summary of Coordination

Early and continuing coordination with the public and appropriate federal, state, and local agencies is an essential part of the environmental process to determine the scope of environmental documentation, the level of analysis, potential impacts and avoidance, minimization, and/or related environmental requirements. Agency consultation for this project has been accomplished through a variety of methods.

This Draft SEA and FONSI will be issued for a 30-day public comment period. The USACE will issue a public notice and will make the documents available on the Savannah District's external website. Review comments will be requested from federal and state agencies, as well as various interested parties, all of which are listed in Section 6.2 below. Responses to public comments will be included in Appendix C in the Final SEA, as applicable.

6.2. List of Agencies and Persons Consulted

In addition to the posting of the Draft SEA and FONSI on the USACE website, a notice requesting comments will be sent to the following agencies and groups:

- Tribes
    - Absentee-Shawnee Tribe of Indians of Oklahoma
    - Alabama-Quassarte Tribal Town
    - Catawba Indian Nation
    - Coushatta Tribe of Louisiana
    - Eastern Shawnee Tribe of Oklahoma
    - Kialegee Tribal Town
    - The Muscogee (Creek) Nation

  - Poarch Band of Creek Indians
  - The Seminole Nation of Oklahoma
  - Shawnee Tribe
  - Thlopthlocco Tribal Town
- Federal Agencies
  - EPA
  - National Marine Fisheries Services- Protected Resources Division (NMFS-PRD)
  - National Marine Fisheries Services- Habitat Conservation Division (NMFS-HCD)
  - USWFS
- State Agencies
  - Georgia Ports Authority (GPA)
  - GADNR-CRD
  - GADNR-EPD
  - GA SHPO
  - South Carolina Department of Natural Resources (SCDNR)
  - SCDES
  - SC SHPO
  - Georgia Department of Transportation (GDOT)
  - Savannah River Maritime Commission (SRMC)
- Stakeholder Groups
  - Savannah Riverkeeper

6.2.1. Tribes

The USACE continues to coordinate with the 11 Tribes that view Chatham County, Georgia and Jasper County, South Carolina within their area of interest.

6.2.2. Cooperating Agencies

The USACE has coordinated with the SHEP cooperating agencies regarding the development of the draft SEA and selection of a preferred alternative. Cooperating agencies for the SHEP are the Department of Interior (USFWS), Department of Commerce (NMFS), EPA, GDOT, and GPA.

6.2.3. Federal Agencies

The USACE continues to coordinate with USFWS, NMFS, and EPA on the proposed project. Coordination began early in the project development and will continue through project completion.

6.2.4. State Agencies

The USACE has conducted robust consultation with the GADNR-CRD, GADNR-EPD, SCDES, SCDNR, SC SHPO, GA SHPO, SRMC, and GDOT on the sediment basin weir and fill thorough interagency meetings and personal communications. The USACE will continue to engage state agencies throughout the NEPA process.

6.2.5. Local Stakeholders

The USACE has conducted robust engagement with the Savannah Riverkeeper and others on the sediment basin weir and fill project through interagency meetings and personal communications. The USACE will continue to engage local organizations throughout the NEPA process.

6.3. Stakeholder Engagement

Stakeholders include any member of the public that might be able to affect, are affected by, or are interest in the results of the USACE planning process. They are people or groups who see themselves as having rights and interests at stake, either directly or indirectly. The USACE has engaged with federal agencies, state agencies, and NGOs to aid in the evaluation of the proposed action. The USACE has held meetings with NMFS, USFWS, EPA, GADNR-EPD, GADNR-CRD, SCDES, SCDNR, GDOT, and others. Additionally, the USACE provides status updates in quarterly and annual SHEP stakeholder meetings. The following provides a list of these engagements:

- October 24, 2022
  - Interagency meeting presenting the findings of the 2022 Model. This model report can be found at: shep.uga.edu
- April 11, 2023
  - Habitat Suitability Modeling Workshop
- June 5, 2023
  - SHEP H&H Model Interagency Meeting
- July 24, 2023
  - SHEP Sediment Basin Draft Scope of Work Review
- October 23, 2023
  - Sediment Basin and HSI Modeling - Salinity Contour Meeting
- January 25, 2024
  - Sediment Basin Meeting with Agencies and Stakeholders- Model Results and Findings.
- June 4, 2024
  - SHEP Sediment Basin Supplemental EA Kickoff Meeting
- July 9, 2024
  - SHEP Sediment Basin Supplemental EA Interagency Meeting- Alternatives Development
- July 18, 2024
  - SHEP Quarterly Meeting- Update on SEA
- January 16, 2025
  - SHEP Quarterly Meeting- Impacts Analysis and Public Comment Period Notification

7. Selection of a Preferred Alternative

The USACE has determined that the omission of the sediment basin weir and fill from Plan 6a in the 2012 SHEP FEIS is the preferred alternative. This alternative has been selected as the preferred alternative as it best meets the purpose and need, is most cost-effective, avoids construction risks, avoids adverse effects to ESA-listed species and critical habitat, and is the least environmentally damaging practicable alternative.

8. List of Preparers

Name	Affiliation	Role
Alexander Metz	USACE Planning	Biologist/ Technical Lead
Madison Monroe	USACE Planning	Biologist/ Lead Author
Kris Howard	USACE Planning	Biologist/Co-Author
Jonathan Brown	USACE Planning	Archaeologist/Co-Author
Suzanne Hill	USACE Planning	NEPA Lead/Reviewer
Stefany Baron	USACE Engineering	Hydraulic and Hydrologic Engineer

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Savannah Harbor Expansion Project
Flow Rerouting Mitigation Plan – Sediment Basin Weir and Fill Modification
Chatham County, Georgia and Jasper County, South Carolina
Draft Supplemental Environmental Assessment and Finding of No Significant Impact

Appendix A- Draft Impact Analysis

Wetlands, Water Quality, and Fish Habitat

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT
100 WEST OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401

February 2025

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Table of Contents

1. Background

U.S Army Corps of Engineers, Savannah District (the USACE) has prepared this analysis to integrate the best available monitoring and modeling data to inform adaptive management decisions related to the Savannah Harbor Expansion Project (SHEP) Mitigation Plan. In 2012, the USACE completed an Environmental Impact Statement (2012 SHEP FEIS) that evaluated the effects from the SHEP. The USACE prepared a mitigation plan and adaptive management and monitoring plan (2012 SHEP FEIS Appendices C and D, respectively). The selected mitigation plan (Plan 6a) identified flow rerouting measures to address impacts from salinity to freshwater wetlands and habitat and water quality impacts. The USACE has constructed all flow rerouting mitigation measures except the sediment basin weir and fill. The USACE is preparing a Supplemental Environmental Assessment (SEA) to evaluate a no action alternative (NAA) of constructing the sediment basin weir and fill, and a proposed action alternative (AA) of updating the mitigation plan to no longer include constructing the sediment basin weir and fill. The impacts of each alternative were investigated in depth in the Sediment Basin Modeling and Habitat Suitability Index Evaluation Report for Savannah Harbor Expansion Project (GHD 2024). This report incorporates by reference the analysis in that report, which included a comprehensive comparison of the NAA and the AA. The purpose of this report is to provide a detailed comparison between the AA and pre-construction conditions to better understand the effectiveness of the flow rerouting measures in their current condition (no sediment basin weir and fill constructed). This report has been prepared as an appendix to the SEA.

The Sediment Basin Modeling and Habitat Suitability Index Evaluation Report for Savannah Harbor Expansion Project (GHD 2024) is the primary source of modeling data for this assessment. This analysis utilizes the improved 2023 SHEP Model (a combination of EFDC and WASP models) to identify the impacts of the AA and NAA to wetlands, water quality, and fish habitat. This report compared impacts between alternatives but did not compare impacts to baseline conditions (pre-deepened conditions in the Savannah River). Comparisons to the pre-deepened conditions are provided to fully understand the overall effectiveness of the already completed flow re-routing mitigation measures and to improve overall understanding of the impacts from the SHEP. Additionally, this impacts analysis integrates the best available modeling and monitoring data to better inform adaptive management decisions for the Mitigation Plan. Multiple improved SHEP models have been created and are incorporated into this report. The table below summarizes the history of updates to SHEP Models. Models in bold were utilized or referenced for this report. For the purposes of this report, SHEP Models utilize Environmental Fluid Dynamics Code (EFDC) to model salinity throughout the study area and Water Quality Analysis Simulation Program (WASP) to model dissolved oxygen.

Table A1- 1. Table of Existing SHEP Models and updates. **Bold** indicates models used in this analysis.

SHEP Model	**Primary Updates**
SHEP 2006	Original model used for the development of the SHEP FEIS (2012). Simulated period between Jan 1, 1997 – Dec 31, 2003.
SHEP 2010	Developed for EPA Total Maximum Daily Load (TMDL) requirements. Minor modifications to grid.
SHEP 2015 (base)	Recalibrated for the simulation period of Jan 1, 1997 – April 30, 2014.
SHEP 2015 (Without Project)	Bathymetry updated to meet the authorized depth throughout the navigation channel.
SHEP 2015 (With Project)	Mitigation features were added to the model.
SHEP 2018	Simulated the time period between Jan 1, 2014 – Dec 31, 2017. Bathymetry updates in navigation channel and DO sites based on updated surveys.
SHEP 2019	Simulated the time period between Jan 1, 2018 – June 30, 2019. Bathymetry updates in navigation channel, McCoy's Cut, Rifles Cut, and McCoombs Cut. Tide Gate was removed. DO Injections were added to assist with Test Run evaluations.
SHEP 2020	Extension and modification of grid. Bathymetry updates for the navigation channel. WASP model updated to version 8.4. DO Injections were added to assist with the Start Up Run evaluations.
SHEP 2021	Bathymetry updates to navigation channel and sediment basin. First modeling effort to focus primarily on sediment basin impacts. EFDC only. No WASP updates.
SHEP 2023	Bathymetry updates to navigation channel and sediment basin. Second modeling effort to focus primarily on sediment basin. Both EFDC and WASP were evaluated.

Over ten years of water quality data at ten USGS gages have also been collected as part of the Monitoring and Adaptive Management Plan, and those data sets have also been integrated into this analysis where appropriate. Additionally, wetland monitoring started in 2014 has resulted in the collection of over ten years of data. The wetland monitoring data are available on the SHEP Monitoring Website (https://shep.uga.edu/) and have been incorporated into this analysis.

2. Wetlands

2.1 Background: Impacts Methodology

In the 2012 SHEP FEIS, tidal freshwater wetlands were determined to be the most valuable wetland resource that provide more functional value than brackish and saltwater wetlands. Brackish and saltwater wetlands were identified as providing similar functional value. Therefore, only conversion of freshwater wetlands was considered a loss of function that required mitigation. The general methodology applied in the 2012 SHEP FEIS for assessing impacts to freshwater wetlands was to identify a freshwater "contour" using EFDC grid cells with a median salinity of less than 0.5 ppt and drawing lines through the estuary to connect the three main stems of the Savannah River (Front, Middle, and Back) while taking most likely flow paths into account. These "contours" were then used to split a wetlands layer provided by USFWS to calculate an acreage of freshwater wetlands for each modeled scenario (NAA and AA under various flow conditions). This same methodology used in the 2012 SHEP FEIS has been replicated for this analysis.

The primary purpose of the analysis in this report is to identify wetland impacts using the best salinity contours that represent pre-construction and existing conditions and to utilize marsh and water quality monitoring data to verify the selection of these contours. This information will inform adaptive management decisions.

2.2 Evaluation of Preconstruction Conditions

The USACE has prepared this analysis as discrepancies were identified when comparing the initial modeled freshwater contour in the 2006 SHEP model that was used in the 2012 SHEP FEIS with the pre-construction marsh monitoring data. The modeled salinity contour was not aligning with the field monitoring data. As part of pre-construction marsh monitoring efforts, vegetation species, above ground salinity, and root zone salinity were monitored at twelve sites within the area of expected impact. A wetland vegetation classification was also completed in 2014. Upon further examination, the pre-construction salinity modeling results completed in 2015 (Tetra Tech), which utilized the 2015 Without Project SHEP Model, more accurately depict monitored conditions than the 2012 SHEP FEIS salinity contours. Combining these modeling and monitoring efforts provides a more accurate depiction of the pre-construction conditions for freshwater wetlands within the Savannah River estuary and allows for a better characterization of the impacts to freshwater wetlands from the SHEP.

The 2015 SHEP Without-Project Model utilized more robust datasets for calibration and validation than the 2006 model. Continuous gage data at eleven USGS stations were used for calibration and validation versus the limited data from 1997 used for 2006 SHEP Model. The 2015 SHEP Model provides greater confidence in the estimation of

the pre-construction freshwater contour due to the integration of more robust bathymetric, calibration, and validation datasets. The statistical comparison between the 2006 and 2015 SHEP models indicate that the salinity contours produced during the 2015 modeling effort are the best representation of pre-construction salinity conditions in the Savannah Harbor.

Visual comparisons of salinity concentration outputs from the 2006 SHEP Model and 2015 SHEP Model are provided in Figure A1-1. Comparisons between these model outputs show that the 2006 SHEP Model places the freshwater contour much further downstream than the 2015 SHEP Model. The 2015 SHEP Model utilizes a more robust data set for calibration and validation and provides a more accurate representation of pre-construction conditions.

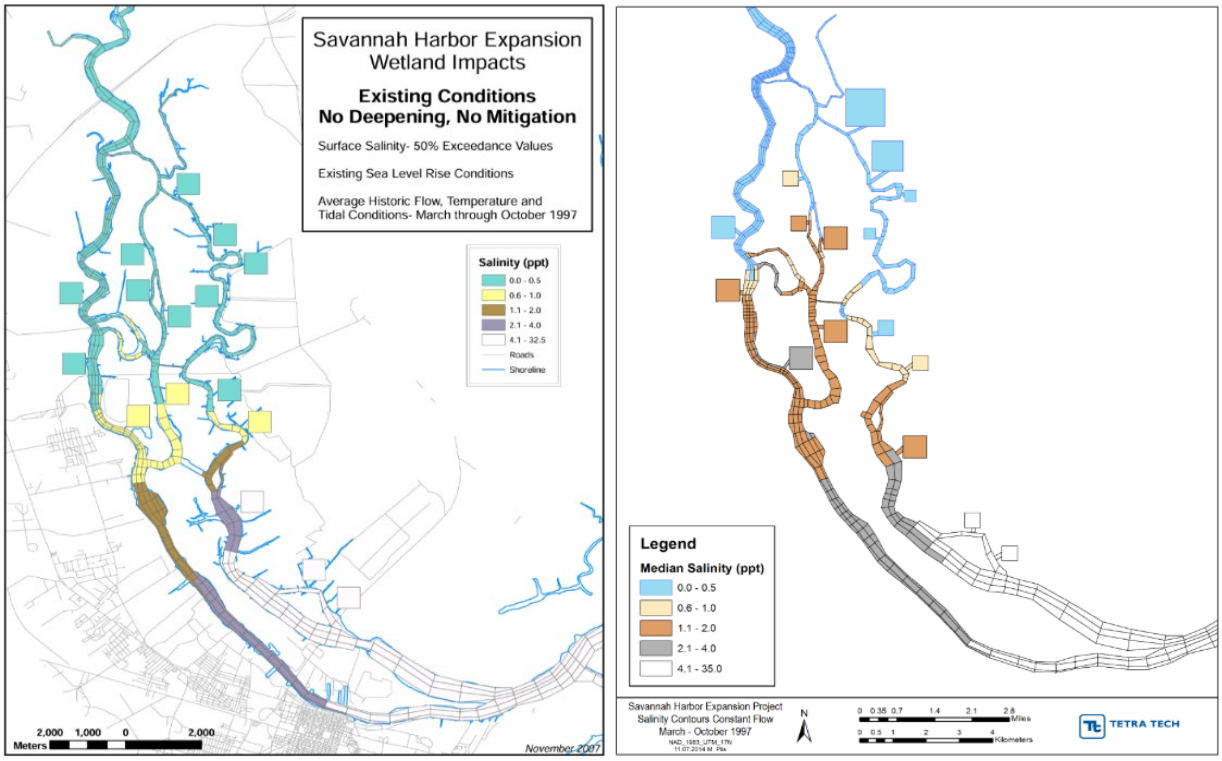

Figure A1- 1. Comparison of pre-construction growing season salinity medians with the 2006 SHEP model results on the left (USACE 2012) and the 2015 SHEP model results on the right (Tetra Tech 2015).

Vegetation classification completed as part of the 2014 Marsh Monitoring Report (Duberstein 2014) provides further validation for using the freshwater contour produced from the 2015 SHEP Model. The vegetation classification was completed using remote sensing data (8-band, 50 cm imagery) and was verified using field data as training polygons to classify vegetation by salinity tolerance. Classifying vegetation by three salinity zones (fresh, oligohaline, and mesohaline) using remote sensing data resulted in an overall accuracy of 78% (cross validation). Figure A1-2 visualizes the vegetation classification for both the 2006 SHEP and 2015 SHEP 0.5 ppt contours.

Figure A1-2 shows that the 0.5 ppt salinity contour produced from the SHEP 2015 Model provides a better approximation of the extent of freshwater wetlands than the 2006 SHEP Model contour. A large portion of the vegetation upriver of the 2006 Model's

contour is oligohaline or even mesohaline whereas the contour from the 2015 SHEP Model provides a clearer designation between fresh and brackish vegetation, more closely matching the classification results. Neither contour perfectly captures the distribution of vegetation by salinity tolerance because vegetation community composition is influenced by more than just river salinities. Soil properties, elevation, and varying inundation and salinity tolerances are just a few of the additional variables that affect community composition. Comparison of each freshwater contour to the imagery-derived vegetation classifications provides further validation for the use of the salinity contour produced using the 2015 SHEP Model versus the 2006 SHEP Model.

Council on Environmental Quality's NEPA regulations at 40 C.F.R. § 1506.6 Methodology and Scientific Accuracy require the use of high-quality information, including models. Therefore, as the 2015 SHEP Model is the best representation of pre-construction conditions, this evaluation will rely on salinity contours created from the 2015 SHEP Model as the pre-construction baseline conditions.

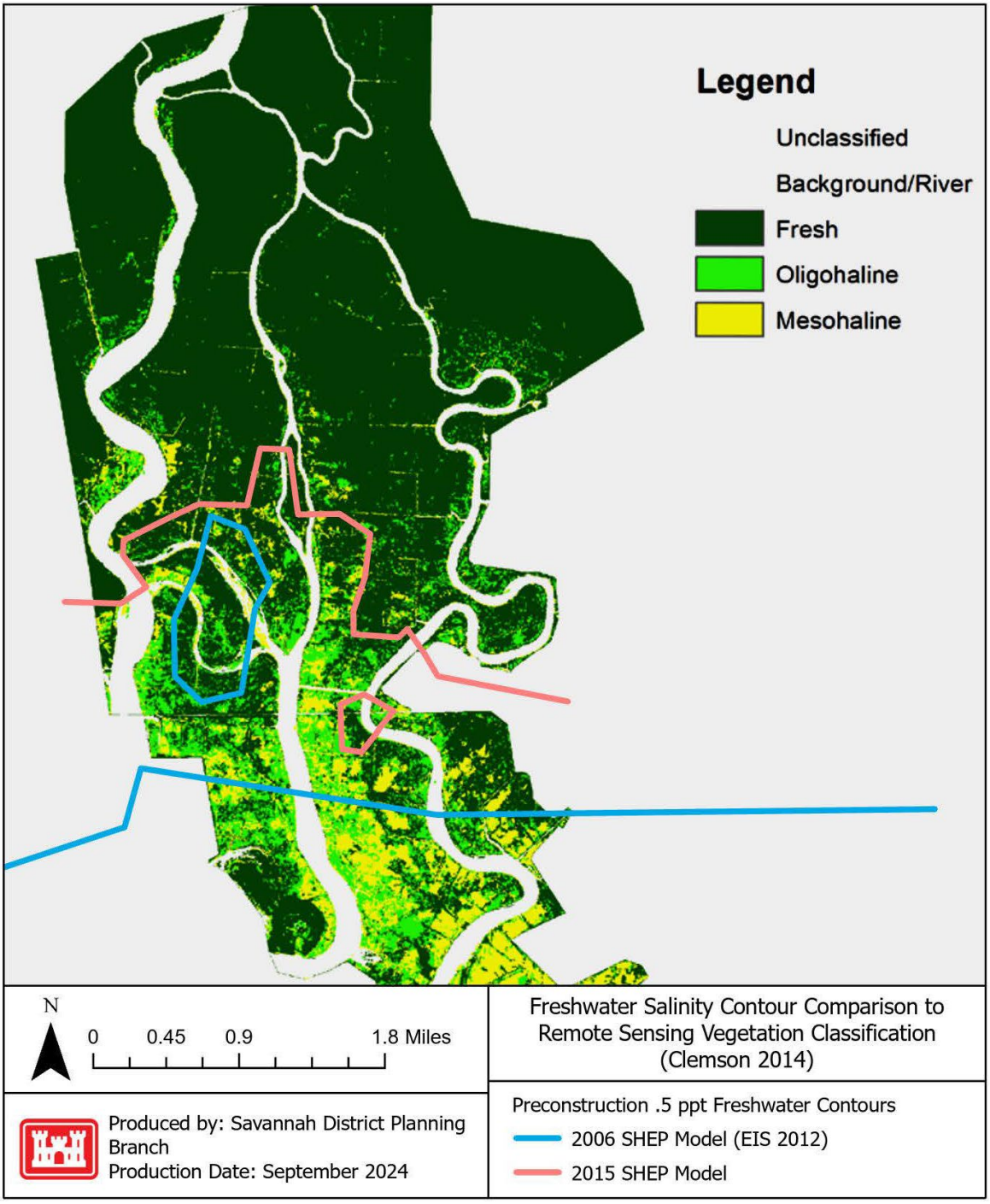

Figure A1- 2. Comparison of 2006 SHEP Model salinity contour (blue) and 2015 SHEP Model salinity contour (pink) over remote sensing classification of wetland communities. The 2015 SHEP salinity model provides a better fit to the wetland community classification. The blue polygon above the contour indicates brackish marsh surrounded by freshwater marsh, and the pink polygon represents freshwater marsh surrounded by brackish marsh.

2.3 GHD 2024 Report

2.3.1 2023 SHEP Model Validation

Figure A1-3 overlays existing conditions (AA) from the 2023 SHEP Model with 2021 flows and 2021 wetland monitoring results (Duberstein 2021) to assess how modeling results match observed conditions. Overall, modeling results closely matched the 2021 marsh monitoring data including vegetation composition and average above ground salinity (Duberstein 2021). The modeled contour correctly depicted salinity conditions observed at eleven of twelve marsh monitoring sites. The Middle 3 monitoring site was the only site that did not fall within the predicted salinity class. This could be due to a few factors. The Middle 3 monitoring site provided an average of the root zone salinities rather than the median of water column salinities which provide only an indirect comparison. Furthermore, the soil properties of flotant marsh, which have been identified at this location, are known to hold salinity for longer periods of time. These results again verify use of updated SHEP Model outputs as a tool to predict impacts to freshwater wetlands and therefore provide the best available information for adaptive management decisions. The 2023 SHEP Model is the best available representation of post-deepening conditions, and the contours provided from GHD 2024 are used to represent post-deepening conditions for the analysis in this report.

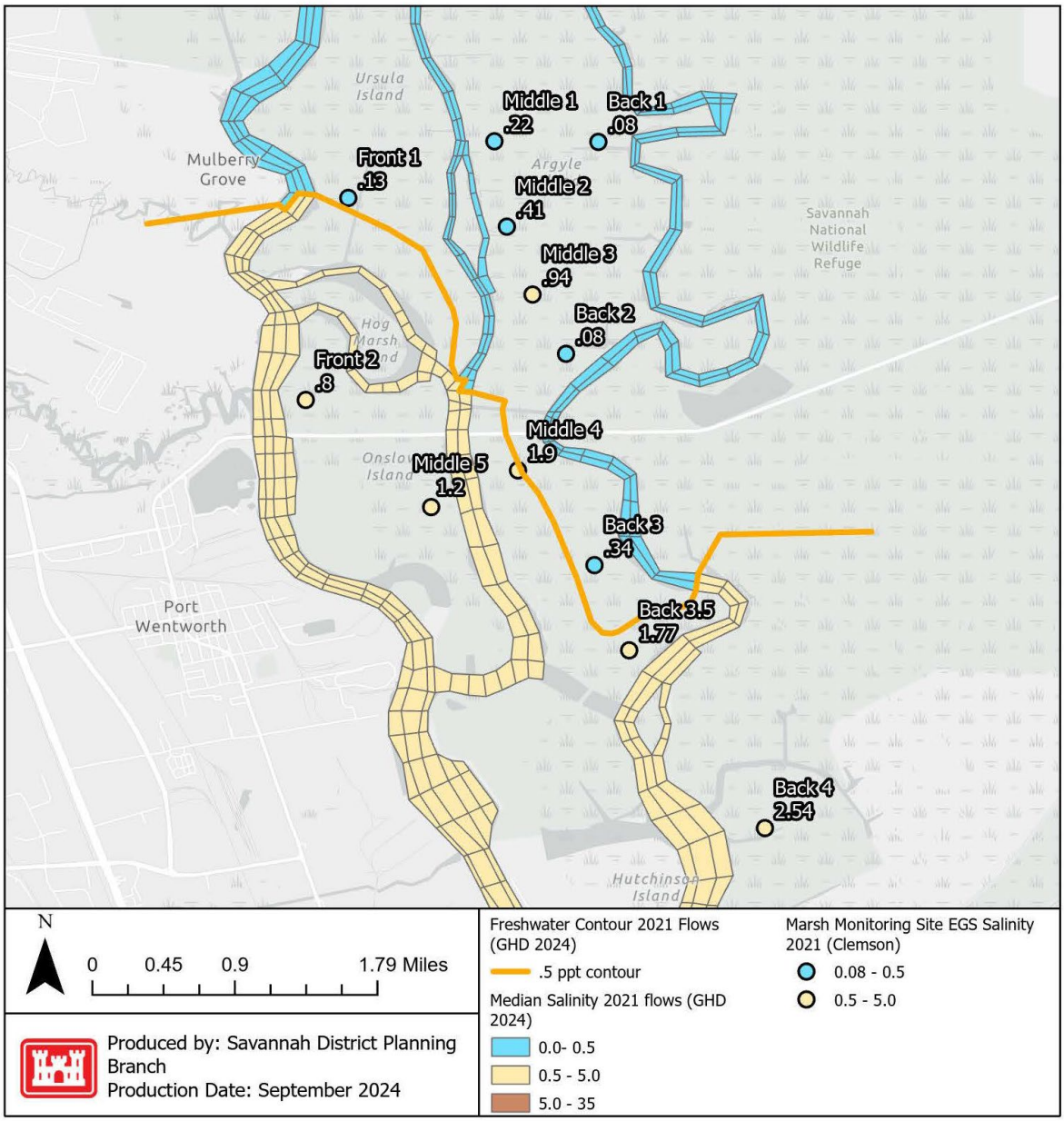

Figure A1- 3. Overlay of SHEP 2023 model results (Action Alternative - 2021 flows) and 2021 early growing salinity averages. Modeling and monitoring results show similar results verifying the modeling methodology used for wetlands impacts analysis, and the use of the SHEP 2023 Model as the best tool for identifying post-deepening conditions.

2.3.2 Freshwater Wetland Impacts: NAA compared to AA.

The GHD 2024 report provides a direct comparison of impacts related to construction of the sediment basin and weir (NAA) compared to not constructing the sediment basin and weir (AA). The report evaluated the effectiveness of the weir in preventing the conversion of additional freshwater wetlands by reducing brackish waters entering the Back River under multiple flow and fill conditions. Both 1997 and 2021 flows were modeled as these years were determined to be the statistically “most average” flow years in the period of record (1970-2023) at USGS Gage 02198500 at Clyo, GA. GHD 2024 then utilized those model outputs to develop salinity contours for each alternative

(NAA and AA) and flow year (1997 and 2021). All impacted acreages were calculated through comparisons to the 2006 SHEP Model contours to assess the effectiveness of each alternative. Direct comparisons between the NAA and AA show that construction of sediment basin weir and fill would result in a conversion of 124 acres of brackish to freshwater wetlands under 1997 flows and 50 acres under 2021 flows. However, the relative gains in freshwater wetlands need to be understood in context of the Mitigation Plan to make a fully informed decision regarding construction of the sediment basin weir and fill.

2.4 Updated Wetlands Impact Assessment and Supporting Data

Freshwater wetland impacts in the GHD 2024 report were calculated using the same methodology utilized in the 2012 SHEP FEIS. Salinity contours taken from the 2023 SHEP Model's outputs of median salinities within the growing season (March-October) were compared to background (pre-construction) freshwater contours from the 2006 SHEP Model to calculate the acreage of impacted freshwater wetlands. The 2006 SHEP Model utilized limited calibration/validation data from 1997 to determine background freshwater contours. Under 1997 flow conditions, the GHD 2024 report identified an additional 1004 acres of freshwater wetlands loss. However, these impacts were overestimated because the GHD 2024 report utilized contours derived from the less accurate 2006 model to represent pre-construction conditions. The USACE, recognizing the limitation of the wetlands impacts analysis in the GHD 2024 report, has updated the analysis using the 2015 SHEP Model contour to represent pre-construction conditions (Figure A1-4) in this Impact Analysis. This comparison assesses the effectiveness of the existing flow rerouting measures to determine the need for additional mitigation. Outputs using 1997 flows were utilized to maintain consistency of with the evaluation of impacts in the 2012 SHEP FEIS and to provide a direct comparison to previous modeling efforts.

Figure A1-4 shows a comparison between modeled median growing season salinity under pre-construction (left) and existing conditions (right). Existing conditions represents the AA where the SHEP has been constructed and all flow rerouting measures have been constructed except the sediment basin weir and fill. Both models used 1997 growing season flows, providing for a direct comparison. The general shift in the post-construction salinity contour matches the shift predicted in the 2012 SHEP FEIS, with the 0.5 ppt contour shifting upriver on the Front River and downriver on both the Middle and Back Rivers.

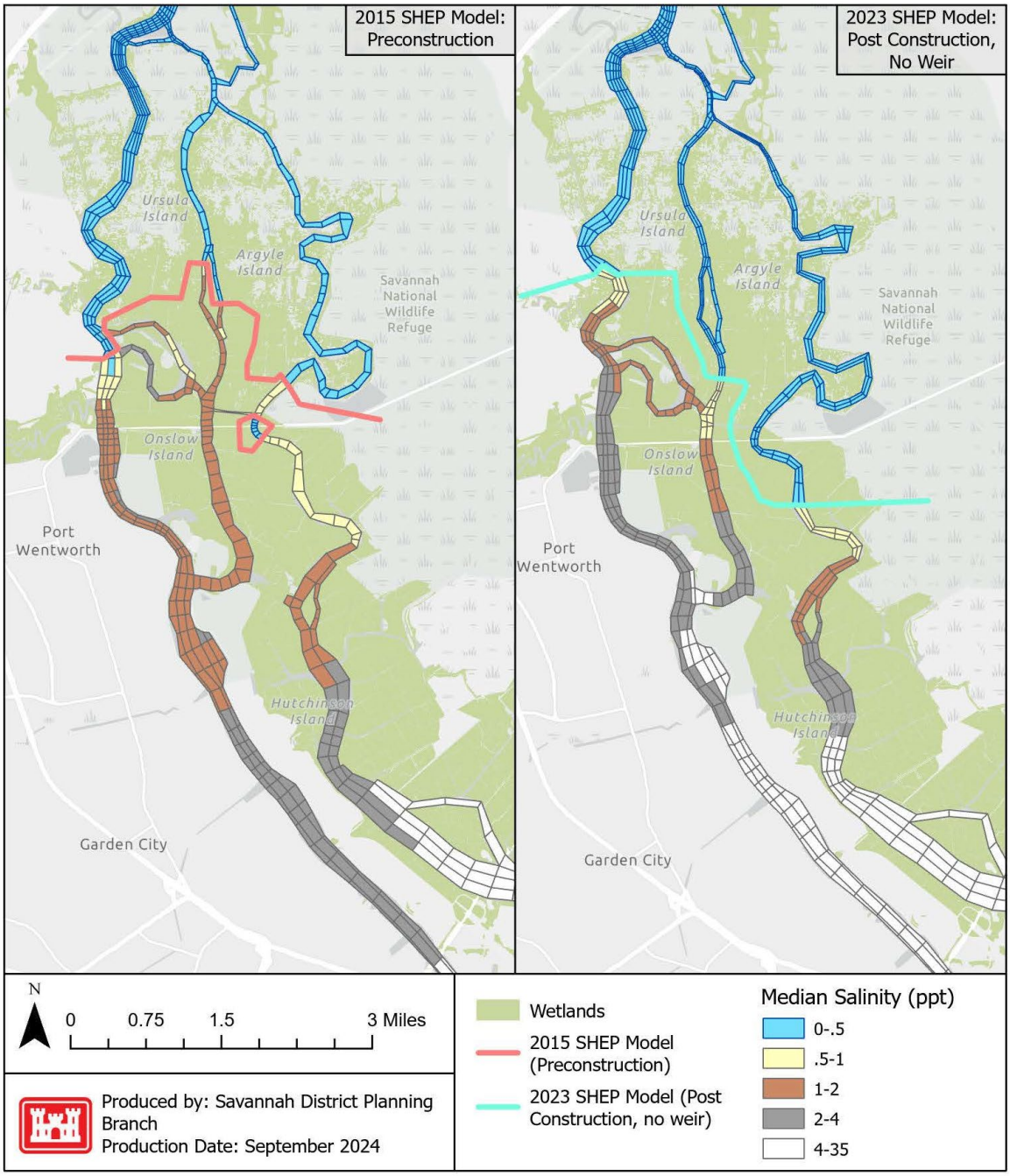

Figure A1-4. Freshwater salinity contours. Pre-construction conditions (2015 SHEP Model) vs Post-deepened conditions (2023 SHEP Model).

A comparison of pre-construction and existing conditions was completed to assess the overall effectiveness of the currently constructed flow rerouting measures. This comparison is shown in Figure A1-5. In Figure A1-5, Pre-construction (pink, 2015 SHEP model) and Existing conditions (blue, 2023 SHEP Model) 0.5 ppt contours are combined to identify freshwater wetland impacts as acres gained (green), lost (red), or unchanged (gray/blue). All impacts were assessed using the same methodology used in the 2012 SHEP FEIS and the best available modeling data using 1997 flows.

The areas identified in green represent wetlands that would have been considered brackish in pre-construction conditions but have been converted to freshwater marsh due to flow rerouting measures, under the same flow conditions.

The areas in red represent wetlands that would have been considered freshwater in pre-construction conditions but been converted to brackish marsh due to the SHEP and constructed flow rerouting measures, under the same flow conditions.

The area identified in gray was designated as no change because it has been identified as flotant marsh in marsh monitoring reports and has historically supported brackish species in a variety of flow conditions, likely due to soil conditions more likely to maintain higher salinities in the root zone. The USACE did not include this area of wetlands as converted to freshwater wetlands since it is flotant marsh. This area would have been considered as freshwater wetlands gained if the 2012 SHEP FEIS methodology were replicated exactly, but marsh monitoring reports have allowed for a more informed understanding of potential impacts in this area.

The area designated in blue also represents no change. This area is identified as freshwater (0-0.5 ppt) in the 2015 SHEP model and continues to support freshwater conditions. Since this blue area is classified as freshwater wetlands in pre-construction conditions, it is represented as no change in Figure 5 and those acres are not included in the gained category.

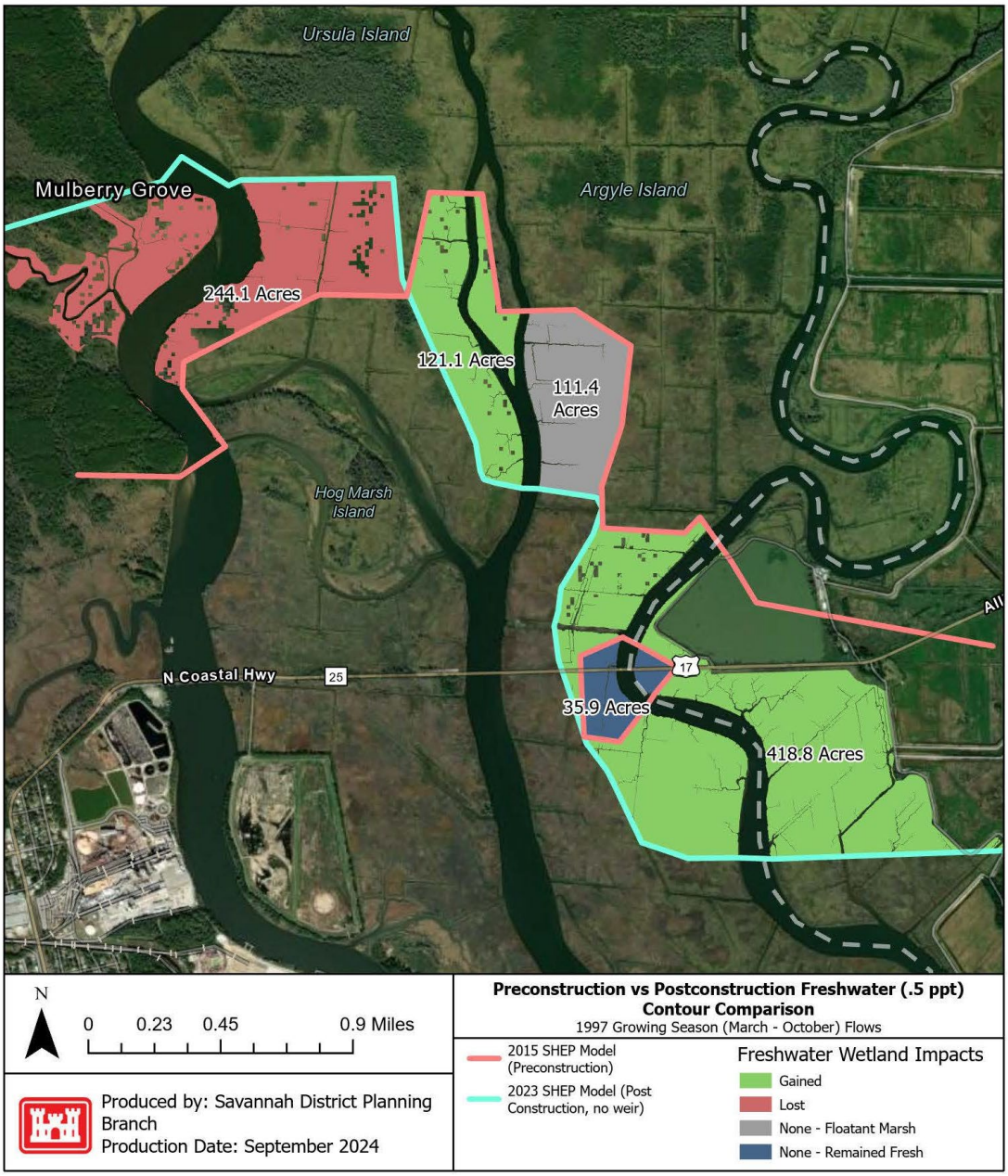

Figure A1-5. Freshwater wetland impacts. Pre-construction vs Existing Conditions (post-deepened, no sediment basin weir and fill).

Table A1-2. Summary of impacted acres

Location	**Acres of freshwater wetlands gained**
Front River	-244.1
Middle River	+121.1
Back River	+418.8
	=+295.8 acres

According to the acreage values shown in Figure A1-5 and Table A1-2, the net change in freshwater wetlands is an overall gain of an estimated 295.8 acres under the 1997 growing season flow conditions.

The original estimate in the 2012 SHEP FEIS was an unavoidable loss of 223 acres of freshwater wetlands even with construction of all flow rerouting measures identified in Plan 6a. These results suggest the flow rerouting measures identified in Plan 6a have successfully mitigated for all predicted loss of freshwater wetlands due to the SHEP without construction of the sediment basin weir and fill. This could be partially due to natural sedimentation in the sediment basin increasing fill to 70% of the original design. Monitoring efforts suggest that this level of fill has stabilized within the sediment basin and is unlikely to experience major changes. Another potential reason for the increase in acres of freshwater wetlands is the increased dredge areas and depths implemented in the deepening of McCoy's Cut which rerouted more freshwater down the Middle and Back Rivers (USACE 2017). Increased model accuracy of updated SHEP Models also provides a better understanding of the estuary and more accurate tools to characterize impacts and could also explain the discrepancies in impact estimation between the 2012 SHEP FEIS and more recent findings.

The modeled increase in freshwater wetland acreage is also supported by marsh monitoring data collected by Clemson University from 2014 to present (Figure A1-6). While flow conditions have been variable throughout pre-construction, during construction, and post-deepening time periods, the two years of pre-construction monitoring (2014-2015) show the lowest percentage of freshwater vegetation out of any collected year, and freshwater vegetation percentages in post-deepened years have remained high since the closing of Rifle Cut in 2020. Additional supporting information from marsh monitoring and USGS gage data for this trend is provided in the 2023 Marsh Monitoring Report (Duberstein 2023).

Year	Total # Plots	# Fresh	% Fresh	# Oligo	% Oligo	Other %
2014	108	15	14%	77	71%	15%
2015	108	9	8%	68	63%	29%
2016	108	24	22%	74	69%	9%
2017	108	18	17%	69	64%	19%
2018	108	23	21%	54	50%	29%
2019	108	34	31%	42	39%	30%
2020	108	34	31%	42	39%	30%
2021	103	28	27%	44	43%	30%
2022	107	38	36%	51	48%	17%
2023	108	22	20%	67	62%	18%

Figure A1-6. Wetland monitoring: vegetation composition. Blue column shows percent of surveyed vegetation that is considered fresh, and orange column indicates percent brackish vegetation. 2014 to 2015 represent pre-construction conditions while 2022 and 2023 represent post-deepened conditions.

River discharge at the USGS Gage 02198500 near Clyo is often used as the primary data source for freshwater influence on the estuary. Figure A1-7 shows a comparison by year of the long-term average, modeled, and pre-construction and post-deepening

years. Of note, 2015 (pre-construction) and 2022 (post-deepening) are statistically very similar years with similar growing seasons. However, the percentage of freshwater vegetation identified in 2022 (36%) is significantly greater than the percentage identified in 2015 (8%) suggesting that under similar flow conditions, freshwater wetland vegetation is more prevalent in post-deepening conditions than pre-construction conditions.

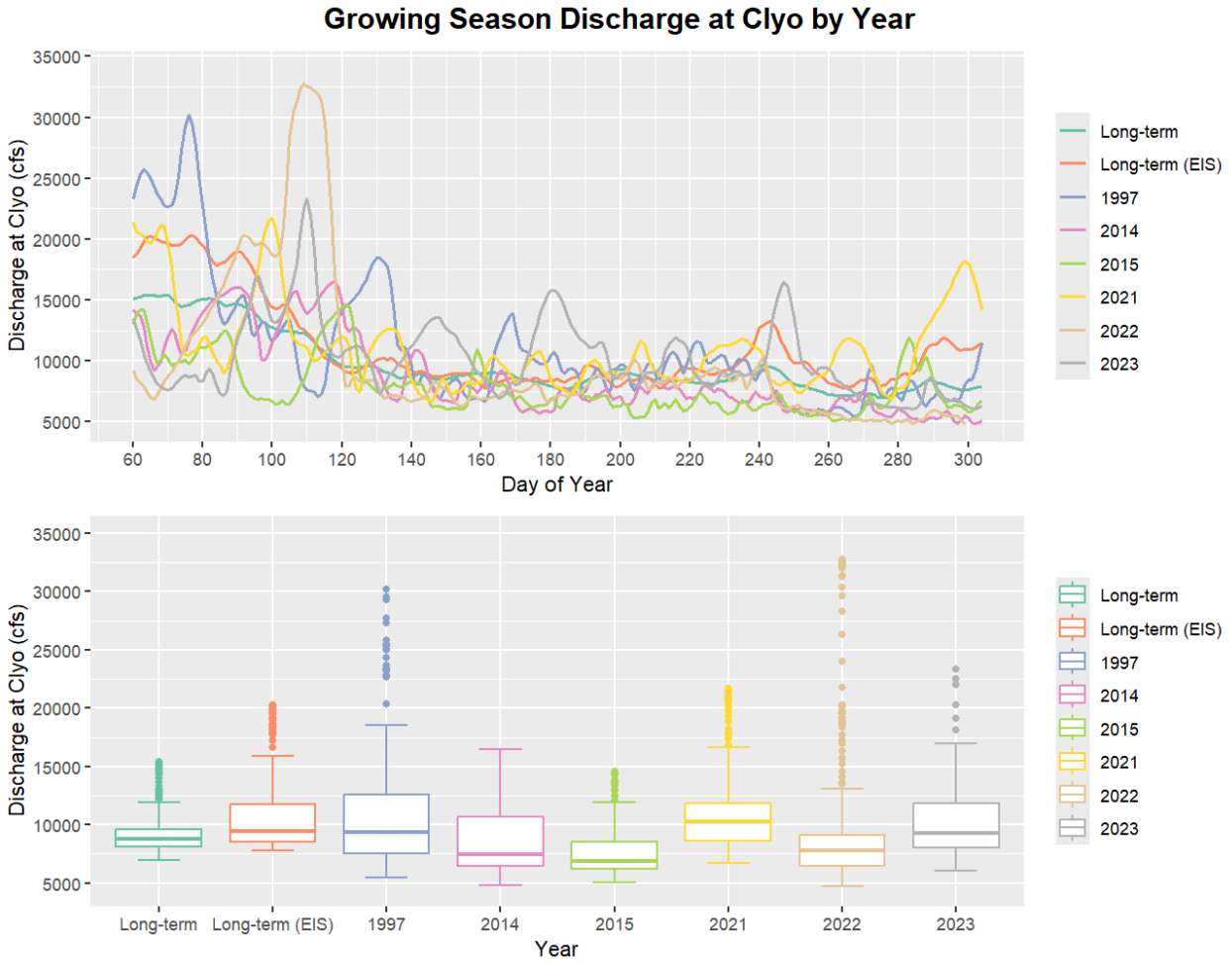

Figure A1-7. Discharge at Clyo by year. 2014 and 2023 are similar flow years, as well as 2015 and 2022. 1997 and 2021 are included to provide comparison for modeled flow years. Long term (EIS) represents flows from 1985-1997, and Long-term represents flows from 1985-2024. Both are represented as a per day average.

Analysis of daily median salinity at the gages located on the Little Back and Back Rivers show similar trends of decreased salinity in post-deepening conditions despite the late growing season drought in 2022 (Figures A1-8 and A1-9). Pre-construction includes dates prior to September 2015, and post-construction includes dates after March 9, 2022, when deepening of the harbor was completed.

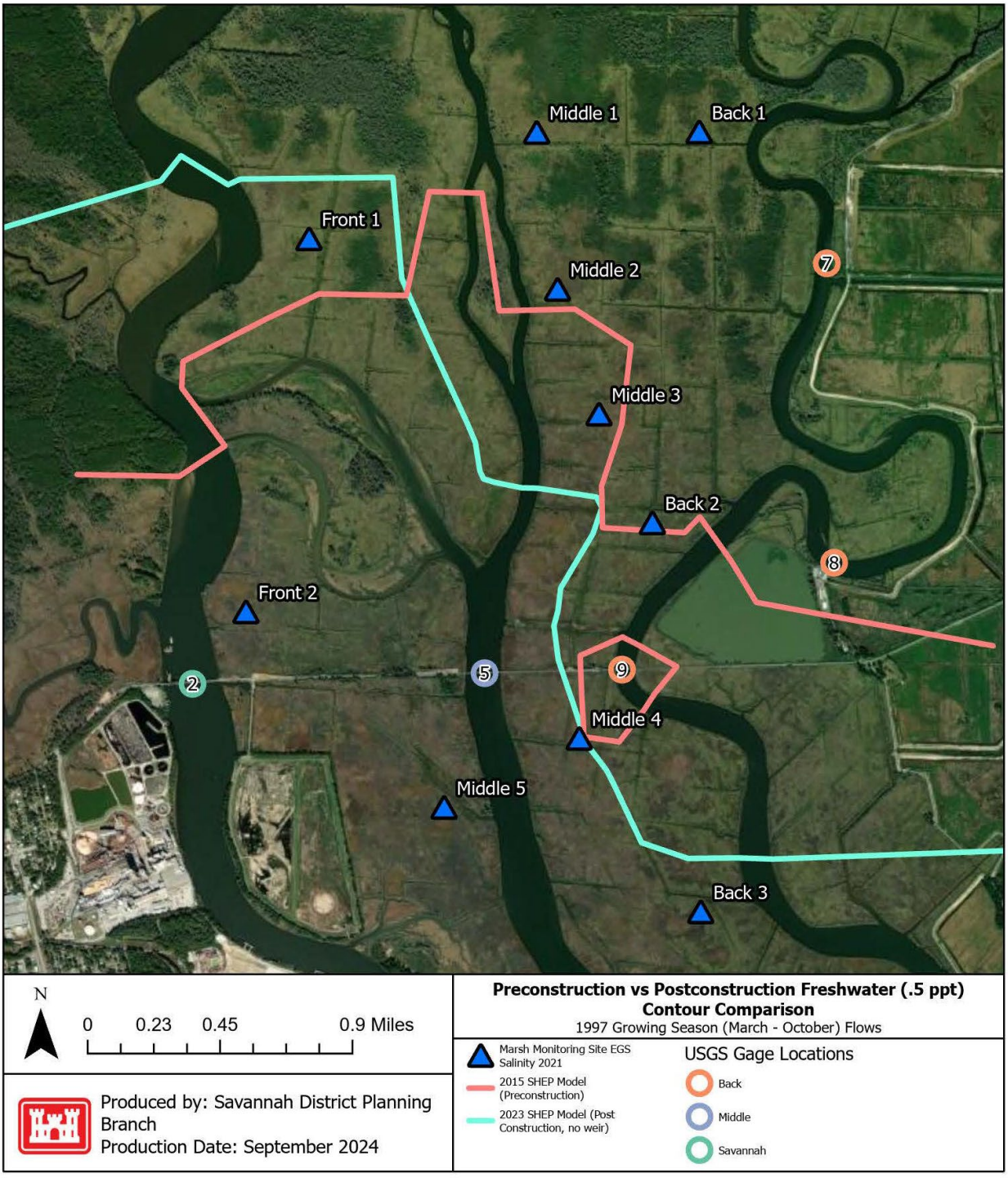

Figure A1-8. A map of USGS gages and marsh monitoring sites located in the study area. Monitoring data from each of these monitoring measures is available on the SHEP Monitoring Portal, https://shep.uga.edu/, and were utilized for this impacts analysis.

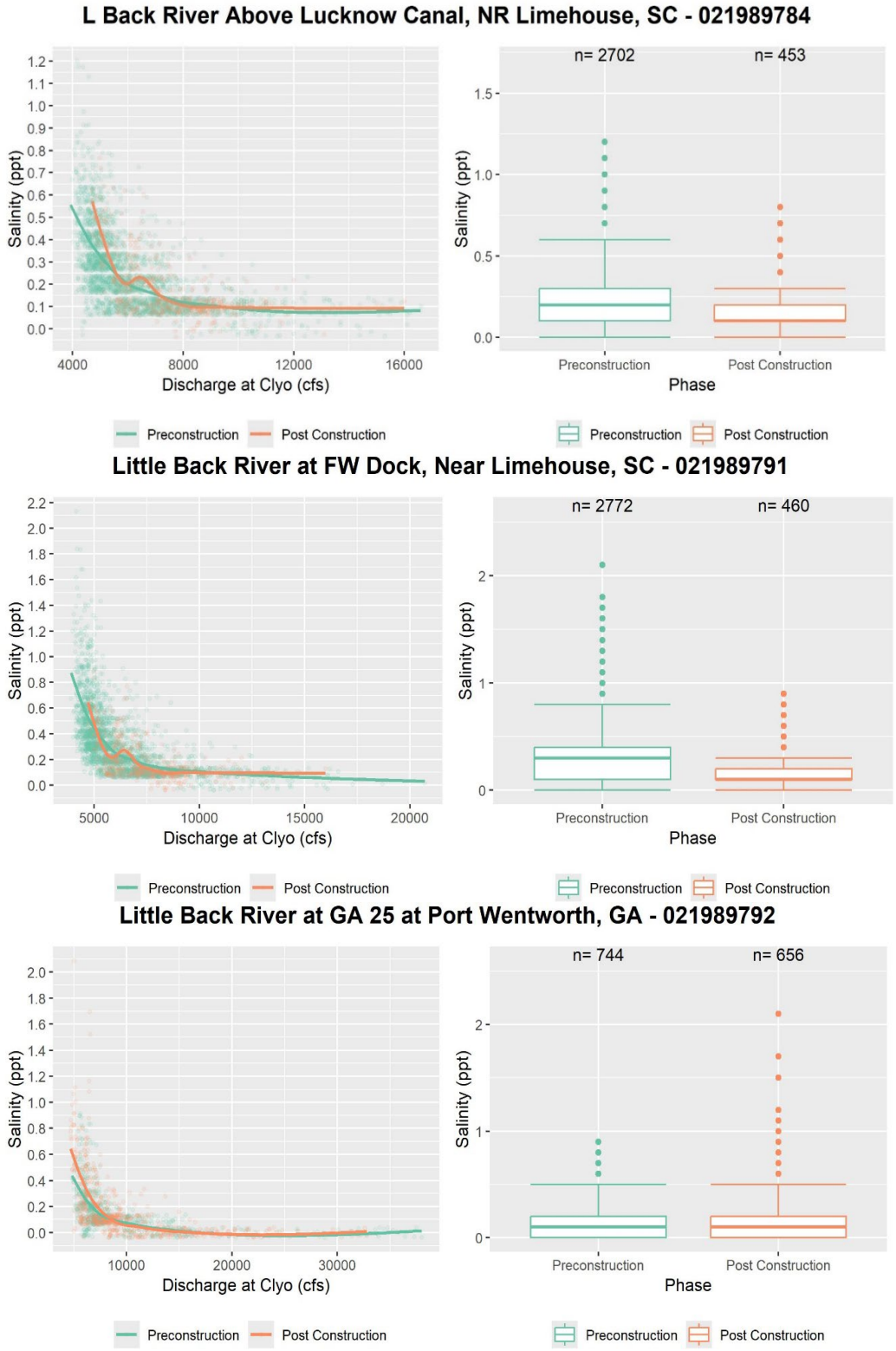

Figure A1-9. Discharge at Clyo vs. salinity at three gages on the Back and Little Back Rivers. Box and whisker plots of daily median salinity at all three gages (right). These figures are represented as USGS gages 7, 8, and 9, top to bottom, in Figure 8. Pre-construction includes dates prior to September 2015, when construction of the SHEP began, and Post-Construction includes dates after March 9, 2022, when deepening of the harbor was completed.

2.5 Wetlands Summary

Overall, this analysis demonstrates that the completed flow rerouting measures have successfully mitigated for all predicted loss of freshwater wetlands due to the SHEP. Instead of the predicted conversion (loss) of 223 acres of freshwater wetlands, best available data indicate that there has been a net increase of 295.8 acres of freshwater wetlands. These findings suggest that flow rerouting measures are currently outperforming their original intent resulting in more freshwater wetlands than before the SHEP. The net increase of 295.8 acres of freshwater wetlands is in addition to the 2,331.8 acres of freshwater wetlands transferred to the USFWS (excess of 86.8 acres) to mitigate for the original 223 acres of impact identified in the 2012 SHEP FEIS. This analysis demonstrates that the AA (not constructing the sediment basin weir and fill) will not result in any additional loss of freshwater wetlands in context of the 2012 SHEP FEIS. The USACE will continue monitoring activities including marsh monitoring, water quality monitoring, and hydrodynamic modeling to inform the adaptive management plan as outlined in Appendix D: Monitoring and Adaptive Management Plan (Monitoring and Adaptive Management Plan) of the 2012 SHEP FEIS.

3. Water Quality: Dissolved Oxygen

The primary water quality parameter assessed in the 2012 SHEP FEIS was dissolved oxygen (DO). Impacts to DO were identified using a zonal analysis under multiple flow and temporal conditions. The GHD 2024 report utilized a zonal analysis of both full water column and bottom half of the water column within the full growing season (March-October) to model the impacts to DO from construction of the weir and fill in the sediment basin. This analysis was conducted using both 1997 and 2021 flows. The spatial zones used are the same as the zones used for the 2012 SHEP FEIS (Figure A1-10).

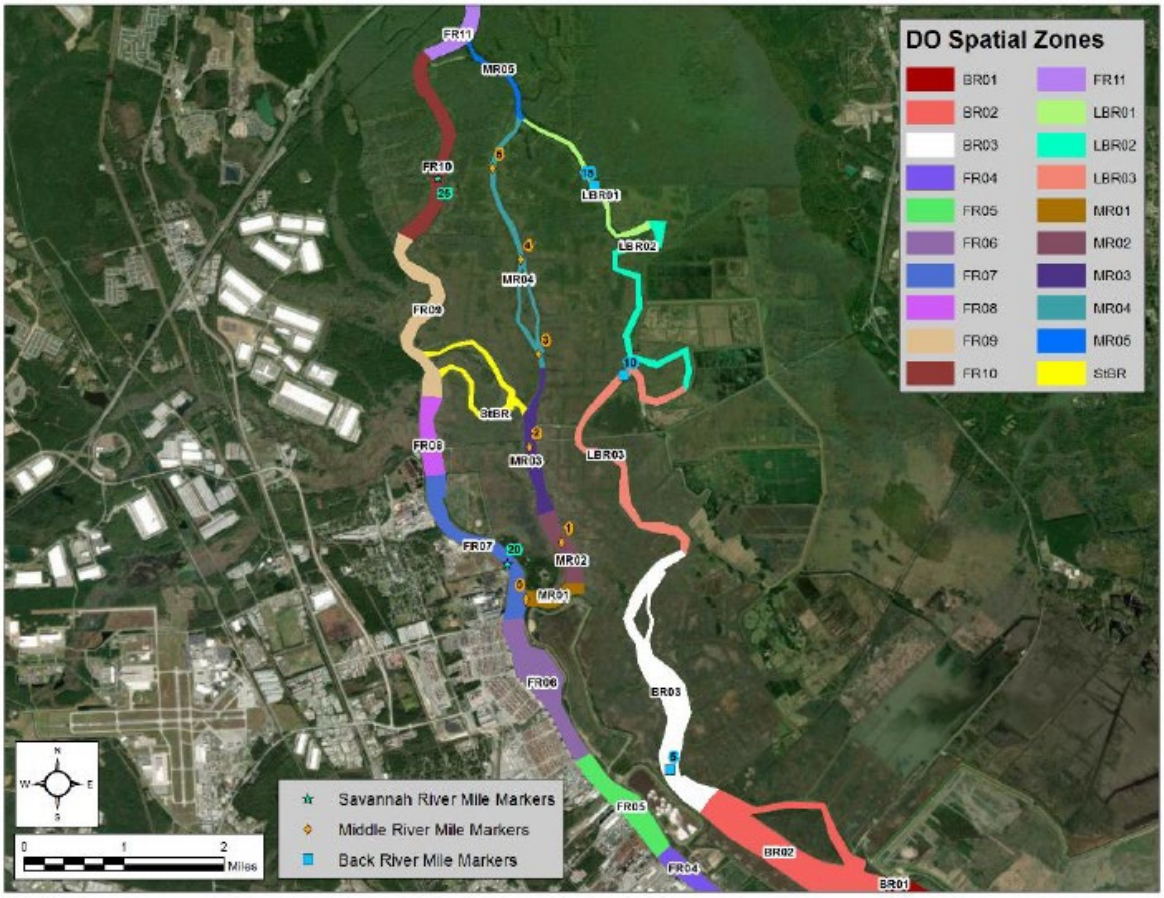

Figure A1-10. Map of zones used for dissolved oxygen zonal analysis. The Back River sites are represented as zones that start with "BR".

A comparison of DO concentrations between the NAA (construction of the sediment basin weir and fill) and the AA (no construction of sediment basin weir and fill, existing conditions) in the bottom half of the water column using 1997 growing season flows can be found in Table A1-3. This table shows only the six zones that are likely to be affected by the construction of the weir and fill in the sediment basin. The results show only minimal improvements to DO in the bottom half of the water column from the NAA. The AA will not have any impact to current conditions and would not have a significant impact compared to the NAA. DO concentrations do not decrease by more than five percent and concentrations remain above 3 mg/l. Additionally, no fish kills have been reported since deepening was completed in March 2022.

Table A1-3. Comparison of average dissolved oxygen concentrations between the Action Alternative (AA) and No Action Alternative (NAA), by percentile (5th, 50th, and 95th).

1997 Growing Season Flows: bottom half of water column

Zones	**Action Alternative (AA)**			**No Action Alternative (NAA)**			**AA-NAA**			**% Change**		
	5	**50**	**95**	**5**	**50**	**95**	**5**	**50**	**95**	**5**	**50**	**95**
BR01	3.39	5.15	8.12	3.5	5.24	8.22	-0.11	-0.09	-0.09	-3	0	0
BR02	3.76	5.5	8.77	3.82	5.53	8.78	-0.06	-0.03	-0.02	-1	0	0
BR03	3.99	5.77	9.07	4.03	5.81	9.08	-0.04	-0.04	-0.01	-1	0	0
LBR01	5.64	7	9.29	5.66	7.02	9.29	-0.02	-0.02	0	0	0	0
LBR02	5.08	6.59	9.27	5.11	6.61	9.27	-0.03	-0.02	0	-1	0	0
LBR03	4.33	6.11	9.24	4.36	6.13	9.24	-0.03	-0.03	0	-1	0	0

A comparison to the pre-construction modeling results from the 2012 SHEP FEIS (Table A1-4) shows that DO concentrations have improved in the Back River since construction of the SHEP under the modeled existing conditions, which does not include the sediment basin weir and fill. The 2012 SHEP FEIS was used for this comparison because the 2015 SHEP modeling effort did not produce a comparable DO zonal analysis, and the 2015 SHEP Model and 2006 SHEP Model produced similarly performing results regarding DO. Full water column was used because it was the only pre-construction zonal analysis performed for the same period of time and flow conditions utilized for GHD 2024 report.

Table A1-4. Comparison of average dissolved oxygen concentrations between existing conditions (Post-construction, no weir) and pre-construction (2012 SHEP FEIS) by percentile (5th, 50th, and 95th).

1997 GROWING SEASON FLOWS: FULL WATER COLUMN

	Post-construction, no weir (2024)			**Pre-construction (2006)**				**Post-construction-Pre-construction (Δ)**		
	5	**50**	**95**	**5**	**50**	**95**		**5**	**50**	**95**
BR01	3.62	5.32	8.3	2.96	3.62	4.97	**BR01**	0.66	1.7	3.33
BR02	3.91	5.58	8.81	2.63	3.27	4.57	**BR02**	1.28	2.31	4.24
BR03	4.11	5.84	9.09	2.63	3.17	4.4	**BR03**	1.48	2.67	4.69
LBR01	5.7	7.04	9.3	3.61	4.01	5.3	**LBR01**	2.09	3.03	4
LBR02	5.15	6.63	9.29	2.9	3.47	4.78	**LBR02**	2.25	3.16	4.51
LBR03	4.43	6.15	9.25	2.6	3.12	4.39	**LBR03**	1.83	3.03	4.86

Further analysis of the water quality monitoring gages on the Little Back and Back Rivers that collect DO data further verify the findings of this comparison. At a given

temperature during pre- and post-construction, the respective DO concentrations are similar or trend higher for post-construction conditions than pre-construction conditions (Figure A1-11). When making this comparison at higher temperatures, the increase of DO concentrations is even more apparent. This phenomenon can likely be attributed to DO injection systems during the DO Injection Plants run season (June 15 – September 30) and improved flows through the middle estuary due to existing flow rerouting features. This suggests that the mitigation objective of preventing decreased DO concentrations during the run season is currently being met without construction of the weir and fill. Analysis of DO percent saturation showed similar results, with less occurrences of low DO saturation in current, post-deepening conditions than in pre-construction conditions (Figure A1-12).

Of note, percent saturation must be calculated using the instantaneous collected water quality data rather than daily statistics and offers insight on a substantially more robust dataset. Furthermore, percent saturation takes into account the effects of temperature and salinity on DO, making the comparison more direct without varying influence from tides, temperature, and precipitation that makes concentrations much more difficult to compare. The use of percent saturation for this analysis also provides a more direct indicator of oxygen transfer efficiency for gill-breathing organisms.

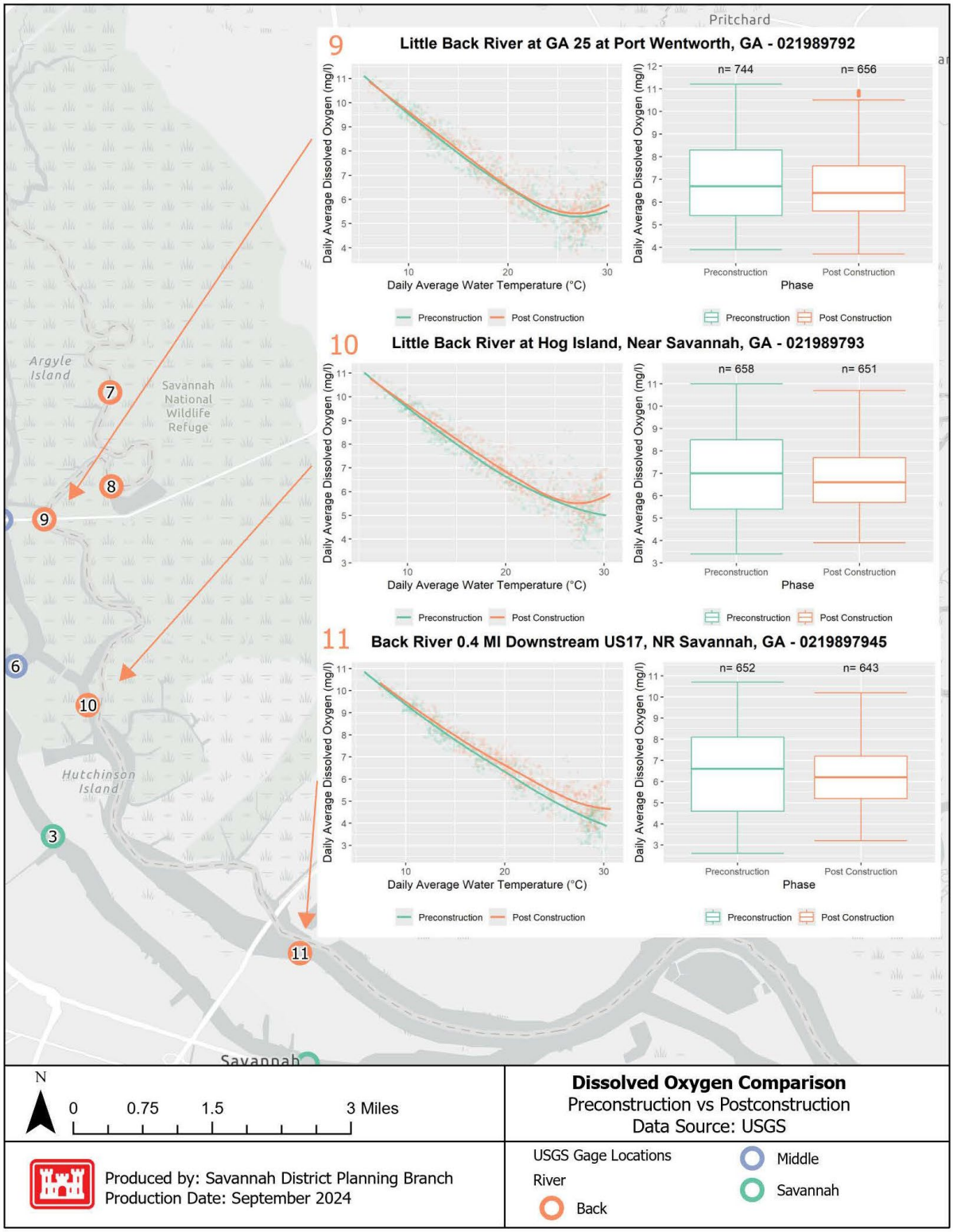

Figure A1-11. Daily average dissolved oxygen plotted against temperature, a primary driver during normal conditions, at each gage within the potential area of impact. Box and whisker plots show the distribution of daily average dissolved oxygen pre-construction and post-construction.

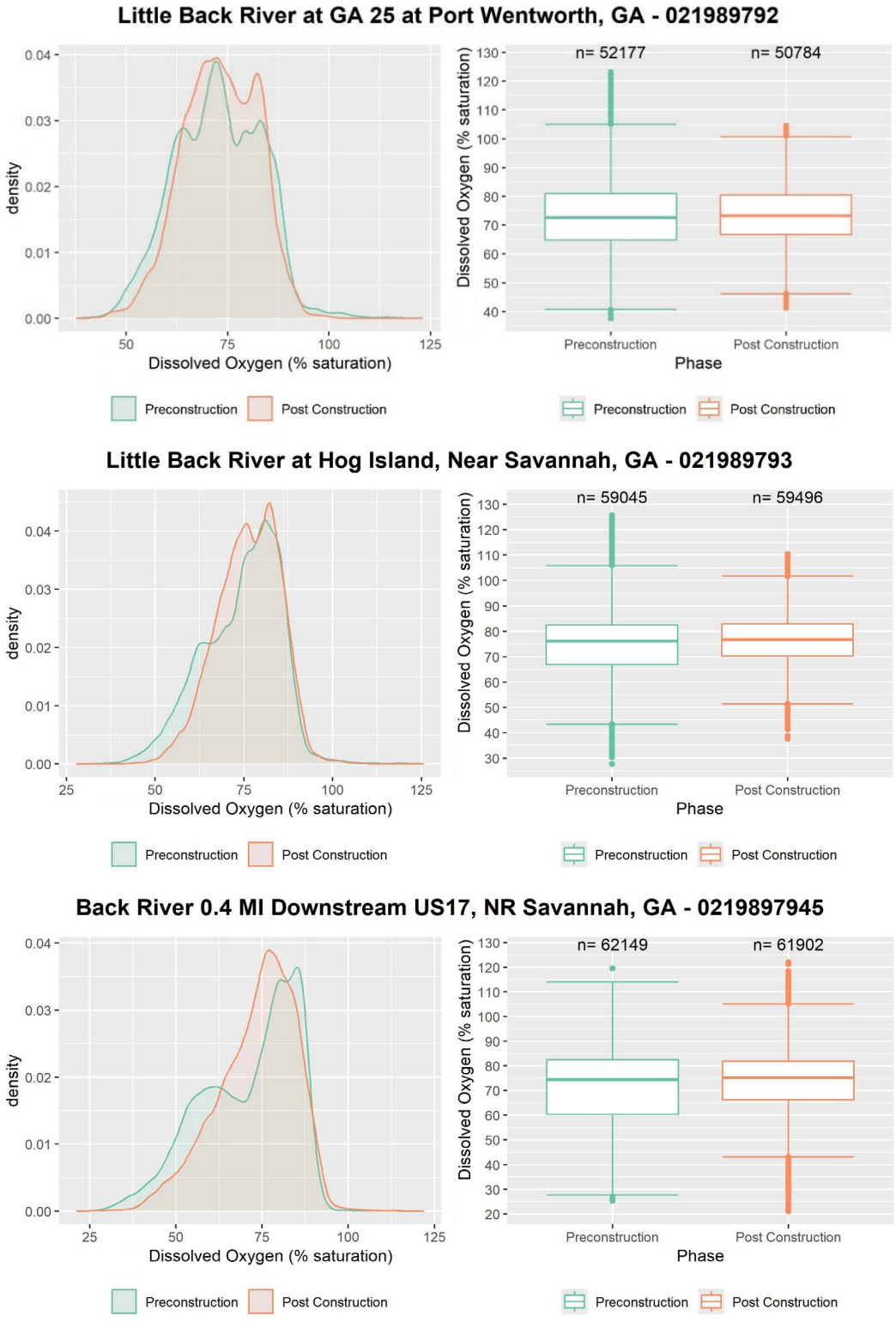

Figure A1-12. Density and box and whisker plots of dissolved oxygen percent saturation. There are fewer occurrences of percent saturation below 50% at all three gages in post-construction conditions.

4. Fish Habitat

The 2012 SHEP FEIS utilized binary (pass/fail) Habitat Suitability Indices (HSIs) created with stakeholder input to model impacts to fish habitat from the SHEP. Habitat suitability for striped bass, southern flounder, American shad, and shortnose sturgeon were assessed using salinity, dissolved oxygen, and velocity outputs from the 2006 SHEP Model. This process was replicated for the Sediment Basin Modeling and Habitat Suitability Index Evaluation for SHEP (GHD 2024). A table of the species/life stages assessed and the parameters of each are shown in Table A1-5.

Table A1-5. List of species and life stages assessed using Habitat Suitability Indices, and the criteria and conditions used for modeling.

SPECIES & LIFE STAGE	FRESHWATER FLOW CONDITIONS	SIMULATION PERIOD	HABITAT CRITERIA
Striped Bass (spawning)	20%-tile 50%-tile 80%-tile 20%-tile 50%-tile 80%-tile	April 1997 April 1997 April 1997 April 2021 April 2021 April 2021	Suitable habitat when (1) 90th percentile salinity <= 1 ppt, and (2) Mean velocity >= 30 cm/s *Applicable Vertical Layer(s): surface layer*
Striped Bass (eggs)	20%-tile 50%-tile 80%-tile 20%-tile 50%-tile 80%-tile	April 1997 April 1997 April 1997 April 2021 April 2021 April 2021	Suitable habitat when (1) Mean 50th percentile salinity <= 9 ppt, (2) Mean velocity >= 30 cm/s, and (3) 10th percentile D.O. >= 4.5 mg/l *Applicable Vertical Layer(s): depth average*
Striped Bass (larvae)	20%-tile 50%-tile 80%-tile 20%-tile 50%-tile 80%-tile	May 1997 May 1997 May 1997 May 2021 May 2021 May 2021	Suitable habitat when (1) Mean 50th percentile salinity between 3 and 9 ppt, and (2) Mean 10th percentile D.O. >= 4.5 mg/l *Applicable Vertical Layer(s): depth average*
Southern Flounder	50%-tile 50%-tile	August 1997 August 2021	Suitable habitat when DO >= 4.0 mg/l at 90% exceedance (10th %ile) *Applicable Vertical Layer(s): bottom layer*
American Shad	50%-tile 50%-tile 50%-tile 50%-tile 50%-tile 50%-tile	January 1997 January 2021 May 1997 May 2021 August 1997 August 2021	Suitable habitat when D.O. >= 4.0 mg/l at 90% exceedance (10th percentile) *Applicable Vertical Layer(s): top half of water column*
Shortnose Sturgeon (adult)	50%-tile 50%-tile	January 1997 January 2021	Suitable habitat when DO >= 3.5 mg/l at 90% exceedance (10th %ile), >=3.0 at 95% (5th percentile), and >=2.0 at 99% (1 percentile) Suitable habitat when Max Salinity <= 25 ppt *Applicable Vertical Layer(s): bottom layer*
Shortnose Sturgeon (adult)	50%-tile 50%-tile	August 1997 August 2021	Suitable habitat when DO >= 4.0 mg/l at 90% exceedance (10th %ile), >=3.0 at 95% (5th percentile), and >=2.0 at 99% (1 percentile) Suitable habitat when Max Salinity <= 10 ppt *Applicable Vertical Layer(s): bottom layer*
Shortnose Sturgeon (juvenile)	50%-tile 50%-tile	January 1997 January 2021	Suitable habitat when DO >= 3.5 mg/l at 90% exceedance (10th %ile), >=3.0 at 95% (5th percentile), and >=2.0 at 99% (1 percentile) Suitable habitat when Max Salinity <= 14.9 ppt* *Applicable Vertical Layer(s): bottom layer*

In-depth comparisons between the AA and NAA are available in the Sediment Basin Modeling and Habitat Suitability Index Evaluation for SHEP (GHD 2024), but a simplified percent table is available below (Table A1-6). Effects to suitable habitat were variable with each flow condition modeled.

HSI results indicate that the NAA would result in 11.3% more habitat for American shad under the August 2021 50th percentile flow conditions; however, a closer look at the HSI inputs showed that cells that failed were very close (within 0.2 mg/l) to the threshold of 4 mg/l. The use of a binary model resulted in this habitat being identified as unsuitable for

American shad, however, this small exceedance over the threshold likely has little impact to the species and showcases a limitation of binary (pass/fail) HSI models.

The NAA would also result in more suitable habitat for juvenile shortnose sturgeon, striped bass eggs, and striped bass spawning habitat under certain flow conditions, however, model comparisons indicate that existing mitigation features (proposed action) have increased suitable habitat for these species/life stages beyond pre-construction conditions without construction of the sediment basin weir and fill.

Table A1-6. Comparison of percent change of suitable habitat between NAA and AA for each life stage modeled.

	AA Percent Change ((AA-NAA)/NAA)x100	
Species/Life Stage	1997 flows	2021 flows
Striped Bass (Spawning)		
April 20th %ile	-5.0	-1.8
April 50th %ile	-1.8	0
April 80th %ile	-0.9	-1.6
Striped Bass (Eggs)		
April 20th %ile	1.1	.4
April 50th %ile	1.9	.4
April 80th %ile	1.6	-7.0
Striped Bass (Larvae)		
May 20th %ile	-3.6	-.2
May 50th %ile	1.3	-.3
May 80th %ile	1.3	1
Southern Flounder		
August 50th %ile	-2.5	-.6
American Shad		
January 50th %ile	0	0
May 50th %ile	0	0
August 50th %ile	0	-11.3
Shortnose Sturgeon (Adult)		
January 50th %ile	0	0
August 50th %ile	0	-.8
Shortnose Sturgeon (Juvenile)		
January 50th %ile	-2.5	-6.1

A comparison between the HSI results for the Action Alternative (which also represents current, existing conditions) and pre-deepening conditions (2012 SHEP FEIS) shows improved conditions for most species and life stages assessed (Table A1-7). This is likely due to the improved dissolved oxygen concentrations and salinity migration discussed in the above sections.

Table A1-7. Comparison of percent change of suitable habitat between existing conditions (AA) and modeled pre-deepened conditions (PDC) for each life stage modeled. Positive values indicate a gain in suitable habitat.

	Percent Change ((AA-PDC)/PDC)x100	
Species/Life Stage	1997 flows	2021 flows
Striped Bass (Spawning)		
April 20th %ile	-41	3
April 50th %ile	-35	-25
April 80th %ile	-56	-36
Striped Bass (Eggs)		
April 20th %ile	88	141
April 50th %ile	49	47
April 80th %ile	14	30
Striped Bass (Larvae)		
May 20th %ile	665	659
May 50th %ile	220	208
May 80th %ile	121	92
Southern Flounder		
August 50th %ile	48	-13
American Shad		
January 50th %ile	23	23
May 50th %ile	23	23
August 50th %ile	23	-49
Shortnose Sturgeon (Adult)		
January 50th %ile	53	53
August 50th %ile	70	13
Shortnose Sturgeon (Juvenile)		
January 50th %ile	21	15

Striped bass spawning was the only species/life stage with a significant decrease in suitable habitat between pre-construction and post-deepening conditions. However, this is likely due to the initial 2006 SHEP model incorrectly predicting the extent of fresh (>1 ppt) surface water in the estuary as discussed in the wetlands section above. Additionally, a combined adverse impact percentage for all life stages was used for calculating the overall mitigation required for striped bass in Section VI-D of Appendix C: Mitigation Plan (Mitigation Plan) of the 2012 SHEP FEIS. This approach offset negative impacts with positive impacts, when applicable. These results, which overrepresent loss of striped bass spawning habitat, would still result in excessively positive overall impacts to striped bass populations since uplift from eggs and larvae habitat far outweigh the negative impacts to spawning habitat. Additional spawning habitat is also present above the study area, making egg and larval habitat the most limiting and critical life stages for determining effects to the species. Post-deepening conditions and existing flow rerouting measures appear to have significantly improved habitat for these life stages without construction of the sediment basin weir and fill.

As referenced in the water quality section above, model results and gage data both show an overall increase in dissolved oxygen in post-construction conditions, likely attributed primarily to dissolved oxygen injection and flow rerouting, though other factors such as improved discharges throughout the system could also have an influence on water quality improvements. These water quality improvements overall result in improved habitat quality for the assessed species using the same methodology utilized during the 2006 modeling that is reported in the 2012 SHEP FEIS. The new modeling results imply that the flow rerouting measures are working as intended, even without construction of the sediment basin weir and fill. However, comparisons to the pre-construction conditions are limited to the accuracy of the 2006 SHEP Model used for initial HSI modeling in the 2012 SHEP FEIS. For improved future comparisons for post-construction impact analysis and mitigation calculations, improved HSI modeling should be completed using the 2015 SHEP Pre-construction model or a similar model using more robust pre-construction water quality data.

5. Summary

The best available modeling and monitoring data indicates that flow rerouting measures and additional mitigation features appear to have positively impacted freshwater wetlands, water quality, and fish habitat when compared to pre-construction conditions. Additional construction of the weir and fill within the sediment basin would result in minor indirect benefits for some species but would directly impact existing habitat within the sediment basin and potentially create a barrier to migration for the endangered Atlantic Sturgeon and other anadromous species. The objectives of the mitigation plan are currently being met, and future monitoring and mitigation efforts as outlined in the Monitoring and Adaptive Management Plan from the 2012 SHEP FEIS should ensure the avoidance of unmitigated impacts to the environment due to the SHEP.

6. References

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Savannah Harbor Expansion Project
Flow Rerouting Mitigation Plan – Sediment Basin Weir and Fill Modification
Chatham County, Georgia and Jasper County, South Carolina
Draft Supplemental Environmental Assessment and Finding of No Significant Impact

Appendix B- Draft Essential Fish Habitat Assessment
National Marine Fisheries Service

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT
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February 2025

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1. Introduction

The U.S. Army Corps of Engineers, Savannah District (the USACE) is proposing to modify the flow rerouting mitigation plan (6a) identified in the Savannah Harbor Expansion Project (SHEP) Final Environmental Impact Statement (FEIS) (2012). Specifically, the USACE is proposing to not construct the sediment basin weir and fill flow rerouting measure. The proposed action is being evaluated in a Supplemental Environmental Assessment (SEA) and this essential fish habitat (EFH) assessment will be included as an appendix. The SHEP included the deepening of the Savannah Harbor Federal Navigation Channel from a depth of -42 feet to -47 feet mean lower low water (MLLW). The SHEP FEIS was completed with the signing of the Record of Decision (ROD) on October 26, 2012.

Given the proximity of the navigation channel to sensitive estuarine resources, exhaustive engineering and environmental studies were conducted to identify the environmental impacts, such as salinity intrusion, that would be expected from the project to ensure those impacts will be offset through mitigation. The selected mitigation features (referred to as Plan 6a) are detailed in the 2012 SHEP FEIS, Appendix C: Mitigation Planning (Mitigation Plan) (USACE 2012) and include closing Rifle Cut and the western arm of McCoy Cut; installing a flow diversion structure at McCoy Cut; deepening portions of McCoy Cut, Middle River, and Little Back River; removing tide gate abutments, and constructing a rock weir in the sediment basin and depositing fill in the basin upriver of the weir (USACE 2012).

Pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. § 4321 *et. seq.*), the USACE is preparing the draft SEA to evaluate and compare the impacts of constructing the sediment basin weir and fill as identified in the Plan 6a (no action alternative) and not constructing the sediment basin weir and fill (proposed action). We have incorporated data from modeling and monitoring efforts to assess the effectiveness of the already constructed flow rerouting measures (with the exception of the sediment basin weir and fill) and identify the need for updates to the mitigation plan outlined in the Mitigation Plan from the 2012 SHEP FEIS regarding the sediment basin weir and fill.

The Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSA), as amended (16 U.S.C. § 1801 *et. seq.*) requires Federal agencies to consult with the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), when their actions or the result of their actions may adversely affect EFH or federally managed fisheries. MSA defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” EFH is designated through Federal Fisheries Management Plans developed by Fisheries Management Councils (stewards of nearly all plans) or NMFS (stewards of the plan for Highly Migratory Species). The USACE, pursuant to Section 305(b)(2) of the MSA, has prepared this assessment to support consultation with NMFS regarding the proposed

Federal action that may adversely affect EFH.

The EFH Assessment includes a brief description of the proposed Federal action, an inventory of the habitats and managed fishery resources that are present within the project action area, and assessment of potential effects of the proposed Federal action on the resources.

2. Project Description

The proposed Federal action is to modify Plan 6a to omit the construction of the sediment basin weir and fill. The sediment basin weir and fill are the final flow rerouting feature of several designed to mitigate the conversion of freshwater wetlands into brackish wetlands caused by salinity intrusion from the SHEP. All of the other flow rerouting features have been constructed. Figure B1-1 identifies the general area of the sediment basin weir and fill, and the limits of disturbance expected from direct and indirect impacts from construction of the sediment basin weir and fill.

The USACE has been considering the modification of the Mitigation Plan to remove the sediment basin weir and fill measure from Plan 6a for several reasons. Firstly, there were multiple challenges identified in the 95% design of the sediment basin weir and fill, such as constructability and cost risks, due to uncertainties in sediment composition and depth. Moreover, additional data and updated models suggest that the USACE is currently meeting SHEP's mitigation requirements for the conversion of freshwater wetlands, as well as impacts to the concentration of dissolved oxygen (DO), without the sediment basin weir and fill.

Given these findings, the proposed revision to the Mitigation Plan is needed because of new environmental conditions, design feasibility, and cost considerations. Table B1-1 provides the estimated acreage of sediment basin weir and fill limits of disturbance area.

Figure B1-1. Proposed location for the sediment basin weir and fill. The area where the rock weir would be exposed is represented in blue fill. The area where the depth would be decreased is shown in a hatched fill, and the limits of disturbance are represented with a dashed line. Limits of Disturbance (LOD) is the boundary that defines where construction, landscaping, grading, and other activities will take place. In this case, construction may directly impact any area identified within the limits of disturbance.

Table B1-1. Sediment Basin Location.

Sediment Basin Location (Lat/Long)	**Dimensions/Size Sediment Basin Area (acres)**
Back River 32.085489, -81.047114	Approximately 86 acres

2.1 Modeling Results

Additional information on the background and modeling history of the SHEP is included in Section 1.1 of the SEA.

During the development of the 95% design, the USACE tasked GHD, an engineering firm, with updating the 2020 SHEP model to evaluate the performance of the sediment basin weir and fill 95% design (GHD 2022). GHD was tasked with evaluating the performance related to preventing salinity intrusion in the Back River and evaluate the rock weir's ability to withstand shear stresses in the riverine environment. The results of this 2022 modeling effort showed that the proposed sediment basin weir and fill would accomplish minimal conversion of brackish (estuarine) to freshwater (palustrine) wetlands (see section 3.1 for specific salinity ranges), in comparison with existing conditions would only minimally prevent the movement of salinity upstream in the Back River. Additional findings from the USACE monitoring included a determination that the Sediment Basin may not naturally fill to the depth of -9.5 ft MLLW on its own. Weir construction creates the potential for critical shear stresses to mobilize upstream fill material. This phenomenon would require periodic placement of sandy fill by the USACE to maintain design fill elevations.

The USACE, in coordination with federal and state resources agencies, determined additional hydrodynamic and habitat suitability models were needed to make an informed decision regarding updates to the SHEP mitigation plan. Additional modeling was completed (GHD 2024) to assess habitat suitability for the species and life stages modeled in the 2012 SHEP FEIS and to understand potential impacts to DO between the action (no weir or fill) and no action (weir and 95% design fill) alternatives. The USACE completed an additional impacts analysis to assess the performance of currently constructed flow rerouting measures (no sediment basin weir and fill) in comparison to the objectives identified in the 2012 SHEP FEIS (Appendix A). This analysis also reassesses impacts to wetlands using best available data, since an outdated pre-construction salinity contour was provided to GHD for the wetlands impacts analysis conducted in the GHD 2022 and 2024 studies.

The monitoring and modeling by GHD indicate that the flow rerouting measures and additional mitigation features that have been as constructed have avoided or offset negative impacts from the SHEP to freshwater wetlands, water quality, and fish habitat when compared to pre-construction conditions. Additionally, construction of the weir and fill within the sediment basin would result in minor indirect benefits for some species but would directly impact existing fish habitat within the sediment basin and potentially create a barrier to migration for the endangered Atlantic sturgeon and other anadromous species. The objectives of the mitigation plan are currently being met without construction of the sediment basin weir and fill, and future monitoring efforts as outlined in Appendix D: Monitoring and Adaptive Management Plan (Monitoring and Adaptive Management Plan) from the 2012 SHEP FEIS will help inform any future adaptive management decisions.

3. Essential Fish Habitat in Project Area

The final rule for implementing the EFH provisions of the MSA was released on 17 January 2002. Fishery Management Plans administered by the NMFS, South Atlantic Fishery Management Council (SAFMC), and the Mid-Atlantic Fishery Management Council (MAFMC) designate EFH in the project area. The EFH for a given species can include multiple habitats to support reproduction, juvenile and adult development, feeding, protection, and shelter during species' various life stages. This EFH assessment describes the habitat(s) and managed fishery resource(s) that may be present within the potential project footprint depending of time of year and life stage. The project footprint includes the area required for the sediment basin weir and fill and the area of the limit of disturbance. If any activities could potentially adversely affect EFH, the applicable Federal agency must consult with the NMFS to develop measures to conserve EFH and support management of sustainable marine fisheries.

EFH in estuarine areas for fisheries that are managed by the SAFMC and MAFMC and occurring within the placement or project area are listed in Table B1-2. EFH was identified within the project area using NOAA Fisheries Essential Fish Habitat Mapper (https://coast.noaa.gov/digitalcoast/tools/efhmapper.html) along with the User's Guide to Essential Fish Habitat Designations by the South Atlantic Fisheries Management Council (SAFMC 2024). Table B1-3provides the common species that may be located in the project area, as listed on the NOAA EFH Mapper (accessed October 12, 2024).

Table B1-2. EFH categories likely to be in project area (NOAA 2024; NMFS Procedure 03-201-16).

Essential Fish Habitat	**Potential Presence**		**Potential Effects**
	In/Near Project Vicinity	**Project Impact Area**	**Proposed Action (No Weir and fill) Effects**
Estuarine Water Column	☑	☑	No adverse effect
Unconsolidated Bottom	☑	☑	No adverse effect
Estuarine Emergent Wetlands	☑		No adverse effect
Palustrine Emergent Wetlands	☑		No adverse effect

Table B1-3. NMFS, SAFMC, and MAFMC managed species potentially located in placement area.

Common Name	Scientific Name	Function	Life Stage Use(s)	Fisheries Management Plan
Blacktip shark	*Carcharhinus limbatus*	Refuge, Forage, Nursery	Juvenile, Adult, Neonate	NMFS Highly Migratory Species
Bluefish	*Pomatomus saltatrix*	Refuge	Juvenile	MAFMC Bluefish
Gray snapper; Gag grouper	*Lutjanus griseus* (Gray snapper) *Mycteroperca microlepis* (Gag Grouper)	Forage	ALL	SAFMC Snapper Grouper
Penaeid Shrimp (Brown, Pink, and White Shrimp)	*Penaeus aztecus (Brown Shrimp)* *Penaeus duorarum (Pink Shrimp)* *Penaeus setiferus (White Shrimp)*	Refuge, Forage, Nursery	ALL	SAFMC Coastal Migratory Pelagics
Summer flounder	*Paralichthys dentatus*	Forage	Juvenile, Larvae	MAFMC Summer Flounder, Scup, Black Sea Bass
Tiger shark	*Galeocerdo cuvier*	Forage	Juvenile/Adult	NMFS Highly Migratory Species

3.1. Estuarine Water Column

The transient boundaries of the estuarine water column are variable due to wind- and tidal-driven inlet sea water mixing with upland freshwater sources and land surface runoff. With these mixing attributes, salinity levels vary within this estuarine EFH. Typically, the salinity groups include four ranges: oligohaline (< 5 parts per thousand (ppt)), mesohaline (5 to 18 ppt), polyhaline (18 to 30 ppt), and euryhaline (>30 ppt). The saltwater tidal action and freshwater inflows are primary factors in estuarine circulation and nutrient/waste removal. Strong wind events and freshwater tributaries can increase turbidity, reducing light penetration, and adversely effecting submerged aquatic vegetation (SAV) and phytoplankton photosynthesis. Freshwater rivers and stream inflows provide estuarine EFH habitats with organic matter, nutrients, and finer grained sediments, whereas ocean-driven tides provide coarser sediments and act as a transport mechanism for estuarine-dependent species (i.e., at least one life stage occurs in the estuary). The ocean waters within this EFH act as a temperature stabilizer that offsets seasonal temperature extremes that would reduce productivity and diversity in the shallow

upstream waters. Salinity, temperature, dissolved organic matter, turbidity, total suspended solids, dissolved inorganic nitrogen, and dissolved oxygen are components normally used to characterize the estuarine water column. Other descriptors, such as adjacent structures (shoals, channels, and marshes), water depth, available fetch, and light availability (K_d490) are also used to further describe this EFH. The estuarine water column provides both migrating and residential fish species of varying life stages the opportunity to survive in a productive, active, unpredictable, and at times strenuous environment. As the transport medium for nutrients and organisms between the ocean and the upstream rivers and inland freshwater systems, the estuarine water column is as essential a habitat as any marsh, seagrass bed, or reef (SAFMC 2009).

3.2. Unconsolidated Bottoms

Unconsolidated bottom is defined as all wetland and deep-water habitats with at least 25% cover of particles smaller than stones, and a vegetative cover less than 30% (Cowardin et al. 1985), where stone particle size ranges from 25.4 cm to 60.4 cm. Water regimens are restricted to subtidal, permanently flooded, intermittently exposed, and semi-permanently flooded. Diverse assemblages of fish and benthic macroinvertebrates, such as red drum, cobia, southern flounder, Atlantic croaker, spot, spotted seatrout, Atlantic menhaden, bay anchovy, striped mullet, weakfish, and blue crab, utilize these areas and serve as food sources for fish the SAFMC, MAFMC, or NMFS manage.

3.3. Estuarine Emergent Wetlands (Salt Marsh and Brackish Marsh)

Salt marshes are transitional areas between land and water, occurring along the intertidal estuarine shorelines where salinity ranges from near ocean strength to near fresh in upriver marshes. The estuarine wetland is described as tidal wetlands in low-wave-energy environments, where the salinity is greater than 0.5 parts per thousand and is variable owing to evaporation and the mixing of seawater and freshwater (SAFMC 1998). Estuarine emergent marshes protect shorelines from erosion, produce detritus, filter overland runoff, and function as vital nursery area for various fish and many other species. Estuarine emergent wetlands are characterized by the presence of erect, rooted, herbaceous hydrophytes dominated by salt-tolerant perennial plants.

The structure and function of salt marshes are influenced by tide, salinity, nutrients, and temperature. Estuarine intertidal marshes, as well as the network of tidal creeks that salt marshes drain into, provide refuge, forage, and nursery habitat for Council- and NMFS-managed species, other non- managed fishes, shellfish, invertebrates, as well as endangered and threatened species. Estuaries provide major sources of nutrients, nekton, prey fish, and detritus to other ecosystems, which is primarily facilitated by water movement. The cross-habitat transfer of energy and carbon from donor to recipient habitats plays a vital role in shaping food webs and productivity in recipient systems, particularly those supporting additional managed species, such as coastal migratory pelagics (e.g., mackerels), highly migratory pelagic species (e.g., Atlantic sharp nose sharks, blacktip sharks, and bull sharks), and species in the snapper

grouper complex (Polis et al. 1997). Additionally, salt marsh estuaries provide commercial and economic value to people; it is estimated that 95% of finfish and shellfish species harvested commercially in the U.S. are wetland-dependent, thus could be considered estuarine-dependent (SAFMC Habitat Plan 1998).

3.4. Palustrine Emergent Wetlands

Palustrine emergent wetlands are “All nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and all such tidal wetlands where ocean-derived salinities are below 0.5 ppt,” (Cowardin et al. 1985). These wetlands would be considered tidal freshwater wetlands (Cowardin et al. 1985).

4. Habitat Areas of Particular Concern (HAPC)

Habitat Areas of Particular Concern (HAPC) are a subset of EFHs that are rare, stressed by development, provide important ecological functions for federally managed species, or are especially vulnerable to anthropogenic (or human impact) degradation. HAPCs may include areas species use for migration, foraging, reproduction, and development. HAPCs exists in intertidal and estuarine habitats within the project area. The MSA does not provide any additional regulatory protection to HAPCs. However, if HAPCs are potentially adversely affected, additional inquiries and conservation guidance may result during the NMFS EFH consultation (NMFS 2008).

There are no HAPCs within sediment basin. Oysters are an HAPC for gag grouper and gray snapper, but salinities within the sediment basin are too low to support persistent, substantial oyster aggregations. Estuarine submerged aquatic vegetation (SAV) is an HAPC for summer flounder; however, SAV does not occur within the sediment basin.

5. Managed Species and Essential Fish Habitat Use

5.1 Snapper/Grouper Species Complex and Relevant EFH

Snapper/Grouper

Many snapper grouper species utilize both pelagic and benthic habitats during several stages of their life histories. Larval stages of these species live in the water column and feed on plankton. Most juveniles and adults are demersal (bottom dwellers) and associate with hard structures like artificial reef structures, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings). Juvenile stages of some snapper grouper species also utilize inshore seagrass beds, mangrove estuaries, lagoons, oyster reefs, and embayment systems. In many species, various combinations of these habitats may be utilized during daytime feeding migrations or seasonal shifts in cross-shelf distributions (Gore et al. 2013).

Gray Snapper

The project area is designated as EFH for the snapper grouper complex. Since there is limited data on species in the southeastern estuaries, the gray snapper is used as a proxy (i.e., indicator species) for other estuarine dependent species (SAFMC 1998). Gray snapper – a snapper species in the Lutianidae family– are one of the few estuarine dependent species in the snapper grouper complex (SAFMC 1998). EFH for gray snapper ranges from shallow estuarine areas (e.g., vegetated sand bottom, mangroves, jetties, pilings, bays, channels, and mud bottom) to offshore areas (e.g., hard and live bottom, coral reefs, and rocky bottom) as deep as 300 feet (Allen 1985; Bortone and Williams 1986) depending on life stage. Like most snappers, these species participate in group spawning, which indicates either an offshore migration or a tendency for larger, mature individuals to take residency in deeper, offshore waters. Both the eggs and larvae of these snappers are pelagic (Richards et al. 1994). After an unspecified period in the water column, the planktivorous larvae move inshore through tidal transport and become demersal juveniles. Juvenile gray snapper are euryhaline and occur at salinities from 0-37 ppt (SAMFC 1998). The diet of these newly settled juveniles primarily consists of benthic crustaceans, but they also consume fish, mollusks, and polychaetes. Juveniles inhabit a variety of shallow, estuarine areas including vegetated sand bottom, bays, mangroves, finger coral, and seagrass beds. As adults, most are common to deeper offshore areas such as live and hardbottom habitat, coral reefs, and rock rubble. However, adult gray snapper also inhabit vegetated sandy bottom areas, but occur less frequently in estuaries (Bortone and Williams 1986). Data suggests adults tend to remain in one area. The diet of adult gray snapper includes a variety of fish, shrimp, crabs, gastropods, cephalopods, worms, and plankton. This species is of commercial and/or recreational importance (Bortone and Williams 1986; NOAA Fisheries 2025).

NOAA's Estuarine Living Marine Resources (ELMR) database has identified gray snapper species as being present (rare, common, abundant, or highly abundant) or not present for the "Tidal Fresh", "Mixing," and "Seawater" salinity zones in the Savannah River. Since gray snapper is the only estuarine dependent species under the Snapper Grouper Fishery Management Plan (FMP) in the ELMR data set, it is used as a proxy for other estuarine dependent species, such as gag grouper (Nelson et al. 1991; SAFMC 1998).

Table B1-4. Spatial distribution and relative abundance of Gray Snapper (Nelson et al. 1991).

		Southeast Estuaries- Savannah River		
		Tidal Fresh	Mixing	Seawater
Gray Snapper	Adult	Not Present	Not Present	Not Present
	Spawning Adult	Not Present	Not Present	Not Present
	Juveniles	Rare	Rare	Rare
Lutjanus griseus	Larvae	Not Present	Not Present	Not Present
	Eggs	Not Present	Not Present	Not Present

Snapper/Grouper Complex EFH in Project Area

EFH for the grouper/snapper complex species discussed above includes the estuarine water column, estuary emergent wetlands, and unconsolidated bottom. These habitats provide migration, refuge, and feeding/developmental areas for post-larval, juvenile, and/or adults of these species. Furthermore, Georgia and South Carolina tidal inlets, state-designated nursery areas, and oyster/shell bottoms are considered HAPCs for the grouper-snapper complex; however, there are no HAPCs for the snapper/grouper complex within the project footprint (NMFS 2008).

5.2 Other Managed Species and Relevant EFH

Other managed species, like highly migratory species, penaeid shrimp, and those in the summer flounder, scup, and black sea bass fisheries, are included with those listed in Table B1-5. Of these species, sharks, penaeid shrimp, and summer flounder are the most likely to use EFHs in the project area.

Table B1-5. Other managed species and highly migratory species likely to be present within project area (NOAA 2024).

Common Name	Scientific Name	Function	Life Stage Use(s)
Blacktip shark	*Carcharhinus limbatus*	Refuge, Forage, Nursery	Juvenile, Adult, Neonate
Bluefish	*Pomatomus saltatrix*	Refuge	Juvenile
Penaeid Shrimp (Brown, Pink, and White Shrimp)	*Penaeus aztecus (Brown Shrimp)* *Penaeus duorarum (Pink Shrimp)* *Penaeus setiferus (White Shrimp)*	Refuge, Forage, Nursery	ALL
Summer flounder	*Paralichthys dentatus*	Forage	Juvenile, Larvae
Tiger shark	*Galeocerdo cuvier*	Forage	Juvenile/Adult

Summer Flounder

The summer flounder's range includes shallow estuarine and outer continental shelf waters from Nova Scotia to Florida and the northern Gulf of Mexico (NEFSC 1999). Summer flounder display intense seasonal inshore/offshore migration patterns. From late spring through early fall, summer flounder are concentrated in estuaries and sounds until migrating to the offshore outer continental shelf wintering grounds (NEFSC 1999; ASMFC 2009). During fall and early winter, offshore spawning occurs, and the larvae are carried by wind-driven currents into coastal areas. Most larvae and juvenile development occur principally within the estuaries and sounds. Most individuals are

sexually mature at age two years. Growth rates and maximum ages vary substantially between sexes, where adult females routinely grow larger and live longer than males (NEFSC 2009).

Summer flounder will begin spawning at age two or three years old. Summer flounder eggs are pelagic, buoyant, and most plentiful between Cape Cod, Massachusetts and Cape Hatteras, North Carolina. The eggs are spherical with a transparent rigid shell, and the yolk occupies approximately 95% of the egg volume (ASMFC 2009). Larval free feeding is initiated once the yolk-sac material is consumed, which is a function of the incubation temperature (NEFSC 1999).

Summer flounder are left-eyed flatfish, which begin with eyes on both sides of its body; the right eye migrating to the left side in 20 to 32 days post-emergence. Larvae migrate to inshore coastal areas from October to May where they burrow into the sediment and develop into juveniles. Late larval and juvenile summer flounder are active predators, preying on crustaceans, copepods, and polychaetes. Research indicates that appendages of benthic fauna are an important food source for post-larval summer flounders (NEFSC 1999). Burrowing behavior is influenced by predator and prey abundance, salinity, water temperature, tides, and time of day. Juveniles inhabit marsh creeks, mud flats, and seagrass beds, but prefer primarily sandy shell substrates. Juveniles often remain inshore for 18 to 20 months. Males reach maturity at approximately ten inches, while females reach maturity at approximately 11 inches (NEFSC 1999; ASMFC 2009).

Adults primarily inhabit sandy substrates, but have been documented in seagrass beds, marsh creeks, and sand flats. Summer flounders are quick, opportunistic predators that ambush their prey, making use of a well-developed dentition. Their camouflage and bottom positioning allow for efficient predation on small fish and squid; crustaceans make up a large percentage of their diet (ASMFC 2009; NEFSC 1999). Adults are active during daylight hours and normally inhabit shallow, warm, coastal estuarine waters before wintering offshore on the outer continental shelf. Some research suggests that some older individuals may remain offshore year-round (NEFSC 1999).

Table B1-6. Spatial distribution and relative abundance of Summer Flounder (Nelson et al. 1991).

		Southeast Estuaries- Savannah River		
		Tidal Fresh	Mixing	Seawater
Summer Flounder	Adult	Not Present	Rare	Rare
	Spawning Adult	Not Present	Not Present	Not Present
	Juveniles	Not Present	Abundant	Abundant
	Larvae	Not Present	Common	Common
Paralichthys dentatus	Eggs	Not Present	Not Present	Not Present

Other Managed Species EFH in the Project Area

Potential EFH locations for the species discussed above include estuarine water column, unconsolidated bottoms, and estuarine emergent wetlands. Sharks may utilize any of the EFHs in the project area, especially for foraging. Their use of tidal areas may be limited based on size of individuals and high tide water depths. Penaeid shrimp may utilize the EFH in the project areas during all life stages, especially for refuge, foraging and nursery. Summer flounder utilize the EFH in the project area during the juvenile and larval life stages as important nursery habitats. As adults, summer flounder utilize the EFH as important foraging grounds and habitat during warmer months.

All native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within the adult and juvenile summer flounder EFH is considered HAPC. If native species of SAV are eliminated then exotic species should be protected because of functional value; however, all efforts should be made to restore native species. There is no SAV within sediment basin.

Oyster reefs and shell banks are defined by SAFMC as being the “natural structures found between and beneath tide lines, which are composed of oyster shell, live oysters, and other organisms.” Oyster reefs are extremely important to the aquatic ecosystem as they remove particulate matter, release inorganic and organic nutrients, stabilize sediments, provide habitat cover and serve as both indirect (i.e., house macroinvertebrates) and direct food sources for various fish species. There is no oyster reef EFH within the sediment basin.

6. Assessment of Effects

In this section, potential effects to EFH as well as to managed species within the action area are evaluated. Impacts to managed species are focused on the following diagnostic species: gray snapper and summer flounder. Diagnostic species are used because of similarities in environmental conditions and preferences among different species. The chosen diagnostic species can be used to predict impacts to similar species in the area.

6.1 Potential Effects to EFH

No Construction of the Sediment Basin Weir as Identified in the 2012 SHEP FEIS

The USACE’s evaluation of effects from omitting the construction of the sediment basin weir and fill (AA) are summarized below. Overall, the USACE believes any adverse effects from not constructing the weir would be within the scope of those evaluated by NMFS during review of the 2012 SHEP EIS and its EFH assessment.

Estuarine Water Column

Under the proposed action, there will be no adverse effect to current conditions.

Compared to construction of the sediment basin weir and fill, there will be minor adverse, but not substantial, effects to dissolved oxygen in the water column. A table of dissolved oxygen concentrations that compare the AA and NAA is below (Table B1-7).

Table B1-7. Comparison of DO concentration for AA and NAA.

	1997 Growing Season Flows: bottom half of water column											
	Action Alternative (AA)			**No Action Alternative (NAA)**			**AA-NAA**					
	Average DO (mg/L) by percentile			**Average DO (mg/L) by percentile**			**Average DO (mg/L) by percentile**			**% Change**		
	5	**50**	**95**	**5**	**50**	**95**	**5**	**50**	**95**	**5**	**50**	**95**
BR01	3.39	5.15	8.12	3.5	5.24	8.22	-0.11	-0.09	-0.09	-3	0	0
BR02	3.76	5.5	8.77	3.82	5.53	8.78	-0.06	-0.03	-0.02	-1	0	0
BR03	3.99	5.77	9.07	4.03	5.81	9.08	-0.04	-0.04	-0.01	-1	0	0
LBR01	5.64	7	9.29	5.66	7.02	9.29	-0.02	-0.02	0	0	0	0
LBR02	5.08	6.59	9.27	5.11	6.61	9.27	-0.03	-0.02	0	-1	0	0
LBR03	4.33	6.11	9.24	4.36	6.13	9.24	-0.03	-0.03	0	-1	0	0

Construction of the sediment basin weir and fill would result in slightly higher dissolved oxygen concentrations (increase of <.12 mg/l under 1997 flows) under certain conditions. However, a comparison to pre-construction modeling results using the same flows indicates existing mitigation measures (flow rerouting and DO injection) have already improved dissolved oxygen conditions over pre-construction conditions in the Back River. Additionally, as the GHD report indicates, shear stresses and movement of sediment of fill area related to the NAA, may necessitate periodic placement of fill. Under the NAA, the construction of the rock weir and the potential recurring placement of fill material would have recurring, short-term impacts to water quality in the water column due to turbidity from placement activities. As noted in the Mitigation Plan from the 2012 SHEP FEIS, p.9, “During the initial discussions about the potential filling of the Sediment Basin, agencies expressed substantial concern about water quality aspects of such a measure. They were concerned that sediment placement using a large hydraulic dredge would (1) exacerbate recurring low dissolved oxygen levels in that portion of the harbor and (2) allow fine-grained sediments to spread up into shallower portions of the Back River, leading to sedimentation in that critical area. Because of these concerns, the USACE minimized the extent of the sediment placement that would be included in the design. Hydrodynamic modeling indicated that a narrow sill at the downstream end of the Basin would still allow salinity to cross over and move upstream. This would negate the intent of the measure, which is to reduce the movement of salinity up the Back River. The final design consists of a broad berm that would restrict upstream salinity movement. The placement of new work sediments is included but would be minimized to avoid the potential adverse impacts identified by the natural resource agencies.”

The proposed action would avoid recurring, temporary adverse effects to water quality from periodic placement of fill and would have long-term minor adverse effects to

dissolved oxygen concentrations compared to constructing the weir. DO concentrations do not decrease by more than five percent and concentrations remain above 3 mg/l.

Unconsolidated Bottom

The proposed action removes the planned impact to unconsolidated bottom from constructing the weir and placing fill. If the sediment basin weir and fill are constructed, there would be a direct impact of 8.26 acres would occur from the conversion of unconsolidated bottom to hardened structure and direct impacts to 50.5 acres of unconsolidated bottom from fill. The impacts may be recurring as additional fill material may be required to maintain the function and integrity of the weir as sheer stresses created by the weir mobilize fill material.

Estuarine & Palustrine Emergent Wetlands

The proposed action removes the planned impact to estuarine emergent wetlands within the project area. Construction of the sediment basin weir and fill would require construction of tie-ins that would result in permanent loss of 0.16 acres estuarine wetlands. The proposed action avoids these direct impacts.

Construction of the sediment basin weir and fill as described in the original flow rerouting plan would result in indirect conversion of estuarine wetlands to palustrine wetlands. The extent of the conversion would vary depending on the fluctuation of flows within the watershed. Using the methodology from the 2012 SHEP FEIS to predict impacts to wetlands, GHD 2024 indicates construction of the weir would result in 124 and 50 acres of estuarine wetlands converted to palustrine wetlands under 1997 and 2021 flows, respectively. However, monitoring data shows vegetation composition flux between estuarine and palustrine species in both pre- and post-construction conditions depending on the Savannah River flows, which are affected by climatic conditions. Monitoring and modeling data indicate existing flow rerouting measures have resulted in greater occurrence of conditions conducive to the growth of palustrine wetland vegetation than before the SHEP.

6.2 Potential Effects to Managed Species

Effects to Gray Snapper

The project area includes estuarine resources that may be used by gray snapper and their prey. By not constructing the sediment basin weir and fill, productive estuarine marshes and benthic habitat, particularly useful for snapper foraging and refuge for young, will not change from current conditions and will not differ substantially from those evaluated in the 2012 SHEP EIS and its EFH assessment. Compared to the NAA, construction of the sediment basin weir and fill would result in minor changes in salinity around the project area. However, salinity in this area already changes considerably due to flow and tide conditions and the effects to salinity would be minimal. Effects to gray snapper and their prey will be minimal due to species ability to migrate

with shifting salinity to abundant adjacent habitat throughout the Savannah River estuary. In addition, gray snapper and many associated species are euryhaline and unlikely to be affected by small shifts in salinity that may result from the proposed action.

Effects to Summer Flounder and Other Managed Species

Other managed species potentially using the project area include summer flounder during almost all their life stages. By not constructing the sediment basin weir and fill, summer flounder and associated species and their habitats should not change from current conditions and will not differ substantially from those evaluated in the 2012 SHEP EIS and its EFH assessment. Compared to the NAA, minor, indirect effects on summer flounder may result if prey habitat is removed or prey populations decline in the project area due to changes in salinity or DO. However, these migratory species are likely to move to another area where suitable prey would be found. There is abundant similar adjacent habitat throughout the Savannah River estuary. In addition, because summer flounder have the ability to migrate, the effects from not building the weir would be minimal. Summer and southern flounder are euryhaline species and are unlikely to be affected by small shifts in salinity that may result from the proposed action. Habitat Suitability Index (HSI) modeling was completed for southern flounder, which can serve as a proxy for summer flounder due to the similar physiology between the species. HSI results showed very small changes to habitat suitability from the proposed action (-2.5% and -0.6% for 1997 and 2021 flows, respectively). The HSI modeling assessed how changes to dissolved oxygen concentrations would affect the species. While minor adverse impacts were modeled from the proposed alternative, bottom dissolved oxygen concentrations have been increased by existing mitigation features (flow rerouting measures and DO injection) in the area that would be affected by construction of the sediment basin weir and fill. With the proposed action, DO concentrations remain above the critical 3.0 threshold for flounder even at the fifth percentile (Deubler and Posner 1963). The binary pass/fail HSI model used a threshold of 4.0 mg/l for dissolved oxygen and may have underestimated suitable habitat within the study area.

Highly migratory species potentially using the sediment basin area include sharks, most of which use inshore areas as juveniles. It is highly unlikely that any individuals of these species would be affected by not constructing the weir due to their high motility and ability to travel between adjacent habitat area. Indirect effects on these species may result if prey habitat is removed or prey populations decline in the project area. However, these migratory species are likely to move to another area where suitable prey would be found, and it is unlikely that there will be significant impacts to prey species. Therefore, it is unlikely that there would be adverse effects to highly migratory species associated with the proposed change to Plan 6a.

7. Summary of Effects and Determination

The 2012 SHEP EIS proposed constructing the sediment basin weir and filling adjacent

upstream waters as part of a larger effort to offset impacts from salinity intrusion into the Savannah River estuary caused by the SHEP. The dredging needed to expand the navigation channel has been completed as has the flow modifications described for Plan 6a, other than two actions discussed herein for the sediment basin. While environmental monitoring is still underway, the data collected thus far combined with updated hydrodynamic and water quality models show the objectives of Plan 6a have been achieved without constructing the weir and filling the sediment basin. Additionally, new geotechnical studies show constructing the weir and filling the basin would be more difficult and less effective than anticipated by the 2012 EIS. Accordingly, the USACE undertook a new evaluation of these components of Plan 6a.

Construction activities associated with the sediment basin weir and fill would have direct and indirect effects to estuarine water column, unconsolidated bottom, estuarine emergent wetlands, and palustrine emergent wetlands. The estuarine water column would have slightly higher DO concentrations due to the construction of the sediment basin weir and fill. However, there may be reoccurring, temporary impacts to the water column from turbidity from subsequent periodic sediment placement activities. The materials used to construct the sediment basin weir would permanently convert unconsolidated bottom to hardened structure, resulting in a direct impact 8.26 acres and the fill would result in of 50.5 acres of unconsolidated bottom getting covered. The impacts due to fill may be reoccurring as additional fill material may be required to maintain the function and integrity of the weir and berm as sheer stresses created by the weir would mobilize fill material. Implementation of the sediment basin weir and fill would require construction of tie-ins that would directly impact 0.16 acres of estuarine wetlands.

In addition to the impacts to EFH, the construction of the sediment basin weir and fill may adversely affect managed species in the area even though these species would likely travel to adjacent habitat to avoid direct impacts like construction and turbidity. Indirect dredging and placement impacts, such as impacted water quality due to temporary increases in turbidity levels for activities such as feeding or spawning may also occur; however, these impacts would be short-term (within 12-24 hours) and minor in nature as the Back River is naturally turbid due to tidal and riverine influences. Once placement activities are completed, any turbidity will quickly dissipate given the riverine/tidal currents. The placement of sediment as part of the fill activities may adversely affect invertebrates and bottom-dwelling organisms at the site by smothering immobile organisms, (*e.g.,* invertebrate prey species) or forcing mobile animals (*e.g.,* benthic oriented fish species) to migrate from the area. However, natural disturbances are common in coastal environments so faunal communities are resilient to many kinds of periodic disturbances. Recovery is normal for healthy saltmarsh habitats if the disturbance event is under the critical threshold and if there are adjacent unaffected habitats that can serve as a source for colonists (McCall and Pennings 2012). This direct impact would be minor and long-term (approximately 2 years) and would reoccur with subsequent fill activities.

The proposed action (foregoing construction of the sediment basin weir and filling of the

sediment basin), compared to the NAA (constructing the sediment basin weir and fill as described in Plan 6a) would not adversely affect EFH and managed species. The proposed action may have minor, indirect adverse effects to managed species from not constructing the sediment basin weir and fill, but the effects will be minimal due to species ability to migrate away from the small shifts in salinity and there is abundant, adjacent habitat within the Savannah Estuary system. In addition, HSI results showed very small changes to habitat suitability due to the proposed action (-2.5% and -0.6% for 1997 and 2021 flows, respectively).

If the sediment basin weir and fill is not constructed, there will be no changes to habitat or managed species from current conditions. Based on the analysis above, the USACE has determined that the proposed action would ensure the continued spawning, breeding, feeding, and growth of managed species in the area. The USACE has used the best scientific and commercial data available to complete this analysis and looks forward to further discussion on this project and its potential effects.

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Savannah Harbor Expansion Project
Flow Rerouting Mitigation Plan – Sediment Basin Weir and Fill Modification
Chatham County, Georgia and Jasper County, South Carolina
Draft Supplemental Environmental Assessment and Finding of No Significant Impact

Appendix C- Placeholder for Public Comments

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT
100 WEST OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401

February 2025

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Savannah Harbor Expansion Project
Flow Rerouting Mitigation Plan – Sediment Basin Weir and Fill Modification
Chatham County, Georgia and Jasper County, South Carolina
Draft Supplemental Environmental Assessment and Finding of No Significant Impact

Appendix D- Environmental Compliance Coordination

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT
100 WEST OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401

February 2025

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From: Moore, Kelie
To: Monroe, E Madison CIV USARMY CESAS (USA)
Cc: Hill, Suzanne CIV USARMY CESAS (USA); Metz, Alexander P CIV USARMY CESAS (USA)
Subject: [Non-DoD Source] RE: Sediment Basin CZMA
Date: Tuesday, November 5, 2024 8:16:52 AM

No additional CZMA federal consistency documentation will be required for not building the Sediment Basin Weir and Fill since any impacts to coastal resources and uses arising from that mitigation measure will be mitigated by alternative measures, so there is no reasonably foreseeable net increase to effects above what was originally concurred with.

Kelie Moore
Federal Consistency Coordinator
Coastal Resources Division
Office: 912-264-7218 | Cell: 912-602-1339
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From: Monroe, E Madison CIV USARMY CESAS (USA) <Emily.M.Monroe@usace.army.mil>
Sent: Monday, November 4, 2024 3:40 PM
To: Moore, Kelie <Kelie.Moore@dnr.ga.gov>
Cc: Hill, Suzanne CIV USARMY CESAS (USA) <Suzanne.Hill@usace.army.mil>; Metz, Alexander P CIV USARMY CESAS (USA) <Alexander.P.Metz@usace.army.mil>
Subject: Sediment Basin CZMA

Hi Kelie,

I hope you have had a wonderful rest of your day. I am just following up on our conversation earlier this morning regarding the Sediment Basin Supplemental Environmental Assessment.

We just want to confirm that we will not need any compliance documentation for CZMA based on the proposed action of not building the Sediment Basin Weir and Fill.

Thank you!

E. Madison Monroe
Biologist
USACE, Savannah District, Planning Branch
Phone: 912-710-1268
Email: Emily.m.monroe@usace.army.mil

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
https://www.fisheries.noaa.gov/region/southeast

02/19/2025

F/SER31:AH
SERO-2025-00309

(Sent via Electronic Mail)

Colonel Ronald J. Sturgeon, Commander
U.S. Army Corps of Engineers Savannah District
100 W Oglethorpe Avenue
Savannah, Georgia 31401

Dear Colonel Sturgeon:

Since October 2023, NOAA's National Marine Fisheries Service (NMFS) - Protected Resources Division (PRD) has been discussing a potential modification to the original flow rerouting mitigation planned as part of the Savannah Harbor Expansion Project (SHEP) with the Savannah District. The original rerouting plan included, in part, constructing a sediment basin weir and placing fill upriver of the weir. The Savannah District has shared monitoring data and results from new hydrologic models of the Savannah River Estuary with NMFS-PRD and other agencies. The new hydrologic models included several updates and incorporated all of the flow rerouting structures constructed as a part of the SHEP mitigation, to date. Model results show the completed flow rerouting mitigation features have essentially achieved the new salinity regime and dissolved oxygen concentrations targeted in the 2012 Final Environmental Impact Statement, without a sediment basin weir or placing fill upriver of the weir. In light of this new information, the Savannah District seeks to forgo the construction and maintenance of these two features.

NMFS-PRD appreciates the Savannah District's coordination and transparency regarding these proposed changes. NMFS-PRD supports the District's proposal to forgo constructing the sediment basin weir and upriver fill. Forgoing constructing it will still achieve the results of the planned flow rerouting mitigation while avoiding unnecessary construction and maintenance expenses and repeated benthic impacts from maintaining the fill. SHEP's flow rerouting mitigation features and their effects were considered in previous Section 7 consultations on SHEP. Because the effects of the action are not changing, the removal of this feature from the proposed action does not trigger the reinitiation of consultation requirements described in 50 CFR 402.16(a); thus, further coordination with NMFS-PRD is not required for this action.

We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions on this consultation, please contact Andy Herndon, at (727) 824-5367, or by email at Andrew.Herndon@noaa.gov.

Sincerely,

David Bernhart
Assistant Regional Administrator
for Protected Resources

File: 1514-22.f.3

cc: COE, Suzanne.Hill@usace.army.mil, andrew.j.loschiavo@usace.army.mil,
Emily.M.Monroe@usace.army.mil
USFWS, Bill_Wikoff@fws.gov
SCDNR, CroweS@dnr.sc.gov, PostB@dnr.sc.gov
GADNR, Kelie.Moore@dnr.ga.gov, Elizabeth.Booth@dnr.ga.gov
F/SER3, Karla.Reece@noaa.gov, Nick.Farmer@noaa.gov
F/SER47, Pace.Wilber@noaa.gov, Lisa.Wickliffe@noaa.gov

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
https://www.fisheries.noaa.gov/region/southeast

January 29, 2025 F/SER47:LW/pw

(Sent via Electronic Mail)

Colonel Ronald J. Sturgeon, Commander
U.S. Army Corps of Engineers Savannah District
100 W Oglethorpe Avenue
Savannah, Georgia 31401

Attention: Madison Monroe

Dear Colonel Sturgeon:

NOAA's National Marine Fisheries Service (NMFS) reviewed the draft essential fish habitat (EFH) assessment for modifying the flow rerouting planned as part of the Savannah Harbor Expansion Project (SHEP). Based on recent monitoring data and new hydrologic models, the Savannah District believes two components of the plan, constructing the sediment basin weir and placing fill upriver of the weir, are no longer necessary for SHEP to achieve the salinity regime targeted in the 2012 Final Environmental Impact Statement. Accordingly, the Savannah District proposes deleting the sediment basin weir and upriver filling from SHEP. As the nation's federal trustee for the conservation and management of marine, estuarine, and diadromous fishery resources, the NMFS provides the following comments pursuant to authorities of the Fish and Wildlife Coordination Act and Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

The Savannah District has discussed this modification with NMFS and other agencies on several occasions since October 2023. These discussions reviewed monitoring data and results from new hydrologic models of the Savannah River Estuary. The new hydrologic models included several updates to older ones and all of the flow rerouting structures constructed to date. NMFS assisted the Savannah District with reviewing the contractor reports describing these data and model results, and the Savannah District intends to summarize the reports in the Supplemental Environmental Assessment being prepared for modifying the flow rerouting plan. Results from water quality models show the flow rerouting structures already completed have essentially achieved the targeted new salinity regime and levels of dissolved oxygen, which are the main drivers of the habitat suitability models for select fishes the District and agencies used to determine SHEP's mitigation requirements. By dropping the sediment basin weir and upriver fill, an unnecessary expense and a chronic disturbance from maintaining the fill are avoided.

NMFS assisted the Savannah District with the EFH assessment by providing additional information and comments on January 6, 2025. NMFS greatly appreciates the opportunity to have this early review and offers no EFH Conservation Recommendations pursuant to Section 305(b)(2) of the Magnuson-Stevens Act for the proposed modification to the flow rerouting plan.

Thank you for the opportunity to provide these comments. Please direct related questions or comments to the Dr. Lisa Wickliffe at Lisa.Wickliffe@noaa.gov.

Sincerely,

Pace Wilber, Ph.D.
Acting Assistant Regional Administrator
Habitat Conservation Division

cc: COE, Emily.M.Monroe@usace.army.mil
USFWS, Bill_Wikoff@fws.gov
SCDNR, CroweS@dnr.sc.gov
GADNR, Kelie.Moore@dnr.ga.gov, Elizabeth.Booth@dnr.ga.gov
EPA, Somerville.Eric@epa.gov
F/SER3, Andrew.Herndon@noaa.gov
F/SER47, Lisa.Wickliffe@noaa.gov

From: Hedeen, David
To: Hill, Suzanne CIV USARMY CESAS (USA)
Cc: Monroe, E Madison CIV USARMY CESAS (USA); Richardson, Dewey
Subject: [Non-DoD Source] RE: SHEP Sediment Mitigation Feature- 401 WQC
Date: Monday, February 17, 2025 9:11:25 AM

Hi Suzy – Folks at EPD would not object the Savannah District's proposal to not construct the weir in the Back River. The 401 WQC would not require any modifications. Please let me know if you have any other questions. Thank you,

David Hedeen
Manager – Wetlands Unit
Georgia Environmental Protection Division
2 Martin Luther King, Jr. Dr. SE, Suite 1052
Atlanta, GA 30334

david.hedeen@dnr.ga.gov
470-427-2730 (office)
678-483-2287 (cell)

From: Hill, Suzanne CIV USARMY CESAS (USA) <Suzanne.Hill@usace.army.mil>
Sent: Friday, February 14, 2025 10:15 AM
To: Hedeen, David <david.hedeen@dnr.ga.gov>
Cc: Monroe, E Madison CIV USARMY CESAS (USA) <Emily.M.Monroe@usace.army.mil>
Subject: SHEP Sediment Mitigation Feature- 401 WQC

David-

We had discussed briefly a few months ago the Sediment Basin Mitigation Feature and any potential ramifications for the SHEP 401 WQC. As a refresher the Corps is proposing to NOT construct the final flow-rerouting feature which the rock weir and fill in the Back River. We had discussed because the proposed action would avoid construction of a permanent structure in the Back River, that modifications to the 401 WQC would not be required.

We are planning on issuing the draft supplemental environmental assessment February 25 for a 30-day public comment and will be requesting GADNR EPD comments. The draft SEA will indicate that the Corps has determined that a modification to the 401 WQC is not necessary and is seeking concurrence from GADNR-EPD. We plan on requesting this concurrence in our letter transmitting the draft SEA for your review.

As you can see below GADNR-CRD has already determined that no additional federal consistency determination will be required.

Please let me know if you have any concerns with our preliminary determination that a modification will not be necessary for the 401 WQC and concerns with the Corps seeking this concurrence through the review of the draft SEA.

Thank you,

Suzy

Suzanne Hill
Environmental Section Chief
USACE, Savannah District Planning Branch
912.423.2324

From: Moore, Kelie <Kelie.Moore@dnr.ga.gov>
Sent: Tuesday, November 5, 2024 8:16 AM
To: Monroe, E Madison CIV USARMY CESAS (USA) <Emily.M.Monroe@usace.army.mil>
Cc: Hill, Suzanne CIV USARMY CESAS (USA) <Suzanne.Hill@usace.army.mil>; Metz, Alexander P CIV USARMY CESAS (USA) <Alexander.P.Metz@usace.army.mil>
Subject: [Non-DoD Source] RE: Sediment Basin CZMA

No additional CZMA federal consistency documentation will be required for not building the Sediment Basin Weir and Fill since any impacts to coastal resources and uses arising from that mitigation measure will be mitigated by alternative measures, so there is no reasonably foreseeable net increase to effects above what was originally concurred with.

Kelie Moore
Federal Consistency Coordinator
Coastal Resources Division
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From: Monroe, E Madison CIV USARMY CESAS (USA) <Emily.M.Monroe@usace.army.mil>
Sent: Monday, November 4, 2024 3:40 PM
To: Moore, Kelie <Kelie.Moore@dnr.ga.gov>
Cc: Hill, Suzanne CIV USARMY CESAS (USA) <Suzanne.Hill@usace.army.mil>; Metz, Alexander P CIV USARMY CESAS (USA) <Alexander.P.Metz@usace.army.mil>

Subject: Sediment Basin CZMA

Hi Kelie,

I hope you have had a wonderful rest of your day. I am just following up on our conversation earlier this morning regarding the Sediment Basin Supplemental Environmental Assessment.

We just want to confirm that we will not need any compliance documentation for CZMA based on the proposed action of not building the Sediment Basin Weir and Fill.

Thank you!

E. Madison Monroe
Biologist
USACE, Savannah District, Planning Branch
Phone: 912-710-1268
Email: Emily.m.monroe@usace.army.mil

Savannah Harbor Expansion Project
Flow Rerouting Mitigation Plan – Sediment Basin Weir and Fill Modification
Chatham County, Georgia and Jasper County, South Carolina
Draft Supplemental Environmental Assessment and Finding of No Significant Impact

Appendix E- 2024 Sediment Basin Modeling and Habitat Suitability Index Evaluation for SHEP Comments and Responses

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SAVANNAH DISTRICT
100 WEST OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401

February 2025

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Controlled Unclassified Information (CUI) Only

Comment Report: All Comments
Project: SHEP Sediment Basin Weir and Fill (Flow Re-Routing)
Review: 35% Submittal - 2023 GHD Modeling Report
Displaying 28 comments for the criteria specified in this report.

Id	Discipline	Section/Figure	Page Number	Line Number
10551815	General	n/a	n/a	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Pdf page 11. Section 2.2.

The fourth bullet is missing a word between of and from. The purpose of the sentence is lost.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Dec 06 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10551818	Environmental	n/a	n/a	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

PDF pg. 13. Section 2.3, Sentence 2.

Wetland acres changes is unclear. Replace with wetland conversion.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Dec 06 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10551823 Environmental n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

PDF pg. 14. Paragraph 2, last sentence.

This verbiage suggests the model was edited to prevent representation of salinity migration.

Please reword to state that it was edited to better match gage/calibration data.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Dec 06 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024

Current Comment Status: **Comment Closed**

10551827 Environmental n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

PDF pg. 22. Section 3.4, Figure 3.

Proposed fill and extended fill are represented visually.

Recommend also visually outlining the cells that represent the weir or the centerline data of the weir as well.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Dec 06 2023

1-0 Evaluation **Concurred**
The figure has been updated in accordance with the recommendation.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024

Current Comment Status: **Comment Closed**

10552804 Hydraulics n/a PDF pages 11-12 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

I had been surprised by how much the marsh sizes changed during calibration. Could some context be added explaining how the additional/improved bathymetry data in the upper estuary led to increased marsh sizes during calibration?

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**

This topic was discussed in detail during the technical modeling workshop held 05 and 06 December 2023 with USACE and GHD technical personnel. Some additional text has been added in this section of the report as requested.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024

Current Comment Status: **Comment Closed**

10552814 Hydraulics n/a PDF page 13 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: In table 1, specify that bottom roughness is unitless.

From Stefany: along those lines, perhaps provide a brief note somewhere that clarifies that these bottom roughness do not necessarily correspond with the well known CHOW 1959 manning n values.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**

Report updated accordingly. Bottom roughness values updated. Additional paragraph added regarding bottom roughness determination.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024

Current Comment Status: **Comment Closed**

10552817 Hydraulics n/a PDF page 13 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

First sentence of second paragraph has a typo - delete "focused on".

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024

Current Comment Status: **Comment Closed**

10552835 Hydraulics Figure 2 PDF page 14 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

This figure 2 is not included in the Table of Figures. The next figure in the report is also called Figure 2.

This map shows 14 gages, but only 7 were used in the study. Could you differentiate (maybe with different colors) between primary, secondary, and unused gages in this figure?

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Also, the subject figure has been updated in accordance with the recommendation (very good recommendation by the way).

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024

Current Comment Status: **Comment Closed**

10552846 Hydraulics n/a PDF page 14 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Cite reference for the USGS report that contained the fair to poor rating.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**

These USGS rating are provided on the individual USGS gage site web page, under surface-water field measures. One example gage reference is included in the report. This one.
https://waterdata.usgs.gov/nwis/measurements/?site_no=02198950&agency_cd=USGS

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024

Current Comment Status: **Comment Closed**

10552854 Hydraulics n/a PDF page 15-16 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Recommend adding statistical bias as a parameter to more completely quantify model calibration.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Non-concurred**

Statistical bias has not been included in models GHD's technical team members have reviewed or completed in the last 40 years. If this is needed, suggest USACE ask Earl for examples where this was used to evaluate models.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Open Comment**

Earl will send GHD some examples.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 04 2024

2-0 Evaluation **For Information Only**

Stefany provided examples via email 01/11/2024. These are helpful and clarify the original request. The use of the term "Statistical bias" was a source of confusion, but now we are on the same page. It should be noted that the Index of Agreement calculation has the model bias calculation as part of its equation. IA is in the revised 65% but statistical bias not yet included due to lack of time. To be included in the 100% if still warranted.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

Backcheck not conducted

3-0 Evaluation **Check and Resolve**
Per weekly meeting 02/01/2024, instead of adding in an additional statistic to all tables, GHD will add description to the report where Index of Agreement is discussed to describe how the IA calculation incorporates statistical bias/model uncertainty. Stefany agreed with the approach. This will be made to the 100% report.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 01 2024

3-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Feb 13 2024
Current Comment Status: **Comment Closed**

10552857 Hydraulics n/a PDF page 14 n/a
Comment Classification: **Controlled Unclassified Information (CUI)**

Define Index of Agreement.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024
Current Comment Status: **Comment Closed**

10552858 Hydraulics section 2.3.1.2 PDF page 17 n/a
Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: What reason did USGS give for the poor rating?

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **For Information Only**
USGS did not provide this information, just the rating.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024
Current Comment Status: **Comment Closed**

10552861 Hydraulics n/a PDF page 18 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Tables 7 and 9 are missing medians.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**

Tables updated accordingly. Note medians have been removed for flow but kept for salinity, given mean is a more valuable measurement for flow.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024

Current Comment Status: **Comment Closed**

10552916 Hydraulics n/a PDF page 19 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Tables 10 and 11 have very poor index of agreement for gage 021989784. What is the significance of this to the overall project conclusions?

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**

Data has been updated in 65% based on revised runs, which show an improvement. It is worth considering that this section of the Little Back River has very low salinity, such that any delta in real terms can be small even though the percentage appears large. The mean and the percentiles match well considering the low salinity values.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 04 2024

Current Comment Status: **Comment Closed**

10552921 Hydraulics 3.1 PDF page 20 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Reword the second sentence. I do not understand its meaning.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024
Current Comment Status: **Comment Closed**

10553022 Hydraulics n/a PDF page 22 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: I think it would be beneficial to add a vertical elevation plot after Fig. 3 to show how the bottom elevation varied in proximity to the weir and basin.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Additional figures (2) added per recommendation.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 04 2024
Current Comment Status: **Comment Closed**

10553024 Hydraulics n/a PDF page 21 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Add more explanation to the paragraph below table 12 to more completely explain different approaches depending on the sparseness of the survey data.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024
Current Comment Status: **Comment Closed**

10553033 Hydraulics n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: General comment - data is plural, so change "data was" to "data were" throughout the report.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly. Only one use in the 35%. There was also one use of "data is" which has been updated to "data are." Will make sure that any additional uses in new text added are compliant.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024
Current Comment Status: **Comment Closed**

10553059 Hydraulics n/a PDF page 22 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: explain why only the surface salinities were analyzed and not the bottom salinity or depth-averaged salinity?

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **For Information Only**
This was already described in Section 3.2. Additional text has been added.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024
Current Comment Status: **Comment Closed**

10553069 Hydraulics 3.5 n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Recommend adding "median" before "surface salinity" in all these figures.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024
Current Comment Status: **Comment Closed**

10553071 Hydraulics 3.5 n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: "Deepened" is spelled incorrectly in the legends of all these figures.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Figures (multiple) updated accordingly

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024
Current Comment Status: **Comment Closed**

10553075 Hydraulics 3.5.1 n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Reword first sentence.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024
Current Comment Status: **Comment Closed**

10553091 Hydraulics 3.5.2 PDF page 26 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Quantify "slightly less" in the second sentence.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Open Comment**
Reword the new last sentence.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024

2-0 Evaluation **Concurred**
The last sentence has been reworded to provide a clearer message.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024

Current Comment Status: **Comment Closed**

10553095 Hydraulics n/a PDF page 27 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: In the text above Fig. 8, recommend changing "one cell" to "only one cell" in the third sentence.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024

Current Comment Status: **Comment Closed**

10553105 Hydraulics n/a PDF page 32 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Last Sentence, remove the word "is" so that it reads "... steady state flows from USGS gage..."

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024
Current Comment Status: **Comment Closed**

10553115 Hydraulics n/a PDF page 32-33 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

We may want to mention that the following decisions were made during the April 11, 2023 interagency meeting:

1. the use of both 1997 and 2021 flows for existing conditions vs. weir and design fill vs. weir and extended fill.

2. Species Habitat Criteria would not be modified.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024
Current Comment Status: **Comment Closed**

10553124 Hydraulics n/a PDF page 33 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Table 14 is pretty low resolution. I will email GHD the original png file of the table so that you can have a higher quality image inserted into the document.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **Concurred**

Original .png file received from Stefany (USACE) and added to the report.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024

Current Comment Status: **Comment Closed**

10553127 Hydraulics n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: "I strongly recommend that the district stop using the 1970s box model (WASP) that has quasi-first order numerics at best."

Submitted By: Stefany Baron (912-652-5223). Submitted On: Dec 07 2023

1-0 Evaluation **For Information Only**

This topic was discussed in detail during the technical modeling workshop held 05 and 06 December 2023 with USACE and GHD technical personnel. No change to report. USACE action item on whether to take Earl's recommendation.

Submitted By: Tom Gillespie (2252366959) Submitted On: Dec 22 2023

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 03 2024

Current Comment Status: **Comment Closed**

Comment Report: All Comments
Project: SHEP Sediment Basin Weir and Fill (Flow Re-Routing)
Review: 65% Submittal - 2023 GHD Modeling Rep
Displaying 30 comments for the criteria specified in this report.

Id	Discipline	Section/Figure	Page Number	Line Number
10578067	Civil	Figure 1	n/a	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

For the calibration effort, do storage-volumes auto-recalculate when the shape/size of the storage area is changed? Other hydraulic software, such as HEC-RAS, require the modeler to manually adjust the storage-volume tables as the map is just a visual representation.

Submitted By: Jason LaVecchia (912-652-5814). Submitted On: Dec 29 2023

1-0 Evaluation **For Information Only**
Yes, the volume is auto-recalculated based on the geometry of the marsh cells. The figure presented (Figure 1) is to scale.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 09 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10578068	Civil	n/a	Page 5	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Was a sensitivity on bottom roughness performed? If so, mention it's impact. If not, perform general sensitivity analysis on bottom roughness.

Submitted By: Jason LaVecchia (912-652-5814). Submitted On: Dec 29 2023

1-0 Evaluation **Concurred**
During weekly project team meeting 1/11/2024, Jason agreed that a sensitivity analysis wasn't warranted for the report, but requested additional detail in the report to give context around this topic. This has been included in Section 2.2, immediately above Table 1.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10578072	Civil	Table 2	9	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Table 2 - Under UGSS Gage 021989793, Simulated - should "125" be "1.25"?

Submitted By: Jason LaVecchia (912-652-5814). Submitted On: Dec 29 2023

1-0 Evaluation **Concurred**
This was an error and has been corrected to 1.25.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10578077	Civil	n/a	7	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Give a range of possible values for index of agreement. Is the scale 0-1 with 1 being the strongest agreement?

Submitted By: Jason LaVecchia (912-652-5814). Submitted On: Dec 29 2023

1-0 Evaluation **Check and Resolve**
The 65% report as issued 22DEC2023 included the following, which I believe addresses the comment:

The statistical measure – Index of Agreement (IA) – was used to determine the agreement between the simulated and measured data. The IA evaluates the global agreement between predictions and observations. Values of IA range between 0 and 1 with the highest agreement value of 1 indicating a perfect match. The IA is calculated by taking the ratio of the mean squared error and the potential error multiplied by the number of observations and then subtracted from one.

The only additional detail we could consider here is including the formula for IA. Would that be beneficial?

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10578083	Civil	Section 3.6	n/a	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

For the salinity contours, I like how the reader can see the red/white grid cells and how that shapes the salinity contour in Figure 13. Could we try adding the associated grid cells to the salinity contours in Appendix A as well? It may end up making the figures too busy and not helpful, but maybe let's do one of them as an example and discuss further?

Submitted By: Jason LaVecchia (912-652-5814). Submitted On: Dec 29 2023

Revised Jan 04 2024.

1-0 Evaluation **Concurred**
During the weekly meeting 01/11/2024, an example of a revised figure incorporating more details of the model results was presented per the request. The team agreed that it was a valuable improvement and should be incorporated into the remaining figures. All figures in Attachment A have been updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10583321 Hydraulics n/a PDF page 14 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Paragraph 1, Line 5 - small typo. Remove the) after IA.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 04 2024

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10583342 Hydraulics n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Salinity calibration tables and salinity contour lines have changed since the 35% report. This was discussed at the Jan 4 PDT meeting. USACE is OK with this change, but recommend adding some verbiage to the report about the dispersion method that was chosen.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 04 2024

1-0 Evaluation **Concurred**
During the weekly project team meeting 01/11/2024, agreed to provide verbiage on dispersion method in ProjNet rather than the revised 65% report. Afterwards, review whether to add in the 100% report or leave as is. Here is that verbiage.

The 2023 models use the Euler dispersion equations as was done in 2020. In 2022 based on comments from South Carolina we had changed to the Cosmic dispersion equation to satisfy South Carolina and used this for the 2022 analysis. After further review of the model, it was determined the Cosmic equation provided too much dispersion (confirmed by the phone discussion with Earl) and we reverted back to Euler as used in the 2020 calibrated models.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Feb 13 2024
Current Comment Status: **Comment Closed**

10583403 Hydraulics n/a PDF page 37 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Critical Cell DO tables (placeholder table 17 and 18) will not be necessary, as discussed during Dec 28 and Jan 4 meetings.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 04 2024

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10583425 Hydraulics n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Appendix A 1997 Flow Figures - the 35% report figures exclude a small area in the upper right hand corner of the orange, negative conversion shapefile. However, this area is included in the 65% report figures. (See attached PNG). If it is meant to be excluded, is it for the same reasons that the internal blob around the horseshoe bend was also excluded?

(Attachment: Comment_about_Salinity_Contour_Maps.PNG)

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 04 2024

1-0 Evaluation **Concurred**
This area was excluded in error in the 35%. This error was not carried through to the 65% figures (and acreages). What was presented in the 65% was correct.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10583440 Hydraulics n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Appendix B, Action Alternative Figures for Striped Bass Larvae. The salinity criteria for this species is between 3 and 9 ppt. Figures show passing in upper estuary where salinity is likely to be much less than 3ppt.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 04 2024

1-0 Evaluation **Concurred**
Correct, we had the upper bound but not the lower bound included for this species. This has been corrected in the latest revision, issued 01/17/2024.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 17 2024

1-1 Backcheck Recommendation **Open Comment**
These look good now! With one exception - I am uncertain about the May 2021 20th percentile flow figure. When comparing this figure to the figure in your first 65% submittal, the location of the upper bound has significantly changed. I then spot checked the values in appendix C and noticed a huge difference in the DO values for this scenario than what was used 22 Dec.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024

2-0 Evaluation **Check and Resolve**
Discussed in weekly meeting 01/18/2023 (and documented in meeting minutes). USACE confirmed during weekly meeting with USACE 02/01/2024 that this comment can be closed.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 01 2024

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Feb 13 2024

Current Comment Status: **Comment Closed**

10583444	Hydraulics	n/a	n/a	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Do we need an Appendix D? If not, we can remove the Appendix D cover page.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 04 2024

1-0 Evaluation **Concurred**
Removed from revised 65%. Will add back in if needed for 100% report.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024

Current Comment Status: **Comment Closed**

10590161	Environmental	n/a	2	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

PDF pg. 9, top paragraph.

Language might should be added that summarizes the additional challenges associated with the weir identified in the 2022 report including likelihood of sediment mobilization, scouring, and requirement of continued deposition of fill material by USACE, if the PDT agrees.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Jan 09 2024

1-0 Evaluation **Concurred**
Language added per suggestion. Section 1.1, paragraph 6.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024

Current Comment Status: **Comment Closed**

10590172 Environmental 2.1 Introduction 4 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Pdf pg. 11, second paragraph

Recommend including that concurrence was received from USGS that 2021 flow years best represent the average monthly flows during the growing season between 1985-2022. (correspondence attached)

(Attachment:
USGS_Outside_Agency_Review_Average_Monthly_Flows_during_the_growing_season_at_Savannah_River.pdf)

Submitted By: Alexander Metz (912-602-1827). Submitted On: Jan 09 2024

1-0 Evaluation **Concurred**
Report updated accordingly. End of Section 2.1.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024

Current Comment Status: **Comment Closed**

10590174 Environmental 2.3 Calibration 7 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pg. 14, top paragraph, line 5

floating ")" after IA, requires removal

Submitted By: Alexander Metz (912-602-1827). Submitted On: Jan 09 2024

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024

Current Comment Status: **Comment Closed**

10590182 Environmental 3.4 Scenarios 16 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pg. 23, top paragraph

If previous report/surveys support this, it should be added that extended fill modeling was exploratory at the request of resource agencies and that extended fill is unlikely to occur naturally.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Jan 09 2024

1-0 Evaluation **Concurred**
Additional text added to end of first paragraph in Section 3.4.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10590187 Environmental 3.6 Salinity Contour Development 24 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pg. 31, top paragraph, line 3.

Existing language states that marsh acreage would be converted from fresh to saline.

The word saline should be replaced with brackish.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Jan 09 2024

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10590191 Environmental 4.1 Introduction 27 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pg. 34, general text line 6 (starting with 1.)

The line describes the flow conditions and alternatives evaluated, but weir and extended fill is listed.

Weir and extended fill were not evaluated for habitat suitability and should be removed.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Jan 09 2024

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10590213	Environmental	4.4 Discussion	29	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

The opening paragraph should focus on differences between alternatives (weir/no weir).

IF results hold after addressing minimum salinity concerns, this should specify that the largest (or only significant change) change in habitat suitability due to weir construction is an increase in Striped Bass larvae under May 2021 (20th percentile flows only), with note that other flow scenarios saw very little changes.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Jan 09 2024

1-0 Evaluation **Concurred**
This section has been updated to first address the difference between action and no-action alternatives, and then to review/refine language based on updated results. See latest iteration issued 01/17/2024.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 17 2024

1-1 Backcheck Recommendation **Close Comment**
Concern addressed

Submitted By: Alexander Metz (912-602-1827) Submitted On: Feb 14 2024
Current Comment Status: **Comment Closed**

10590752	Hydraulics	n/a	n/a	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl - State somewhere that this EFDC model uses a Z-grid (and not a sigma grid).

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 10 2024

1-0 Evaluation **Check and Resolve**
This is already stated in Section 4.2. We could mention it earlier in the document, but were worried it could add confusion given the Z-grid model has been used in the Savannah Harbor since the 2010 TMDL model. To us. Section 4.2 is the most appropriate location to include.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10590755	Hydraulics	2.2 Model Updates	pdf page 11	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Describe nature of the adjustments made to the grid cell geometries mentioned in a few of these bullets. What do "adjustments to marsh grid cell quantities" refer to?

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 10 2024

Revised Jan 10 2024.

1-0 Evaluation **Concurred**
Additional text has been added to the report, below the bullet list in Section 2.2.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10590761 Hydraulics paragraph 2 pdf page 14 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Describe how the flow connections were adjusted.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 10 2024

1-0 Evaluation **Concurred**
Additional text (three sentences) has been included in this paragraph.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10590777 Hydraulics 2.3.1 pdf page 15 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: State at what levels above the bottom where salinities measured. Also state from what layer salinities were compared to the measure values.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 10 2024

Revised Jan 10 2024.

1-0 Evaluation **Concurred**
Additional text added to the report, and provided below (given only one sentence).

USGS measures salinities in the upper level of the rivers and these measurements were compared to the top layer of the appropriate model cell.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10590784 Hydraulics n/a pdf page 15 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Provide a brief explanation of how the calibration priorities for the seven USGS gages were developed.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 10 2024

1-0 Evaluation **Concurred**
Report updated accordingly. Priorities align with those as defined in the EIS by resource agencies.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10590798 Hydraulics n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: With the use of Z-layering in the EFDC model, need to evaluate mass conservation of water and simulated WQ constituents by WASP. Documentation of the mass conservation analyses should be included as an appendix in the report.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 10 2024

1-0 Evaluation **Non-concurred**
GHD opinion this is not appropriate for this report - this seems to be a critique of WASP.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024
Backcheck not conducted

2-0 Evaluation **Check and Resolve**
Discussed in weekly meeting 01/18/2024 and 02/01/2024. GHD will not provide what Earl requested. But GHD will provide a model run checklist. Tom questioned whether this should be a separate document or an appendix to the report. Stefany said appendix to the report. This will be included in 100% report.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 01 2024

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Feb 13 2024
Current Comment Status: **Comment Closed**

10590806 Hydraulics 3.4 23 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Explain why the surface salinity (and not the depth-averaged salinity) was used for this analysis.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 10 2024

Revised Jan 10 2024.

1-0 Evaluation **Concurred**
Report updated accordingly. Added a cross-reference to Section 3.2 where we give an explanation of the importance of the surface salinity and the growing season.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10590809	Hydraulics	n/a	n/a	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Add explanations of the meanings of the magenta and green lines, including how their positions were determined.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 10 2024

1-0 Evaluation **Concurred**
Report updated accordingly in Section 3.4. Note the results are presented in Section 3.5.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10590812	Hydraulics	3.6	31	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

From Earl: Expand this section to better define the purpose and analyses performed. It is not clear at present, especially with regard to the general flow paths shown in Fig. 13.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Jan 10 2024

1-0 Evaluation **Non-concurred**
GHD is uncertain on how to make this section more clear/concise. Additional language could be added but we do not believe it would add value.

Note that during the 4 January 2024 call held with project team, the team verbally went through what the general flow paths and tidal creeks were and how they play into the salinity contour. Earl was on that call.

It should also be noted this process was presented to the resource agencies 10/23/2023, and the feedback received was that it was clearly presented and described.

We can discuss prior to the next report iteration if needed.

Submitted By: Tom Gillespie (2252366959) Submitted On: Jan 16 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Jan 17 2024
Current Comment Status: **Comment Closed**

10630896	Environmental	n/a	n/a	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Sediment Basin Modeling and Habitat Suitability Index Evaluation for SHEP 65% Report.

1) Dissolved Oxygen: The modeling work indicates the installation of the sediment basin weir as per Plan 6A of the SHEP Environmental Impact Statement results in a relatively a higher zonal DO values. The action alternative (no weir of fill) result shows varying but small negative impacts on the DO. As noted in the report, the negative impacts were more pronounced in the year 2021 compared to 1997. Monthly averaged flows at Clyo for three selected years (1997 -average, 1999 -low, 2021 -average) show during the hot months of May and June, the year 2021 has significantly low flow compared to 1997 and they have nearly similar flows in July and August. These distributions might explain why the magnitude of the DO impact in 2021 is higher than 1997. On the other hand, the year 1999 had very low flow conditions and it was the flow used to evaluate the impact of the deepening on dissolved oxygen. Hence, before making any conclusion or recommendation, it is better to evaluate the relative impact during low flow condition using the 1999 flow. Running the model with and without the DO Injector under low flow conditions is more informative. The analysis should include how the critical zones identified in the EIS are impacted. This is important as the existing Waste Allocations under the 5R are tied to this.
2) Identifying the relative impact of the reaeration and salinity (freshwater) on the DO balance, particularly in the Back River and Little Back River areas, would be useful and suggestive information to any subsequent action, if any. This can be done, in part, by comparing salinity levels per WQ zones under the Action and No Action plans.
3) Use consistent units- SI unit or U.S. Customary (e.g., page 8).
4) We expect the final report to accompany the EFDC and WASP models used in the analysis. (submitted by QuickAdd)

Submitted By: Feleke Arega (803-898-4451). Submitted On: Jan 31 2024

1-0 Evaluation **For Information Only**
1) 1999 runs are out of scope for this contract. Looking at the results in this report against prior analysis suggests the oxygen injection system should mitigate the negative change in BR and LBR DO that were caused by the deepening with or without the Sediment Basin. Therefore, should not impact the Discharger's permit allocations.

2) This could be done but it would show the relative change in zonal salinities only, not the change in reaeration. It would also be an inconsistent analysis, and is not part of the scope of the contract.

3) GHD has reviewed and updated the report to ensure consistency throughout (where possible), noting that sections of the EIS as quoted are metric (e.g. second paragraph of Section 1.1), as are the model inputs (Table 1) and certain measured parameters (DO in mg/L).

4) Yes, these can be provided.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 08 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Jimmy Luo (912-652-5009) Submitted On: Feb 20 2025
Current Comment Status: **Comment Closed**

10631147 Environmental n/a n/a n/a

Comment Classification: **Public (Public)**

1) Dissolved Oxygen: The modeling work indicates the installation of the sediment basin weir as per Plan 6A of the SHEP Environmental Impact Statement results in a relatively a higher zonal DO values. The action alternative (no weir of fill) result shows varying but small negative impacts on the DO. As noted in the report, the negative impacts were more pronounced in the year 2021 compared to 1997. Monthly averaged flows at Clyo for three selected years (1997 -average, 1999 -low, 2021 -average) show during the hot months of May and June, the year 2021 has significantly low flow compared to 1997 and they have nearly similar flows in July and August. These distributions might explain why the magnitude of the DO impact in 2021 is higher than 1997. On the other hand, the year 1999 had very low flow conditions and it was the flow used to evaluate the impact of the deepening on dissolved oxygen. Hence, before making any conclusion or recommendation, it is better to evaluate the relative impact during low flow condition using the 1999 flow. Running the model with and without the DO Injector under low flow conditions is more informative. The analysis should include how the critical zones identified in the EIS are impacted. This is important as the existing Waste Allocations under the 5R are tied to this.
2) Identifying the relative impact of the reaeration and salinity (freshwater) on the DO balance, particularly in the Back River and Little Back River areas, would be useful and suggestive information to any subsequent action, if any. This can be done, in part, by comparing salinity levels per WQ zones under the Action and No Action plans.
3) Use consistent units- SI unit or U.S. Customary (e.g., page 8).
4) We expect the final report to accompany the EFDC and WASP models used in the analysis. (submitted by QuickAdd)

Submitted By: Feleke Arega (803-898-4451). Submitted On: Jan 31 2024

1-0 Evaluation **For Information Only**
Repeat of comment 10630896. Refer to evaluation for that comment.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 08 2024

1-1 Backcheck Recommendation **Close Comment**
Comment closed as it is a duplicate of comment 10630896. Refer to evaluation for that comment.

Submitted By: Jimmy Luo (912-652-5009) Submitted On: Feb 09 2024
Current Comment Status: **Comment Closed**

10631192 Civil n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Tables 24 and 25 of the draft report are based on the average DO concentration. The FEIS (beginning on page 5-44) provided two tables for DO concentrations, one with average DO concentration from all the cells in the zone (and presumably all depths) and one with the lowest DO level modeled within the zone (Table 5-21), which presumably often came from the bottom layer. Can the next version of the report provide DO levels in both ways as was done in the FEIS?

I'd like to see more explanation of how the DO values used for the HSI modes were obtained, specifically whether the DO inputs to HSI modes were an average for the water column or whether specific model layers were used. The FEIS and Appendix P are also ambiguous on this point. For example, I think most agencies understood the southern flounder HSI mode focused on bottom laysers and the American shad HSI model focused on surface layers, but I don't see that spelled out in the FEIS or Appendix P. (submitted by QuickAdd)

Submitted By: pace wilber (999-999-9999). Submitted On: Jan 31 2024

1-0 Evaluation **For Information Only**

1) Undertaking this would not be an apples-to-apples comparison given the prior critical cell analysis was for the 1999 flow year and month of August only. The purpose of that critical cell analysis was for siting of the DO injection systems. As discussed during the agency meeting 01/25/2024, agreed to update Section 5 of the report with four tables – 1997 and 2001 flow years for both the entire water column and the bottom half of water column.

2) Agreed, clarity was needed. Table 16 has been updated in the Final Report to include the applicable vertical layer(s) in the habitat criteria column.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 08 2024

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jimmy Luo (912-652-5009) Submitted On: Feb 20 2025

Current Comment Status: **Comment Closed**

Controlled Unclassified Information (CUI) Only

Comment Report: All Comments
Project: SHEP Sediment Basin Weir and Fill (Flow Re-Routing)
Review: 100% Submittal - 2023 GHD Modeling Rep
Displaying 17 comments for the criteria specified in this report.

Id	Discipline	Section/Figure	Page Number	Line Number
10652047	Hydraulics	n/a	n/a	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

In Sections 2.3, 2.4, and 2.5 the report now refers to the current model as the "2021 model". This is not consistent with other sections of the report or with previous report submittals.

Section 2.3 also mentions the "2020 model" when I believe it should be the "2022 model" when referencing the previous sediment basin report model.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Feb 14 2024

1-0 Evaluation **Concurred**
Discussed during 02/15/2024 and 02/22/2024 team meeting. Updated text in Section 2.2, and added in Appendix F which includes SHEP model history (repurposed Appendix K of Startup Run Report)

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 22 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Mar 06 2024
Current Comment Status: **Comment Closed**

10652059	Hydraulics	n/a	n/a	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Figure 4 looks great, but I have one questions about it (and I'm sorry I didn't ask this the first time you guys shared this figure with us) - Is there a reason why we cant show the bathymetric comparison for the whole system? Why is Back River not included?

Submitted By: Stefany Baron (912-652-5223). Submitted On: Feb 14 2024

1-0 Evaluation **For Information Only**
Discussed during team meeting 02/15/2024. We do not have high resolution bathymetric data in the Back River.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Mar 06 2024
Current Comment Status: **Comment Closed**

10652069 Hydraulics n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Section 5 (DO Tables):

If no changes have been made to the model, then tables 24 and 25 in the 100% report should match tables 24 and 25 in the 65% report. Why are they different?

Submitted By: Stefany Baron (912-652-5223). Submitted On: Feb 14 2024

1-0 Evaluation **For Information Only**
Discussed during weekly team meeting 02/15/2024. In the 65% report, calculations were done manually which led to some rounding. In the 100% report, a zonal analysis program had been completed and QC'd (it was under development at 65%). This program was used to develop the results, which were more accurate. Confirmation that no change to model runs. The changes in the deltas between the 65% and 100% reports are small.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Mar 06 2024
Current Comment Status: **Comment Closed**

10652075 Hydraulics n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Add the draft water mark back in until after the agencies have a second chance to review.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Feb 14 2024

1-0 Evaluation **Non-concurred**
Discussed during team meeting 02/15/2024. Agreed to not add draft given this is technical a final report (although there is potential for revisions based on agency comments).

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Mar 06 2024
Current Comment Status: **Comment Closed**

10652078 Hydraulics n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Appendix D is helpful, thank you!! However, the last sentence of paragraph 1 mentioned that PowerPoints were included in the shared files and I did not see them in there.

Submitted By: Stefany Baron (912-652-5223). Submitted On: Feb 14 2024

1-0 Evaluation **Concurred**
Discussed during meeting 02/15/2024 to either provide PowerPoints or remove from text. Confirmed during that meeting that the PowerPoints were not previously provided. Jim Greenfield (GHD) sent these to Stefany Baron on 02/16/2024. No change to report required.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Mar 06 2024
Current Comment Status: **Comment Closed**

10652468 Environmental 2.2 4 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pg. 12. First sentence of section 2.2 needs a year added or "that was formulated removed. Incorrect sentence structure currently.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Feb 14 2024

Revised Feb 15 2024.

1-0 Evaluation **Concurred**
Text updated so reference is at end of sentence rather than mid-sentence.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Mar 06 2024
Current Comment Status: **Comment Closed**

10652489 Environmental 3.1 16 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pg. 24, section 3.1 - Rewrite the paragraph as follows: The previous salinity modeling (GHD, 2022) indicated that the construction of the Sediment Basin weir and fill portion of
the mitigation measures would not result in the same salinity contours as specified in the SHEP EIS (USACE, 2012a). The salinity modeling and marsh monitoring efforts conducted since the EIS and post completion
of deepening and flow re-routing measures indicate that salinity intrusion and subsequent impacts to freshwater wetland acreage is not occurring as was modeled in the EIS (USACE, 2012a). Therefore, the construction
of the Sediment Basin weir structure with backfill is being re-evaluated as a mitigation option using the latest 2023 model
updates.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Feb 14 2024

1-0 Evaluation **Concurred**
Text updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**
Comment addressed.

Submitted By: Alexander Metz (912-602-1827) Submitted On: Apr 03 2024

1-2 Backcheck Recommendation **Close Comment**
Comment addressed.

Submitted By: Alexander Metz (912-602-1827) Submitted On: Apr 03 2024

Current Comment Status: **Comment Closed**

10652492 Environmental 3.3 16 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pg. 24, section 3.3, first sentence. Change saltwater to brackish

Submitted By: Alexander Metz (912-602-1827). Submitted On: Feb 14 2024

1-0 Evaluation **Concurred**
Text updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**
addressed

Submitted By: Alexander Metz (912-602-1827) Submitted On: Apr 03 2024

Current Comment Status: **Comment Closed**

10652495 Environmental 4.1 30 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pg 38, section 4.1. The second half of the introduction is in future tense. This section should be written in past tense as the analysis has been completed.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Feb 14 2024

1-0 Evaluation **Concurred**
Report updated accordingly.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**
addressed

Submitted By: Alexander Metz (912-602-1827) Submitted On: Apr 03 2024

Current Comment Status: **Comment Closed**

10652498 Environmental 4.3 32 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pg. 40, section 4.3. The last sentence before the table notes that comparison is not viable. Add that this analysis used percentile flows from 1997 and 2021 months while the EIS used percentiles from multi-year, long-term historical flows of a time period ending before EIS publication.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Feb 14 2024

1-0 Evaluation **Concurred**
Discussed during team meeting 02/15/2024 and 02/22/2024. Agreed to add additional text identifying the flow differences (in addition to the differences already noted).

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 22 2024

1-1 Backcheck Recommendation **Close Comment**
addressed

Submitted By: Alexander Metz (912-602-1827) Submitted On: Apr 03 2024

Current Comment Status: **Comment Closed**

10652501 Environmental 5.1 36 n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pg 44 of pdf, section 5.1. If the selection of bottom layers including an extra layer in instances where the number of layers is odd is a replication of methodology from any other related study, please include language that says so.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Feb 14 2024

1-0 Evaluation **For Information Only**

Discussed during team meeting 02/15/2024 and 02/22/2024. No precedent exists. Discussed whether to state this in the text, but the group (USACE and GHD) agreed to keep the text unchanged.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 22 2024

1-1 Backcheck Recommendation **Close Comment**

concur

Submitted By: Alexander Metz (912-602-1827) Submitted On: Apr 03 2024

Current Comment Status: **Comment Closed**

10652504	Environmental	5.3	41	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pg. 49, section 5.3. Add language addressing BR01 delta for 2021 flows to discussion (only zone where delta is greater than or equal to -0.1 mg/L). This was discussed at the agency meeting. Could also add that decreases in BR01 under the action alternative are likely due to removal of a portion of the water column from analysis due to construction of the weir and fill. While depth averaged (full water column and bottom half of the water column) DO may be slightly lower under the action alternative, there is also a lower quantity of water being assessed.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Feb 14 2024

1-0 Evaluation **Non-concurred**

This was discussed during the team meeting on 02/15/2024. Specifically about whether we should identify those deltas of 0.1 or greater in the report. GHD team concerned about linking this to GA WQ standards, which are somewhat unrelated and could cause confusion to the reader. Also, the addition of table 26 and 27 in the 100% report meant there was more than one instance when a 0.1 delta was achieved, so adding descriptive language could cause confusion and was deemed to not add value.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**

agree

Submitted By: Alexander Metz (912-602-1827) Submitted On: Apr 03 2024

Current Comment Status: **Comment Closed**

10652513	Environmental	5.3	41	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pg. 49, section 5.3. Add language why these values cannot be compared to SHEP EIS, Section 5. This should include the use of different flow years ('97 and '21 vs 99) and also the analysis of a different period of time (growing season vs August '99 drought conditions).

Submitted By: Alexander Metz (912-602-1827). Submitted On: Feb 14 2024

1-0 Evaluation **Concurred**
Language has been added but to Section 5.2 in the "results" section. This is consistent with the similar language advising against comparison in the HSI Section (Section 4.3 - Results).

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**
addressed

Submitted By: Alexander Metz (912-602-1827) Submitted On: Apr 03 2024
Current Comment Status: **Comment Closed**

10652525	Environmental	Section 5.2, Figures 15 & 16	36-37	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

pdf pgs. 44-45, section 5.2. Figures 15 and 16 are hard to follow. River mile markers can be removed or need symbology adjusted. Labels should be added to Zones because the color changes alone are subtle in some instances. Cell outlines prevent fill colors from being seen where the river is not wide. A compass rose and scale bar should be added. A simpler basemap (or none) may aid in ease of readabiliy.

Submitted By: Alexander Metz (912-602-1827). Submitted On: Feb 14 2024

1-0 Evaluation **Concurred**
Updated figures to include those from the Startup Run, as agreed during team meeting 02/15/2024.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**
figures updated

Submitted By: Alexander Metz (912-602-1827) Submitted On: Apr 03 2024
Current Comment Status: **Comment Closed**

10652618	Hydraulics	n/a	n/a	n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Section 5.2

Could we replace figures 15 and 16 with the figures that were used in the Start-Up Run report? (Figures 11-13, 11-14, and 11-15 in the Start-Up Run Report). See attachement.

(Attachment: Start-Up_Run_Zonal_Map.PNG)

Submitted By: Stefany Baron (912-652-5223). Submitted On: Feb 14 2024

1-0 Evaluation **Concurred**

Updated figures to include those from the Startup Run, as agreed during team meeting 02/15/2024.

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 20 2024

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Stefany Baron (912-652-5223) Submitted On: Mar 06 2024

Current Comment Status: **Comment Closed**

10662742 Environmental n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

Comparisons to the 2012 EIS. The following phrasing: "The updated wetland acreage analysis results in more freshwater wetland conversion than the 2012 EIS results predicted." This phrasing is problematic as it suggests that there is more freshwater wetland conversion occurring than what was predicted. Field monitoring doesn't neccessarily support this conclusion. Suggest that this language be rewritten to focus on the comparison of the modeled salinity contour line in comparison to predicted salinity contour line from the 2012 EIS, rather than draw conclusions related to wetland conversion.
This phrasing or similar is found, each instance should be modified/rephrased:
Executive Summary P.1
Section 3.8 p.29
Section 6 p. 42

Submitted By: Suzy Hill (912.423.2324). Submitted On: Feb 21 2024

1-0 Evaluation **Concurred**

Text updated from:
"The updated wetland acreage analysis results in more freshwater wetland conversion than the 2012 EIS results predicted."

to:
"The 2023 modeling analysis shows a shift in the salinity contour relative to the 2012 EIS results."

Submitted By: Tom Gillespie (2252366959) Submitted On: Feb 22 2024

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jimmy Luo (912-652-5009) Submitted On: Feb 20 2025

Current Comment Status: **Comment Closed**

10681099 Bioenvironmental n/a n/a n/a

Comment Classification: **Controlled Unclassified Information (CUI)**

The SRMC appreciates the clear and concise presentation of the water quality model results for both the action and no-action alternatives, including the addition of bottom water results in the final report. However, the absence of model results for the 1999 low flow conditions means that the SRMC must assume potential water quality impacts would exceed those presented for average flow conditions. We look forward to reviewing the supplemental Environmental Assessment and the details of how impacts to water quality will be mitigated. (submitted by QuickAdd)

Submitted By: Tom Gallo (9193495700). Submitted On: Mar 04 2024

1-0 Evaluation **For Information Only**

If SRMC makes that assumption on the low flow conditions, that stance cannot be change without providing model results for the 1999 flow year. Note, the 1999 scenario was not part of this project's scope (which all agencies provided input on at April 2023 meeting). No action associated with comment.

Submitted By: Tom Gillespie (2252366959) Submitted On: Mar 09 2024

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Jimmy Luo (912-652-5009) Submitted On: Feb 20 2025

Current Comment Status: **Comment Closed**

Sediment Basin 2024 65% Report Comments	
Comments Received in Projnet	
Submitted by Feleke Arega	
The modeling work indicates the installation of the sediment basin weir as per Plan 6A of the SHEP Environmental Impact Statement results in a relatively a higher zonal DO values. The action alternative (no weir of fill) result shows varying but small negative impacts on the DO. As noted in the report, the negative impacts were more pronounced in the year 2021 compared to 1997. Monthly averaged flows at Clyo for three selected years (1997 -average, 1999 -low, 2021 -average) show during the hot months of May and June, the year 2021 has significantly low flow compared to 1997 and they have nearly similar flows in July and August. These distributions might explain why the magnitude of the DO impact in 2021 is higher than 1997. On the other hand, the year 1999 had very low flow conditions and it was the flow used to evaluate the impact of the deepening on dissolved oxygen. Hence, before making any conclusion or recommendation, it is better to evaluate the relative impact during low flow condition using the 1999 flow. Running the model with and without the DO Injector under low flow conditions is more informative. The analysis should include how the critical zones identified in the EIS are impacted. This is important as the existing Waste Allocations under the 5R are tied to this.	Status: Closed GHD response: 1999 runs are out of scope for this contract. Looking at the results in this report against prior analysis suggests the oxygen injection system should mitigate the negative change in BR and LBR DO that were caused by the deepening with or without the Sediment Basin. Therefore, should not impact the Discharger's permit allocations. USACE response: While 1999 flows are outside of the scope of the contract for assessing the impacts of building/not building the rock weir and fill in the sediment basin, additional analysis will be conducted during post construction monitoring and can utilize 1999 flows to better replicate the EIS analysis and provide direct comparisons. Comparisons of current conditions with operational DO injectors will be made to pre-construction conditions during post construction monitoring which will evaluate the overall effectiveness of the project's mitigation features. EFDC and WASP model assessments will also be completed to ensure model performance guidelines are being met and the SHEP model will be updated/recalibrated as necessary.
2) Identifying the relative impact of the reaeration and salinity (freshwater) on the DO balance, particularly in the Back River and Little Back River areas, would be useful and suggestive information to any subsequent action, if any. This can be done, in part, by comparing salinity levels per WQ zones under the Action and No Action plans.	Status: Closed GHD response: This could be done but it would show the relative change in zonal salinities only, not the change in reaeration. It would also be an inconsistent analysis and is not part of the scope of the contract. USACE response: While this is outside of the scope of our current contract with GHD, we can further discuss the specifics of how to conduct post construction monitoring as described in Appendix D of the EIS. This evaluation is intended to evaluate the impacts of the project to ensure they do not exceed those that are predicted, the effectiveness of the project's mitigation features, and the project's effects on specific resources. Intensive water quality sampling will be conducted as part of this effort and the SHEP model will be updated/recalibrated as necessary.
3) Use consistent units- SI unit or U.S. Customary (e.g., page 8).	Status: Resolved Units updated for consistency unless used for a prior analysis/comparison. Language added to report.
4) We expect the final report to accompany the EFDC and WASP models used in the analysis.	Status: Resolved Input files can be shared via DoD Safe.
Submitted by Pace Wilber	
1) Tables 24 and 25 of the draft report are based on the average DO concentration. The FEIS (beginning on page 5-44) provided two tables for DO concentrations, one with average DO concentration from all the cells in	Status: Resolved GHD response: Undertaking this would not be an apples-to-apples comparison given the prior critical cell analysis was for the 1999 flow year and month of

the zone (and presumably all depths) and one with the lowest DO level modeled within the zone (Table 5-21), which presumably often came from the bottom layer. Can the next version of the report provide DO levels in both ways as was done in the FEIS?	August only. The purpose of that critical cell analysis was for siting of the DO injection systems. As discussed during the agency meeting 01/25/2024, agreed to update Section 5 of the report with four tables – 1997 and 2001 flow years for both the entire water column and the bottom half of water column. USACE Response: Concur. Open to discussion of including critical cell analysis as part of the post-construction monitoring efforts.
2) I'd like to see more explanation of how the DO values used for the HSI modes were obtained, specifically whether the DO inputs to HSI modes were an average for the water column or whether specific model layers were used. The FEIS and Appendix P are also ambiguous on this point. For example, I think most agencies understood the southern flounder HSI mode focused on bottom layers and the American shad HSI model focused on surface layers, but I don't see that spelled out in the FEIS or Appendix P.	Status: Resolved GHD response: Agreed, clarity was needed. Table 16 has been updated in the Final Report to include the applicable vertical layer(s) in the habitat criteria column. USACE response: Concur
Outstanding Comments received at 1/25 Meeting	
Pace Wilber asked if there was a report on 2021 USGS analysis, and why that was considered representative relative to 1997. Beth said no report, just an email from USGS after their independent analysis. Pace was interested in seeing the comparison, particularly in the spring. Spencer said this has been presented in prior meetings. Tom Gillespie mentioned these slides in the presentation from 06/05/2023.	Status: Resolved Flow analysis spreadsheet sent to Pace.
Liz Booth – was the model calibrated to the new 2023 bathymetry. Jim said no, calibration was to 2021 bathymetry. Liz asked what the impact of the new bathymetry is on water quality. Jim doesn't expect impacts, but that analysis can be added.	Status: Open Currently assessing how to address this comment. USACE will provide a response dependent on the outcome of the assessment.
Pace Wilber – for statistics, add gage names to the tables.	Status: Resolved Gage names added to tables.
Liz Booth – question again on 2023 vs 2021 bathymetry vs flow/salinity/DO. Tom Gallo had similar questions during the break. Agreed this needs to be more clearly defined in the final report.	Status: Resolved Report better defined the use 2021/2023 data for calibration and analysis.
Pace Wilber: Question on bathymetry changes. Requested a delta plot of bathymetry data. GHD sought confirmation of 2023 vs pre-dredging, or 2023 vs 2021. Group discussion ensued. GHD and USACE to discuss.	Status: Resolved Delta plot of 2021 vs 2023 bathymetry added to report. Further bathymetric data is available on the publicly available eHydro portal (USACE).
Liz Booth – salinity between 2021 bathymetry and 2023 bathymetry, asked to add comparison.	Status: Open Connected to above, currently assessing how to address this comment.
Pace Wilber – requested confirmation that we did not model the extended fill scenario for HSI. Alex said yes. Pace asked why. Alex said based on results of prior bathymetric surveys and the 2022 model results. Pace requested adding a paragraph describing why the extended fill footprint wasn't included in HSI analysis.	Status: Resolved Language was added describing the reason extended fill was not included.

Pace Wilber suggested that improvements could be made to the presentation of the HSI results (figures) to better identify suitable habitat between the two. Also, requested improvements to visuals (color).	Status: Resolved Figures updated accordingly.
Pace Wilber – can suitable habitat area tables include areas as predicted in 2012 EIS. Jim suggested percentage changes, which Pace agreed would be reasonable. USACE is going to review internally if feasible.	Status: Closed Language was added describing why the comparison to the EIS is not directly comparable.
Pace Wilber: Why does the southern flounder consider only 50th percentile flows, and not 20th or 80th percentiles. The answer was because that is what was done in the EIS. Alex also said the scope of work for this study was reviewed by the agencies. Pace requested providing results for 20th and 80th percentiles. USACE to consider.	Status: Closed We don't have adequate time or contractual capabilities to expand the analysis. A workshop was held in March 2023 to address expanding the HSI analysis and the outcome was to replicate EIS criteria. Additionally, the scope for this analysis was provided to resource agencies for review prior to contracting.
Pace Wilber – surface layers or full water column? Jim said full water column. Tom Gallo asked about including results for bottom half of water column too, for consistency with prior modeling effort. Discussion about how to run the bottom half given three cells in Back River and Middle River. Tom Gallo understood the challenge of selecting one or two cells, not requesting a fourth cell to be added but just take a consistent approach (bottom half) with prior modeling efforts. Jim indicated we will use the bottom two cells.	Status: Resolved Tables of the bottom half of the water column added to report. Language describing the methodology when there were an odd number of vertical layers was added.
Pace Wilber – suggested green cells where water quality standards have been met and red cells where standards not met. Liz qualified that 0.1 mg/L delta is the water quality criteria (when below 5 mg/L). Discussion about TMDL's and delay on dischargers getting compliant (Liz thinks two years away).	Status: Closed Cells will not be colored at this time to avoid confusion interpreting results. Critical zones as identified in the EIS were highlighted within the zonal analysis tables.
Tom Gallo: graphic of zones and cells needs to be updated. The cells have changed since 2010 (when that figure was developed).	Status: Resolved A new graphic of zones was added.
Wade Cantrell – questioned critical area in TMDL model. Mentioned he thought the sediment basin wasn't where the critical zones were, but instead it was the Front River. Tom Gallo, Jim, and Liz confirmed.	Status: Resolved Critical zones as identified in the EIS were highlighted within the zonal analysis tables.