FINDING OF NO SIGNIFICANT IMPACT

Noyes Cut Section 1135
Modifications for Improvement of the Environment
Satilla River Basin, Camden County, Georgia
Integrated Feasibility Report & Environmental Assessment

The U.S. Army Corps of Engineers (USACE), Savannah District, has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The USACE assessed the effects of the following actions in the Final Integrated Feasibility Report and Environmental Assessment, dated November 2018, for the Noyes Cut Section 1135 project. To achieve the project goals, the recommended plan includes three closure structures that would be placed within Noyes Cut, Dynamite Cut, and Old River Run. These closures are designed to restore the hydrodynamic environment and restore salinity gradients, reduce local sedimentation issues, and increase connectivity for local biota by increasing tidal exchange in Dover and Umbrella Creeks.

In addition to the 'no action' alternative, 3 alternatives with varying degrees of hydromodification to restore historic conditions of salinity regimes and increased connectivity for local fauna within the Satilla River estuary. The recommended plan was identified as the National Ecosystem Restoration (NER) Plan and thus the environmentally preferred plan. All practicable means to avoid and minimize adverse environmental effects have been incorporated into the recommended plan. No significant adverse impacts were identified for any of the important resources within the area of impact. This assessment concludes that the recommended plan, "may affect, but is not likely to adversely affect" manatees, wood storks or their critical habitat. The recommended plan would have "no effect" on Atlantic or shortnose sturgeon. Therefore, no compensatory mitigation is required.

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

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

2. All action alternatives include post construction monitoring of the existing data points for 5 years to ensure the accuracy of the predicted hydrodynamic changes from the Hydraulic and Hydrologic (H&H) modeling. The monitoring includes assessing changes in flow and salinity in accordance with the study objectives.

3. Construction contractor specifications will include the "Standard Manatee Conditions and Procedures for Aquatic Construction", as provided by the U.S. Fish and Wildlife Service.

4. Construction contractor specifications will include the "Sea Turtle and Smalltooth Sawfish Construction Conditions" [as provided by the National Marine Fisheries Service], which will apply to both species of sturgeon.

5. Construction of all of the closures would utilize barges to avoid impacts to surrounding wetlands.

6. A Memorandum of Agreement would be executed with the Georgia State Historic Preservation Office to mitigate any adverse effects to significant resources that would be impacted.

Technical criteria used in the formulation of alternative plans were those specified in the Water Resource Council's 1983 *Economic and Environmental Principles for Water and Related Land Resources Implementation Studies*. USACE has assessed the potential impacts of the proposed action. All applicable laws, executive orders, regulations, and local government plans were considered in the evaluation of the alternatives. It is my determination, based on this assessment and implementation of the environmental design commitments listed above, that the recommended plan does not constitute a major federal action that would significantly affect the human environment. Therefore, preparation of an Environmental Impact Statement is not required.

7 JAN 19
Date

Daniel H. Hibner, PMP
Colonel, U.S. Army
Commanding

Noyes Cut, Satilla River Basin, Georgia
Final Integrated Feasibility Study and Environmental Assessment

Section 1135 - Project
Modifications for Improvement of the Environment

NOVEMBER 2018

US Army Corps
of Engineers®
Savannah District

Noyes Cut Section 1135
Project Modifications for Improvement of the Environment
Satilla River Basin, Georgia
Final Integrated Feasibility Study and Environmental Assessment

EXECUTIVE SUMMARY

The non-Federal sponsors, Georgia Department of Natural Resources (GADNR) and the Satilla Riverkeeper, in collaboration with Dover Bluff residents, requested that the U.S. Army Corps of Engineers (USACE) investigate under Section 1135 the best way to restore the Satilla River estuary system.

In 1933, the USACE widened and deepened Noyes Cut as part of the Inland Waterway. In 1940, USACE constructed the Atlantic Intracoastal Waterway (AIWW) from Umbrella Creek through the lower reach of Dover Creek. In total, eight man-made cuts account for the degraded ecosystem in the study area.

Those cuts changed the water circulation patterns in the estuary, altering patterns of tidal exchange; disrupting gradual salinity gradients from the headwaters to the mouth of the creeks; and limiting access to headwaters for estuarine species due to channel sedimentation.

The estuarine species historically found in Dover and Umbrella Creeks include shrimp (white and brown), river herring, American shad, blue crabs, eastern oyster, and striped bass. All of these species would benefit from the restoration of tidal flows, water depths, and salinity gradients in the area. Shad, herring, and striped bass require freshwater for spawning, while blue crabs, oysters, and shrimp require brackish water for successful reproduction.

To improve the quality of the existing aquatic habitat for resident species and increase connectivity for migratory species in the upper reaches of the Dover and Umbrella Creek watersheds, the study team recommends closing cuts to restore historic flow patterns in the watershed.

The study team assessed, evaluated, and compared the following final array of action alternatives: closing Noyes Cut alone; closing Dynamite Cut and Old River Run (ORR); and closing Noyes Cut, Dynamite Cut, and ORR.

The team compared the cost effectiveness of the ecosystem benefits for each alternative. The study team identified two cost effective alternatives: Alternative 6 (closing Dynamite Cut and ORR) and Alternative 7 (closing Noyes Cut, Dynamite Cut, and ORR). The team identified Alternative 7 as the Recommended Plan because it would provide the greatest amount of ecosystem restoration benefits and the best ecosystem for migratory fish spawning habitat.

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Satilla River Basin, Georgia

This report is a combined feasibility report and Environmental Assessment, complying with requirements of the U.S. Army Corps of Engineers (USACE) and the Council of Environmental Quality (CEQ), and is intended to reduce duplication and paperwork. An **asterisk (*)** in the table of contents and headings notes paragraphs that are required for National Environmental Policy Act (NEPA) compliance.

TABLES

FIGURES

APPENDICES

ACRONYMS

Acronyms	Definition
AAHU	Average Annual Habitat Units
AIWW	Atlantic Intracoastal Waterway
BMP	Best Management Practices
CE/ICA	Cost Effectiveness/Incremental Cost Analysis
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic Feet Per Second
CZM	Coastal Zone Management
DNR	Department of Natural Resources
DO	Dissolved Oxygen
EA	Environmental Assessment
EN-H	Engineering Division-Hydraulics and Hydrology Branch
EO	Executive Order
EPA	United States Environmental Protection Agency
EPD	Environmental Protection Division
ERDC	US Army Engineer Research and Development Center
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact
FWCAR	Fish and Wildlife Coordination Act Report
GADNR	Georgia Department of Natural Resources
GPA	Georgia Ports Authority
H&H	Hydraulic and Hydrologic
HTRW	Hazardous, Toxic, and Radioactive Waste
HUC	Hydrologic Unit Codes
IPAC	Information, Planning, and Conservation System
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NAA	No Action Alternative
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NGO	Non-Government Organizations
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
OMRR&R	Operation, Maintenance, Repair, Rehabilitation, and Replacement
OP-N	Operations Division, Navigation
ORR	Old River Run near Bull Whirl Cut
PA	Programmatic Agreement
PD	Planning Division

PDT	Project Delivery Team
PPA	Project Partnership Agreement
ppt	parts per thousand
RCRA	Resource Conservation and Recovery Act
SAD	South Atlantic Division
SHPO	State Historic Preservation Officer
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UGA	University of Georgia
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
WRDA	Water Resources Development Act

1.0 Introduction

1.1 Purpose of Study Report*[1]

The U.S. Army Corps of Engineers (USACE) has prepared this integrated Feasibility Report and Environmental Assessment (EA) to evaluate the potential impacts of closing man made cuts to restore hydrology in the Dover and Umbrella Creeks section of the Satilla River estuary. This EA was prepared in accordance with the National Environmental Policy Act of 1969, Council on Environmental Quality's Regulations (40 CFR 1500-1508), and USACE Engineer Regulation ER 200-2-2. This EA provides sufficient information on the potential adverse and beneficial environmental effects to allow the Savannah District Commander to recommend a decision on the appropriateness of an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

1.2 Study Authority

The study authority is Section 1135 of the Water Resources Development Act (WRDA) of 1986 (P.L. 99-662), as amended, which is intended for modifications to existing Federal projects for environmental benefits. Under this authority, USACE may plan, design, and construct modifications to existing USACE projects (or areas degraded by USACE projects) to restore aquatic habitats for fish and wildlife. The man-made cuts made as part of the Federally-authorized Atlantic Intracoastal Waterway (AIWW) project caused unexpected ecological degradation. The modifications proposed are to features of the AIWW project and are designed to restore the ecological functions of the ecosystem.

Noyes Cut was authorized as a feature of an existing Federal project which is now known as the AIWW. Noyes Cut has been obsolete since 1939. Some alternatives include the closure of Noyes Cut which would be a modification to the Federal project without impacting the authorized purposes of the AIWW. Noyes Cut is neither part of the active nor part of the Alternative AIWW navigation channel.

1.3 Study and Project Area*

The study area is located in southern Georgia, in Camden County, just south of the town of Brunswick, Georgia. It includes Noyes Cut, Dover and Umbrella Creeks, as part of the lower Satilla River estuary (Figure 1 and Figure 2). The area that could be benefited by the proposed project consists of approximately 4,518 acres and encompasses the tributaries and associated Spartina marsh above the Noyes Cut closure area (Figure 2 and Figure 3). Dover and Umbrella Creeks are meandering tidal channels generally running parallel to the Satilla River. The Satilla River (along with salt marshes, hammocks, sand bars, and mud flats) makes up the northern portion of the St. Andrews Sound estuary. Tidal marshes and creeks are some of the most ecologically

[1] An **asterisk (*)** in the table of contents and heading notes paragraphs that are required for National Environmental Policy Act (NEPA) compliance.

productive ecosystems providing critical habitat for fish and shellfish of commercial and recreational importance. Tidal marshes also provide a rich food source for both resident and migratory birds including osprey and eagles and they are utilized for many traditional, low impact recreational activities. The lands adjacent to Dover and Umbrella Creeks are sparsely populated with some residential developments along the creeks that include Dover Bluff Community, Piney Bluff Community, and River Marsh Landing.

Figure 1 - Study Area within the Satilla River Basin (Yellow)

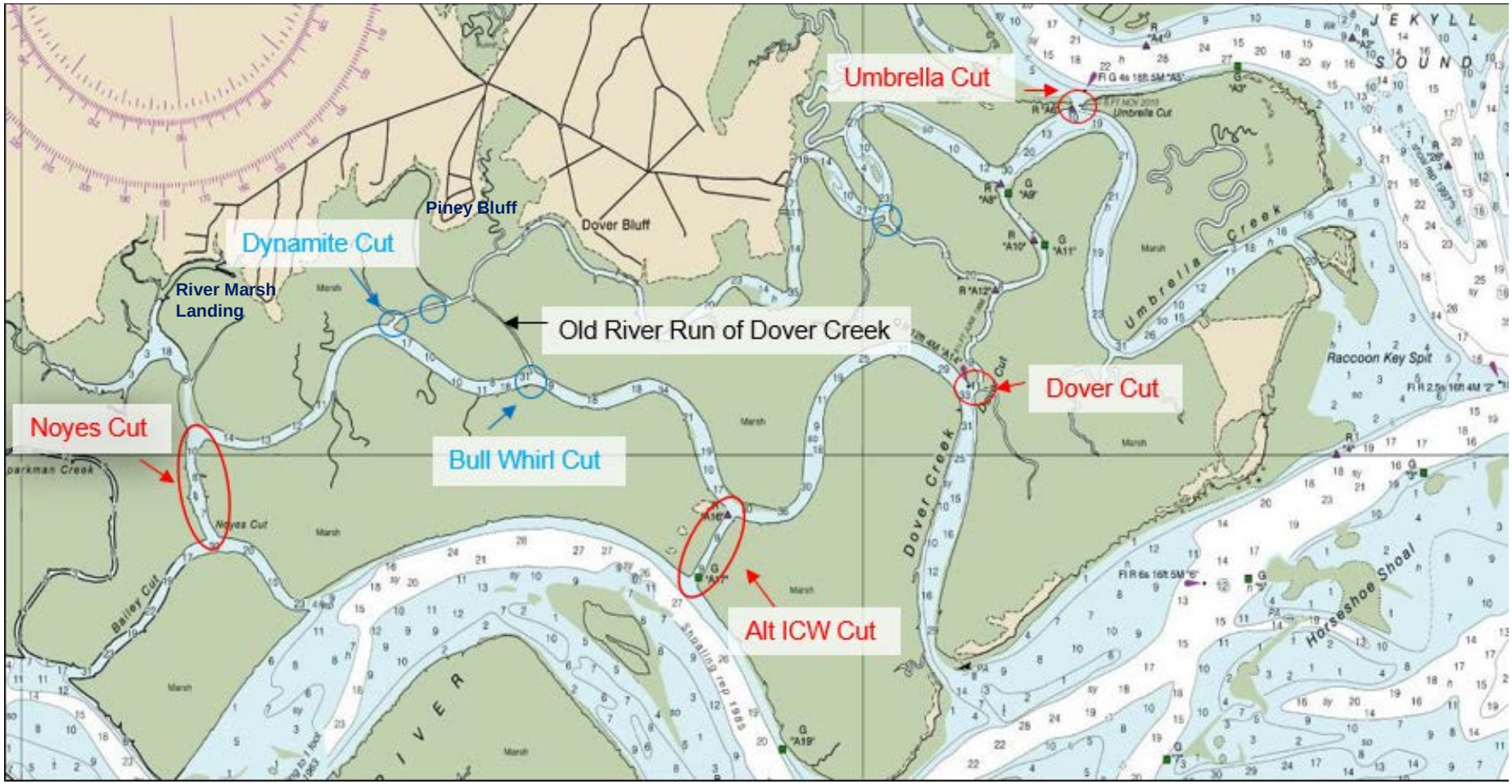

Figure 2 - Satilla River estuary with series of navigation cuts.
Congress authorized cuts depicted in red. Blue cuts were created by local citizens.

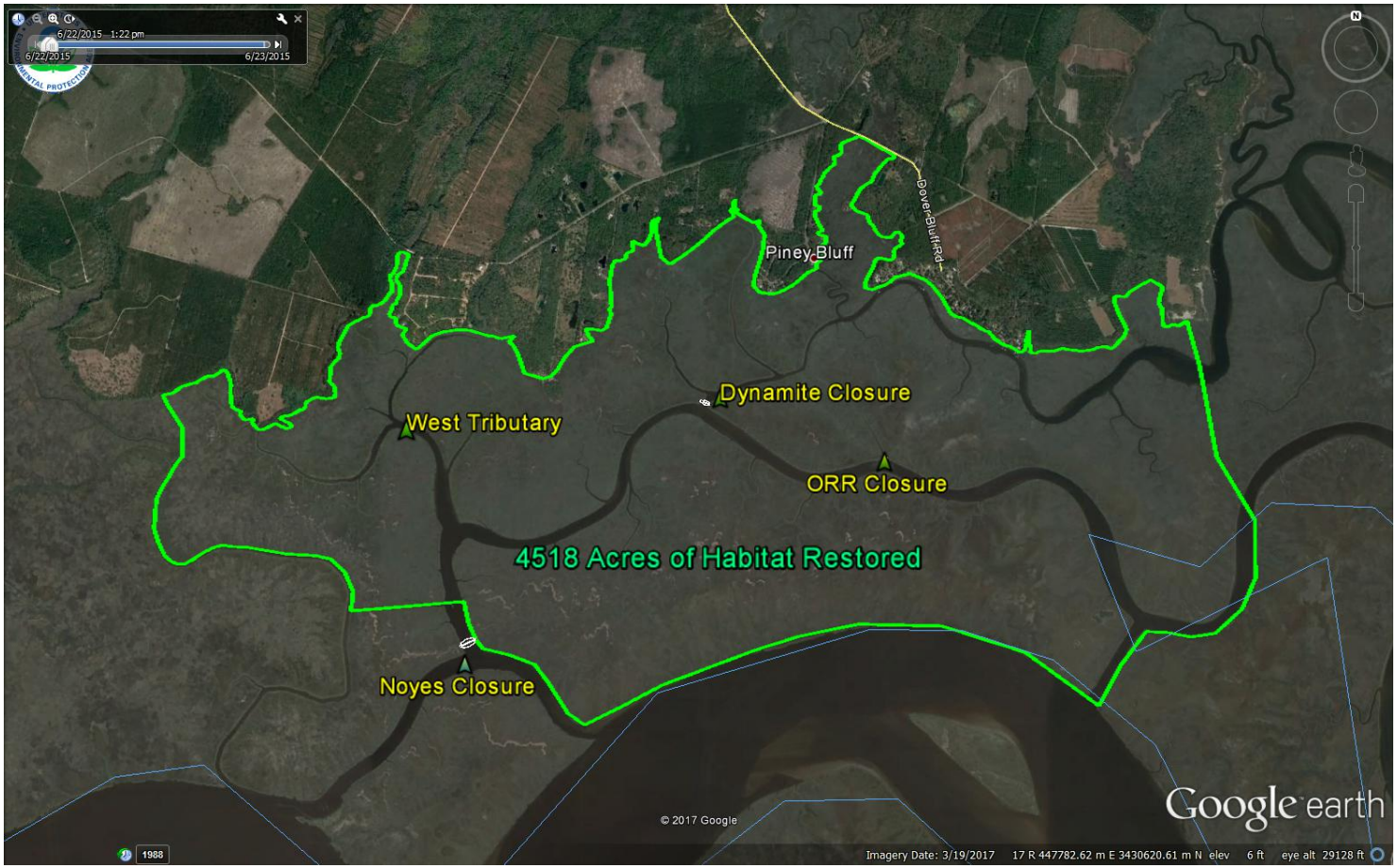

Figure 3 - Noyes Cut Closure, West Tributary, Restored Area

The main AIWW navigation route is through the open waters of St. Andrews Sound as illustrated in Figure 4. The Alternate AIWW route provides a safer inland passage for small boats. Neither route includes passage through Noyes Cut.

- The Alternate AIWW leaves the main AIWW route at Jekyll Sound
- goes up the Little Satilla River
- through Umbrella Cut
- along Umbrella Creek
- through Dover Cut
- along Dover Creek
- through Alt AIWW Cut
- then heads down the Satilla River
- and reconnects to the main AIWW route

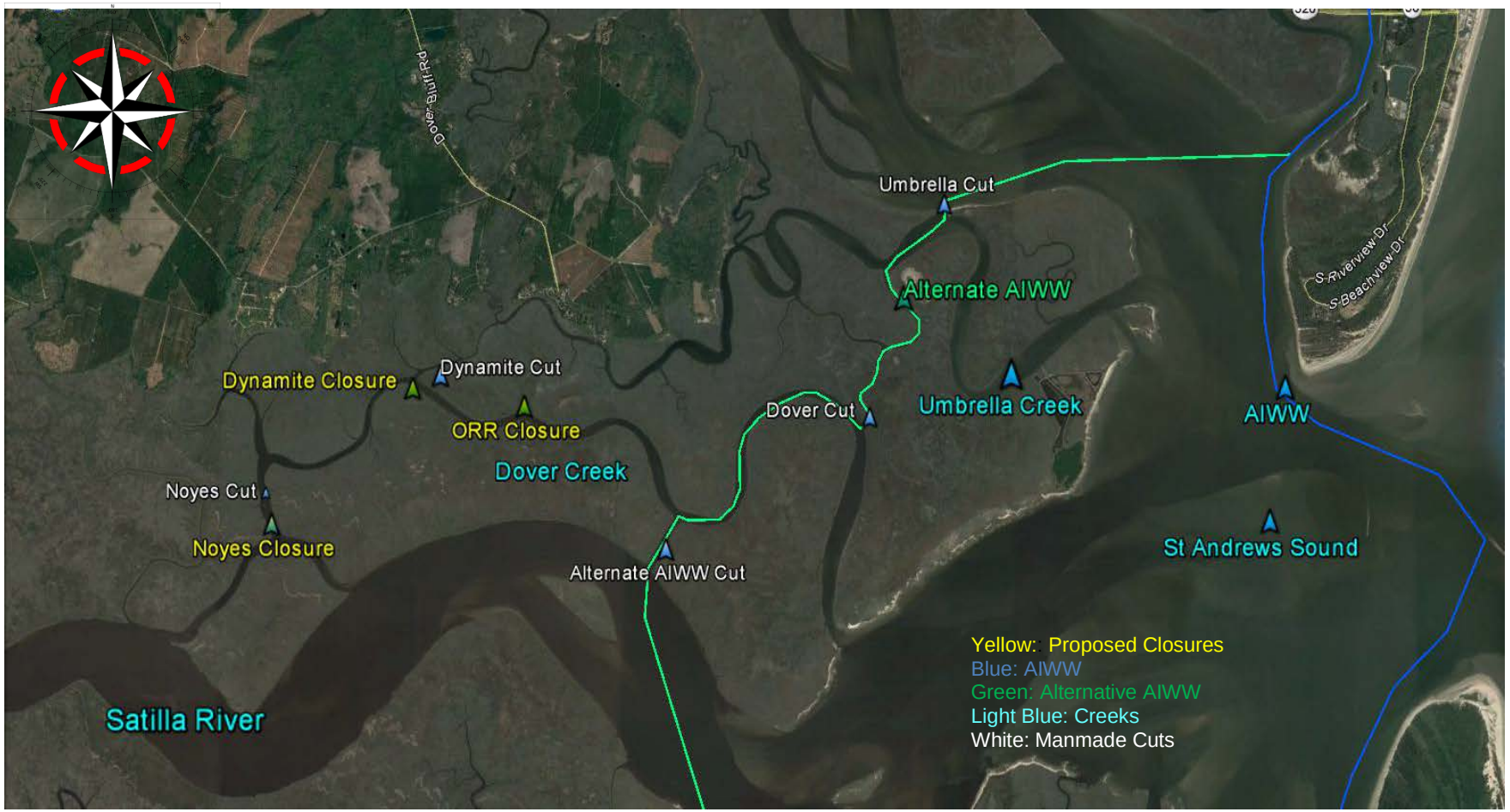

Figure 4 - AIWW and Alternate AIWW

1.4 Purpose and Need

The purpose of the project is to restore aquatic habitat (wetlands and tidal creeks) degraded by the AIWW in the vicinity of Umbrella and Dover Creeks of the Satilla River estuary and improve salinity gradients that improve directional cues for migratory fish, shrimp, and crabs. The project is needed because past actions for the AIWW altered salinity gradients by allowing a large volume of Satilla River water to enter upriver portions of tidal creeks through the short pathway of Noyes and Dynamite Cuts.

This large volume of brackish water overwhelms the freshwater that enters the headwater area and causes the salinity to be nearly constant throughout most of Umbrella and Dover Creeks. Additionally, tidal flows through multiple creeks and cuts cause a tidal node where sediment deposition clogs channels. Reducing tidal flows through Noyes Cut and Dynamite Cut should restore water depths in Umbrella and Dover Creeks, which have silted in as a result of changes in circulation patterns. This sedimentation has restricted access to portions of the estuary for shrimp, shellfish, and migratory fish.

A benefit of closing the man-made cuts is restoring the natural tidal flows that typically occur along the length of unaltered tidal creeks. This distribution should redistribute the sediments, creating a sandier, deeper creek bottom, and restore gradual salinity gradients from the headwaters to the mouth. Salinity gradients serve as important directional cues for orienting migratory fish and shellfish.

Estuarine species historically found in Dover and Umbrella Creeks include shrimp (white and brown), river herring, American shad, blue crabs, eastern oyster, and striped bass (see Table 2 for a more comprehensive list). All of these species should benefit from restoring historic tidal flows, water depths, and salinity gradients in the area. Shad, herring, and striped bass require freshwater for spawning, while blue crabs, oysters, and shrimp require brackish water for successful reproduction. Potential indirect long-term benefits of restoring depths and flows may include increased dissolved oxygen (DO) levels, decreased Total Suspended Solids (TSS), and improved nutrient exchange between the Satilla River, St. Andrews Sound, and the Atlantic Ocean.

In addition to the intended ecosystem benefits, ancillary benefits may include the return of sport fishing and commercial fishing/crabbing in Dover and Umbrella Creeks for the aforementioned species. Deep water access would also be restored to residential developments adjacent to the estuary that currently have access only at high tide.

1.5 History

The Satilla River estuary contains a complex network of tidal channels. From 1900 to 1939, eight man-made cuts (Figure 2) were made between natural channels to increase the accessibility of the tidal creeks for the timber industry and to provide safer inland routes for smaller water craft. Some of these cuts were authorized as features of an inside waterway from Savannah, GA to Fernandina, FL, now known as the AIWW. The

AIWW between Savannah, Georgia, and Fernandina, Florida, was initially authorized by the River and Harbor Act of August 2, 1892 (House Document 41, 52nd Congress, 2nd Session) which provided for a 7-foot channel.

The River and Harbor Act of July 25, 1912 (House Document 1236, 60th Congress, 2nd Session) incorporated alternate routes previously improved as separate projects and auxiliary channels in the waterway between Savannah, GA and Fernandina, FL. In 1915, USACE excavated cuts at Umbrella Creek and Dover Creek, dredging channels 4 feet deep at mean low water, 85 feet wide, and of a total length of 1,130 feet. The River and Harbor Act of July 3, 1930 (Senate Document 43, 71st Congress, 2nd Session) authorized a channel 5 feet deep and 50 feet wide connecting Baileys Cut (a natural auxiliary to Satilla River) to Dover Creek in accordance with the report submitted in Senate Document 43, Seventy-first Congress, second session, thereby making the channel part of the auxiliary route of the inland waterway. The cut was completed in 1933. The cut, known locally as Noyes Cut, had been excavated in 1910 by Camden County to create a safe inland route for small watercraft travelling from the Satilla River to Brunswick, GA, which allowed vessels to avoid the rough waters in St. Andrews Sound.

In 1939, USACE completed Satilla Cut (or Alternative AIWW Cut), which connected the lower reach of Dover Creek with the Satilla River, creating a shallow, protected route (Figure 2 and Figure 3). The protected route with 3 feet project depth leaves Brunswick Harbor and follows Jointer Creek, Jekyll Sound, Little Satilla River, Umbrella Cut, Umbrella Creek, Dover Cut, Dover Creek, Satilla River, Todd Creek, and Floyd Creek to Cumberland River. This route, now referred to as the Alternate AIWW, made Noyes Cut obsolete.

Old River Run (ORR), which is near Bull Whirl Cut, (Figure 2), is a remnant of Dover Creek. This reach of Dover Creek has been greatly changed by the aforementioned man-made cuts over the last century, and ORR is currently in the process of completely filling in due to the natural processes of sedimentation. This sedimentation in ORR and the overall change to the ecosystem in the area are due to hydrologic changes caused by the multitude of man-made cuts. This reach is converting into tidal marsh from the historic tidal creek.

In 1979, as part of the Satilla River Basin Study, hydraulic analysis examined six (6) alternatives to address the shoaling problem. The report recommended plugging the oxbow cut on Dover Creek, and connecting Dover and Umbrella Creeks on the ebb side of the closure at a cost of $1.3 million. Economic analysis of the recommended plan identified no net benefits.

In 1983, USACE studied shoaling at Umbrella Creek. Numerical modeling was used to determine potential causes of shoaling and courses of action. This study set the groundwork for the demonstration project authorized in the Water Resources Development Act of 1986. The Water Resources Development Act of 1986 authorized

USACE to complete a demonstration project in the Satilla River Basin to close Noyes Cut and Bull Whirl Cut with earthen plugs and monitor for a 10-year period.
The Energy and Water Development Act of 1990 authorized funding for additional study of the Umbrella Creek area. In May 1990, USACE completed a preliminary study of the shoaling in Umbrella Creek/Dover Bluff and determined a better course of action was to close Bull Whirl Cut first due to environmental and navigational impacts. The Corps further deduced that Noyes Cut could potentially be closed at a later date unless the 10-year monitoring showed closing it unnecessary.

On June 6, 1990, Congressman Lindsay Thomas notified USACE of his position to oppose further funding/work to carry out construction of the demonstration project authorized in WRDA 1986. On June 6, 1991, further correspondence from Congressman Thomas informed USACE that he did not feel it would be useful to pursue further study of the area at that time. On May 2, 1991, Major Elias Smith, Acting Savannah District Commander, informed the Commander of South Atlantic Division of Congressman Thomas' position and that the $450,000 remaining funds should be reprogrammed. As a result, in the Federal Register, Vol. 68, No 123 (38022), the demonstration project for the Satilla River Basin to close Noyes Cut and Bull Whirl Cut was deauthorized.

1.6 Other Planning Studies, Reports, or Efforts

- McMahon, George F. Chief, Coastal and Waterways Engineering Station. Hydrodynamic Analysis from Man-made Cuts, Dover Bluff, Satilla River Basin, Camden County, Georgia. USACE. September 1983 (which is incorporated herein by reference).

- USACE Savannah District Planning Division. Umbrella Creek Section 1135 Preliminary Restoration Plan. February 2004.

- USACE Savannah District Planning Division. Section 1151 of WRDA 1986 Umbrella Creek Demonstration Project. May 10, 1990.

1.7 Study Sponsor

USACE is conducting this study in partnership with the non-Federal sponsors, which are the Georgia Department of Natural Resources (DNR) and the Satilla Riverkeeper.

2.0 Existing Conditions and Affected Environment*

2.1 Environmental Setting

The Satilla River estuary contains a complex network of tidal channels. Man-made cuts changed the hydraulic circulation patterns in the estuary by (1) altering local patterns of tidal exchange; (2) disrupting gradual salinity gradients from the headwaters to the mouth of the creeks; and (3) reducing access to headwaters for estuarine species due

to channel sedimentation. These have significantly degraded the watershed habitat. Dover and Umbrella Creeks are the primary creeks within the system and serve as both key habitats and primary routes for movement of organisms and water.

Salinity gradients provide a variety of estuarine and migratory species the directional cues for local movement and long-distance migration essential for completing their life cycles. Additionally, tidal flows through multiple creeks and cuts cause a tidal node where sediment deposition clogs channels. Reduced tidal flows through Noyes Cut and Dynamite Cut should restore water depths in Dover and Umbrella Creeks, which has silted in as a result of changes in circulation patterns. This sedimentation has restricted access to portions of the estuary for shrimp, shellfish, and migratory fish.

Umbrella and Dover Creeks are part of the lower Satilla River tidal estuary. The Satilla River (along with salt marshes, hammocks, sand bars, and mud flats) makes up the northern portion of the St. Andrews Sound estuary. Shallow subtidal creeks and mudflats surround the tidal marshes. Tidal marshes and creeks are some of the most ecologically productive ecosystems providing critical habitat for fish and shellfish of commercial and recreational importance. Tidal marshes/creeks also provide a rich food source for both resident and migratory birds including osprey and eagles and they are utilized for many traditional, low impact recreational activities. The tidal marshes in the study area consist primarily of saltmarsh cordgrass (*Spartina alterniflora*).

This estuarine habitat provides a site for abundant primary production that supports a rich diversity of plankton, benthic invertebrates, and small fish, which are food sources for higher level consumers such as wading birds, larger fish, blue crabs, and shrimp. Commercial crabbing is still active in this area, but occurs at much less than historical levels. The large tidal flushing of the area results in the wide dispersal of the products of the marshes' primary production to the ocean.

Aside from some residential developments along uplands adjacent to Dover and Umbrella Creeks, the area is sparsely populated. An adjacent area of over 1,000 acres of forested uplands that is undeveloped provides valuable wildlife habitat and a habitat corridor connecting forested uplands with the tidal open water and marsh habitat. Portions of this land adjacent to Dover Bluff have been operated as a hunting club for a number of years, resulting in higher quality habitat for native wildlife. This land use results in higher quality habitat by both preserving the native forest ecosystem and through plantings designed to increase foraging habitat for wildlife.

The Satilla River basin is characterized by mild winters and hot summers. Mean annual precipitation ranges from 46 to 54 inches per year. Rainfall is fairly evenly distributed throughout the year, but a distinct dry season occurs from mid-summer to late fall. Rainfall is usually greatest in March and least in October. The mean annual temperature is about 68 degrees Fahrenheit (Satilla River Basin Management Plan 2002).

2.2 Relevant Resources

This section contains a description of relevant resources that could be impacted by the project. The important resources described in this section are those recognized by laws, executive orders, regulations, and other standards of National, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. Table 1 provides summary information of the institutional, technical, and public importance of these resources**.**

Table 1 – Relevant Resources

Resource	Institutionally Important	Technically Important	Publicly Important
Wetlands/Tidal Marsh	Clean Water Act of 1977, as amended; Executive Order 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968., EO 11988, and Fish and Wildlife Coordination Act. Jurisdictional wetlands and Jurisdictional Waters of the US under Section 404 of Clean Water Act	They provide necessary habitat for various species of plants, fish, and wildlife; they serve as ground water recharge areas; they provide storage areas for storm and flood waters; they serve as natural water filtration areas; they provide protection from wave action, erosion, and storm damage; and they provide various consumptive and non-consumptive recreational opportunities. One of rarest ecosystems in world. One of most biologically productive ecosystems in world.	The high value the public places on the functions and values that wetlands provide. Environmental organizations and the public support the preservation of marshes. Satilla Riverkeeper has coordinated with local fisherman/boaters/other organizations for support of this project. Tidal marshes/creeks provide critical habitat for fish/ shellfish of commercial & recreational importance in addition to critical nursery habitat for many estuarine and marine species.
Aquatic Resources/ Fisheries (see sections 2.3.2, 2.3.3, & 4.2 for more detail)	Fish and Wildlife Coordination Act of 1958, as amended.	They are a critical element of many valuable freshwater and marine habitats; they are an indicator of the health of the various freshwater and marine habitats; and many species are important commercial resources. Aquatic species dependent on gradual salinity gradients would benefit from this project. Many of the species in the project impact area (Table 2) require this more natural salinity gradient to navigate between saltwater, brackish, and freshwater environments to complete life cycles.	The high priority that the public places on their aesthetic, recreational, and commercial value. 60% and 80 % of the commercially important fish and shellfish species in the southeast have some life stage associated with salt marsh habitats. Local residents have expressed continued decline to commercial fisheries (i.e. shad, herring, crab, shrimp) from existing hydrologic malfunction related to 8 man-made cuts.

Resource	Institutionally Important	Technically Important	Publicly Important
Wildlife (see sections 2.3.5 & 4.5 for more detail)	Fish and Wildlife Coordination Act of 1958, as amended and the Migratory Bird Treaty Act of 1918	They are a critical element of many valuable aquatic and terrestrial habitats; they are an indicator of the health of various aquatic and terrestrial habitats; and many species are important commercial resources. The large fishery provides a food source for both resident and migratory birds including osprey and eagles.	The high priority that the public places on their esthetic, recreational, and commercial value.
Threatened and Endangered Species: Manatees & Wood Storks (see sections 2.3.6 & 4.6 for more detail)	The Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald Eagle Protection Act of 1940.	USACE, USFWS, NMFS, NRCS, EPA, and GA cooperate to protect these species. The status of such species provides an indication of the overall health of an ecosystem. The large fishery provides food source Federally endangered wood storks; and manatees primarily feed on freshwater vegetation along with some seagrasses and require freshwater for drinking.	The public supports the preservation of rare or declining species and their habitats.
Cultural Resources	National Historic Preservation Act of 1966, as amended (54 USC 2106); the Native American Graves Protection and Repatriation Act of 1990; and the Archaeological and Historical Preservation Act of 1974 (16 USC 469-469c)	Resources are tangible remains of past human activity. They may yield information about past environments and societies. Their association or linkage to past events, to historically important persons, and to design and construction values; and for their ability to yield important information about prehistory and history.	Public supports protection and enhancement of cultural resources as a way to learn about cultures, history and traditions.

Resource	Institutionally Important	Technically Important	Publicly Important
Recreation Resources (see sections 2.3.5 & 4.10.3 for more detail)	Federal Water Project Recreation Act of 1965 as amended and Land and Water Conservation Fund Act of 1965 as amended	Provide high economic value to local, state, and national economies.	Public makes high demands on recreational areas. There is a high value that the public places on fishing, hunting, and boating, as measured by the large number of fishing and hunting licenses sold in Georgia; and the large per-capita number of recreational boat registrations in Georgia. All involved parties (e.g. NFS, stakeholders/public/agencies have all been very supportive of project. All comments & USACE responses are detailed in Appendix C. Locals concerned over decline in recreational activities (boating & fishing) from extensive sedimentation occurring over the decades since Noyes Cut was constructed. Access for locals restricted to high tide access in skiffs or larger boats drawing less than 2'.
Aesthetics	USACE ER 1105-2-100, and National Environmental Policy Act of 1969, the Coastal Barrier Resources Act of 1990, Wild and Scenic Rivers Act of 1968, and the National and Local Scenic Byway Program.	Visual accessibility to unique combinations of geological, botanical, and cultural features that may be an asset to a study area. State and Federal agencies recognize the value of tidal salt marsh ecosystems.	Environmental organizations and the public support the preservation of natural pleasing vistas.
Air Quality	Clean Air Act of 1963	State and Federal agencies recognize the status of ambient air quality in relation to the NAAQS.	Virtually all citizens express a desire for clean air.

Resource	Institutionally Important	Technically Important	Publicly Important
Water Quality	Clean Water Act of 1977, Fish and Wildlife Coordination Act, Coastal Zone Mgt Act of 1972.	USACE, USFWS, NMFS, NRCS, EPA, and States DNRs and wildlife/fishery offices recognize value of fisheries and good water quality. The national and state standards established to assess water quality.	Environmental organizations and the public support the preservation of water quality and fishery resources and the desire for clean drinking water.

2.2.1 Hydrology and Floodplains

Historical man-made cuts changed the circulation patterns in the estuary and (1) altered local patterns of tidal flows; (2) disrupted gradual salinity gradients from the headwaters to the mouth of the creeks; and (3) increased local sedimentation within Umbrella Creek. Currently, salinity gradients are altered by a large volume of Satilla River water. This large volume of brackish water entering through the short pathways of the man-made cuts overwhelms the freshwater that enters the headwater area and causes the salinity to be nearly constant throughout most of Dover Creek. Additionally, tidal flows through multiple creeks and cuts causes a tidal node where sediment deposition clogs channels.

Tides play an important role in the ecology of a salt marsh ecosystem. As the tide rises and falls twice a day, tidal surges deliver nutrients and distribute them throughout the marsh. It also returns nutrients from the marsh back to the estuaries and bays. The average tidal range for coastal Georgia is approximately 8 feet. The largest known tidal range at Jekyll Creek is approximately 10.7 feet. The height of the tide determines the flooding depth and, consequently, the height of salt marsh plants that can live in the two marsh zones - low marsh, which is usually flooded twice a day, or high marsh, which is only flooded during storms or unusually high tides.

2.2.2 Aquatic Resources and Aquatic Habitat

Estuarine species historically found in Dover and Umbrella Creeks include shrimp (white and brown), river herring, American shad, blue crabs, eastern oyster, and striped bass. All of these species may benefit from the restoration of tidal flows, water depths, and salinity gradients in the area. Shad, herring, and striped bass require freshwater for spawning, while blue crabs, oysters, and shrimp require brackish water for successful reproduction. A more comprehensive list of species in the study area that may benefit from ecosystem restoration is detailed in Table 2. Additional information about the decline and scarcity of shad and herring may be found in Section 2.2 and demonstrated in Figure 5.

Table 2 - Common Species in study area potentially impacted by project (USACE 2017b)

Fauna Type	Habitat Requirements	Currently present in project impact area	Historically present in project impact area	Habitat Benefited from Restoration
Blue crab (C)	Saltwater for spawning; Brackish water for nursery and adult male habitat	Yes	Yes	Yes

Shrimp (C)	Saltwater for spawning; Brackish water for nursery habitat	Yes	Yes	Yes
Oyster(C)	Brackish water	Yes (small amounts)	Yes	Possible
American/Hickory Shad (G/C)	Saltwater - Freshwater (Spawning)	Yes (small amounts)	Yes, large runs to spawning grounds	Yes
Herring (River, Alewife, blueback) (C)	Saltwater - Freshwater (Spawning)	Yes	Yes	Yes
Striped bass (G)	Saltwater - Freshwater (Spawning)	Yes (Rare)	Yes	Yes
American eel (C)	Freshwater - Saltwater for Spawning	Yes	Yes	Yes
Spotted seatrout (C/G)	Brackish - Freshwater	Yes	Yes	Yes
Red drum(C/G)	Brackish - Freshwater	Yes	Yes	Yes
Snapper Grouper Complex (C/G)	Saltwater - Brackish	Yes	Yes	Yes
Flounder (C/G)	Saltwater - Brackish - Freshwater	Yes	Yes	Yes
White Bullhead (G) *Ameiurus catus*	Freshwater - Brackish	Yes	Yes	Yes
Shortnose Sturgeon (E&T)	Saltwater - Freshwater (Spawning)	Yes (Rare)	Yes (Rare)	No
Atlantic (E&T) Sturgeon	Saltwater - Freshwater (Spawning)	Yes (Rare/ Juveniles)	Yes (Rare/ Juveniles)	No
Manatee (E&T)	Freshwater - Saltwater	Yes	Yes	Yes
Wood Stork (E&T)	Saltwater - Freshwater	Yes	Yes	Yes
C- Commercial Species; G - Game Species; E&T - Endangered or Threatened Species (see Section 2.3.6 for more detail on these species)				

2.2.3 Essential Fish Habitat

Essential Fish Habitat (EFH) in the study area consists entirely of tidal saltmarsh and tidal creeks. The structure and function of a saltmarsh are influenced by tide, salinity, nutrients, and temperature. Saltmarsh can be a stressful environment to plants and animals, with rapid changes occurring in these abiotic variables (Gosselink 1980; Gosselink et al. 1974). Although species diversity may be lower than in other systems, the saltmarsh is one of the most biologically productive ecosystems in the world (Teal 1962; Teal and Teal, 1969). The high primary productivity that occurs in the marsh, and the transfer of detritus into the estuary from the marsh, provides the base of the food chain supporting many marine organisms.

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) set forth requirements for the National Marine Fisheries Service (NMFS), regional Fishery Management Councils (FMC), and other federal agencies to identify and protect important marine and anadromous fish habitat. These

amendments established procedures for the identification of EFH and a requirement for interagency coordination to further the conservation of Federally-managed fisheries.

Through EFH consultations, NMFS works with federal agencies to conserve and enhance EFH. Consultation is required when a federal agency authorizes, funds, or undertakes an action that may adversely affect EFH. The federal agency must provide NMFS Fisheries with an assessment of the action's impacts to EFH, and NMFS Fisheries provides the federal agency with EFH conservation recommendations to avoid, minimize, mitigate, or otherwise offset those adverse effects. Federal agencies must provide a detailed written explanation to NMFS Fisheries describing which recommendations that it has not adopted.

The Magnuson-Stevenson Fishery Conservation and Management Act requires that Essential Fish Habitat (EFH) areas be identified for each fishery management plan and that all Federal agencies consult with the NMFS on Federal actions that may adversely affect EFH. In coordination with NMFS (Cooksey 2017), USACE determined that the EFH species that could be impacted by the alternatives are within the shrimp group and the Snapper-Grouper Complex. The specific species within these two groups are shown in Table 3.

Table 3 - Essential fish Habitat (EFH) Species for the Project Area

Fishery Management Plan (FMP)	**Scientific Name of Species**	**EFH for Life Stages (Estuarine)**	**Habitat Areas of Particular Concern**
Shrimp	Brown shrimp *Farfantepenaeus aztecus*	Post Larvae, Juveniles, and Adults	Penaeid Shrimp HAPC – tidal inlets, state nursery and overwintering habitats
Shrimp	White shrimp *Litopenaeus setiferus*	Post Larvae, Juveniles, and Sub Adults	Penaeid Shrimp HAPC - tidal inlets, state nursery and overwintering habitats
Snapper Grouper Complex	Black Sea Bass *Centropristis striata*	Post Larvae, Juveniles	Estuaries, particularly oyster reefs
Snapper Grouper Complex	Gag grouper *Mycteroperca microlepis*	Post Larvae, Juveniles	Estuaries, particularly oyster reefs
Snapper Grouper Complex	Crevalle Jack *Caranx hippos*	Post Larvae, Juveniles, and Adults	
Snapper Grouper Complex	Sheepshead *Archosargus probatocephalus*	Post Larvae, Juveniles, and Adults	Estuaries, particularly oyster reefs
Snapper Grouper Complex	Gray snapper *Lutjanus griseus*	Post Larvae, Juveniles, and Sub Adults	
Snapper Grouper Complex	Lane snapper *Lutjanus synagris*	Juveniles Sub Adults	

2.2.4 Wetlands

The study area consists entirely of tidal saltmarsh (Jurisdictional Wetlands) and tidal creeks (Jurisdictional Waters of the U.S.). Although species diversity may be lower than in other systems, the tidal saltmarsh is one of the most biologically productive ecosystems in the world (Teal 1962; Teal and Teal, 1969). Tidal marshes and creeks provide critical habitat for fish and shellfish of commercial and recreational importance. This ecosystem also serves as critical nursery habitat for many estuarine and marine species. It is estimated that between 60% and 80 % of the commercially important fish and shellfish species in the southeast have some life stage associated with salt marsh habitats (DeVoe and Baughman 1986; Crowder 1999). The large fishery provides a food source for both resident and migratory birds including osprey and eagles; and the ecosystem is utilized for many traditional, low impact recreational activities.

The extensive salt marshes surrounding the Satilla are generally dominated by salt marsh cord grass, (*Spartina alterniflora)* at lower elevations. Areas that are infrequently flooded are dominated with black needle rush, (*Juncus roemerianus)*. Brackish marshes are dominated by big cordgrass (*S. cynosuroides)* and salt marsh cord grass *(S. alterniflora)* along levees, with monospecific stands of black needle rush (*J. roemerianus)* throughout the mid-marsh. Freshwater marshes typically contain a greater diversity of species, including wild rices, (*Zizania aquatic)* and (*Zizaniopsis miliacae)* (Alber et al. 2003).
The major primary producers in the salt marsh community are grasses that have little immediate nutritional value to fish and wildlife but support an important detritus-based food web (Teal 1962). The high primary productivity that occurs in the marsh, and the transfer of detritus into the estuary from the marsh, provides the base of the food chain supporting many marine organisms. In contrast, the fleshy broad leaf plants characteristic of fresh marshes generally are high in nitrogen and low in fiber content and there is a high incidence of direct grazing or feeding on these plants (Odum et al. 1984).

2.2.5 Terrestrial Resources and Wildlife

Reptiles inhabiting the salt marsh include the diamondback terrapin (*Malaclemys terrapin*) and alligators (*Alligator mississippiensis*) occasionally feed in the marsh. Three bird species nest in the marsh: the clapper rail (*Rallus longirostris*); seaside sparrow (*Ammodramus maritimus*); and long-billed marsh wren (*Telmatodytes palustris*). Great blue herons (*Ardea herodias*), common and snowy egrets (*Egretta* spp.), and other wading birds commonly forage in the marsh at low tide. Several mammal species also feed in the salt marsh: raccoons (Procyon lotor), marsh rabbits (*Sylvilagus palustris),* mink (Mustela vison), otter (*Lontra canadensis*), and rice rat (Oryzomys palustris) (Seabrook 2017).

2.2.6 Threatened, Endangered and Protected Species

The Endangered Species Act (ESA) of 1973 (16 USC 1531-1543) regulates activities affecting plants and animals classified as endangered or threatened, as well as the designated critical habitat of such species. Research on the U.S. Fish and Wildlife Service's (USFWS) Information, Planning, and Conservation System (IPAC) website (http://ecos.fws.gov/ipac/) indicated Federally listed species within the Camden County. The USFWS IPAC website also identified critical habitat for many of the endangered and threatened species within the study area.

The recently designated critical habitat for Atlantic Sturgeon does not affect the study area. Based on the most recent (August 16, 2017) Federal Register publication of the final rule and the GIS mapping provided by NMFS on their website, SAS has confirmed that the impact area for the closure structures and the area where hydraulic changes will occur are outside of the designated critical habitat.

Table 4 identifies the species that have been listed by the USFWS and/or the NMFS that have the potential to occur within the study area.

Table 4 - Federal/State Endangered, Threatened and Candidate Species With Potential to Occur in the Study Area

Common Name	Scientific Name	Critical Habitat Designated In Study Area	Federal/State Status
West Indian Manatee	Trichechus manatus	N	T/T
Wood Stork	Mycteria americana	N	T/E
Atlantic Sturgeon[1]	Acipenser oxyrinchus oxyrinchus[1]	N	E/E
Shortnose Sturgeon[1]	Acipenser brevirostrum[1]	N	E/E
E - Endangered T - Threatened N - None Source: This information was obtained from coordination with USFWS/NMFS in April-May 2017 1 - Species under jurisdiction of NMFS			

West Indian Manatee (*Trichechus manatus)* **Federal Status**: Threatened
Manatees inhabit both salt and fresh water of sufficient depth (5 feet to usually less than 20 feet) that includes slow-moving rivers, estuaries, saltwater bays, canals, and coastal areas (USFWS, 1991) throughout their range. The West Indian manatee is herbivorous and eats aquatic plants such as hydrilla, eelgrass, and water lettuce. They may be encountered in canals, rivers, estuarine habitats, saltwater bays, and on occasion have been observed as much as 3.7 miles off the Florida Gulf coast. Manatees may move through the study area in the summer months. More information on this species' life cycle may be found on the USFWS website: https://ecos.fws.gov/ipac/.

During the cooler months between October and April, Florida manatees concentrate in areas of warmer water. Manatees are thermally stressed at water temperatures below 18ºC (64.4ºF) (Garrott et al., 1995); therefore, during winter months, when ambient water temperatures approach 20ºC (68ºF), the U.S. manatee population confines itself to the coastal waters of the southern half of peninsular Florida and to springs and warm water industrial outfalls as far north as southeast Georgia.

Manatees are known to visit the study area in the summer months (April through November) as they migrate up and down the coast. The USFWS advised that manatees can be assumed to be in the study area from April through November (USFWS 2017). The GADNR (GADNR 2017) said a very conservative estimate would be March 1 to November 30 due to the warmer winters and increasing populations of manatees. Management of this protected species falls under the jurisdiction of the USFWS. The USFWS has recommended the inclusion of the "Standard Manatee Conditions and Procedures for Aquatic Construction" (FWCAR 2018).

Manatees will often be attracted to any type fresh water emission into the river; even emissions as small as a garden hose and will often come up to docks and drink from the hose (Hill 2010). Local residents of Dover Bluff have observed them at their docks during the summer months (Montague 2017c).

Manatees primarily feed on freshwater vegetation along with some seagrasses and require freshwater for drinking. There would be beneficial impacts to their habitat from the increase in quantity of freshwater upstream and the improvement of access/connectivity to these upstream freshwater feeding grounds.

Shortnose Sturgeon (*Acipenser brevirostrum*) **Federal Status**: Endangered

The Shortnose sturgeon (Figure 6) is an anadromous species restricted to the east coast of North America. Throughout its range, Shortnose sturgeon occur in rivers, estuaries, and the sea. It is principally a riverine species and is known to use three distinct portions of river systems: (1) non-tidal freshwater areas for spawning and occasional overwintering; (2) tidal areas in the vicinity of the fresh/saltwater mixing zone, year-round as juveniles and during the summer months as adults; and (3) high salinity estuarine areas (15 parts per thousand (ppt) salinity or greater) as adults during the winter. The majority of populations have their greatest abundance and are found throughout most of the year in the lower portions of the estuary and are considered to be more abundant now than previously thought (NMFS 1998).

Figure 5 - Shortnose Sturgeon

Atlantic Sturgeon have rarely been caught in Noyes Cut during sampling events, but there have not been any reported occurrences of shortnose sturgeon in the study area (USFWS/NMFS 2017). The shortnose sturgeon occupies similar habitat as the Atlantic sturgeon and could possibly occur within the study area. Recent University of Georgia (UGA) surveys regarding shortnose sturgeon populations in the nearby Satilla River have only found a couple over the last few years (Harrison 2017). Most of UGA's sampling efforts have been concentrated in the Woodbine to White Oak Creek areas, which are in the area of the closure structures. Any juveniles that are in the area would stay year-round and any adults present would be migrating through the area (Harrison 2017). More information on this species' life cycle may be found on the NMFS website: http://www.fisheries.noaa.gov/pr/species/

Atlantic Sturgeon (*Acipenser oxyrinchus*) **Federal Status**: Endangered

Atlantic sturgeon (Figure 7) spawn in freshwater, but spend most of their adult life in the marine environment. Spawning adults generally migrate upriver in the spring/early summer; February-March in southern systems, April-May in mid-Atlantic systems, and May-July in Canadian systems. In some southern rivers, a fall spawning migration may also occur.

Figure 6 - Atlantic Sturgeon

Atlantic sturgeon spawning is believed to occur in flowing water between the fresh/salt water interface and fall line of large rivers, with optimal depths of 11-27 meters. Sturgeon eggs are highly adhesive and are deposited on the bottom substrate, usually on hard surfaces (e.g., cobble).

This species has recently been listed as endangered under the Federal Endangered Species Act and critical habitat has been designated. The main stem of the Satilla River has been designated, but neither Dover nor Umbrella Creek has been designated critical habitat. The Atlantic sturgeon occupies similar habitat as the shortnose sturgeon above and could possibly occur in the vicinity of the proposed action. This species migrates more freely between freshwater, estuarine, and marine waters than the shortnose sturgeon. Atlantic sturgeon have only rarely been caught in Noyes Cut during sampling events in the vicinity (Montague 2017c).

UGA's recent findings regarding Atlantic sturgeon populations in the nearby Satilla River indicate a slow increase in numbers over the last few years (Harrison 2017). Most of UGA's sampling efforts have been concentrated in the Woodbine to White Oak Creek areas, which are in the study area. Any juveniles that are in the area would stay year-round and any adults present would migrate through the area (Harrison 2017). Freshwater habitat is required for sturgeon to spawn; however, sturgeon tend to require much deeper water than what the proposed restoration is likely to provide.

Wood Stork (*Acipenser oxyrinchus*) **Federal Status**: Endangered

Storks reside in freshwater and brackish wetlands, primarily nesting in cypress or mangrove swamps. Wood storks (Figure 8) are the largest wading birds that breed in North America; they nest up to 60 feet off the ground (in cypress, blackgum, southern willow, and buttonbush trees) in wetland areas of Georgia, South Carolina, and Florida. They feed in freshwater marshes, narrow tidal creeks, ditches, or flooded tidal pools. Particularly attractive feeding sites are depressions in marshes or swamps where fish become concentrated during periods of falling water levels.

Figure 7 - Adult Wood Stork

These birds have a unique feeding technique and require higher prey concentrations than other wading birds. Optimal water regimes for the wood stork involve periods of flooding, during which prey (fish) population's increase, alternating with dryer periods during which receding water levels concentrate fish at high densities. Wood storks are known to frequent the more protected estuarine areas of the study area for feeding. There is no suitable nesting habitat for this species within the study area. The study area is within 13 mile core foraging area for four nearby wood stork nesting colonies (FWCAR 2018).

2.2.7 Air Quality

Air quality at any given location is a function of several factors, including quantity and dispersion rates of pollutants, local climate, topographic and geographic features, and also windblown dust and wildfires. Air pollution can threaten the health of human beings, animals, plants, lakes; as well as damage the ozone layer and buildings, and cause haze that reduces visibility.

The Clean Air Act (CAA), which was last significantly amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The CAA established two types of national ambient air quality standards-primary and secondary. Primary standards are levels established by the EPA to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards are levels established to protect the public welfare, including protection from decreased visibility and damage to animals, crops, vegetation, and buildings.

The EPA has set six National Ambient Air Quality Standards (NAAQS) that regulate six pollutants: carbon monoxide (CO), lead (Pb), nitrogen oxide (NO_x), ozone (O_3), sulfur dioxide (SO_2), and particulate matter ($PM_{2.5}$ and (PM_{10}). Geographic areas have been officially designated by EPA as being in attainment or non-attainment for air quality based on an area's compliance with the NAAQS. The project area is currently in attainment for the NAAQS for all criteria pollutants.

2.2.8 Water Quality

There are not any areas designated as areas of concern by the GADNR or EPA (EPA and Satilla Riverkeeper 2017). Since this area is undeveloped and not expected to become developed, runoff from developed areas is not currently an issue or expected to become an issue.

The man-made cuts changed the circulation patterns in the estuary and (1) altered local patterns of tidal flows; (2) disrupted gradual salinity gradients from the headwaters to the mouth of the creeks; and (3) increased local sedimentation within Umbrella Creek. Currently, salinity gradients are altered by a large volume of Satilla River water. This large volume of brackish water entering through the short pathways of the man-made cuts overwhelms the freshwater that enters the headwater area and causes the salinity to be nearly constant throughout most of Dover Creek. Additionally, tidal flows through multiple creeks and cuts causes a tidal node where sediment deposition clogs channels.

2.2.9 Cultural Resources

Federal undertakings will comply with the Archaeological and Historical Preservation Act, as amended (54 USC 312501-312508: Preservation of Historical and Archeological and Data), the Abandoned Shipwreck Act of 1987 (PL 100-298; 43 USC 2101- 2106), the National Historic Preservation Act of 1966, as amended (54 USC 300101 et seq.: Historic Preservation) and the Advisory Council on Historic Preservation's implementing regulation, 36 CFR Part 800 (Protection of Historic Properties). Section 106 of the National Historic Preservation Act (NHPA) (54 USC 306108) requires Federal agencies to take into account the effects of undertakings on historic properties. The area of potential effects (APE) for the proposed project consists of Dover and Umbrella Creeks, as well as the tributaries and marshes that surround the creeks and the man-made cuts.

A query of Georgia's Natural, Archaeological, and Historic Resources GIS (GNAHRGIS) database revealed the locations of several archaeological and historic resources within the APE. A 2001 historic structures survey recorded 18 residences in the Dover Bluff Club community north of Umbrella Creek. The bungalow-style homes were constructed in the 1940s-1950s. Five archaeological sites are located at the marsh edge or along tributaries to Umbrella Creek near the communities of Dover Bluff and Piney Bluff. The archaeological sites are prehistoric artifact and shell scatters.

USACE conducted a remote sensing survey of Noyes and Dynamite Cuts in September 2017 to identify and evaluate any submerged cultural resources. Analysis of the targets

revealed several small ferrous objects such as traps, small boat anchors and sections of pipe in Noyes Cut, but no potentially significant resources have been identified. A survey of Dynamite Cut resulted in the identification two anomalies. One anomaly is associated with exposed modern pilings. The other anomaly is located in the Dover Creek channel southwest of the pilings.

A low water bank line survey of Noyes Cut, Dynamite Cut and ORR failed to locate any potentially significant cultural resources.

2.2.10 Socio-Economics

2.2.10.1 Demographics And Economic Conditions

The project area consists of the opening portion of the Satilla River estuary located within Census Block Group 2 of Tract 101 in Camden County, Georgia. The 2015 American Community Survey estimates the total population of this area at 1,589. This population contains 70.1 percent claiming white ancestry alone, 29.4 percent claiming black or African American alone, and 0.05 percent claiming ancestry of two or more races. Applying 2015 population growth rates developed for Camden County by the Georgia Governor's Office of Planning and Budget yields an expected 2050 population of 2005. The 2015 per capita income for this area was $29,405, while median household income was $54,856. Of the population over sixteen years of age, 67.0 percent were in the civilian labor force. The 2015 unemployment rate was 16.5 percent, which is above state rate of 9.7 percent and the county rate of 8.5 percent.

Further information on study area population, including age, sex, race, housing, families/living arrangements, education, health, local economy, transportation, income, poverty, business, and geography can be found on the U.S. Census Bureau website: http://www.census.gov/quickfacts/table/PST045215/00.

The project impact area consists of Dover and Umbrella Creeks, as part of the lower Satilla River estuary south of the city of Brunswick (and Figure 2) in Camden County. The lands adjacent to the study area are sparsely populated with some residential developments along the creeks that include Dover Bluff Community, Piney Bluff Community, and River Marsh Landing. Dover Bluff is a small residential community of 20-30 homes; and Piney Bluff and River Marsh Landing are failed developments consisting of around 15 homes each.

2.2.10.2 Noise

For purposes of regulation, noise is measured in dBA or A-weighted decibels. This unit uses a logarithmic scale and weights sound frequencies. Table 5 shows typical noise levels and corresponding impressions. Since the project area is very sparsely populated, noise associated with agriculture and forestry practices are the predominant sources of noise in the project area. Naturally occurring noises (buzzing of insects, bird

calls, etc.) are also common within the project area. The background noise in the project area would be at the level of a soft whisper.

Table 5 - Typical Noise Levels and Subjective Impressions

Source	Decibel Level	Subjective Impression
Normal breathing	10	Threshold of hearing
Soft whisper	30	---
Library	40	Quiet
Normal conversation	60	---
Television audio	70	Moderately loud
Ringing telephone	80	---
Snowmobile	100	Very loud
Shouting in ear	110	---
Thunder	120	Pain threshold

2.2.10.3 Recreation

Current recreational activities include boating and fishing for residents of local communities (i.e. Dover Bluff Community, Piney Bluff Community, and River Marsh Landing). Piney Bluff Community and River Marsh Landing are very sparsely populated recent developments, the residents of which have only had limited access to the Satilla River due to the extensive sedimentation that has occurred in the area over the decades since Noyes Cut was constructed (Montague 2017b). Access for Piney Bluff Community and River Marsh Landing has been limited to high tide access in skiffs or larger boats that draw less than 2 feet.

2.2.10.4 Aesthetics

The aesthetic quality in the project area is high, due to the vast amount of undeveloped tidal marsh. In addition, the adjacent upland areas are mostly undeveloped forested areas that are sparsely populated with three residential developments along the creeks that include Dover Bluff Community, Piney Bluff Community, and River Marsh Landing. Due to the quantity and quality of these two ecosystems, there is an abundance of habitat for both resident and migratory birds.

Aesthetics in the study area have been degraded by extensive sedimentation and shoaling within the estuary, due to the impacts from the man-made cuts. Portions of Umbrella Creek that were once 100 yards wide have now narrowed to 10 yards, and inland reaches are dry at low tide. The siltation has also blocked creek access to recreational boating and fishing; and commercial fishermen whose livelihood has historically depended on harvesting seafood from these waters.

2.2.10.5 Water Supply

There are no municipal water or sewage systems in the developed areas that are adjacent to the study area. The local water supply is from wells utilizing the Floridian aquifer.

2.2.10.6 Environmental Justice

The concept of environmental justice is based on the premise that no segment of the population should bear a disproportionate share of adverse human health or environmental effects. Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low Income Populations* requires each Federal agency to make achieving environmental justice part of its mission. Specifically, the agency must identify and address, as appropriate, the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. In addition, EO 1298 requires each federal agency to conduct its programs, policies, and activities so that they do not exclude, deny benefits to, or discriminate against persons (including populations) because of race, color, or national origin.

The high ground adjacent to the Satilla River estuary does not support disproportionate concentrations of minority or low-income communities. Minority or low-income populations do not recreate in this portion of the estuary in disproportionate numbers. The evidence for a lack of low income/minority recreational use came largely through general surveys and reconnaissance of the area. This includes anecdotal information obtained through interviews and meetings with local residents (who do use the area for recreation), the Satilla Riverkeeper, and the Georgia DNR.

3.0 Formulation of Alternatives

3.1 Problems, Opportunities, and Constraints

The condition of the study area placed it as #8 on the Georgia Water Coalition's Dirty Dozen list in 2012 (Georgia Water Coalition 2012). The Georgia Water Coalition Dirty Dozen is a list of the 12 worst offenses against Georgia's water. The report concluded that the unnatural cuts from the early 1900's are "wreaking havoc on migrating fish, blue crabs and boating routes near the mouth of the Satilla River."

In the March 21, 2013 Legislative Session, the Georgia Senate and the Georgia House of Representatives passed Resolution 267 to become a Joint Resolution (13: LC 40 0308). This resolution urged USACE to close Noyes Cut to restore the migrations of fish in the Satilla River and tidal creeks and improving routes for boaters (Georgia Senate/House Resolution 2013).

Scarcity and Significance of Resource: Approximately 60% and 80 % of the commercially important fish and shellfish species in the southeast have some life stage associated with salt marsh habitats.
Local residents have expressed continued decline to commercial fisheries (i.e. shad, herring, crab, shrimp) from existing hydrologic malfunction related to 8 man-made cuts.

Shad and river herring are anadromous fish that spend the majority of their adult lives at sea, only returning to freshwater in the spring to spawn. Historically, shad and river herring spawned in virtually every river and tributary along the coast. Species such as shad have historically been found in large seasonal runs to upstream spawning grounds in the study area. These aquatic species are dependent on gradual salinity gradients and would benefit from this project.

Shad and river herring once supported the largest and most important commercial and recreational fisheries along the Atlantic coast. Since colonial times, the blockage of spawning rivers by dams and other impediments, combined with habitat degradation and overfishing, have severely depleted shad and river herring populations. In general, populations of these two species have declined exponentially (as demonstrated in Figure 5) over the last several decades in the southeast (ASMFC 2016 and NMFS 2014).

Commercial landings for these species have declined dramatically from historic highs. Commercial landings by domestic and foreign fleets peaked at 140 million pounds in 1969. Since 2000, domestic landings totaled less than four million pounds in any given year, with a historic low of 823,000 pounds occurring in 2006. In 2005, the directed at-sea fishery for American shad was closed, and subsequent landings from the ocean are only from the bycatch fishery. In 2015, approximately 414,921 pounds of American shad were landed, while an estimated 1.3 million pounds of river herring were landed.

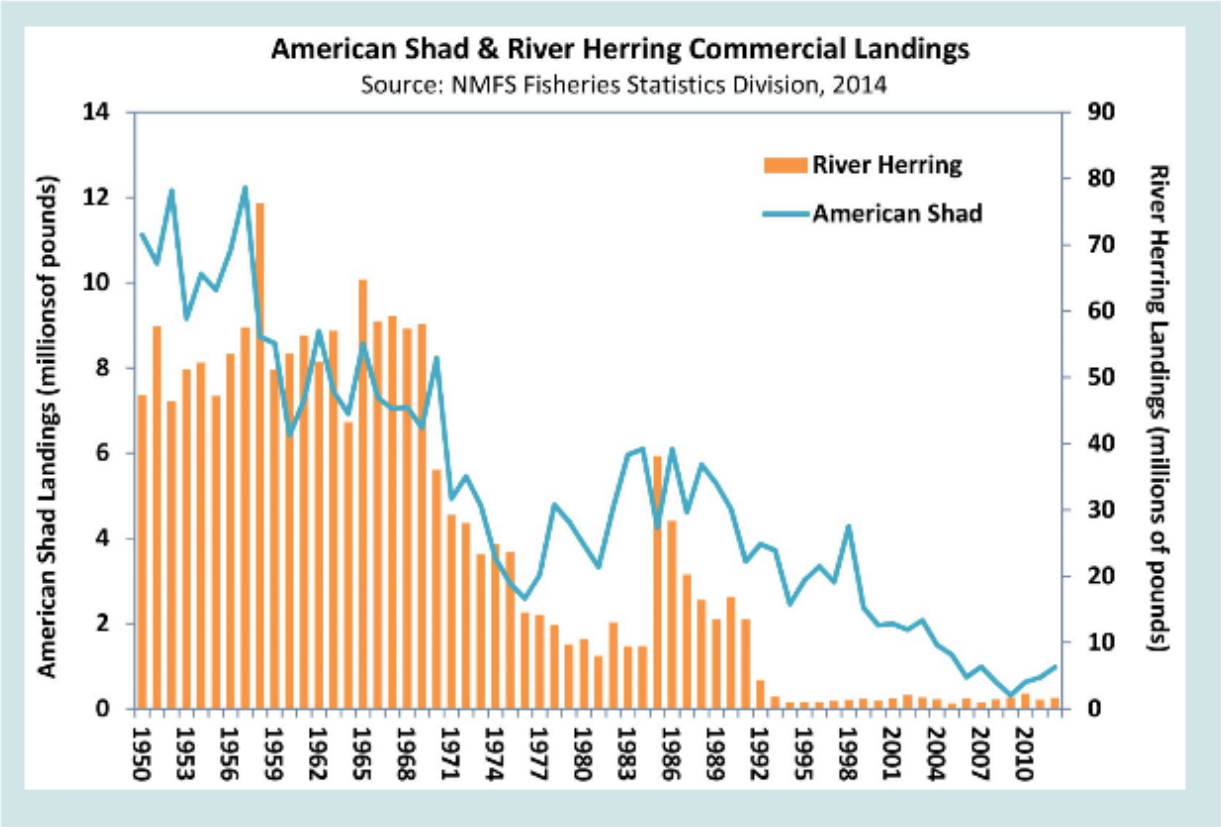

Figure 8 - Decline in American Shad/River Herring since 1950

3.1.1 Problems

The 8 man-made cuts have changed circulation patterns in the estuary resulting in the following problem:

- The cuts have altered the local patterns of the tidal exchange; disrupted the gradual salinity gradients and reduced access to the upstream portion of creeks for estuary species by sedimentation. As an example, the Noyes Cut original dimensions changed from 50’ wide by 5’ deep to the current conditions at 300-500’ wide by 7-10’ deep.

3.1.2 Opportunities

The opportunities in this study include:

- Restoring natural circulation to the Satilla River estuary;
- Increasing the tidal exchange and restoring the water depths to Dover & Umbrella Creeks; and

Restoring the salinity gradients, which would provide migratory species directional cues to upstream spawning habitats. Aquatic species dependent on gradual salinity gradients would benefit from this project. Many of the species in the project impact area require this more natural salinity gradient to navigate between saltwater, brackish, and freshwater environments to complete life cycles (Table 2).

3.1.3 Objectives

The objectives of this Section 1135 environmental restoration project are:

- Restore historic depths by year 5 (2026) post-construction and circulation patterns by year 3 post-construction to Umbrella and Dover Creeks and maintain these changes for the 50-year period of analysis;

- Improve aquatic habitat for resident species (e.g., blue crabs, shrimp) by year 5 (2026) post-construction and maintain these changes for the 50-year period of analysis; and

- Increase connectivity and salinity gradients for migratory species (e.g., striped bass, American eels; and shad, river herring, etc.) in the upper reaches of the estuary by year 5 (2026) post-construction and maintain these changes for the 50-year period of analysis.

The amount of habitat improvements from the alternatives was assessed using USACE approved Habitat Valuation method, which is described in Section 3.3 and Appendix A. This method is based on calculating the amount of tidal flows (exchange volume) in multiple locations throughout Dover and Umbrella Creeks (Appendix A). Exchange volume serves as an important surrogate for the restoration of salinity gradients, which influence the wide variety of species occurring in the estuary. Additionally, exchange volumes may be used to assess the predictability of the salinity regime in the estuary and the degree to which it represents the unaltered condition needed for estuarine fauna (i.e., expected upstream-to-downstream, fresh-to-saline patterns).

3.1.4 Constraints

1) The presence of Federally protected species within the study area may be a constraint during construction activities associated with closure structures. Construction contractor specifications will include the standard construction limitations provided by the USFWS and NMFS to avoid impacts to listed species.

2) The alternatives in this study must not adversely impact navigation within the existing Federal project (AIWW and Alternate AIWW). H&H modeling indicates that the alternatives would not adversely impact the Federal navigation project by increasing shoaling and sedimentation.

There have been no other constraints identified to date in this study.

3.1.5 Assumptions

1) The standard degree of error that is present in the Hydraulic and Hydrologic (H&H) model will not have a major impact on the correlated predictions of the ecosystem benefits.

2) The costs for rocks for closure structures are based on transit by rail to Brunswick Georgia Ports Authority (GPA) (staging area); 20 miles by barge from staging area to construction site.

3) No real estate actions are expected to be required. The staging area, the cuts and wetland where construction would occur are owned by the State of Georgia.

4) For the study area, sea level is predicted to rise 9 inches over the 50-year period of analysis. The tidal marsh in the study area would be very adaptable to increases in sea level rise due to the large tidal range, available sediment supply, and the ability of the existing marsh to create its own sediment from detritus (NOAA 2011). Therefore, no decrease in tidal marsh habitat is projected in the without project condition for the 50-year period.

5) Alternatives that do not include closing ORR present a risk of re-opening this area, which is currently in the process of closing through sedimentation. The estuary in the area of ORR has undergone such significant modification due to the approximately 100 years of hydrological malfunction. The re-opening of ORR would result in the loss of most of the hydrologic and ecological benefits predicted in the models. This re-opening would allow salt water to intrude into the middle of the Umbrella Creek and prevent a salinity gradient. Sedimentation modeling has been used in the study to help manage the risk by predicting the potential for ORR to re-open.

6) Since there has been so much damage to ecosystem for roughly 100 years since all of the cuts were made between 1900 and 1939, we could not predict further future degradation with models (within this CAP project's constraints). Modeling beyond available funding would have been required to predict future changes, if any. Therefore, as part of risk informed decision process, USACE assumes that the future conditions with no action alternative was equal to existing conditions.

3.2 Planning Horizon

- All hydrologic data was collected in 2015 and 2016. The model runs were based on a four month period, which was April 1 to July 31 of 2016. More information on the data collected and these models can be found in Appendix B.

- The period of analysis is 50 years from the date of completion of the closures at which point benefits are expected to begin.

3.3 Alternative Formulation Process

In 2015, the Project Delivery Team (PDT) determined that portions of the estuary have excessive amounts of shoaling. This shoaling is a physical barrier to upstream migration of migratory fish.

The PDT considered the following alternatives:

Initial Array of Alternatives

- No Action
- Construct Partial Diversion Structure
- Close Dover Cut
- Close Umbrella Cut
- Close East Side of Bailey's Cut
- Close Noyes Cut
- Close ORR
- Close ORR and Noyes Cut
- Dredge Umbrella, ORR, and Dover Creeks
- Use Partial Closure of Cuts (for navigation) for all alternatives above

The first four action alternatives (construct partial diversion structure, close Dover Cut, close Umbrella Cut, and close east side of Bailey's Cut) were eliminated early in the plan formulation process because the H&H preliminary assessment of the estuary indicated that these actions would not restore the historic tidal flow patterns. The partial diversion structures were eliminated because of potential safety issues from high velocities through the openings. One alternative that the PDT considered, was dredging Dover, ORR, and Umbrella Creeks to solve the shoaling problems. However, once the PDT studied this alternative, it was realized that dredging would be too costly due to lack of placement areas, potential wetland impacts, and would not change the sediment movement trends. In addition, opening ORR would prevent the development of salinity cues in Umbrella Creek. The partial navigation closures were eliminated because they would not completely eliminate the salinity influence from downstream of the cut. The elimination of these alternatives was agreed to at the December 18, 2015, In Progress Review (IPR) meeting that concluded with narrowing the scope of alternatives (SAD 2015).

As a result of the IPR, the following intermediate array of alternatives was approved for further analysis. These alternatives were consistent with alternatives examined in 1983 (McMahon 1983) that appeared to create the most benefit.

Intermediate Array of Alternatives

- No Action
- Close Noyes Cut
- Close ORR
- Close Noyes Cut and ORR

The initial H&H modeling indicated that closing Dynamite Cut could provide significant contributions in solving the salinity and shoaling issues in Umbrella Creek. On March 19, 2017, USACE, the local sponsor, and stakeholders met to discuss the potential of further investigating Dynamite Cut as another alternative (USACE 2017a). This management measure involves closing Dynamite Cut, either alone or in combination with other cuts. The PDT decided to include Dynamite Cut in the H&H modeling. The H&H modeling showed that closing Dynamite Cut would provide more hydrologic benefits/ecosystem benefits over closing ORR, primarily because ORR has naturally been filling in on its own since the 1983 study. The H&H model analyzed the following draft array of alternatives:

Second Intermediate Array of Alternatives

- NAA – No Action (Baseline/existing conditions models)
- Alt 1 – Close Noyes Cut
- Alt 2 – Close ORR
- Alt 3 – Close Noyes Cut and ORR
- Alt 4 – Close Dynamite Cut
- Alt 5 – Close Noyes and Dynamite Cuts
- Alt 6 – Close Dynamite Cut and ORR
- Alt 7 – Close Noyes and Dynamite Cuts, and ORR

Subsequent H&H sedimentation modeling revealed that closing Dynamite Cut alone was likely to cause ORR to scour and re-open. This re-opening of ORR would cause the loss of most of the hydrologic and ecological benefits gained from having a salinity gradient; therefore, closing Dynamite Cut alone (Alt 4) was eliminated. The H&H modeling suggested that the following alternatives would not provide adequate improvements and may cause problems in the estuary: Closing ORR (Alt 2); closing Noyes and ORR (Alt 3); closing Noyes and Dynamite cuts (Alt 5).

Therefore, the PDT eliminated these three alternatives and added the combination of closing Dynamite Cut and ORR to the final array below.

Table 6 - Rationale for Elimination of Alternatives

Alternatives	Rationale for elimination
Alt 2	ORR is almost closed already; no additional benefits gained
Alt 3	Closing ORR/Noyes provides no additional benefits vs closing Noyes only and costs more than Noyes only
Alt 4	ORR would re-open and remove benefits gained from closing Dynamite Cut by short circuiting the system
Alt 5	ORR would re-open and remove benefits gained from other closures by short circuiting the system

Final Array of Alternatives

- NAA – No Action
- Alt 1 – Close Noyes Cut
- Alt 6 – Close Dynamite Cut and ORR
- Alt 7 – Close Noyes Cut, Dynamite Cut, and ORR

To achieve the project objectives in a cost effective manner, the PDT evaluated and compared the final array of alternatives using habitat units as the non-monetary benefit divided by the project costs.

Benefits were quantified (Habitat Units [HUs]) from each alternative by calculating the fluctuation of tidal exchange in multiple locations throughout Dover and Umbrella Creeks (Appendix A). Exchange volume serves as an important surrogate for the restoration of salinity gradients, both of which influence the wide variety of species occurring in the estuary. Additionally, exchange volumes may be used to assess the predictability of the salinity regime in the estuary and the degree to which it represents the unaltered condition needed for estuarine fauna (i.e., expected upstream-to-downstream, fresh-to-saline patterns).

Based on changes in tidal exchange within the areas of impact and the costs to make those changes, the Cost Effectiveness/Incremental Cost Analysis (CE/ICA) in Section 3.4 estimated the relative cost efficiency and effectiveness of the alternatives. The CE/ICA analysis was used in combination with the habitat valuation method (Appendix A) to identify cost effective alternatives.

3.3.1 Future without project condition alternative

No Action Alternative (NAA) represents the most likely anticipated future condition (Future Without Project) if there is no change to the man-made cuts in the Satilla estuary.

3.3.2 Description of Alternatives*

Each of the action alternatives would restore (in various degrees) the hydrodynamic environment; which will consequently restore salinity gradients, reduce local sedimentation issues, and increase connectivity for local biota. Alternatives focus on closing a combination of ORR, Noyes Cut, and Dynamite Cut to alter tidal exchange in Dover and Umbrella Creeks (Figure 2). Closing man-made cuts is also anticipated to restore historic conditions of salinity regimes and increase connectivity for local fauna.

3.3.2.1 No Action Alterative (NAA)/Future Without Project Condition

The NAA adverse environmental impacts come from allowing the continuation of unnatural circulation patterns created by the existing man-made cuts. These cuts have expanded greatly over the decades since their construction and continued expansion

has had adverse impacts to the salinity gradient and shoaling within Dover and Umbrella Creeks.

3.3.2.2 Alternative 7 (Close Noyes Cut, Dynamite Cut, and ORR)

To achieve the project objectives, this alternative would alter the hydrodynamic environment by closing Noyes Cut, Dynamite Cut, and ORR (Figure 2). The closure structures (Figure 9 and Figure 10) would consist of a combination of rip rap, bedding stone, and sheet pile end walls. The closures are designed with sheet pile tying into the marsh (not across the entire structure) on both ends to minimize environmental impacts within the marsh. Construction of all of the closures would use barges to avoid impacts to surrounding tidal salt marsh.

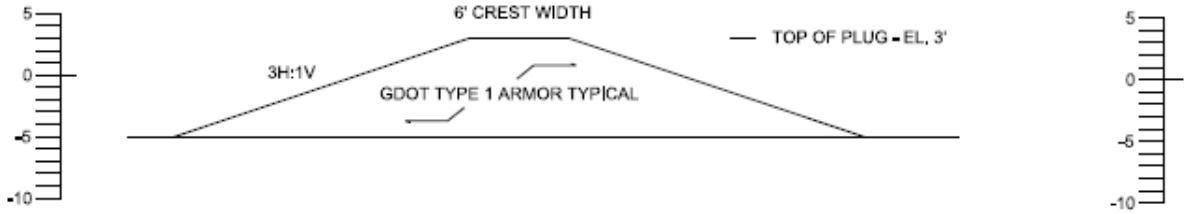

Figure 9 - Conceptual design (Cross Section) of closure structure

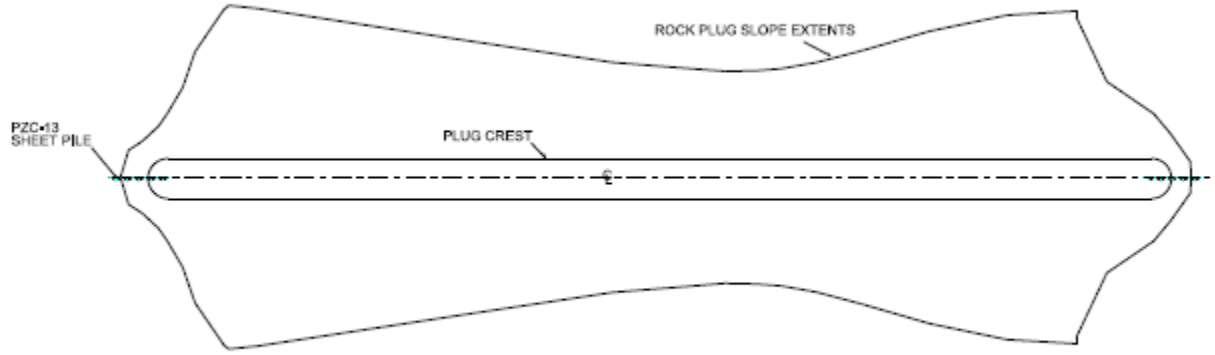

Figure 10 - Conceptual Design (Plan View) of Closure Structure

Noyes Cut is approximately 3,100 feet long and 500 feet wide. The Noyes Cut closure structure would be approximately 432 feet long, 72 feet wide, and 11 feet high.

ORR is approximately feet 3,000 feet long and 30 feet wide. The ORR closure structure would be approximately 112 feet long, 54 feet wide, and 8 feet high.

Dynamite Cut is approximately 350 feet long and 250 feet wide. The Dynamite Cut closure structure would be approximately 312 feet long, 66 feet wide, and 10 feet high.

All closure structures (Figure 11) would include signage on both sides to warn boat traffic of the danger associated with the closures. This alternative includes the closure of Noyes Cut. Noyes Cut has been obsolete since 1939 (Section 1.5 “History”), yet remains a feature of the Federal project. The closure of Noyes Cut can be considered a modification of the current structure and is not inconsistent with the authorized purposes of the AIWW.

Figure 11 - Locations of Closure Structures

3.3.2.3 Alternative 6 (Close Dynamite Cut and ORR)

This alternative involves the combination of closing Dynamite Cut and ORR as described in Alternative 7 above, but would not include the closure of Noyes Cut.

3.3.2.4 Alternative 1 (Close Noyes Cut)

This alternative involves the closure of Noyes Cut as described in Alternative 7 above, but would not include the closure of the other cuts in Alternative 7.

3.4 Cost Effectiveness/Incremental Cost Analysis (CE/ICA)

According to the *Planning Guidance Notebook* ER 1105-2-100, USACE may recommend modifications for the improvement to the environment. If it is determined that a USACE water resources project has contributed to the degradation of the quality of the environment, restoration measures may be implemented at the project site or at other locations that have been affected by the construction or operation of the project, if such measures do not conflict with the authorized project purposes. Of particular interest to USACE are restoration projects that improve wetlands, floodplains, and aquatic systems. USACE restoration policy focuses on engineering and water control solutions rather than land acquisition. Possible improvements include, but are not limited to: restoring tidal creeks and tidal pond habitat; restoring tidal hydrology and native wetland vegetation; using dredged material to restore wetlands; and restoring conditions conducive to native species establishment.

The primary objectives of this project are to improve the quality of the existing aquatic habitat for resident species (e.g., blue crabs, shrimp) and increase connectivity for migratory species (e.g., striped bass, American eels, shad, river herring) in the upper reaches of the Dover and Umbrella Creeks watershed.

To achieve these stated objectives, this project would restore the hydrologic connectivity by restoring the historic flow circulation in the watershed. These changes would restore salinity gradients and reduce local sedimentation issues; both of which would improve access to upstream spawning habitat for local migratory species.
In order to comply with the requirements of ER 1105-2-100, a Cost Effectiveness and Incremental Cost Analyses (CE/ICA) must be conducted for ecosystem restoration projects to identify the Cost Effective or “Best Buy” solutions for each possible level of ecosystem output. “Cost Effective" means that, for a given level of non-monetary output, no other plan costs less, and no other plan yields more output for less money. The most efficient plans are called "Best Buys." They provide the greatest increase in output for the least increases in cost.

The tasks required to conduct the National Ecosystem Restoration (NER) analysis for the Noyes Cut study are described in terms of the seven steps listed in ER 1105-2-100, E-36. In these steps, the CE/ICA are identified separately and begin after the outputs and costs have been determined. The software program, IWR Planning Suite II, developed by the Institute for Water Resources (IWR), was used to prepare the CE/ICA analysis.

The costs used in the CE/ICA were based on the current working estimate of the construction; design & specifications; performance monitoring; Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R); and real estate of the conceptual plans. Per USACE policy, only actual project implementation costs are to be included in the total project cost calculations for the Cost Effectiveness and Incremental Cost Analyses.

Since project benefits are not measured in dollars, the CE/ICA offers the next-best approach to value. The CE/ICA of alternative plans may not identify a unique or optimal solution; but they can lead to a more-informed choice from among alternatives during the decision making process.

In addition to the intended ecosystem benefits, ancillary benefits may include the return of sport fishing and commercial fishing/crabbing in Dover and Umbrella Creeks for the aforementioned species. Residential deep water access would also be restored to residential developments adjacent to the estuary that currently have access only at high tide. Benefits in addition to the habitat units calculated in the CE/ICA would be obtained by establishing a uniform salinity gradient from the headwater to the sound. These benefits are discussed in more detail in Section 3.4.1 (*Additional Habitat Lift from Salinity Gradient Improvements*).

Step 1 - Display outputs and costs: Calculate average annual outputs (not discounted) and equivalent annual costs (discounted) based on inputs over a 50-year period of analysis beginning at the completion of construction. Output values or the average annual change in Habitat Units were calculated by subtracting the Without-Project value from the With-Project value ("With-&-Without Analysis"). The difference between them is the average annual net benefit. Construction costs were calculated in terms of present worth and annualized over a 50-year period of analysis at the current Fiscal Year 2018 (FY18) Federal discount rate of 2.75 percent. Monitoring costs were discounted over a five year period of analysis and added to annualized construction costs in order to calculate total average annual costs.

Outputs:
Habitat Units: The net increase in Average Annual Habitat Units (AAHU) was selected as the output unit of measurement. This ranges from a low of 0 under the No Action Alternative to a high of 1780 under Alternative 7 (Table 7 and Figure 12).

Table 7 - Average Annual Habitat Net Benefits

Alternative	Alternative Description	Plan Outputs (AAHU Increase)
Baseline	NAA	0
1	Close Noyes Cut	493
6	Close Dynamite Cut and ORR	1,330
7	Close Noyes Cut, Dynamite Cut and ORR	1,780

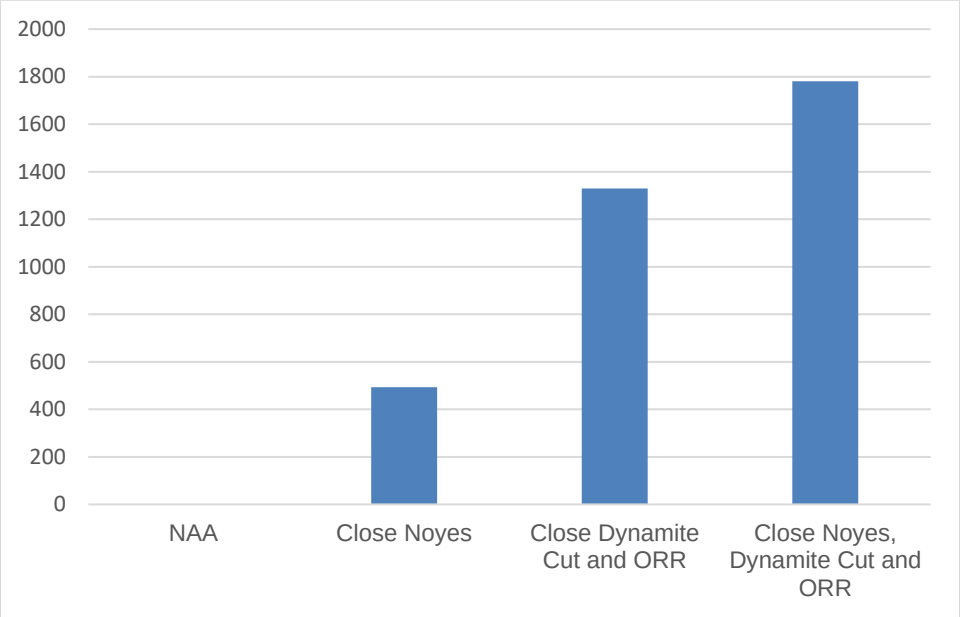

Figure 12 - Average Annual Habitat Net Benefits

Cost Estimates:
First Costs: The detailed project construction first costs for each Alternative are presented in Table 8.

Average Annual Equivalent Costs: The average annual equivalent (AAE) costs are based on October 2017 price levels, the current FY18 Federal discount rate of 2.75 percent, and a 50-year period of analysis beginning at construction completion. This interest rate, as specified in the Federal Register, is to be used by Federal agencies in the formulation and evaluation of water and land resource plans.

Average Annual Costs (AAC): The average annual costs ranged from a low of $0 for the No Action Alternative to a high of $290,537 for Alternative 7. Total average annual cost includes average annual performance monitoring costs as presented in Table 8. Because the construction period for each alternative considered is under two months in duration, no calculation for interest during construction is included.

Table 8 - Average Annual Project Costs (FY18 Price Level)

	Alternative	Project Construction First Costs*	Average Annual OMRR&R Cost	Monitoring Costs **	Total Average Annual Costs***
	NAA	-	-	-	-
1	**Close Noyes**	$3,898,044	$10,000	$350,000	$157,722
6	**Close Dynamite Cut and ORR**	$4,235,636	$10,000	$350,000	$170,227
7	**Close Noyes, Dynamite Cut and ORR**	$7,483,680****	$10,000	$350,000	$290,537

* In conformance with ER 1105-2-100, Project First Costs are used for the CE/ICA as presented in Table 8. These are not equivalent to fully funded Total Project Costs, which are applied for the determination of cost share responsibilities for the sponsor and the Federal Government.
** Monitoring costs for comparison is the original estimated cost without contingency.
*** Discounted over 50 year period.
**** Alternative 7 "first cost" in above table was developed for alternative comparisons and differs from "first cost" included in the later-developed TPCS.

Step 2 - Identify combinable management measures:
In this step, several possible combinations of management measures were formulated to achieve project objectives. The results of this analysis are presented by the alternatives below.

Alternative:
No Action Alternative: No Federal action would be undertaken to restore the degraded conditions in the project area with the NAA.

Alternative 1: This alternative includes the construction of a plug designed to close Noyes Cut.

Alternative 6: This alternative includes the construction of two plugs designed to close Dynamite Cut and ORR, respectively.

Recent H&H sedimentation modeling revealed that closing Dynamite Cut alone was likely to cause ORR to scour and re-open. This re-opening of ORR would cause the loss of most of the hydrologic and ecological benefits. As such, the combination of Dynamite Cut and ORR plugs was instead added to provide a more ecologically viable alternative to the final array.

Alternative 7: This alternative combines the management measures that compose Alternatives 1 and 6. It includes the construction of a plug designed to close Noyes Cut, and the construction of 2 plugs designed to close Dynamite Cut and ORR, respectively.

Step 3 - Calculate outputs and costs of combinations: All combinations of management measures and scales were sorted in terms of increasing output. This

provided the basis for developing a supply curve. All environmental outputs were measured in terms of Average Annual Habitat Units. As indicated in Table 7 and discussed in Step 1 of the previous report section, Alternative 7 provides the most net Habitat Units (1780 AAHU). This constitutes a 261.1 percent AAHU increase compared to Alternative 1 (493 AAHU) and a 33.8 percent AAHU increase compared to Alternative 6 (1330 AAHU).

Step 4 - Conduct cost effectiveness analysis: A plan is cost effective if no other plan provides the same level of output for less cost and if no other plan provides more output for the same or less cost. This step identifies the least-cost or best solution plan for a given amount (or range) of outputs. This eliminates economically ineffective solutions. Alternatives identified through this comparison are the "cost effective" plans. Figure 13 and Table 9 display the results of this analysis.

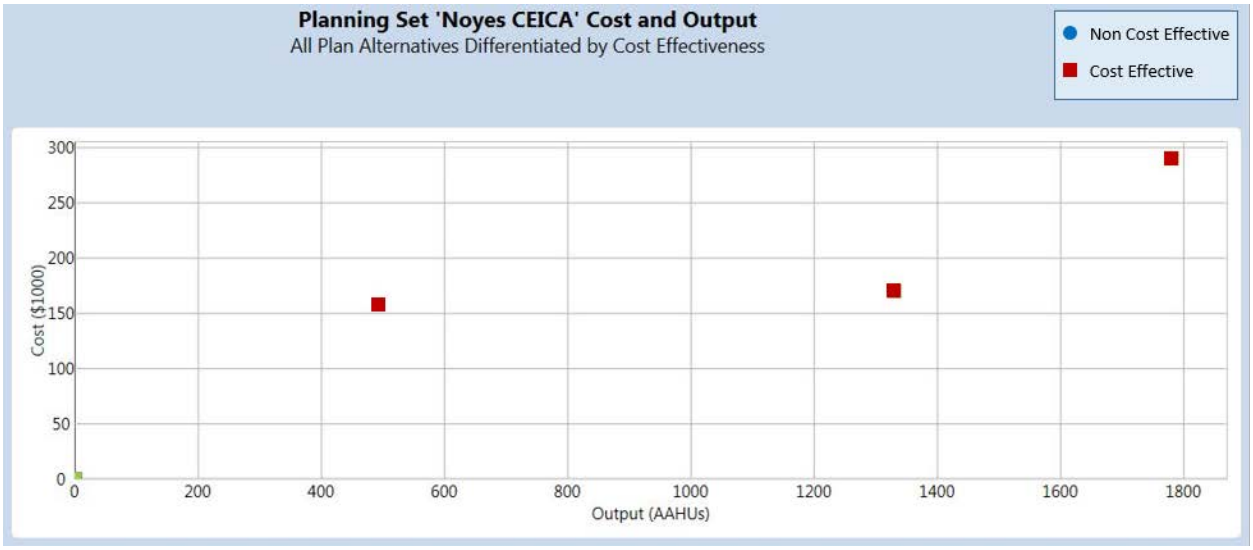

Figure 13 - Cost Effectiveness Analysis

Table 9 - Cost Effectiveness Analysis Data & Results

	Alternative	AAC (FY18 Price Level)	Plan Outputs (AAHU)	Cost Effective
Baseline	NAA	0	0	-
1	Close Noyes	$157,722	493	Yes
6	Close Dynamite Cut and ORR	$170,227	1330	Yes
7	Close Noyes, Dynamite Cut and ORR	$290,537	1780	Yes

Step 5 - Incremental cost analysis: The ICA identifies the subset of cost effective plans that offer the greatest increases in output for the least increases in cost (the plans that have the lowest incremental costs per unit of output for successively larger levels of output). Those plans that are most efficient in production and superior financial investments are called the "Best Buy" plans. “Best Buy” plans are the most efficient plans at producing the output variable (Habitat Units). They provide the greatest increase in the value of the output parameter variable for the least increase in the value of the cost parameter variable. The first best buy plan is the most efficient plan, producing the most output at the lowest incremental cost per unit. If a higher level of output is desired than that provided by the first best buy plan, the second best buy plan is the most efficient plan for producing additional output, and so on.

That is the same as identifying the plans with the lowest incremental cost per habitat unit, also known as a marginal cost analysis. This step considers the most cost effective plans by scale of output, beginning with No Action. It eliminates plans that are smaller in scale than the first “Best Buy” plan. The incremental costs and outputs are first measured against the No Action to determine what is referred to as the first “Best Buy.”

Finally, the additional costs for the additional amounts of output (incremental cost) produced by the “Best Buy” alternative plans were calculated for each alternative. The results of all the calculations and comparisons of costs and outputs provided a basis for addressing the decision question of whether the additional outputs are worth the additional costs incurred to achieve them.

The incremental cost analysis examined how the costs of additional units of environmental output increase as the level of environmental output increases. For this analysis, the environmental outputs are measured in average annual habitat units. The plan is to improve environmental conditions in the study area, which includes restoring the natural flow and salinity levels. The project construction costs of each alternative were compared with the environmental benefits, within the framework of an incremental cost analysis, to identify the most cost effective Alternatives. This analysis identified the

"Best Buy" plans for decision makers to consider. Table 10 displays the incremental cost of all plans relative to No Action.

Table 10 – Average Cost (FY18 Price Level)

	Alternative	AAC	AAHU	Average Cost	Best Buy Alternative
	NAA	0	0	0	
1	Close Noyes	$157,722	493	$320	
6	Close Dynamite Cut and ORR	$170,227	1330	$128	Best Buy
7	Close Noyes, Dynamite Cut and ORR	$290,537	1780	$163	Best Buy

Table 10 shows that Alternative 6 has the lowest average cost at $128 dollars. As such, Alternative 6 is the first Best Buy plan. Because Alternative 1 produces less output than Alternative 6, it is not considered a Best Buy.

Step 6 - Recalculate incremental costs: This step uses iterative incremental cost analysis to identify plans where there is a significant change in incremental costs and identify the potential NER plans. The first step in this process looks at the incremental costs and outputs for plans larger than the first "Best Buy" plan. Plans larger (i.e. providing more output) than the last "Best Buy" plan are iteratively considered with the incremental costs and outputs relative to that last plan. As Alternative 7 is the sole remaining alternative with output greater than the first "Best Buy," it is the only Alternative considered.

Table 11 – Best Buy Incremental Cost Analysis (FY18 Price Level)

Alternative	Alternative Description	Incremental AAC	Incremental Plan Outputs (AAHU)	Incremental Cost/ Unit Output
7	Close Noyes, Dynamite Cut and ORR	$120,311	450	$267

As is indicated in Table 11, Alternative 7 delivers an additional 450 average annual habitat units at an incremental cost of $267 per habitat unit as the second "Best Buy" plan. Although it does not result in the least costly plan per additional AAHU, it does provide the maximum amount of ecosystem benefits (1780 AAHUs) which is 34 percent more in outputs than the next smaller plan. However, Alternative 6 results in the most incrementally cost-effective plan that maximizes ecosystem restoration benefits as compared to costs.

Step 7 - Tabulate and graph incremental costs: This is the last step that displays a summarized table (Figure 14) of the pertinent incremental cost and output information associated with the increasing size (in terms of output) of the "Best Buy" plans. This allowed the team to visualize the increase in benefits versus the cost to go from Alternative 6 to Alternative 7.

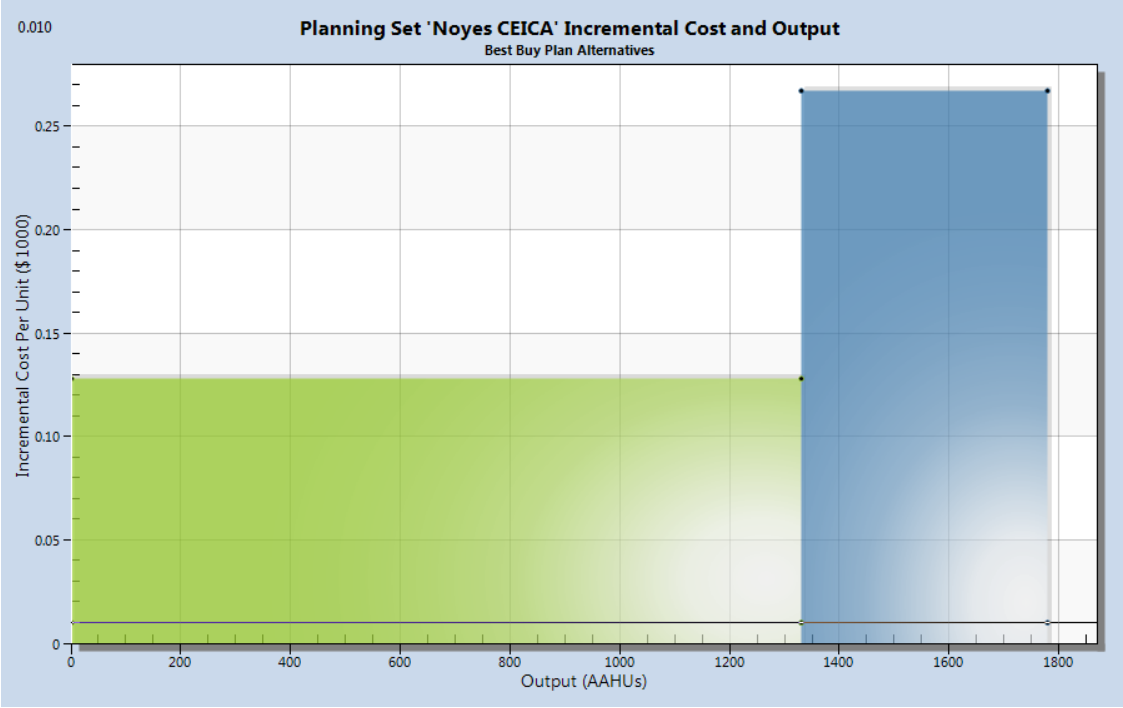

Figure 14 - Incremental Cost Analysis of Best Buy Plans

Table 12 shows additional information, including an incremental cost analysis comparing Alternatives 6 and 7 to the non-Best Buy Alternative 1.

Table 12 – Incremental Cost Analysis by Alternative (FY18 Price Level)

	Alternative 6	Alternative 7
Increase in AAC vs Alt.1 ($)	$12,505	$132,815
Increase in AAC vs Alt.1 (%)	7.9%	84.2%
Increase in AAHU vs Alt.1 ($)	837	1,287
Increase in AAHU vs Alt.1 (%)	169.8%	261.1%
Incremental Cost per Output	$15	$103
Increase in AAC vs Alt. 6 ($)		$120,310
Increase in AAC vs Alt.6 (%)		70.7%
Increase in AAHU vs Alt.6 ($)		450
Increase in AAHU vs Alt.6 (%)		33.8%
Incremental Cost per Output		$267

3.4.1 Additional Habitat Lift from Salinity Gradient Improvements

Within the West Tributary of Dover Creek, Alternative 7 (Close Noyes Cut, Dynamite Cut, and ORR) provides a more suitable salinity gradient (demonstrated by Figure 15) than Alternative 6 (Close Dynamite Cut and ORR) for migratory fish seeking cues to find upstream freshwater spawning habitat.

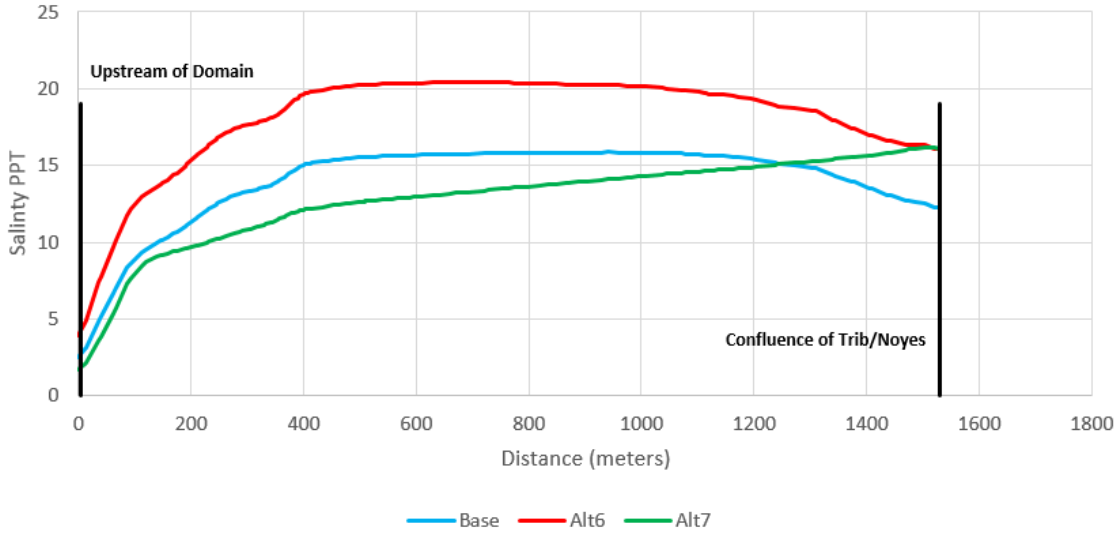

Figure 15 - West Tributary: Graph Starts at Upstream End of Tributary

As illustrated by Figure 15, the base condition and Alternative 6 have a salinity peak that is upstream of the confluence of the west tributary (Figure 3) and Noyes Cut. This increase in salinity levels as migratory fish start to swim upstream toward freshwater discourages fish seeking freshwater from continuing upstream towards spawning habitat. With Alternative 7, there would be a steady reduction in salinity as migratory fish progress upstream towards spawning habitat - without any areas where salinity increases on the way. Alternative 7 provides a significantly improved gradient.

Alternative 7 also provides more freshwater spawning habitat than Alternative 6. The improved salinity gradients would improve habitat for the migratory fish and shellfish listed in Table 2. In addition, Alternative 7 provides more improvements to habitat for the Federally protected manatee due to the increase in freshwater upstream and improved access to this freshwater.

These benefits from an improved salinity gradient would be additional benefits to those calculated in the CE/ICA because the habitat unit calculations did not include salinity analysis.

4.0 Evaluation of Alternatives/ Environmental Impacts*

Since there has been so much damage to ecosystem for roughly 100 years since all of the cuts were made between 1900 and 1939, we could not predict further future degradation with models (within this CAP project's constraints). Modeling beyond available funding would have been required to predict future changes, if any. Therefore, as part of risk informed decision process, USACE assumes that the future conditions with no action alternative was equal to existing conditions.

4.1 Hydrology and Floodplains

Executive Order (EO) 11988 has an objective to avoid, to the extent possible, long, and short-term adverse impacts associated with occupancy and modification of the base floodplain. Further objectives are the avoidance of direct and indirect support of development in the base floodplain wherever there is a practicable alternative and protection and restoration of natural floodplain functions. The USACE regulation for implementing EO 11988 (ER 1165-2-26) defines the base floodplain as the 100-year or one percent chance floodplain. The alternatives analyzed in this document would only involve restoration of historic tidal circulation patterns and would not alter the floodplain hydrology.

Future Conditions with No Action Alternative:
Selection of the NAA would not have impacts on the floodplains within the project area. Selection of the NAA would not be expected to have further adverse impacts to the hydrologic malfunctions that have occurred since the opening of all of the 8 man-made cuts in the study area in the 1900 to 1939 timeframe (Figure 16). Rainfall and tidal event would continue to go out of channel into marsh when the channel capacity is exceeded.

Figure 16 - Entrance of Noyes Cut from Dover Creek facing south

Future Conditions with Action Alternatives 1, 6, and 7:
USACE does not anticipate any significant adverse impacts to the hydrology and floodplains within the Satilla River Basin from the action alternatives, since the alternatives would only involve restoration of historic tidal circulation patterns and would not significantly alter the floodplain hydrology.

To achieve the study goals, this project will alter the hydrodynamic environment. Those alterations are designed to restore historic conditions of salinity gradients, reduce local sedimentation issues, and increase connectivity for local biota. The three action alternatives focus on closing a combination of ORR, Noyes Cut, and Dynamite Cut to alter tidal exchange within Dover and Umbrella Creeks. The closure structures would vegetate and become more resistant to tidal surges and sea level rise over time.

For carrying out the Executive Order's directives (EO 11988), an 8-Step decision making process is required, as provided by 24 CFR §55.20. This 8-Step process (detailed in Appendix I) concluded that the Recommended Plan is inherently located in a 100-year flood plain, as it is designed to restore the degraded hydrologic functions of the floodplain. The restoration of the historic hydrology will consequently restore aquatic habitat, which is all inherently located within the 100 year floodplain. Since all of the components of the Recommended Plan are designed to optimize restoration of hydrologic and ecological functions within the floodplain, there are no adverse floodplain impacts identified by this study. All closure structures would not be much above marsh height; therefore any rainfall and tidal events would go out of channel into marsh when

channel capacity is exceeded which would be similar to what naturally occurs under existing conditions. The volume flood storage of the marsh in the vicinity of the project is very large compared to the minor reduction of the channel volume from the rock closures. Therefore there should be no induced flooding from any of these alternatives.

4.2 Aquatic Resources and Aquatic Habitat

Future Conditions with No Action Alternative:
Selection of the NAA would not be expected to have further adverse impacts in addition to the habitat degradations that have occurred since the opening of all of the 8 man-made cuts in the study area in the 1900 to 1939 timeframe.

Future Conditions with Alternative 7:
To achieve the study goals, this alternative will alter the hydrodynamic environment, which will consequently restore salinity gradients, reduce local sedimentation issues, and increase connectivity for local biota. This alternative would close a combination of ORR, Noyes Cut, and Dynamite Cut to alter tidal exchange in Dover and Umbrella Creeks. Closing cuts would restore historic conditions of salinity regimes and increase connectivity for local fauna.

Potential indirect long-term benefits of restoring depths and flows in the study area may include increased dissolved oxygen (DO) levels, decreased Total Suspended Solids (TSS), and improved nutrient exchange between the Satilla River, St. Andrews Sound, and the Atlantic Ocean. In addition to the intended ecosystem benefits, ancillary benefits would include the return of commercial fishing and crabbing and sport fishing in Dover and Umbrella Creeks. Residential deep water access would also be restored to residential developments adjacent to the estuary that currently have access only at high tide. Alternative 7 also provides significant improvements to habitat for the Federally protected manatee as detailed in Section 4.6.

The PDT quantified the habitat benefits from each alternative by calculating the amount of tidal exchange (exchange volume) in multiple locations throughout Dover and Umbrella Creeks. Exchange volume serves as an important surrogate for the restoration of salinity gradients, which influence the wide variety of species occurring in the estuary. Additionally, exchange volumes may be used to assess the predictability of the salinity regime in the estuary and the degree to which it represents the unaltered condition needed for estuarine fauna (i.e., expected upstream-to-downstream, fresh-to-saline patterns). The habitat model calculated that this alternative would produce 1780 average annual habitat units. More detail on the habitat unit calculation may be found in Appendix A.

Aquatic species dependent on gradual salinity gradients would benefit more from this alternative. Many of the species in the project impact area (Table 2) require this more natural salinity gradient to navigate between saltwater, brackish, and freshwater environments to successfully complete their life cycles. This beneficial impact is discussed in more detail in Section 3.4.1 and is additional to the habitat model

calculations of benefits. Alternative 7 also provides more spawning habitat than Alternatives 1 or 6 for those species that require freshwater for spawning.

Positive impacts of restoring higher flows to Dover and Umbrella Creeks (and improved salinity gradient and access to upstream spawning habitat) include benefits to crabs, shrimp, and striped bass (Montague 2017b). American shad, river herring, blueback herring, alewife, American eel, and striped bass would also benefit from greater depths and restored salinity gradient in Dover and Umbrella Creeks. Most of the species in Table 2 would be expected to be benefited by Alternative 7. There are many other species in Table 2 of major significance for commercial and recreational value that would be benefited more by Alternative 7 than the other alternatives. Many of these species are scarce and have been in a state of rapid decline in recent decades, as described in Section 2.3.2.

Future Conditions with Alternative 6:
Improvements to aquatic habitat from this alternative would be similar to Alternative 7 above. The main difference would be the quantity of benefits, which would be significantly lower (1330 habitat units) than Alternative 7, as described in Section 3.4.

Future Conditions with Alternative 1:
Improvements to aquatic habitat from this alternative would be similar to the alternatives above. The main difference would be the quantity of benefits, which would be significantly lower (480 HUs) than Alternative 7 or Alternative 6, as described in Section 3.4.

4.3 Essential Fish Habitat

Future Conditions with No Action Alternative:
Selection of the NAA would not be expected to have further adverse impacts in addition to the habitat degradations that have occurred since the opening of all of the 8 man-made cuts in the study area in the 1900 to 1939 timeframe.

Future Conditions with Action Alternatives 1, 6, and 7:
Potential indirect long-term benefits of restoring depths and flows in the study area may include increased dissolved oxygen (DO) levels, decreased Total Suspended Solids (TSS), and improved nutrient exchange between the Satilla River, St. Andrews Sound, and the Atlantic Ocean. In addition to the intended ecosystem benefits, ancillary benefits may include the return of commercial fishing and crabbing and sport fishing in Dover and Umbrella Creeks, for the aforementioned species.

To achieve the study goals, this project will alter the hydrodynamic environment, which will consequently restore salinity gradients, reduce local sedimentation issues, and increase connectivity for local biota. The alternatives focus on closing a combination of ORR, Noyes Cut, and Dynamite Cut to alter tidal exchange in Dover and Umbrella Creeks. Closing cuts would restore historic conditions of salinity regimes and increase

connectivity for local fauna. Section 5.0 contains a quantitative comparison of the alternatives.

Future Conditions with Alternative 7:
This alternative involves closure of man-made cuts that would result in an adverse impact to EFH from conversion of 1.08 acres of EFH (0.87 acres of open water and 0.21 acres of salt marsh) to non-EFH rock and sheet pile after construction of the closure structures. However, these adverse impacts would be expected to be nullified by the restoration of EFH (salt marsh habitat) within the three cuts. This restoration of tidal salt marsh would displace an equal amount of open water EFH, which is of lower value from a scarcity and ecological perspective. This conversion to tidal salt marsh would also restore the system closer to the original condition before the man-made cuts.

These cuts would also be expected to at least partially fill in with wetland habitat from natural processes of sedimentation and regeneration of wetland vegetation. An existing project, New Cut in Savannah Harbor, has completely filled in due partially to the deposition of fill material and partially due to the natural processes of sedimentation and regeneration of wetland vegetation.

The Figure 17 and Figure 18 illustrate the condition of New Cut shortly after construction.

Figure 17 - New Cut, Savannah River Estuary, February 19, 1992

Figure 18 - New Cut Post Construction, Savannah River Estuary, 1993 Google Earth Image

The latest aerial imagery (Figure 19) shows the cut completely filled with wetland habitat. New Cut has completely filled in due partially to the deposition of fill material and partially due to the natural processes of sedimentation and regeneration of wetland vegetation.

Figure 19 - Google Earth Aerial Imagery 2014

All three of the areas being closed in Alternative 7 would also be expected to at least partially fill in with wetland habitat from natural processes of sedimentation and regeneration of wetland vegetation.

This restored tidal salt marsh EFH would displace an equal amount of open water EFH, which is of lower value. Tidal marshes are some of the most ecologically productive ecosystems providing critical habitat for fish and shellfish of commercial and recreational importance.

Since this alternative involves restoring natural and historic circulation patterns by closing man-made cuts, overall impacts are expected to be beneficial on an individual project and cumulative effects basis. Restoring the natural circulation patterns may also restore historical salinity gradients allowing more efficient use of EFH by migratory fish species.

This alternative would increase flow to upstream areas of Dover and Umbrella Creeks and consequently, would be expected to convert brackish water to a more freshwater system. This conversion would result in a neutral impact to EFH.

Future Conditions with Alternative 6:
This alternative involves closure of Dynamite Cut that would result in an adverse impact to EFH from conversion of 0.33 acres of EFH (0.23 acres of open water and 0. 09 acres of salt marsh) to non-EFH rock and sheet pile after construction of the closure structures. However, this adverse impact is expected to be more than offset by the

restoration of wetlands (tidal salt marsh habitat) within the cut (as discussed above). This restoration of tidal salt marsh would displace an equal amount of open water EFH, which is of lower value from a scarcity and ecological perspective. This conversion to tidal salt marsh would also restore the system closer to the original condition before the man-made cuts.

This alternative is expected to convert brackish water to a more freshwater system in upstream areas of Dover and Umbrella Creeks. This conversion would result in a neutral impact to EFH.

Since this alternative involves restoring natural and historic circulation patterns by closing man-made cuts, overall impacts are expected to be beneficial on an individual project and cumulative effects basis. Restoring the natural circulation patterns may also restore historical salinity gradients, allowing more efficient use of EFH by migratory fish species.

Future Conditions with Alternative 1:
Construction of the closure in this cut would result in an adverse impact to EFH from conversion of 0.76 acres of EFH (0.64 acres of open water and 0.12 acres of salt marsh) to non-EFH rock and sheet pile after construction of the closure structures. However, this adverse impact is expected to be more than offset by the restoration of wetlands (tidal salt marsh habitat) within the cut (as discussed above). This restoration of tidal salt marsh would displace an equal amount of open water EFH, which is of lower value from a scarcity and ecological perspective. This conversion to tidal salt marsh would also restore the system closer to the original condition before the man-made cuts.

This alternative would increase flow to upstream areas of Dover and Umbrella Creeks and consequently, would be expected to convert brackish water to a more freshwater system in the upper reaches of these creeks. This conversion would result in a neutral impact to EFH.

Since this alternative involves restoring natural and historic circulation patterns by closing man-made cuts, overall impacts are expected to be beneficial on an individual project and cumulative effects basis. Restoring the natural circulation patterns may also restore historical salinity gradients, allowing more efficient use of EFH by migratory fish species.

4.4 Wetlands

Future Conditions with No Action Alternative:
Selection of the NAA is not expected to have impacts to this resource.

Future Conditions with Action Alternatives 1, 6, and 7:
All action alternatives involve closure of man-made cuts that would result in adverse impacts to minor amounts of tidal salt marsh from construction of the closure structures within man-made cuts.

Future Conditions with Alternative 7:
Construction of the closures in Noyes Cut, Dynamite Cut, and ORR would result in the loss of a total of 0.87 acres of jurisdictional waters of the U.S.; and the loss of a total of 0.21 acres of jurisdictional wetlands (Spartina salt marsh). However, this adverse impact is expected to be more than offset by the restoration of wetlands (tidal salt marsh habitat) within the cuts.

This restored tidal salt marsh would displace an equal amount of open water (Jurisdictional Waters of the U.S.), which is of lower value from a scarcity and ecological perspective. As illustrated by the photographs of New Cut (Figure 17, Figure 18, and Figure 19), these man-made cuts are also expected to at least partially fill in with wetland habitat from natural processes of sedimentation and regeneration of wetland vegetation. Construction of the closures would use barges to avoid impacts to surrounding wetlands.

Future Conditions with Alternative 6:
Construction of the closure in this cut would result in the loss of a total of 0.23 acres of jurisdictional waters of the U.S.; and the loss of a total of 0.10 acres of jurisdictional wetlands (Spartina salt marsh). However, this adverse impact is expected to be more than offset by the restoration of wetlands (tidal salt marsh habitat) within the cuts. This tidal salt marsh would displace an equal amount of open water (Jurisdictional Waters of the U.S.), which is of lower value from a scarcity and ecological perspective. This conversion to tidal salt marsh would also restore the system closer to the original condition before the man-made cuts.

Future Conditions with Alternative 1:
Construction of the closure in this cut would result in the loss of a total of 0.64 acres of jurisdictional waters of the U.S.; and the loss of a total of 0.12 acres of jurisdictional wetlands (Spartina salt marsh). However, this adverse impact is expected to be more than offset by the restoration of wetlands (tidal salt marsh habitat) within the cuts. This tidal salt marsh would displace an equal amount of open water (Jurisdictional Waters of the U.S.), which is of lower value from a scarcity and ecological perspective. This conversion to tidal salt marsh would also restore the system closer to the original condition before the man-made cuts.

4.5 Terrestrial Resources and Wildlife

Future Conditions with No Action Alternative:
Selection of the NAA is not be expected to have further adverse impacts in addition to the adverse impacts resulting from habitat degradations that have occurred since the opening of all of the 8 man-made cuts in the study area in the 1900 to 1939 timeframe.

Future Conditions with Project Action Alternatives 1, 6, and 7:
In general, there will positive impacts to local terrestrial fauna in the project vicinity from restoring higher flows to Dover and Umbrella Creeks (and a consequential increase in

freshwater upstream). These indirect beneficial impacts would include numerous species of wildlife that feed on fish and shellfish from the restored aquatic ecosystem (Table 2) (Montague 2017b/c). Higher flows throughout the year would provide a healthier freshwater marsh plant community. All of these benefits to the ecosystem previously discussed may indirectly provide higher quality habitat for terrestrial wildlife.

4.6 Threatened, Endangered, and Protected Species

Future Conditions with No Action Alternative:
Selection of the NAA is not expected to have further adverse impacts in addition to the adverse impacts resulting from habitat degradations that have occurred since the opening of all of the 8 man-made cuts in the study area in the 1900 to 1939 timeframe.

Future Conditions with Alternative 7:
Section 7(a)(2) of the Endangered Species Act (16 U.S. Code 1531 et seq.) requires every Federal agency, in consultation with and with the assistance of the USFWS and the NMFS, to ensure that any action it authorizes, funds, or carries out in the United States or upon the high seas, is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

In general, there will positive impacts to local flora and fauna in the project vicinity from restoring higher flows to Dover and Umbrella Creeks (and a consequential increase in freshwater upstream). These beneficial impacts would include numerous species of fish and shellfish (Table 2) (Montague 2017a). More freshwater conditions throughout the year would provide a healthier freshwater marsh plant community. All of the benefits to the ecosystem previously discussed would directly and indirectly combine to provide higher quality habitat for all of the protected species in Table 4.

West Indian Manatee (*Trichechus manatus)* **Federal Status**: Threatened

Manatees may move through the study area in the summer months. The potential for adverse impacts to manatees would be limited to short term impacts during construction activities associated with the closure structures. The USFWS requires standard construction procedures if construction activities are performed outside winter months of (December to February) designed to protect the manatee. These construction procedures for mitigation of potential impacts to manatees will be part of the contractor specifications and must be implemented on the project site by the contractors at all times. Construction contractor specifications will include the standard manatee construction limitations provided by the USFWS. This project “may affect but is not likely to adversely affect” this species because there is an expected benefit to this species in the long term.

Shortnose Sturgeon (*Acipenser brevirostrum*) **Federal Status**: Endangered
Atlantic Sturgeon (*Acipenser oxyrinchus*) **Federal Status**: Endangered

Based on recent fish sampling research conducted within the project impact area by UGA (Peterson 2018), GADNR (Harrison, Deener, Barrett 2017), and Augusta University (Reichmuth 2018), adverse impacts to these two species of sturgeon would be very unlikely from Alternative 7. Therefore, this project would have "no effect" on Atlantic or shortnose sturgeon; and "no effect" to Atlantic sturgeon critical habitat.

Per correspondence GADNR-WRD "does not anticipate any adverse impacts to sturgeon from this project or any need for any kind of mitigation during construction" (GADNR-WRD 2017). The potential for adverse impacts to these species would be limited to temporary impacts from construction of the closure structures. Best Management Practices (BMPs) established by NMFS would be implemented to mitigate potential impacts. Construction contractor specifications will include the "Sea Turtle and Smalltooth Sawfish Construction Conditions" (as provided by NMFS), which will apply to both species of sturgeon.

Wood Stork (*Acipenser oxyrinchus*) **Federal Status**: Endangered
As discussed in previous sections, the overall improvements to the ecosystem are expected to improve wood stork habitat by improving fishery habitat. This project "may affect but is not likely to adversely affect" because there is an expected benefit to this species in the long term. Critical habitat for this species has not been designated.

In addition to the Federally protected species, the following State Endangered/Threatened species may inhabit the study area and consequently may be beneficially impacted by the restoration of aquatic habitat (GADNR-CRD 2017).

- Bald eagle (*Haliaeetus leucocephalus*)
  Habitat: Edges of lakes and large rivers; seacoasts

- Round tailed muskrat (*Neofiber alleni*)
  Habitat: Freshwater marshes; bogs

Future Conditions with Alternative 6:
Improvements to habitat for this species from this alternative would be similar to Alternative 7 above. The main difference would be the quantity of benefits, which would be lower than Alternative 7, as described in Section 3.4. Adverse Impacts to protected species would be the same as for Alternative 7.

Future Conditions with Alternative 1:
Improvements to habitat for protected species from this alternative would be similar to the alternatives above. The main difference would be the quantity of benefits, which would be lower than both Alternative 7 and Alternative 6, as described in Section 3.4. Adverse Impacts to protected species would be the same as for Alternatives 7 and 6.

4.7 Air Quality

Future Conditions with No Action Alternative:
Selection of the NAA would not be expected to have impacts on air quality.

Future Conditions with Action Alternatives 1, 6, and 7:
There would be no long term impacts to air quality from any of the alternatives. There would be some short term negligible impacts from air emissions during construction of the closure structures. The project area is currently in attainment for the NAAQS for all criteria pollutants. Therefore, implementation of any of the alternatives is not expected to contribute to a change in this designation.

4.8 Water Quality

Future Conditions with No Action Alternative: Selection of the NAA is not expected to have further impacts in addition to the shoaling in portions of the estuary that have occurred since the opening of all of the 8 man-made cuts in the study area in the 1900 to 1939 timeframe.

Future Conditions with Project Action Alternatives 1, 6, and 7:
A benefit of closing the man-made cuts would be restoring the natural tidal flows that typically occurs along the length of unaltered tidal creeks. This distribution should redistribute the sediments, creating a sandier, deeper creek bottom, and restoring gradual salinity gradients from the headwaters to the mouth. Salinity gradients serve as important cues for orienting migratory fish and shellfish.

The estuarine species (Table 2) historically found in Dover and Umbrella Creeks include shrimp (white and brown), herring, shad, blue crab, eastern oyster, and striped bass. All of these species may benefit from the restoration of tidal exchange, water depths, and salinity gradients in the area. Shad, herring, and striped bass require freshwater for spawning, while blue crabs, oysters, and shrimp require brackish water for successful reproduction. The amount of freshwater upstream would increase under the action alternatives.

Additional benefits of restoring depths and flows in the study area would include increased dissolved oxygen (DO) levels, decreased TSS, and improved nutrient exchange between the Satilla River, St. Andrews Sound, and the Atlantic Ocean.

All of the action alternatives will result in these same benefits but in varying degrees. Alternative 7 would result in the largest increase in these benefits based on the H&H modeling and habitat valuation analysis detailed in Section 3.4 (See Section 5.0 for comparative benefits between alternatives).

4.9 Cultural Resources

Future Conditions with No Action Alternative:
The No Action Alternative will have no effects on cultural resources. This alternative would allow processes that are currently in place to continue. Shoaling that would continue in the estuary would not expose or erode archaeological sites that are recorded near Umbrella Creek.

Future Conditions with Action Alternatives 1, 6, and 7:
Implementation of any of the action alternatives would have no effect on cultural resources. A cultural resources survey of the cuts and ORR determined that there are no significant cultural resources located within the areas where the plug features will be placed or within the cuts. One anomaly was identified in Dover Creek, just southwest of the identified plug location for Dynamite Cut. The anomaly will not be impacted by placement of the closure plug or the created wetland habitat.

No historic architectural resources would be affected, nor would the constructed closure structures have an adverse visual effect. The closure structures would help create wetland habitat which is compatible with the viewshed.

Recorded archaeological sites located along the marsh near Umbrella Creek would not be affected by the implementation of this alternative as the sites would not be subjected to increased periods of exposure or longer durations of saturation.

4.10 Socioeconomic Resources

4.10.1 Demographics and Economic Conditions

Future Conditions with No Action Alternative:
Selection of the NAA would have no effects on demographics and economic conditions in the project area.

Future Conditions with Action Alternatives 1, 6, and 7:
In addition to the intended ecosystem benefits, ancillary benefits may include the return of commercial fishing and crabbing in Dover and Umbrella Creeks closer to historic levels. Indirect benefits from improvements to commercial fishing could be more jobs in the community and improvements in supply to local fish markets.

4.10.2 Noise

Future Conditions with No Action Alternative:
Selection of the NAA would have no effects on noise within the project area.

Future Conditions with Action Alternatives 1, 6, and 7:
Implementation of any of the three alternatives being evaluated would not have any direct long term impacts to noise within the project area. There would be some minor

short term impacts during construction activities associated with installing closure structures. The population is sparse in the area. Noise will be comparable to noise from building construction, will be at least .5 miles from nearby residents, and will be limited to the duration of construction.

4.10.3 Recreation

Future Conditions with No Action Alternative:
Selection of the NAA is not likely to adversely impact recreation within the project area. Without cut closure(s) and the elimination of the sedimentation nodes; low tide access at Dover Bluff, Piney Bluff, and River Marsh Landing is expected to continue to deter boating activities in the future. Habitat for game fish would also be expected to continue to be limited within the study area as described in Section 4.2. Therefore, no additional impacts to recreational boating and fishing are expected from this alternative.

Future Conditions with Action Alternatives 1, 6, and 7:
Recreational activities include boating and fishing for residents of local communities (i.e. Dover Bluff, Piney Bluff, and River Marsh Landing). Piney Bluff and River Marsh Landing are more recent developments, the residents of which have had more limited access to Satilla River due to the extensive sedimentation that has occurred in the area over the decades since Noyes Cut was constructed (Montague 2017c). Access for Piney Bluff Community and River Marsh Landing has been restricted to high tide access in skiffs or larger boats that draw less than 2 feet (Montague 2017c). With the closure of ORR and man-made cuts and the subsequent elimination of the sedimentation nodes; low tide access at Piney Bluff and River Marsh Landing is expected to improve over time, and should not continue to deteriorate.

With implementation of the cut closures and the subsequent elimination of the sedimentation nodes; low tide boat access at Dover Bluff, Piney Bluff, and River Marsh Landing are expected to improve. Alternative involving closure of Dynamite Cut (Alternatives 6 and 7) may restrict some access to the Satilla River for residents of the Piney Bluff and Dover Bluff communities. Alternatives involving man-made cuts would increase travel time 8 minutes (from 12 to 20 minutes) to access Satilla River for the residents of Dover Bluff Community (Voigt 2017). The closure structures would include signage on both sides to warn boat traffic of the danger associated with the closures.

Fishing: Implementation of any of the closures is expected to improve recreational fishing in the project vicinity. The past habitat degradations have adversely impacted recreational fishing for game species and the restoration of historical circulation patterns to the estuary is expected to improve the habitat for all of these game species (Table 2). The action alternatives are not expected to have any further adverse impacts in addition to the adverse impacts that have occurred to recreational fishing resulting from the habitat degradations that have occurred since the opening of all of the 8 man-made cuts in the study area in the 1900 to 1939 timeframe.

4.10.4 Aesthetics

Future Conditions with No Action Alternative:
With the no action alterative, aesthetics are not expected to change from the current condition.

Future Conditions with Action Alternatives 1, 6, and 7:
Aesthetics are expected to improve from any of the action alternatives due to the restoration of aquatic habitat and the improvements to sedimentation and shoaling within portions of the estuary. In addition, closure structures within man-made cuts would help restore wetland habitat, which is compatible with the viewshed. Vegetation would establish on the closure structures to provide a natural look.

Residential deep water access would also be restored to some residential developments adjacent to the estuary that currently have water at their docks only at high tide.

4.10.5 Water Supply

There would be no impacts to water supply from any of the alternatives evaluated during this study.

4.10.6 Environmental Justice

Future Conditions with No Action Alternative:
Selection of the NAA would have no effects on Environmental Justice.

Future Conditions with Action Alternatives 1, 6, and 7:
Implementation of Alternative 1 would beneficially impact a portion of the Satilla River estuary that primarily includes Noyes Cut, Dover Creek, and Umbrella Creek and adjacent tidal marsh. The high ground adjacent to the Satilla River estuary does not support disproportionate concentrations of minority or low-income communities. Minority or low-income populations do not recreate in this portion of the estuary in disproportionate numbers. As a result, this alternative would not result in disproportionately high and adverse human health or environmental impacts on minority or low-income populations. Therefore, these alternatives comply with Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”.

4.11 Hazardous Toxic and Radioactive Waste (HTRW)

Future Conditions with No Action Alternative:
Selection of the NAA is not expected to have any impacts related to this issue.

Future Conditions with Action Alternatives 1, 6, and 7:
Fill material requirements for the project's closure of man-made cuts would come from sources that are free of any contamination (e.g. rock and sheet pile). Pollutants from existing sediments being disturbed during construction activities is not expected and historical land use does not warrant any sediment testing for contaminants. The probability of encountering new HTRW contamination is very low for all of the action alternatives. If a new environmental condition is identified prior to construction at the site of the closures, USACE will take the necessary measures to avoid that recognized environmental condition so that the probability of encountering or disturbing HTRW would continue to be low.

4.12 Cumulative Impacts

Council on Environmental Quality regulations (40 CFR 150.7) require an analysis of the cumulative impacts resulting from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes these other actions. Cumulative impacts can result from individually minor, but collectively significant, actions. This cumulative impacts section addresses the cumulative effects arising from considering the alternatives in combination with other historic, ongoing, or proposed actions within the Satilla River Basin.

Future Conditions with No Action Alternative:
The NAA is not expected to result in additional impacts to the ecosystem. However, the past degradations caused by the unnatural circulation patterns created by the existing man-made cuts would continue and would not be offset by any of the improvements from the alternative actions.

Future Conditions with Action Alternatives 1, 6, and 7:
The Satilla River estuary contains a complex network of tidal channels. From 1900 to 1939, eight man-made cuts were made between natural channels to increase the accessibility of the tidal creeks for the timber industry (Figure 2). These cuts changed the circulation patterns in the estuary and (1) altered local patterns of tidal exchange; (2) disrupted gradual salinity gradients from the headwaters to the mouth of the creeks; and (3) reduced access to headwaters for estuarine species due to channel sedimentation.

Currently, salinity gradients are altered by a large volume of Satilla River brackish water entering through the short pathway of Noyes Cut. This large volume of brackish water overwhelms the freshwater that enters the headwater area and causes the salinity to be nearly constant throughout most of Dover Creek. Additionally, tidal flows through multiple creeks and cuts causes a tidal node where sediment deposition clogs channels.

By closing man-made cuts, the project is expected to improve the aquatic ecosystem by restoring the historical hydrologic regime. These improvements would offset much of the historic adverse impacts to the ecosystem from the eight man-made cuts since 1900. Since the action alternatives involve restoring natural and historic circulation patterns by closing man-made cuts, overall impacts are expected to be beneficial on an

individual project and cumulative effects basis. Restoring the natural circulation patterns may also restore historical salinity gradients allowing more efficient use of the ecosystem by migratory fish species.

These three action alternatives focus on closing a combination of ORR, Noyes Cut, and Dynamite Cut to alter tidal exchange within Dover and Umbrella Creeks. The closure structures would vegetate and become more resistant to tidal surges and sea level rise over time. For the study area, sea level is predicted to rise 9 inches over the 50-year period of analysis. The tidal marsh in the study area would be very adaptable to increases in sea level rise due to the large tidal range, available sediment supply, and the ability of the existing marsh to create its own sediment from detritus (NOAA 2011). Actions to mitigate for potential adverse impacts to closure structures from sea level rise are addressed in Section 10.2 (Adaptive Management Plan).

Reasonably foreseeable future actions by others in the basin: In future decades, foreseeable developments in the area appear limited to a slow increase in houses on the north bank of the estuary (Hazzards Neck), and a possible spaceport on the eastern end of the southern bank (Floyds Neck), 5 miles south of the project impact area. The spaceport may also stimulate residential and economic development nearby.

Hazzards Neck is currently rural, with less than 100 houses now along the five adjacent east-west miles closest to this project. The densest development along that stretch is within the confines of the private Dover Bluff Club at the eastern end. Residents of Dover Bluff Club have little desire for intense future development (Montague 2017d).

The industrially zoned eastern end of Floyds Neck is also the site proposed for the small spaceport (known as Spaceport Camden, and consisting of one launch pad, one vertical landing pad, and a few support buildings, with a maximum of 12 liquid-fueled launches per year). The proposed spaceport must be licensed by the Federal Aviation Administration (FAA), a process now ongoing. An EIS for Spaceport Camden is currently in preparation by FAA consultants. If the FAA approves a spaceport license, spaceport activities would not be anticipated to negatively impact the fish and shellfish habitat that would be improved by the recommended plan (Montague 2017d).

The potential for future development is low compared to more urban basins in Georgia and northern Florida. The upland areas immediately adjacent to the estuary are similarly rural. No economic centers or towns are near the proposed restoration area. Woodbine, a town of about 1,300, is near the headwaters of the estuary 15 miles upriver (10 miles west of Noyes Cut).

Across the estuary to the South, Floyds Neck has even less development adjacent to the Satilla River estuary. Its eastern end is zoned by Camden County for heavy industry, however, no active industry or residences are now present. Two large tracts there are owned by Union Carbide and Bayer Crop Science. For half a century, pesticides and rocket fuels were manufactured there, but all such operations ceased

circa 2012. An unlined “legacy” landfill is managed by Union Carbide under a Resource Conservation and Recovery Act (RCRA) permit.

Union Carbide’s legacy landfill is close to Todd Creek, a tributary of the estuary that intersects the AIWW adjacent to the eastern end of Floyds Neck (several miles south of the study area). In case either groundwater or bank erosion reach identified trigger points over the coming decades, Union Carbide has proposed plans to stabilize bank erosion in Todd Creek.

The project impact area, which consists of tidal wetlands and creeks, is Federally protected as jurisdictional waters of the U.S. There are no current dredging activities in the vicinity. The AIWW has very little funding and is only rarely dredged to maintain authorized depths. Two past studies that were not implemented include: 1) Closing Bull Whirl Cut; and 2) building a diversion works at the present intersection of Umbrella and Dover Creeks. There have not been any other known past, present, or future plans to alter or modify this estuary identified in this study.

5.0 Comparison of Alternatives

5.1 National Ecosystem Restoration (NER) Plan

The identified NER plan would be the ecosystem restoration plan of the desired scale that maximizes the monetary and non-monetary beneficial effects/outputs (AAHU) as compared to the monetary and nonmonetary costs. The CE/ICA does not provide a discrete decision criterion for plan selection; however, the incremental cost analysis does provide for the explicit comparison of the relevant changes in costs and outputs on which such decisions may be based. The question that decision makers must ask themselves at each increment of output: “Is it worth it?” To help with this process, the PDT determined that the alternative plan that would be selected as the NER plan would be based on the following criteria:

- Results of the cost-effectiveness and incremental cost analyses;
- Significance of ecosystem outputs produced by the project;
- Improvement in quantity and/or quality of desired ecosystem resources;
- Significance of ecosystem outputs produced by the project in terms of institutional, public, and technical recognition;
- Acceptability, completeness, effectiveness, and efficiency of the plan; and,
- Risk and uncertainty associated with the costs and outputs of the alternative restoration plans.

5.2 Completeness

Completeness is the extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects. This may require relating the plan to other types of public or private plans if the other plans are crucial to obtaining the expected benefits of the objective.

A complete alternative is one that is well thought out. All the necessary implementation actions have been accounted for in the planning process. Once plan effects have been identified, it is important to scrutinize the plan to ensure that it includes all that is necessary to realize the plan effects. This means considering those things beyond the planners' control, as well as those things that may be beyond the scope of the USACE program or the sponsors' commitment.

Since this study accounted for all project purposes, study objectives, necessary investments, implementation actions, and multiple levels of review, the NAA and each of the three action alternatives meet the above conditions of completeness.

5.3 Effectiveness

Effectiveness is the extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities. An effective plan is responsive to the wants and needs of the country. An effective plan makes a significant contribution to the solution of some problems and achieves some opportunities. It contributes to the attainment of the planning objectives. In the screening process, it is often possible to identify alternatives that make little or no contribution to the planning objectives. When this happens, these alternatives would be rejected because they are relatively ineffective.

The alternatives were formulated to meet the project criteria and were evaluated based on their effectiveness in restoring historic hydrodynamic conditions to the study area. Based on the H&H models and the habitat valuation method, all action alternatives would be effective in varying degrees in restoring the hydrology and ecosystem. These models also indicate that Alternative 7 would be the most effective since it provides the most and best habitat restoration to the area.

5.4 Efficiency

Efficiency is the extent to which an alternative plan cost effectively alleviates the specified problems and realizes the specified opportunities, consistent with protecting the Nation's environment.

Efficiency refers to the allocation of resources. Are the resources used efficiently in the construction of a project or the implementation of a plan? Are the outputs produced by the plan produced in an efficient manner? Are the resources that are going to be

significantly affected by the plan still going to be available for efficient use by society? A criterion of efficiency is cost effectiveness. Have we identified the lowest cost of implementation?

Efficiency must be considered in light of all opportunity costs, not just monetary costs. This makes the efficiency criterion considerably more difficult for planning for the Corps' environmental mission because planners may have to trade-off increased implementation costs against less environmental losses.

Cost Effectiveness Incremental Cost Analysis (CE/ICA) was used to identify the most efficient alternative. Based on the CE/ICA, Alternatives 6 and 7 are both Best Buy Plans that would provide the most additional benefits to the ecosystem for the additional cost. The CE/ICA determined that Alternative 6 was more cost efficient than Alternative 7. However, Alternative 7 provides a non-captured benefit to the ecosystem by providing strong salinity cues to migratory fish and larval invertebrates, as detailed in other sections (Sections 3.4.1 and 6.0).

In addition, Alternative 7 also provides more ancillary benefits from improvements to recreational boating and fishing; and commercial fishing. Therefore, Alternative 7 would provide the most overall value to the ecosystem.

5.5 Acceptability

Acceptability is the workability and viability of the alternative plan with respect to acceptance by State and local entities and the public and compatibility with existing laws, regulations, and public policies. Acceptability does not equate with the non-Federal sponsor's willingness to sign a Project Cooperation Agreement. Also, if the plan has opposition from the public, that doesn't make it unacceptable.

There are two primary dimensions to acceptability: implementability and satisfaction. Implementability means is it feasible in the technical, environmental, economic, and social senses. To be acceptable to state and local entities as well as the public, a plan has to be feasible. There are many factors that can render a plan infeasible. These factors can generally be categorized as technical, economic, financial, environmental, social, political, legal, and institutional. If a plan cannot be done for legitimate reasons, it is not feasible.

Acceptability can also be defined as the extent to which a plan is welcome or satisfactory to the public. The goal is to have high acceptability, which means that the alternatives are generally acceptable to all in both an implementable and satisfactory sense. These dimensions of acceptability have been considered in this study. The alternatives satisfy the requirements of all agencies and users and are implementable.

This study has received support from the non-Federal sponsor, stakeholders; and the regulatory agencies that have been involved in the study including GADNR, USFWS, and NMFS. As of March 2017, most local residents and commercial fishermen

(crabbing) have been supportive of alternatives involving closure of man-made cuts in the vicinity during recent inquiries by stakeholders (Montague 2017a). The USFWS has indicated a preference for the plan that would provide the greatest increase in fisheries and related aquatic habitat values (FWCAR 2018), which would be Alternative 7.

5.6 Risk and Uncertainty

The fundamental purpose of the study was to identify the best method of restoring the hydrodynamic environment of the study area. Restoring the hydrodynamic environment would consequently restore the ecosystem from the degradations that have occurred since the 8 man-made cuts were implemented in the early 1900‘s.

To achieve the project objectives, the alternatives were assessed and compared to determine the most effective at restoring the hydrodynamic environment. Based on changes in tidal exchange from the alternatives predicted in H&H models, this study determined which alternative was the most cost effective solution for restoring this ecosystem. The degree of accuracy of H&H models limits the confidence in subsequent predictions of the degree of ecosystem restoration.

Since the USACE Civil Works Program explicitly deals with risk and uncertainty, the goal is to construct an approach that explains the risk and uncertainty in a uniform manner. Risk and uncertainty analysis is intended to improve information and, ultimately, the decisions based upon that information. The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G) of March 10, 1983, states:

> “The planner’s primary role in dealing with risk and uncertainty is to identify the areas of sensitivity and describe them clearly so that decisions can be made with knowledge of the degree of reliability of available information.”

The PDT evaluated the consequences of all known risks and uncertainties and delineated them in the development of a risk register. A detailed description of risks is captured in the study’s Risk Register. After careful consideration, the PDT developed recommendations on how to manage the risks and uncertainties. The alternative selected by the PDT eliminates or minimizes as many adverse effects as possible.

There is some associated risk with selecting Alternative 7 over Alternative 6, since 6 was determined to be the most cost effective in the CE/ICA analysis (Section 3.4). However, this risk is minimal since additional habitat improvements (outside of CE/ICA analysis) were identified with Alternative 7 from the H&H salinity modeling. This additional habitat value is based on providing a more suitable salinity gradient (demonstrated by Figure 9 in Section 3.4.1) than Alternative 6 for migratory fish seeking cues to find upstream freshwater spawning habitat. More detail on the derivation of this additional habitat value is in Section 3.4.1.

5.7 Quantitative and Qualitative Effects Matrix

Table 13 shows a ranking of alternatives based on impacts to important resources in the study area. More detail can be found in Section 4.0.

Table 13 - Ranking of Alternatives Based on Impacts

	NAA	Alt 7	Alt 6	Alt 1
Hydrology	1	4	3	2
Aquatic Resources/Habitat	1	4	3	2
EFH	1	4	3	2
Wetlands/Jurisdictional Waters	--	--	--	--
Terrestrial Resources	--	--	--	--
Threatened/Endangered Species	1	4	3	2
Air Quality	--	--	--	--
Water Quality	1	4	3	2
Cultural Resources	--	--	--	--
Socioeconomics	1	4	3	2
HTRW	--	--	--	--
Cumulative Impacts	1	4	3	2
Average	**1**	**4**	**3**	**2**
Rankings – 1 through 4; 4 being the greatest benefit -- indicates no significant relative difference between alternatives U - Undetermined - to be determined after Phase I surveys				

Conclusion: Based on this analysis, Alternative 7 has the least adverse impacts and the most beneficial impacts among alternatives. Alternative 7 has the highest ranking of the four final alternatives considered in detail.

6.0 Selection of the Recommended Plan

In addition to the NAA, the study team evaluated three alternatives in detail. Alternatives 6 and 7 would produce more benefits at a substantially lower cost per habitat unit than Alternative 1. Therefore, Alternative 1 is less cost-effective and was dropped from consideration as the recommended plan.

The cost effectiveness of Alternatives 6 and 7 can be compared starting with the less expensive plan - Alternative 6. Its output is 1,330 AAHUs, which results in an incremental cost of $128 per AAHU. Alternative 7 has a higher level of output at 1,780 AAHU, which means that an additional 450 AAHUs could be produced for an additional incremental cost of $267 per AAHU. If the additional 450 AAHUs are worth $267 apiece, then Alternative 7 would be selected as the recommended plan.

As detailed in Section 3.4.1, Alternative 7 provides an additional benefit to the ecosystem by providing strong salinity cues to migratory fish and larval invertebrates. Those additional benefits were not measured or included into the CE/ICA calculations (Section 3.4). The ecological and commercial significance of these additional ecosystem outputs were discussed in Section 2.2. The impact analysis in Sections 4.0 and 5.0 also support selection of Alternative 7 as the recommended plan by detailing the amount and significance of the additional benefits to the ecosystem. Therefore, based on all of the above summaries of Sections 2.2, 3.4, 3.4.1, 4.0, and 5.0, Alternative 7 is identified as the recommended plan.

6.1 Costs

Federal and non-Federal cost-share apportionments are based on the fully-funded total project cost to implement the recommended plan. Those costs differ slightly from those used in the CE/ICA, which was based on a prior first cost. The fully-funded costs are the current estimate of the costs at current price levels and inflated through the estimated mid-point of construction.

Implementation responsibilities:
The non-Federal sponsor would be responsible for the following actions:

- Provide during period of construction, a cash contribution equal to 25% of the total construction costs. All construction costs identified and quantified in Table 14.

- Provide all OMRR&R costs at their own expense, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any other specific directions prescribed by the Federal Government or OMRR&R Manual.

- Provide all real estate interests that may be required for implementation of the recommended plan.

- Obtain an intra-agency agreement for the staging and laydown area located at the GPA Brunswick terminal.

Table 14 quantifies the Federal and non-Federal sponsor cost responsibilities shown as Total Project Cost amounts and includes contingencies.

Table 14 - Implementation Responsibilities

Item	Non-Federal Cost (25%)	Federal Cost (75%)	Total Cost (rounded)
Design (includes real estate costs)	$87,250	$261,750	$349,000
Construction	$1,407,500	$4,222,500	$5,630,000
Construction Management (S&A)	$39,250	$117,750	$157,000
Pre- & Post-Construction Monitoring	$116,250	$348,750	$465,000
Adaptive Management (if needed post-construction)	$251,000	$753,000	$1,004,000
Total	**$1,901,250**	**$5,703,750**	**$7,605,000**
OMRR&R[1]	$10,000 (annual)	None	$10,000 (annual)

[1] OMRR&R costs are 100 percent non-Federal.

Table 15 - Implementation Timelines

Phase	Timeline
Decision Document Approval by SAD	November 2018
Project Partnership Agreement	May 2019
Design Approval	April 2020
Contract Award	August 2020
Construction Completion	March 2021
Monitoring	1 event pre-construction 1 event 1 year after construction (2022) 1 event 3 years after construction (2024) 1 event 5 years after construction (2026)
Adaptive Management	If needed, would occur post construction
OMRR&R Period of Analysis	50-year period following construction completion (2021-2071)

6.2 Real Estate

Construction of all of the closures would use barges to avoid impacts to surrounding wetlands. All of the tidal creeks and wetlands in the construction area are owned by the State of Georgia and the U.S. Government. Rock for construction of the closure structures will be sent by rail to Brunswick GPA, which will be the staging area. Use of the staging area at GPA would not incur any additional cost. Since the staging area and the entire area of construction is owned by the State of Georgia and U.S. Government, no other real estate actions would be required. More detail regarding real estate issues may be found in Appendix F.

7.0 Public Involvement*

The Integrated Feasibility Report (including Appendices) was made available to the public for a 30 day review. The non-Federal sponsor, stakeholders; and the regulatory agencies that have been involved in the study have been consulted regarding the selection of the recommended plan. This includes the GADNR, USFWS, and NMFS.

As of February 2018, most local residents and commercial fishermen (crabbing) have been supportive of alternatives involving closure of man-made cuts in the vicinity during recent inquiries by stakeholders (Montague 2017a). The Satilla Riverkeeper has been coordinating with local fisherman, boaters, and other organizations in the area regarding the potential construction of this project.

A community engagement meeting was conducted on January 19, 2018. The response from the community for the tentatively selected plan was very positive and all written comments from the community may be found in Appendix C. The agencies have also been very supportive of the recommended plan. Agency comments and USACE responses are detailed in Appendix C.

8.0 Coordination and Regulatory Compliance*

Preparation of this report has been coordinated with appropriate Congressional, Federal, state, and local interests, as well as environmental groups, interested Federally recognized tribes, and other interested parties. A list of the Federal and state agencies, interested Federally recognized tribes, and Non-Government Organizations (NGO) that were contacted during the evaluation or that received a copy of the report for review follows:

USFWS
EPA
NMFS
Georgia DNR
Georgia DNR-CRD
Georgia DNR-WRD
Georgia DNR-EPD
Georgia DNR - Historic Preservation Division (HPD)
Seminole Nation of Oklahoma

Consultation with Georgia HPD and the Seminole Nation of Oklahoma in accordance with Section 106 of the National Historic Preservation Act has been completed. HPD concurs with the USACE determination of no historic properties affected. The Seminole Nation of Oklahoma has no objections to the proposed undertaking.

The draft report was submitted for review and consultation, and is now complete upon concurrence with the findings of the study and acceptance of the final report.

Consultation regarding protected species in the study area is complete with the USFWS, NMFS, and the GADNR.

USFWS Position and Recommendations:
"The proposed Noyes Cut Section 1135 Project should be designed to provide the greatest incremental increase in fisheries and related aquatic habitat values.

"Based on our evaluation the Service would not object to implementation of the proposed Noyes Cut project providing that the following recommendations are incorporated into the project:

> "1) The inclusion of the "Standard Manatee Conditions and Procedures for Aquatic Construction" as special conditions of any permit that would be issued by USACE.

"We appreciate the cooperation of your staff during our involvement in this planning effort. Please have your staff contact Gail Martinez of this office at 912/312-8739 (Extension 7), if they have any questions regarding our recommendations."

USACE Response to USFWS:
"We appreciate all of the efforts and expertise from the Service during this study and help in developing the Integrated Feasibility Report. The Service' recommendation has been incorporated into the project design. USACE expects that this protocol will continue to be sufficient to ensure the safety of any manatees that might inhabit the area during construction, as it has on our other projects."

GADNR-CRD has also been consulted regarding compliance requirements with the Coastal Zone Management (CZM) Consistency Act (GADNR-CRD 2017). GADNR-WRD has been consulted regarding state protected species.

NMFS has been consulted regarding the fish and shellfish in the study area protected by the Magnuson-Stevenson Fishery Conservation and Management Act. EFH areas have been identified and NMFS concluded that "we accept the conclusion that the proposed action (Alternative 7) has the most beneficial impacts and the least adverse impacts."

The following individuals/agencies listed were consulted during this study:

Name	Organization/Role in Study
Ms. Cynthia Cooksey	NMFS EFH POC
Ms. Kelie Moore	Georgia DNR-CRD Federal Consistency Coordinator & Non-Federal Sponsor

Ashby Nix, Rachael Thompson, and Laura Early	Satilla Riverkeeper
Ms. Gail Martinez	USFWS US FWCAR Preparer
Dr. Clay Montague	Stakeholder Former Satilla Riverkeeper Associate Professor Emeritus Department of Environmental Engineering Sciences. University of Florida
Mr. Fred Voigt	Stakeholder and Resident of Dover Bluff Community
Mr. Bill Post	Diadromous Fish Coordinator S.C. Department of Natural Resources
Dr. Kyle McKay	US Army Engineer Research and Development Center (ERDC) engineer/scientist Development of Habitat Valuation Method
Dr. Bruce Pruitt	ERDC engineer/scientist Development of Habitat Valuation Method
Mr. John Hickey	CEIWR-HEC-WRS Development of Habitat Valuation Method
Mr. Tim Barrett	Georgia DNR-WRD Fisheries Regional Supervisor Provided research on sturgeon presence in area
Dr. Doug Peterson	Professor, Biological Sciences UGA DPeterson@warnell.uga.edu
Dr. Jessica Reichmuth	Associate Professor, Biological Sciences Augusta University Summerville jreichmu@augusta.edu
Mr. Don Harrison	Georgia DNR-WRD Fisheries Biologist III
Ms. Debbie Scerno	USACE South Atlantic Division Planning Division
Mr. Christopher M. Wallen and Staff	Dynamic Solutions Knoxville Tennessee Prime Contractor for H&H model development
Mr. Trap Puckette	RPS Evans-Hamilton H&H Sub Contractor Charleston South Carolina Field data collection
Dr. Clark Alexander	Professor Skidaway Institute of Oceanography Provided local knowledge and available data
Mr. Gaurav Savant	ERDC and consultant for Dynamic Solutions
Mr. Gary Brown	ERDC and consultant for Dynamic Solutions

All comments, letters of concurrence, and permits received regarding the proposed action are located in Appendix C. The individuals/agencies listed below responded with

letters or emails regarding the Draft Integrated Report during the 30-day comment period:

Organization	Name	Certification Type (if required)
Cherokee Nation	Elizabeth Tombs	
Seminole Nation of Oklahoma	Theodore Isham	
Georgia SHPO	Jennifer Dixon Program Manager	
EPA Region 4 - NEPA Program Office	Jamie Higgins	
US Fish and Wildlife Service	Donald Imm Coastal Georgia Supervisor	Section 7 Concurrence December 7, 2017
National Marine Fisheries Service	Virginia Fay Assistant Regional Administrator	EFH Determination December 21, 2017
National Marine Fisheries Service	Mr. David Bernhart Assistant Regional Administrator for Protected Resources	Section 7 Concurrence not required due to “No Effect” Determination on Sturgeon
Georgia DNR-EPD Watershed Protection Branch	Elizabeth Booth	February 26, 2018 Section 401 Water Quality Certification
Georgia DNR-Wildlife Resources Division	Jason Lee Environmental Review Coordinator Non-game conservation	
Georgia Department of Natural Resources Coastal Resources Division	Mr. A. G. Woodward	February 26, 2018 CZM Consistency Determination
One Hundred Miles	Alice Keyes Vice President of Coastal Operations	
Satilla Riverkeeper	Laura Early Satilla Riverkeeper and Executive Director	
Augusta University	Jessica Reichmuth Associate Professor	
Georgia Nature Conservancy	Charles McMillan Coastal Director	

9.0 Mitigation*

The appropriate application of mitigation is to formulate an alternative that first avoids adverse impacts, then minimizes adverse impacts, and lastly, compensates for unavoidable impacts. Compensatory mitigation is not warranted for the recommended plan, since the proposed action would result in substantial positive environmental effects. Some temporary adverse impacts may result from construction of the closure structures; however, standard BMPs would be implemented to mitigate these effects.

The recommended plan avoids adverse impacts by:

1) Limiting construction activities to periods when protected species are less likely to be in vicinity [consultation on-going with USFWS].

2) Construction of the closures would utilize barges to avoid impacts to surrounding wetlands. Barges and rocks would not be placed within marshes outside of closure area.

3) Closures are designed with sheet pile tying into the marsh (not across the entire structure) on both ends to minimize environmental impacts in the marsh.

10.0 Monitoring and Adaptive Management Plans

10.1 Monitoring Plan

All action alternatives include pre- and post-construction monitoring of the 14 data points (Appendix A) used in the hydraulic modeling for the project. Use of the same data points allow a direct comparison of the observed results to those predicted during the feasibility study. The monitoring would assess changes in flow, salinity, and sedimentation.

1) Monitor post-construction changes in Flux at 10 locations (existing data points 4 through 13).

   1 pre-construction monitoring event; 3 post-construction monitoring events (years 1, 3, and 5). Monitoring of flux will be performed during mid-tide and average lunar tidal conditions (incoming or outgoing tide will be chosen).

   The goal is for the change in flux at 100% of 10 locations to trend in the same direction as the modeled results by year 3 post-construction and to be within 10% of the values by year 5 post-construction.

   - Performed by USGS. Use a doppler profiler to collect the flow data. 1 day per creek ~2 weeks total. 2 days for travel. 3-man crew. Post-processing, admin, and escalation. **$**53,250/year X 4 years = $**213,000 Total Flux Costs**

2) Monitor post-construction changes in the salinity profile along Umbrella and Dover Creeks. The monitoring would extend to the upper end of each of these two major tidal creeks.

- Performed by Engineering Division of USACE (EN-H). Profiles with USACE Boston Whaler. ~1 day per creek, ~ 2 days. 2 person crew, 1.5 days post processing. ~$10,500/year X 4 years **= $42,000 Total Salinity Costs**

1 pre-construction monitoring event; 3 post-construction events (years 1, 3, and 5). Monitoring will be performed during a maximum spring tide.

The goal for this monitoring is for the data to show a continually decreasing trend from high to low salinity as one progresses up the tidal creek, as shown in Figure 9 for Alternative 7 by year 3 post-construction.

3) Channel surveys (bathymetry) of domain of the hydraulic model within Dover and Umbrella Creeks, and the Alternate AIWW to measure the amounts of scouring/sedimentation.

Goal is for bathymetry trends to be in the direction (increasing or decreasing sedimentation) predicted in the model by year 5 post-construction.

- Performed by OP-N. ~3 weeks, Admin and escalation. $16,000/year X 4 years = $64,000
- EN labor for volume calculations and/or shoaling maps. $6,500/year X 4 years = $26,000.

Total Bathymetry Costs: $90,000

1 monitoring event pre-construction; 3 events post construction (years 1, 3, and 5).

Total Costs $345,000
$20,000 - EN-H labor coordinate with USGS on flux sampling, provide data to Planning Division of USACE (PD).
$100,000 - PD labor (4 Summary Reports; coordinating with agencies/SAD)

Grand Total $465,000*

*** Total Project Costs**

10.2 Adaptive Management Plan

Adaptive management is a tool to manage risk and uncertainty. The risk of this project failing to obtain the study objectives is considered to be low. If failure occurs, possible adaptive management strategies could include:

- Dredging to improve flows and salinity gradients
- Closure of other existing cuts
- Preventing tidal surges from circumventing constructed closures by:
    - creating wetlands in cuts behind closures to prevent flows going around the closure
    - extending sheet pile wall further into wetlands
    - adding 2 foot of height (additional rock) to closure structures to compensate for settling under the closure structure

Based on limited geotechnical data, the most likely area of project failure is from tidal surges circumventing the sheet pile wall. The estimated cost for installing a 40-foot length of sheet pile to the end of one structure is $717,000.

11.0 Compliance with Law and Regulations*

Table 16 summarizes compliance of the recommended plan with applicable Federal/State laws.

Table 16 - Relationship of Project to Environmental Requirements

Federal Statutes	Level of Compliance*
Clean Air Act	Full
Clean Water Act	Full
Coastal Barrier Resources Act	Full
Coastal Zone Management Act	Full
Comprehensive Environmental Response, Compensation and Liability Act	Full
Endangered Species Act	Full
Estuary Protection Act	Full
Farmland Protection Policy Act	N/A
Federal Water Project Recreation Act	N/A
Fish and Wildlife Coordination Act	Full
Flood Control Act of 1944	Full
Land and Water Conservation Fund Act	Full
Magnuson Fishery Conservation and Management Act	Full
Marine Mammal Protection Act	Full

National Environmental Policy Act	Full
National Historic Preservation Act	Full
North American Wetlands Conservation Act	Full
Resource Conservation and Recovery Act	N/A
Rivers and Harbors Act	Full
Water Resources Development Acts of 1976, 1986, 1990, and 1992	Full
Water Resources Planning Act	Full
Watershed Protection and Flood Prevention Act	Full
Wild and Scenic Rivers Act	Full
Executive Orders (EO), Memoranda, etc.	
Federal Statutes	Level of Compliance*
Migratory Bird (E.O. 13186)	Full
Protection and Enhancement of Environmental Quality (E.O. 11514)	Full
Protection and Enhancement of Cultural Environment (E.O. 11593)	Full
Exotic Organisms (E.O. 11987)	Full
Floodplain Management (E.O. 11988)	Full
Protection of Wetlands (E.O. 11990)	Full
Relating to Protection and Enhancement of Environmental Quality (E.O. 11991)	Full
Environmental Justice in Minority and Low-Income Populations (E.O. 12898)	Full
Invasive Species (E.O. 13112)	Full
Protection of Children from Health Risks and Safety Risks (E.O. 13045)	N/A
Prime and Unique Farmlands (CEQ Memorandum, 11 August 1980)	N/A

*Level of Compliance:
Full Compliance (Full): Having met all requirements of the statute, E.O., or other environmental requirements.
Partial Compliance (Partial): Not having met some of the requirements at current stage of planning. Compliance with these requirements is ongoing.
Non-Compliance (NC): Violation of a requirement of the statute, E.O., or other environmental requirement.
Not Applicable (NA): No requirements for the statute, E.O, or other environmental requirement for the

Environmental compliance for the recommended plan has been achieved through:

- Coordination of this draft report with appropriate agencies, organizations, and individuals for their review and comments.

- U.S. Fish and Wildlife Service (USFWS) and NMFS confirmation that the recommended plan would not likely adversely affect any endangered or threatened species or their critical habitat. The specific Federally protected species include manatees, Atlantic sturgeon, shortnose sturgeon, and wood stork.

- Obtaining Section 401 Water Quality Certification from the State of Georgia.

- Concurrence by the Georgia State Historic Preservation Officer with USACE's determination of effect on cultural resources and resolution of adverse effects should any be required.

- Receipt and resolution of all USFWS Fish and Wildlife Coordination Act recommendations.

11.1 Items of Local Cooperation

Federal implementation of the recommended project would be subject to the non-Federal sponsor agreeing to comply with Federal laws and policies, including but not limited to:

a. Provide 25 percent of the total project cost as further specified below:

1. Provide all lands, easements, and rights-of-way, including those required for relocations, the borrowing of material, and the disposal of dredged or excavated material; perform or ensure the performance of all relocations; and construct all improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material as determined by the Federal Government to be required or to be necessary for the construction, operation, and maintenance of the project;
2. Provide, during construction, any additional contributions necessary to make its total contribution equal to 25 percent of total project costs;

b. Provide, during construction, 100 percent of any project costs that exceed the federal limit of $10,000,000;

c. Shall not use funds from other Federal programs, including any non-Federal contribution required as a matching share therefore, to meet any of the non-Federal sponsor's obligations for the project unless the Federal agency providing the funds verifies in writing that such funds are authorized to be used to carry out the project;

d. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements, and rights-of-way or the addition of facilities which might reduce the outputs produced by the project, hinder operation and maintenance of the project, or interfere with the project's proper function;

e. Shall not use project lands, easements, and rights-of-way required for the project as a wetlands bank or mitigation credit for any other project;

f. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended, (42 U.S.C. 4601-4655) and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way necessary for construction, operation, and maintenance of the project including those necessary for relocations, the borrowing of material, or the disposal of dredged or excavated material; and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act;

g. For so long as the project remains authorized, operate, maintain, repair, rehabilitate, and replace the project, or functional portions of the project, including any mitigation features, at no cost to the Federal Government, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal Government;

h. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access to the project for the purpose of completing, inspecting, operating, maintaining, repairing, rehabilitating, or replacing the project;

i. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, rehabilitation, and replacement of the project and any betterments, except for damages due to the fault or negligence of the United States or its contractors;

j. Keep, and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents, and other evidence are required, to the extent and in such detail as will properly reflect total project costs, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and local Governments at 32 CFR, Section 33.20;

k. Comply with all applicable Federal and state laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army"; and all applicable

Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a et seq.), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 et seq.), and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c));

l. Perform, or ensure performance of, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the construction or operation and maintenance of the project. However, for lands that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigation unless the Government provides the non-Federal sponsor with prior specific direction in which case the non-federal sponsor shall perform such investigation in accordance with such written direction;

m. Assume, as between the Federal Government and the non-Federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the construction, operation, maintenance, repair, rehabilitation, or replacement of the project;

n. Agree, as between the Federal Government and the non-Federal sponsor, that the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, repair, rehabilitate, and replace the project in a manner that will not cause liability to arise under CERCLA;

o. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, (42 U.S.C. 1962d-5b) and Section 101(e) of the WRDA 86, Public Law 99-662, as amended, (33 U.S.C. 2211(e)) which provide that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

12.0 Recommendations

The non-Federal sponsors, the Georgia Department of Natural Resources (GADNR) and the Satilla Riverkeeper, in collaboration with Dover Bluff residents, requested that USACE investigate the best method to restore the Satilla River estuary system under the Section 1135 authority. The purpose of the project is to restore aquatic habitat (wetlands and tidal creeks) degraded by the Atlantic Intracoastal Waterway (AIWW) in the vicinity of Umbrella and Dover Creeks of the Satilla River estuary and improve salinity gradients that improve directional cues for migratory fish, shrimp, and crabs. The project is needed because past actions for the AIWW altered salinity gradients by allowing a large volume of Satilla River water to enter upriver portions of tidal creeks through the short pathway of Noyes and Dynamite Cuts.

To achieve the project objectives, the recommended plan, Alternative 7, would alter the hydrodynamic environment by closing ORR, Noyes Cut, and Dynamite Cut. All three closure structures would consist of a combination of sheet pile walls, rip rap, and bedding stone. Implementation of the recommended plan would include pre- and post-construction monitoring. The monitoring would assess changes in flow, salinity, and sedimentation to determine if the goals of the study were obtained. There would be one pre-construction monitoring event and three post-construction monitoring events. The three post-construction events would occur in alternate years (i.e. years 1, 3, and 5) following construction.

It is anticipated that GADNR will be the non-Federal sponsor for the Design and Implementation phase. The total estimated cost is $7,605,000. Of that amount, the Federal portion would be $5,703,750 and the non-Federal portion would be $1,901,250. The non-federal sponsor that enters into the Project Partnership Agreement with USACE will be responsible for all of the cost-shared activities that are included in that agreement.

The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to higher authority as proposals for project modification and/or implementation funding.

I recommend implementation of Alternative 7 for the restoration of aquatic habitat within the study area.

13 Nov 18
Date

Daniel H. Hibner, PMP
Colonel, U.S. Army
Commanding

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APPENDIX A

Habitat Valuation

Appendix A

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NOYES CUT, GEORGIA
Section 1135 Study

Restoring Tidal Exchange in a Complex Estuarine Environment

Problems and Objectives: The Satilla River estuary contains a complex network of tidal channels. From 1900 to 1939, eight man-made cuts were made between natural channels to increase the accessibility of the tidal creeks (Figure 1 below). These cuts changed the circulation patterns in the estuary and (1) altered local patterns of tidal exchange; (2) disrupted gradual salinity gradients from the headwaters to the mouth of the creeks; and (3) reduced access to headwaters for estuarine species due to channel sedimentation. Dover and Umbrella Creeks are the primary creeks within the system and serve as both key habitats and primary routes for movement of organisms and water. Salinity gradients provide a variety of estuarine animals the directional cues for local movement and long-distance migration essential for completing their life cycles. The overarching goals of this potential Section 1135 restoration project are to restore key estuarine habitats for resident species (e.g., blue crabs) and increase connectivity for migratory species (e.g., striped bass).

Alternatives: To achieve these goals, this project will alter the hydrodynamic environment, which will in turn restore salinity gradients, reduce local sedimentation issues, and increase connectivity for local biota. Preliminary alternatives focus on closing a combination of one or more man-made cuts (e.g., Noyes, Bull Whirl, Dover) to alter tidal exchange in Dover and Umbrella Creeks (Figure 2). Closing cuts is anticipated to restore historic conditions of salinity regimes and increase connectivity for local fauna.

Currently, salinity gradients are altered by a large volume of Satilla River water entering through the short pathway of Noyes Cut. This large volume of estuarine water overwhelms the freshwater that enters the headwater area and causes the salinity to be nearly constant throughout most of Dover Creek. Additionally, tidal flows through multiple creeks and cuts causes a tidal node where sediment deposition clogs channels. Reduced tidal exchange through man-made cuts should restore water depths in Dover and Umbrella Creeks, which have silted in as a result of changes in circulation patterns. This sedimentation has restricted access to portions of the rivers by shrimp, shellfish, and migratory fish.

Another benefit of closing Noyes, Bull Whirl and/or Dover Cuts would be restoration of a natural tidal exchange distribution from downstream to upstream as typically occurs in unaltered tidal creeks. This distribution should eventually redistribute the sediments, create a sandier, deeper creek bottom, and restore gradual salinity gradients from headwaters to mouth. Salinity gradients are key not only for maintaining tidal exchange processes (e.g., sediment, nutrients, carbon) but also serve as important cues for orienting migratory fauna.

Evaluation of Alternatives: The estuarine species historically found in Dover and Umbrella Creeks include shrimp (white and brown), river herring, American shad, blue crabs, eastern oyster, and striped bass. All of these species may benefit from the restoration of tidal exchange, water depths, and salinity gradients in the area. Shad, herring, and striped bass require freshwater for spawning, while blue crabs, oysters, and shrimp require brackish water for successful reproduction. Potential indirect long-

term benefits of restoring depths and flows in the study area may include increased dissolved oxygen (DO) levels; decreased Total Suspended Solids (TSS); improved nutrient exchange between the Satilla River, St. Andrews Sound, and the Atlantic Ocean; and Essential Fish Habitat (EFH) for offshore species dependent on estuarine environment for early life stages. In addition to the intended ecosystem benefits, ancillary benefits would include the return of commercial fishing and crabbing and sport fishing in Dover and Umbrella Creeks for the aforementioned species. Residential deep water access would also be restored to residential developments adjacent to the estuary that currently have access only at high tide.

Savannah District proposes to quantify some of the benefits from each alternative by calculating the amount of tidal exchange (exchange volume) in multiple locations throughout Dover and Umbrella Creeks. Exchange volume serves as an important surrogate for the restoration of salinity gradients, which influence the wide variety of species occurring in the estuary. Additionally, exchange volumes may be used to assess the predictability of the salinity regime in the estuary and the degree to which it represents the unaltered condition needed for estuarine fauna (i.e., expected upstream-to-downstream, fresh-to-saline patterns).

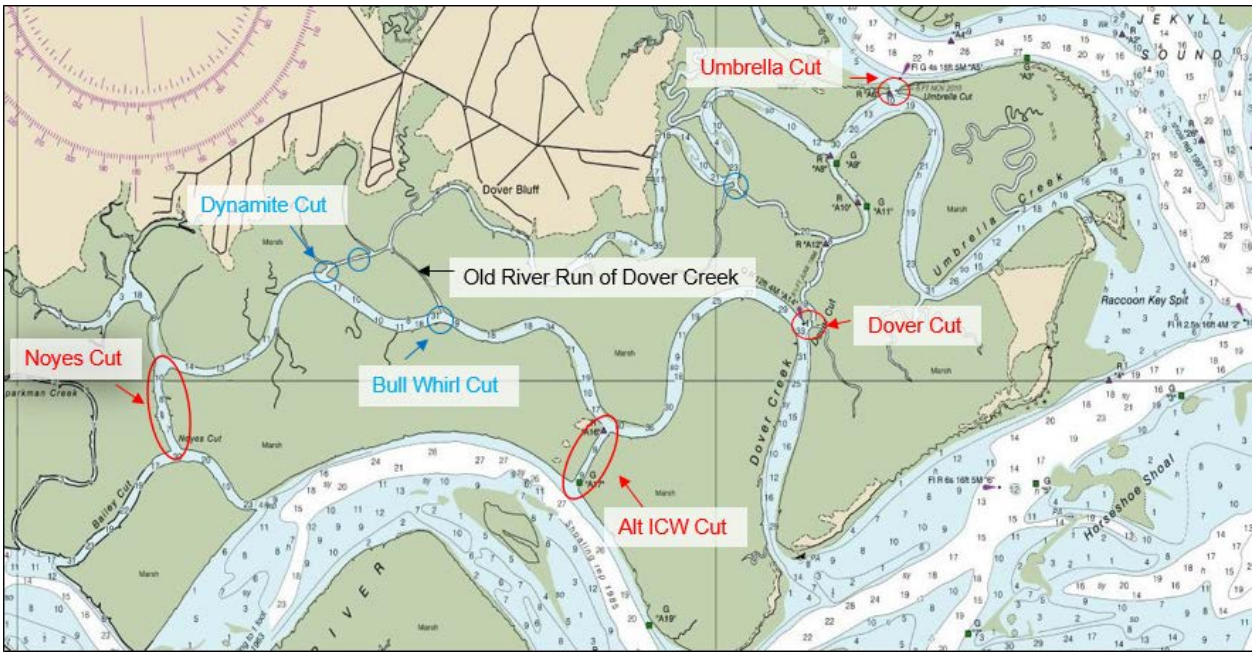

Figure 1: Satilla River estuary with series of navigation cuts. Congress authorized cuts depicted in red. Blue cuts were created by local citizens.

The following table calculates the amount of benefit for each alternative from the amount of flow change (flux). Each column represents the change in flow at the specific data point, which is multiplied by the corresponding acreage (Figure 2) represented by the data point. The total of habitat units for each alternative is the result of cumulative total of flow change throughout the 10 data points/habitat areas.

Delta Change from Base Condition, in terms of CMS %.
A negative number reflects a reduction in flux. Positive number reflects a gain in flux.

Alternative 1	Env 4 (860 Ac.)	Env 5 (166 Ac.)	Env 6 (215 Ac)	Env 7 (297 Ac)	Env 8 (489 Ac)	Env 9 (555 Ac)	Env 10 (474 Ac)	Env 11 (282 Ac)	Env 12 (744 Ac)	Env 13 (437 Ac)		Avg Annual
Noyes	% Change	% Change	% Change	% Change	% Change	% Change	% Change	% Change	% Change	% Change		HUs
Mean Tide Flood	22%	-5%	-129%	5%	3%	5%	3%	2%	26%	1%	179	493
Mean Tide Ebb	-9%	-9%	-19%	17%	6%	21%	17%	15%	75%	14%	807	
Alternative 6	**ENV4**	**ENV5**	**ENV6**	**ENV7**	**ENV8**	**ENV9**	**ENV10**	**ENV11**	**ENV12**	**ENV13**		
Dynamite/ORR Combo	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**		
Mean Tide Flood	0%	-21%	145%	34%	14%	-6%	-5%	-3%	11%	-3%	450	1330
Mean Tide Ebb	3%	3%	778%	87%	34%	-9%	-8%	-7%	29%	-6%	2210	
Alternative 7	**ENV4**	**ENV5**	**ENV6**	**ENV7**	**ENV8**	**ENV9**	**ENV10**	**ENV11**	**ENV12**	**ENV13**		
Combo (Dyn/ORR/Noyes)	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**	**% Change**		
Mean Tide Flood	21%	-24%	155%	36%	15%	-3%	-4%	-3%	27%	-3%	797	1780
Mean Tide Ebb	-8%	6%	796%	88%	33%	10%	7%	7%	74%	6%	2764	

Table 1: Calculation of Habitat Units

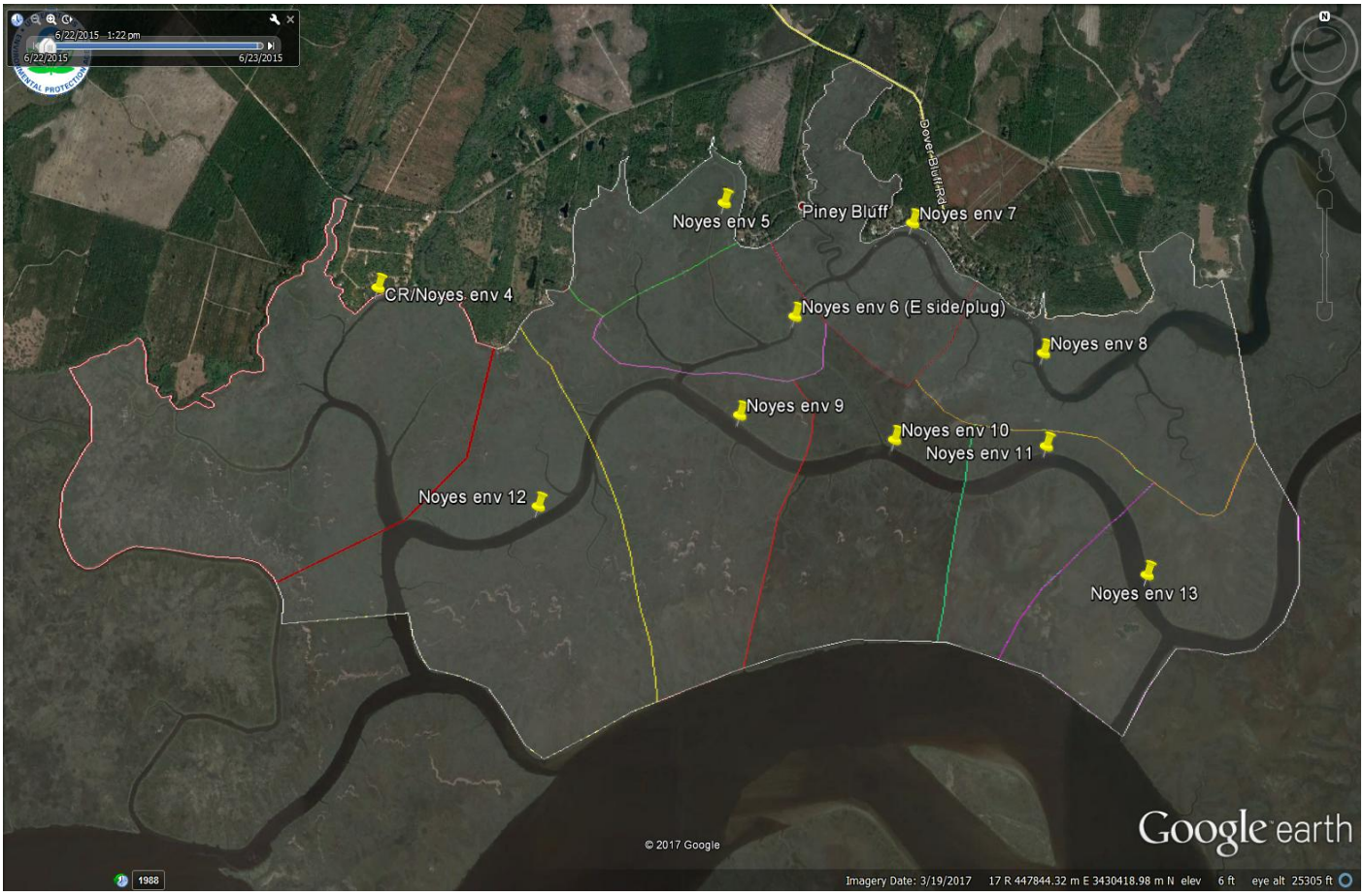

Figure 2 - 10 Habitat Areas With Associated Data Points

APPENDIX B

Engineering Appendix

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1. Introduction

In April of 2016, USACE Savannah District Contracted with Dynamic Solutions LLC to develop a calibrated hydrodynamic model using ADH and a representative coupled sedimentation transport model. Dynamic Solutions delivered the completed model code, associated documentation and model output for the base condition and seven selected alternative project runs. Details for model development can be located in the *Hydrodynamic and Sediment Transport Modeling Report, DSLLC, January 2017*. USACE Engineering Division and Planning Division are tasked with jointly evaluating the output in accordance with project goals, and making a recommendation plan of action.

2. Project Goals

USACE Savannah District and the Non Federal Sponsors (GADNR and Satilla Riverwatch Alliance) entered into a Project Management Plan in February 2015. The plan outlined specific problems and objectives that should be evaluated during the course of the study. The problems are summarized below, in no particular order.

2.1 Ecological Habitat Restoration

2.1.1 Restore salinity gradient in Dover Creek

Over time, it is the hypothesis that the salinity gradient in Dover Creek has flattened out more similarly to the Satilla River, reducing fish and crab habitat. In addition, evaluate the salinity gradient and opportunities for improvement in adjacent tidal creeks.

2.1.2 Increase Tidal Exchange throughout the system

Increasing tidal exchange at various locations throughout the system will be beneficial for ecological restoration, as well as put downward pressure on shoaling rates. The change in flushing volume will be evaluated, with increases in flux viewed as being overall positive to the system.

2.2 Eliminate shoaling in Umbrella Creek-

Umbrella Creek is located at the Dover Bluff Community. Residents have experienced significant shoaling and reduction in dock and recreation in Umbrella Creek over the past ~80 years. A key component of selection an alternative is reverse this long term trend of accretion in Umbrella Creek, and if possible create an environment where the channel will scour out and restore conveyance over time.

3. Alternative Analysis Methodology

3.1 Alternatives to be evaluated

The following combinations of alternatives were evaluated during a 4-month simulation within the hydrodynamic and sedimentation model. The sediment and hydrodynamic models are de-coupled, and require separate execution of the code. Run-time (computing power) and file output size are legitimate considerations, as the output below is approximately 500GB and required 60+ hours of continuous computing time on a super computer. A run time of 4-months encapsulated a full range of tidal conditions under normal flow periods, and provides a good picture of how the system will

react subject to the alternatives. Multi-year sedimentation simulations were determined to not be feasible or beneficial to simulate.

The series of closure combinations were simulated by assigning a new material type to the nodes at each cut location, and switching that material type to OFF. This allows greater stability in model computations, and greater flexibility and uniformity in creating closures. This method acts as an infinite vertical wall, which mimics a full closure structure at an elevation above the high tide line. While consideration was given to realism when inserting the cuts, it is important to note that to objective is to block flow. Design level parameters, such as width, elevation, tie in length, materials, etc. were not evaluated.

Hydrodynamic validation statistics were performed by DSLLC and can be found in Table 6 on page 41 of the *Hydrodynamic and Sediment Transport Modeling Report, DSLLC, January 2017*. The error percentages compared to the calibration stations were calculated for water level (rRMS ~5%), velocity (rRMS ~11%), and salinity (rRMS ~21%). These values are indicative of the compounding uncertainty, with the most uncertainty being exhibited with the salinity constituent. Additionally, the salinity rRMS in Dover Creek (calibration station #3) was calculated at 33%, which is higher than the other four calibration stations, each of which were ~20%.

- BASE – baseline / no alternative / existing conditions models
- ALT1 – Noyes Cut closed
- ALT2 – Old River Run (ORR) Closed
- ALT3 – Noyes and Old River Run (ORR) Closed
- ALT4 – Dynamite Cut Closed
- ALT5 – Noyes and Dynamite Closed
- ALT6 – Dynamite and Old River Run (ORR) Closed
- ALT7 – Noyes and Dynamite and Old River Run (ORR) Closed

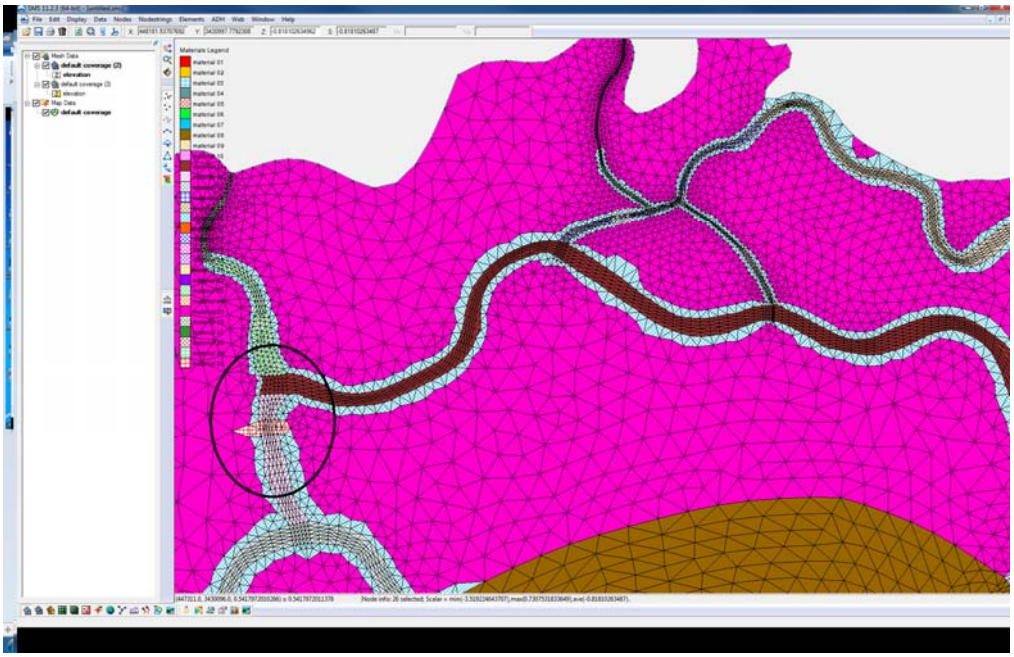

Figure 1 : Noyes Cut Closure Model Representation (Alternative 1)

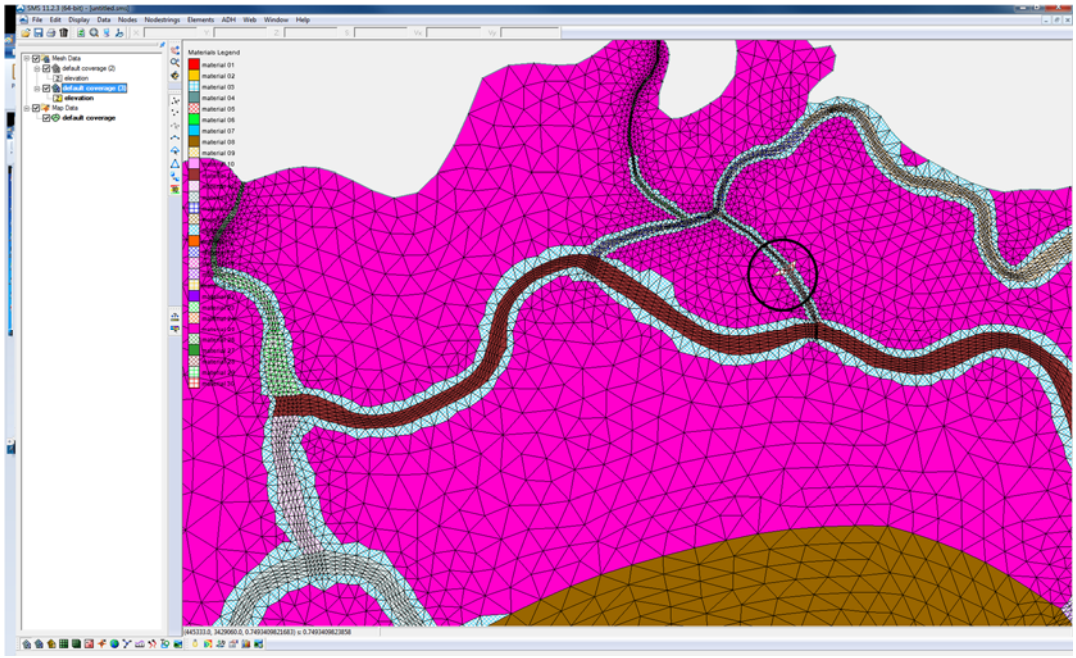

Figure 2 : ORR Closure Model Representation (Alternative 2)

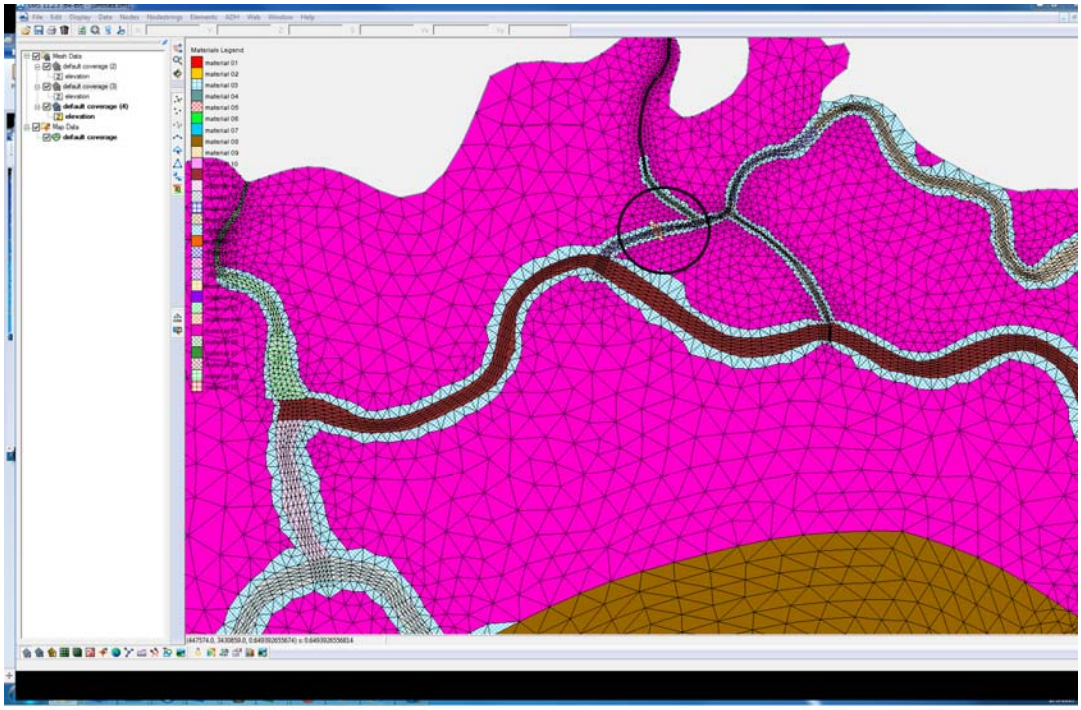

Figure 3 : Dynamite Cut Closure Model Representation (Alternative 3)

3.2 Environmental Analysis Points

Model output is effectively continuous in both space and time. High resolution mesh within channels, and an adaptive time-step with the ability to write output at any time-step desired. One-hour output was selected to a compromise between efficiency and resolution needs. Output can viewed and analyzed in any way the user desires. In order to do a comparison of each alternative versus USACE Biologists needed to develop a series of points within the system and model domain to compare outputs for salinity and change in flux. Fourteen points were ultimately selected, and are shown below.

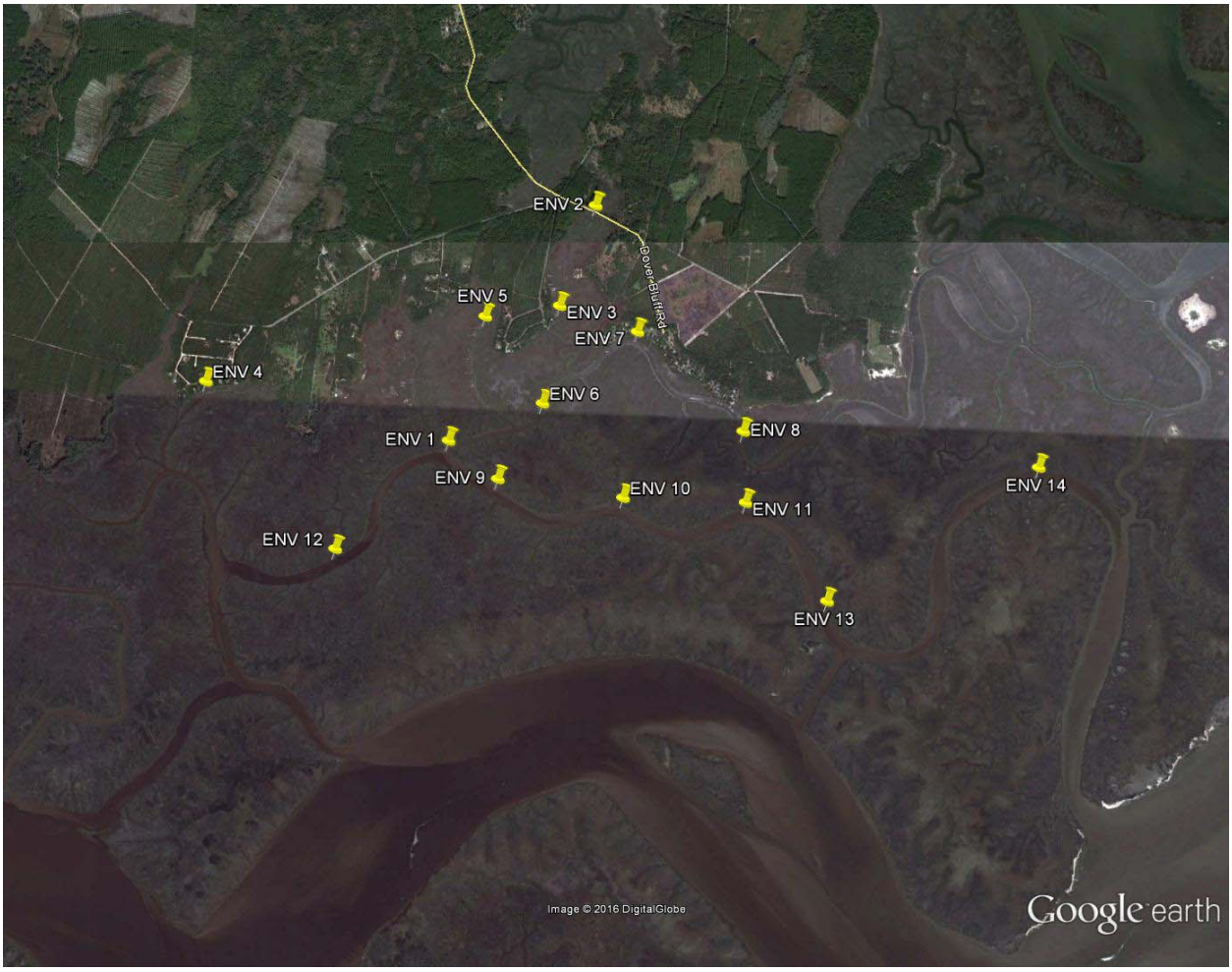

Figure 4 : Environmental Analysis Points

3.3 Daily Average Salinity

The calculated model output values for salinity (ppt) was exported into excel with the following parameters:

- 15-minute time series intervals
- Entire model simulation duration of 4-months, 04/01/2016 – 07/31/2016
- Each of the 14 ENV analysis points
- Base Case Scenario, and seven alternatives

The data was organized in a pivot table to calculate daily average salinity for the base condition and each alternative. The daily averages for each alternative were then compared to the daily average of the base condition. The differences in daily average salinity were expressed in terms of a percent change and assigned a graded color scale, so that trends at each location could be easily compared between alternatives. Green represents an INCREASE in salinity (darker green is higher % increase), where red represents a DECREASE (Darker red is a lower % increase). Monthly averages are displayed here for simplicity. Biologists are utilizing the following data in evaluation of the alternative.

		Umbrella Creek - Upstream -> Downstream						Dover Creek - Upstream -> Downstream							
		Sal12	Sal9	Sal10	Sal11	Sal13	Sal14	Sal1	Sal6	Sal7	Sal8	Sal2	Sal3	Sal4	Sal5
April	Alt1	45.1%	149.6%	16.0%	12.5%	10.0%	10.9%	25.0%	31.2%	4.8%	-50.1%	22.2%	8.5%	94.1%	56.2%
	Alt2	37.9%	44.6%	41.3%	37.4%	31.1%	10.1%	42.1%	48.6%	19.6%	8.7%	16.9%	22.2%	25.7%	67.6%
	Alt3	23.3%	5.5%	-0.7%	-3.3%	-4.7%	0.1%	10.9%	19.6%	3.1%	1.2%	11.7%	8.7%	64.5%	31.1%
	Alt4	-0.4%	-9.4%	-9.8%	-11.0%	-13.0%	-15.3%	0.4%	53.1%	-6.1%	-10.0%	7.8%	12.8%	8.1%	104.4%
	Alt5	30.7%	6.5%	0.0%	-4.7%	-7.6%	-2.1%	20.3%	94.9%	11.2%	3.5%	30.2%	31.6%	90.1%	167.8%
	Alt6	5.6%	-3.2%	-5.1%	-6.3%	-7.7%	-9.0%	2.9%	45.2%	-19.8%	-26.4%	-4.6%	-6.1%	20.6%	97.5%
	Alt7	30.1%	8.6%	1.4%	-2.5%	-4.9%	-5.2%	19.1%	74.2%	-5.2%	-12.7%	10.3%	11.2%	74.6%	141.7%
May	Alt1	-12.9%	41.7%	-17.5%	-14.4%	-10.9%	-3.4%	-18.0%	-18.5%	-17.6%	-48.7%	-14.4%	-21.7%	-6.8%	-22.1%
	Alt2	12.5%	6.4%	3.5%	1.5%	-0.1%	-2.7%	7.6%	9.2%	-1.1%	-2.9%	1.5%	-1.7%	22.0%	5.7%
	Alt3	-9.5%	-15.0%	-13.9%	-11.1%	-8.0%	-4.0%	-13.4%	-12.5%	-12.7%	-7.2%	-5.5%	-13.1%	-4.5%	-18.7%
	Alt4	7.7%	-2.7%	-4.5%	-6.3%	-8.1%	-11.5%	-0.4%	15.7%	-14.8%	-13.6%	-7.6%	-7.9%	11.6%	17.1%
	Alt5	-5.0%	-14.8%	-14.7%	-13.8%	-12.4%	-10.1%	-8.1%	25.9%	-7.5%	-7.4%	-0.5%	0.9%	9.7%	26.9%
	Alt6	24.0%	9.0%	4.7%	2.6%	1.8%	1.3%	8.2%	11.1%	-23.6%	-26.0%	-10.5%	-19.8%	34.8%	16.9%
	Alt7	2.0%	-6.6%	-5.8%	-3.3%	-0.4%	1.3%	-0.9%	22.7%	-12.0%	-12.1%	-6.0%	-5.6%	17.4%	24.9%
June	Alt1	-25.2%	-0.1%	-17.0%	-12.6%	-8.7%	-4.5%	-21.2%	-21.0%	-26.1%	-37.5%	-20.9%	-29.2%	-10.5%	-19.2%
	Alt2	-9.9%	-8.8%	-7.0%	-6.0%	-5.5%	-2.6%	-8.1%	-3.6%	-3.2%	-2.5%	-5.3%	-6.4%	10.1%	-4.9%
	Alt3	-19.9%	-16.9%	-12.5%	-7.8%	-3.6%	0.6%	-16.4%	-14.6%	-17.7%	-13.4%	-12.2%	-20.0%	2.3%	-13.4%
	Alt4	-5.3%	-6.8%	-6.0%	-5.7%	-5.9%	-6.6%	-4.0%	3.4%	-17.1%	-12.3%	-9.8%	-10.6%	7.4%	4.5%
	Alt5	-18.7%	-18.0%	-14.4%	-10.7%	-7.4%	-3.3%	-13.7%	7.0%	-14.0%	-8.6%	-8.4%	-7.5%	6.4%	6.3%
	Alt6	9.4%	4.6%	4.0%	3.5%	3.4%	3.1%	6.5%	9.0%	-15.4%	-11.8%	-9.2%	-9.7%	21.0%	10.2%
	Alt7	-17.8%	-16.4%	-12.3%	-7.9%	-4.3%	-1.0%	-11.9%	3.4%	-17.8%	-13.7%	-8.0%	-11.4%	9.7%	7.2%
July	Alt1	-19.7%	1.8%	-6.9%	-1.8%	2.2%	4.3%	-11.5%	-12.7%	-16.9%	-26.4%	-16.0%	-21.1%	-12.4%	-16.1%
	Alt2	-7.1%	-3.9%	-1.3%	0.1%	0.8%	1.7%	-2.9%	-0.1%	3.8%	2.9%	1.5%	1.3%	9.3%	-1.9%
	Alt3	-17.9%	-12.4%	-7.7%	-2.9%	1.3%	5.7%	-12.1%	-12.8%	-12.1%	-8.7%	-8.8%	-15.0%	-1.2%	-16.3%
	Alt4	6.0%	3.5%	4.5%	4.6%	3.9%	1.1%	4.9%	10.2%	-3.6%	-4.5%	-1.5%	-1.4%	13.1%	10.0%
	Alt5	-15.2%	-11.9%	-7.7%	-3.9%	-0.7%	1.0%	-9.4%	9.1%	-1.8%	-1.7%	0.8%	2.0%	4.5%	9.2%
	Alt6	13.9%	10.7%	12.9%	14.1%	14.2%	11.4%	11.9%	19.1%	3.1%	0.9%	4.0%	4.7%	22.5%	19.1%
	Alt7	-17.4%	-13.5%	-8.6%	-3.5%	0.8%	3.4%	-10.6%	5.6%	-5.0%	-5.1%	-1.1%	-1.4%	1.8%	6.7%

Figure 5 : Monthly Average Salinity Change

Observations to consider

- All Alternatives generally show an increase in salinity during April, and a decrease in May-July.
- Alternative 3 (Noyes + ORR) is not necessarily additive of Alternative 1 (Noyes) + Alternative 2 (ORR)
- Point Sal4 (farthest north in small tidal creek, near River Marsh residential areas off Lampadoshia Road) tends to experience generally more saline environment over all alternatives and months.
- Point Sal8 (just east of Dover Bluff Community dock in Umbrella Creek) tends to experience generally fresher environment over all alternatives and months.
- Changes in the salinity magnitude are most substantial for Alternative 1 and Alternative 3
- Changes in the salinity magnitude are least substantial for Sal11, Sal13 and Sal14, all of which are ocean ward.
- Alternative 2 produces a generally more saline May, while other Alternatives produce fresher.
- Alternative 4 produces a generally more saline July, while other Alternatives produce fresher.
- Freshwater inflow was much higher during April than June/July (see inflow boundary condition graph below). This high amount of fresh water interacts somewhat freely with the project area under current conditions. Since both Alternatives 1 (Noyes) and Alternative 3 (Noyes + ORR) consist of blocking that fresh water source, the salinity change on a percentage basis is magnified during periods of high flow.

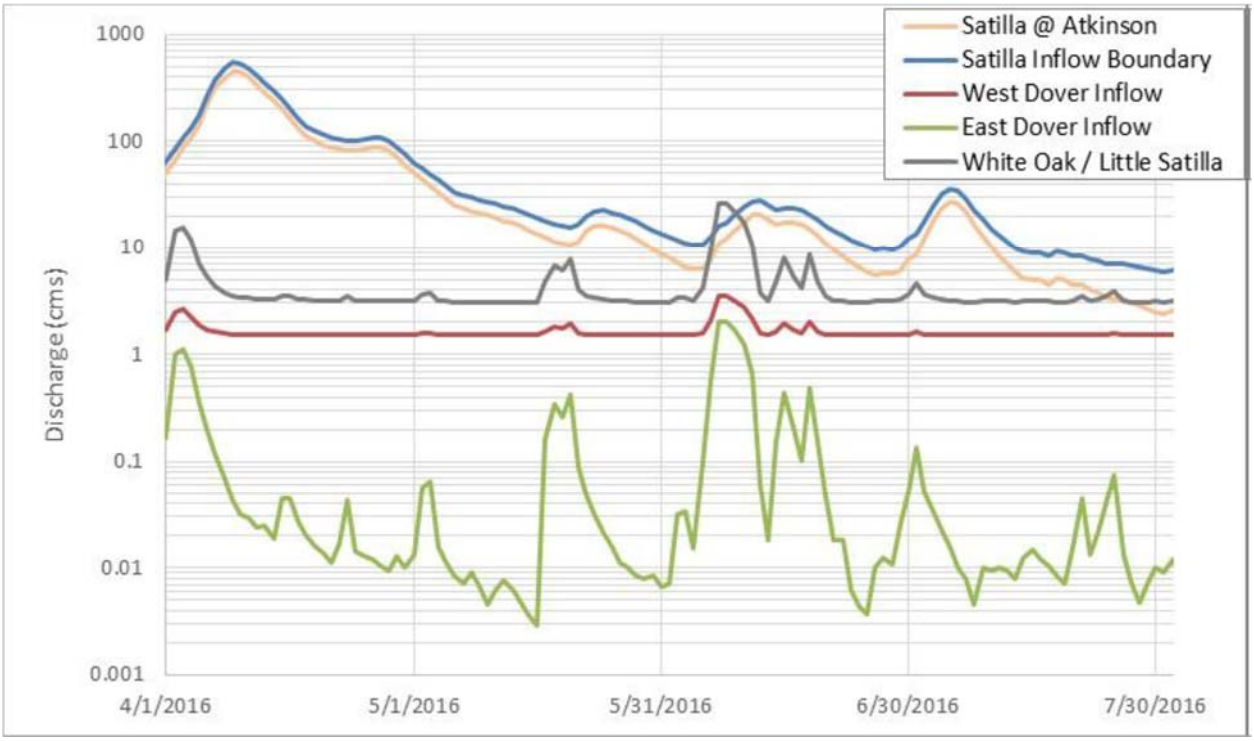

Figure 6 : Freshwater Inflow Boundary Conditions

3.4 Salinity Gradient Change

While daily average and monthly average salinity is important to consider, of the higher concern is restoring the salinity gradient within Dover Creek. The hypothesis is that due to Noyes cut, the salinity gradient of Dover Creek has flattened over time to match the Satilla. An objective of this study is to generate a mild salinity gradient in Dover Creek, and in nearby tidal creeks.

To accomplish this profile graphs are a better tool than quantitative averaging and comparisons. Salinity profiles were developed under the following parameters:

- Three reach locations: Dover Creek, West Tributary and East Tributary.
- Maximum spring high tide (time = 3045:00, 06-April-2016 09:00 PM)

Many of the smaller tidal creeks were not input into the model mesh domain, because they require a disproportionate number of nodes, runtime and file size in relation to the overall final output. DSLLC initially recommended that the West Tributary, East Tributary, and ORR be omitted from the mesh because of negligible impacts. Since part of the model objective specifically wanted to evaluate ecological impacts of tidal creeks, these two reaches were added. ORR was also later added since it was listed under the alternatives.

Figure 7 : Selected Transects for Gradients

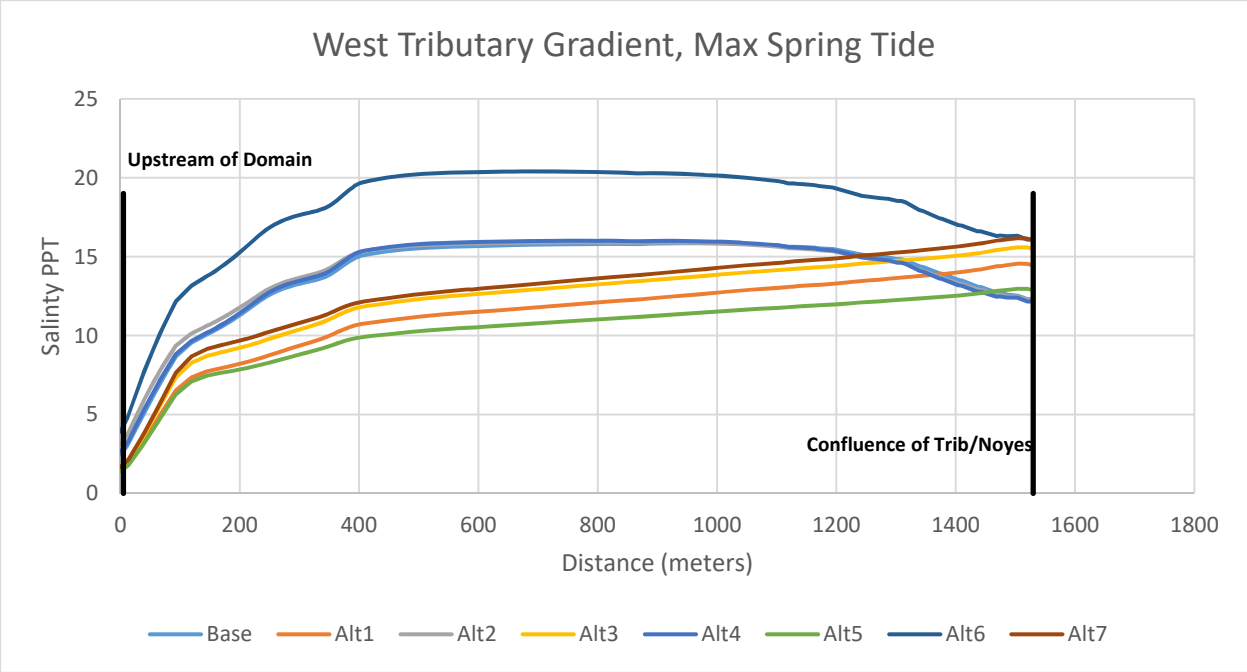

Figure 8 : West Tributary Salinity Gradient

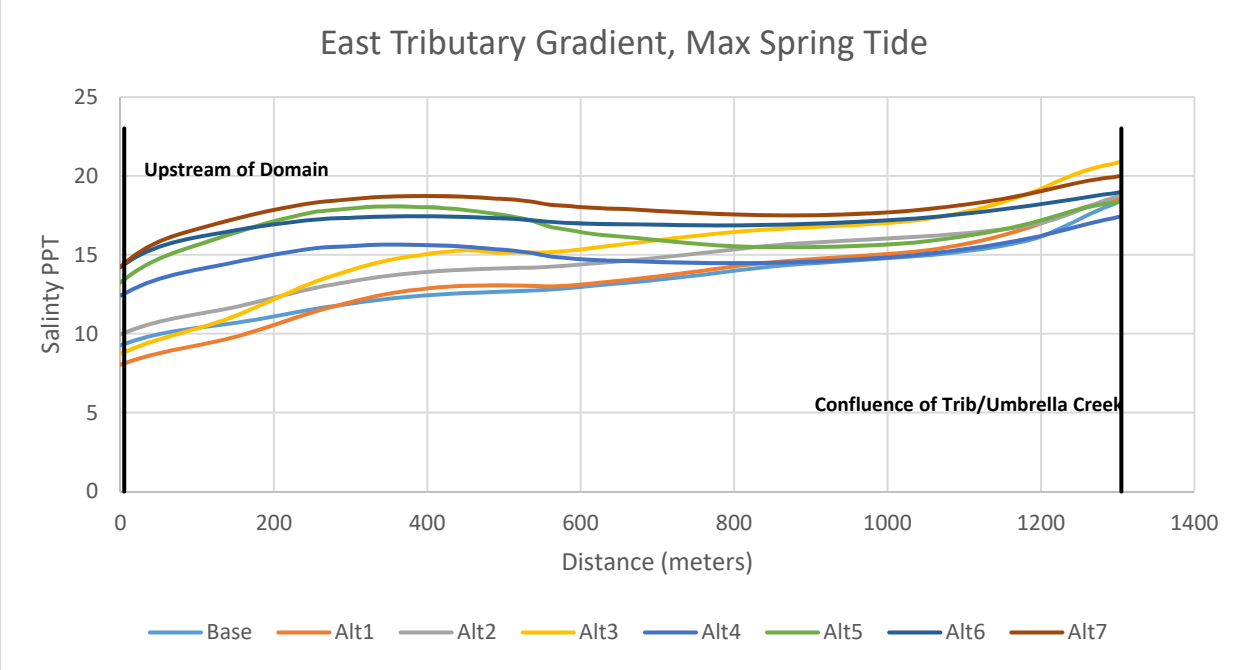

Figure 9 : East Tributary Salinity Gradient

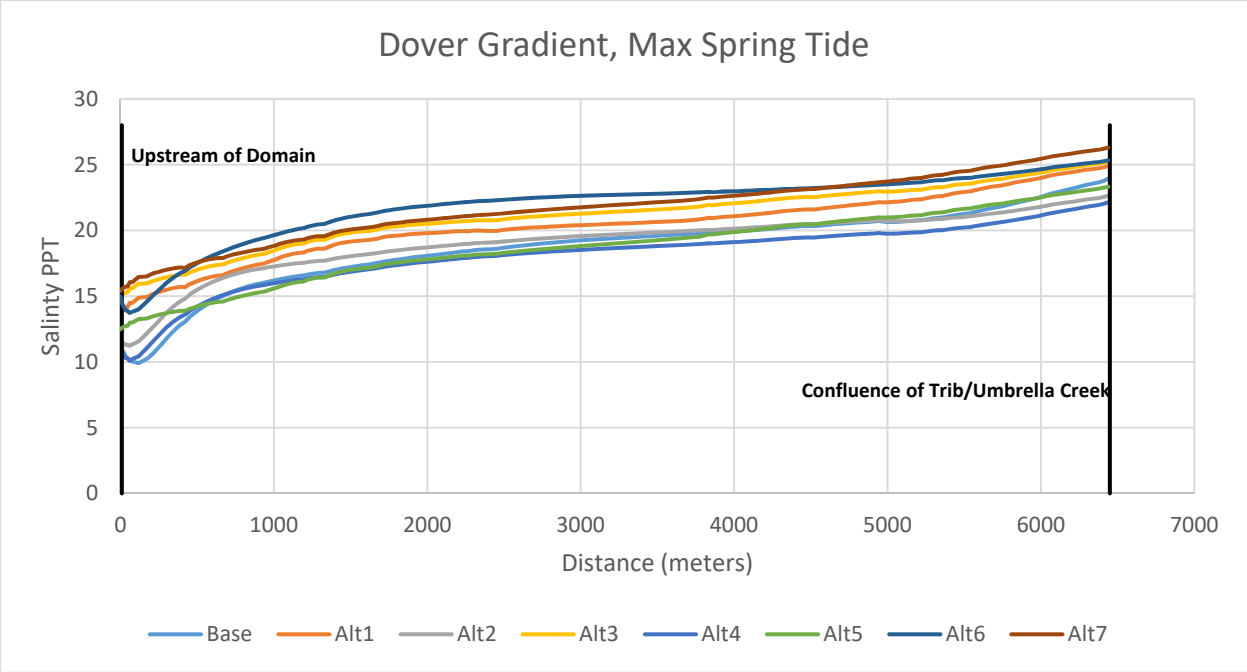

Figure 10 : Dover Creek Salinity Gradient

Observations to consider

- These profiles represent a snapshot in time during spring high tide.
- The assumption currently is that Dover Creek experience no gradient of salinity, however that does not appear to be the case during a maximum spring tide condition
- None of the alternatives selected change the gradient (slope) of the salinity profile in Dover Creek or the East Tributary
- ALT2, ALT4 and ALT6 do not substantially change the base case salinity gradient in the West Tributary from the base condition. (None contain Noyes Cut)
- ALT1, ALT3, ALT5 and ALT7 do restore a salinity gradient in the West Tributary from the base condition. (All contain Noyes Cut)

3.5 Flux Change

USACE biologists required change in flushing volume, or volumetric flux, as a component of assessing the ecological lift associated with each alternative. The hydrodynamic model output was evaluated for Δflux between the base condition and each alternative, at each environmental location shown in Figure 4, for a variety of tidal conditions. The Δflux was obtained by multiplying the scalar dataset of depth and the vector dataset of velocity, over a cross sectional length under varying 6-hour time periods. This yields an increase or decrease in flux, in units of CMS (cubic meters per second) and percent change. A conditional formatting color scheme was applied on the percent change to quickly visualize the major changes in key locations. Dark green represents the largest percent increase, dark red represents the largest percent decrease. A screenshot of the associated excel summary is shown below.

			Umbrella Creek – Upstream -> Downstream										Dover Creek – Upstream -> Downstream									
Alternative 1			ENV12		ENV9		ENV10		ENV11		ENV13		ENV14		ENV1		ENV6		ENV7		ENV8		ENV4		ENV5	
			Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change
Spring Tide Flood	3040	3045	33.735	43.37%	16.302	8.26%	10.736	4.32%	5.9243	2.11%	3.2947	1.06%	1.3284	0.33%	-5.510	-19.40%	-11.16	-371.73%	2.9542	7.75%	4.1018	4.42%	-0.071	-6.43%	-0.011	-0.87%
Spring Tide Ebb	3071	3076	52.085	116.48%	42.081	26.57%	42.842	20.18%	44.751	17.62%	45.863	15.59%	3.1703	2.61%	-7.333	-24.40%	0.4096	17.55%	6.6799	26.53%	3.3897	14.27%	-0.05	-1.51%	0.0483	3.60%
Neap Tide Flood	3971	3976	-6.412	-16.15%	-7.003	-10.28%	-7.17	-8.69%	-7.298	-7.90%	-7.424	-7.11%	-1.187	-0.69%	-0.363	-4.92%	-1.561	-52.02%	0.4377	4.61%	0.8779	3.11%	-0.005	-0.32%	0.009	2.84%
Neap Tide Ebb	4002	4007	-7.201	-16.53%	-5.862	-6.68%	-4.98	-6.38%	-5.173	-5.31%	-5.373	-5.43%	4.3702	2.55%	0.2771	3.96%	-1.911	-61.88%	0.6007	6.78%	0.2681	1.03%	0.0554	2.26%	-0.019	-1.86%
Mean Tide Flood	3350	3355	11.408	26.02%	5.4257	5.25%	4.161	3.25%	2.8027	1.89%	1.9853	1.19%	1.1352	0.46%	-3.552	-20.71%	-3.861	-128.67%	0.8793	4.53%	1.4104	2.81%	0.2048	21.30%	-0.034	-5.03%
Mean Tide Ebb	3380	3385	25.5	74.66%	22.333	21.13%	23.057	17.16%	23.927	15.16%	24.357	13.76%	4.3611	1.73%	-6.421	-25.98%	-0.44	-18.88%	2.6757	17.34%	2.8754	6.33%	-0.262	-8.86%	-0.105	-9.29%
Alternative 2			ENV12		ENV9		ENV10		ENV11		ENV13		ENV14		ENV1		ENV6		ENV7		ENV8		ENV4		ENV5	
			Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change
Spring Tide Flood	3040	3045	-0.628	-0.81%	1.2262	0.62%	-2.86	-1.15%	-2.39	-0.85%	-2.462	-0.73%	-0.634	-0.11%	1.7077	6.01%	0.6424	4.42%	0.5803	1.52%	0.3323	0.36%	0.0041	0.37%	-0.002	-0.16%
Spring Tide Ebb	3071	3076	-0.542	-1.21%	3.2145	2.03%	-0.886	-0.42%	-0.195	-0.08%	-0.477	-0.16%	0.2073	0.06%	2.3742	7.90%	0.2319	5.73%	0.3576	3.80%	1.4861	2.26%	0.0018	0.05%	0.0035	0.63%
Neap Tide Flood	3971	3976	-0.172	-0.43%	0.628	0.32%	-0.378	-0.47%	-0.415	-0.45%	-0.353	-0.34%	0.1436	0.08%	0.7326	3.92%	0.2578	8.53%	0.2679	2.82%	0.4341	1.54%	-0.01	-0.64%	0.007	2.23%
Neap Tide Ebb	4002	4007	-0.032	-0.07%	1.0097	1.43%	0.5027	0.64%	-0.223	-0.26%	0.5153	0.52%	-0.021	-0.01%	0.6783	3.70%	-0.418	-17.33%	0.1268	1.43%	0.1782	0.68%	0.0045	0.18%	-0.064	-6.24%
Mean Tide Flood	3350	3355	-0.281	-0.64%	0.3144	0.88%	-1.182	-0.92%	-1.277	-0.86%	-1.304	-0.78%	0.535	0.23%	1.1727	6.84%	0.4329	3.01%	0.4578	2.39%	0.3652	0.73%	0.0007	0.08%	-0.003	-0.44%
Mean Tide Ebb	3380	3385	0.086	0.25%	1.0689	1.01%	-1.622	-1.21%	-1.347	-0.85%	-1.344	-0.74%	-0.988	-0.41%	1.3428	5.43%	0.3541	21.44%	0.2867	1.86%	0.3142	0.63%	0.0059	0.20%	0.0273	2.41%
Alternative 3			ENV12		ENV9		ENV10		ENV11		ENV13		ENV14		ENV1		ENV6		ENV7		ENV8		ENV4		ENV5	
			Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change
Spring Tide Flood	3040	3045	34.041	43.77%	17.076	9.06%	9.0494	3.64%	4.6703	1.66%	2.1153	0.68%	0.5852	0.15%	-3.531	-12.42%	3.1918	21.96%	3.7914	9.35%	4.8065	5.18%	-0.061	-5.53%	-0.01	-0.82%
Spring Tide Ebb	3071	3076	52.832	118.28%	45.837	28.94%	42.553	20.06%	44.593	17.55%	45.815	15.57%	3.3646	2.66%	-4.842	-16.11%	4.3469	36.06%	7.1597	31.22%	10.738	16.32%	-0.033	-0.99%	0.0916	6.63%
Neap Tide Flood	3971	3976	-7.03	-17.71%	-7.226	-10.61%	-8.319	-10.31%	-8.256	-8.94%	-8.193	-7.84%	-1.697	-0.96%	0.0377	0.51%	0.3942	13.14%	0.2776	2.92%	0.2935	1.04%	0.0088	0.54%	0.0104	3.31%
Neap Tide Ebb	4002	4007	-5.672	-13.02%	-2.501	-3.69%	-2.204	-2.82%	-1.876	-2.14%	-1.503	-1.52%	-0.818	-0.46%	1.9184	27.43%	0.0702	3.01%	1.2732	14.38%	2.0586	7.90%	0.1292	5.26%	-0.079	-7.76%
Mean Tide Flood	3350	3355	11.297	25.77%	6.4967	6.28%	3.2456	2.54%	1.3097	1.23%	1.1502	0.69%	1.4737	0.63%	-2.392	-13.94%	1.687	30.84%	1.3308	6.34%	1.6321	3.38%	0.225	24.06%	-0.035	-5.14%
Mean Tide Ebb	3380	3385	25.173	73.70%	23.716	22.44%	21.146	15.74%	22.115	14.01%	23.039	12.70%	3.0667	1.26%	-4.947	-20.01%	3.4021	205.36%	3.0715	13.91%	3.3362	7.34%	-0.341	-11.55%	-0.11	-3.66%
Alternative 4			ENV12		ENV9		ENV10		ENV11		ENV13		ENV14		ENV1		ENV6		ENV7		ENV8		ENV4		ENV5	
			Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change
Spring Tide Flood	3040	3045	4.8586	6.25%	-5.752	-4.43%	-4.601	-1.85%	-2.954	-1.05%	-2.46	-0.73%	-0.111	-0.03%	-14.76	-51.54%	5.5063	37.58%	4.7355	12.55%	4.4585	4.80%	-0.001	-0.10%	0.0566	4.62%
Spring Tide Ebb	3071	3076	5.6007	12.52%	-6.603	-5.43%	-4.246	-2.00%	-4.037	-1.53%	-4.566	-1.55%	-1.511	-0.40%	-17.2	-57.22%	10.662	215.35%	12.63	30.96%	15.035	22.65%	-0.103	-3.21%	0.0346	2.53%
Neap Tide Flood	3971	3976	3.0539	7.69%	-3.841	-5.64%	-3.456	-4.28%	-3.548	-3.84%	-3.599	-3.45%	-1.43	-0.83%	-6.032	-81.71%	4.3902	146.29%	4.2345	45.15%	4.6521	16.47%	-0.008	-0.48%	-0.003	-0.86%
Neap Tide Ebb	4002	4007	2.0359	4.67%	-4.072	-6.01%	-2.818	-3.61%	-3.45	-3.34%	-2.651	-2.68%	-2.155	-1.26%	-5.321	-84.67%	6.5523	280.81%	7.1573	87.61%	9.424	36.16%	-0.012	-0.43%	-0.021	-2.04%
Mean Tide Flood	3350	3355	4.3803	9.39%	-7.226	-6.39%	-4.267	-3.34%	-3.004	-2.03%	-2.205	-1.32%	-0.265	-0.11%	-12.17	-70.38%	5.7751	105.56%	4.6427	24.23%	4.8573	9.63%	0.0136	1.45%	-0.138	-20.56%
Mean Tide Ebb	3380	3385	8.6465	25.31%	-10.75	-10.18%	-7.511	-5.53%	-7.529	-4.77%	-7.663	-4.23%	-4.007	-1.64%	-18.52	-74.31%	10.142	613.36%	10.167	65.31%	11.47	25.25%	0.0222	0.75%	0.0136	1.20%
Alternative 5			ENV12		ENV9		ENV10		ENV11		ENV13		ENV14		ENV1		ENV6		ENV7		ENV8		ENV4		ENV5	
			Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change
Spring Tide Flood	3040	3045	34.714	44.63%	7.1533	3.62%	4.5168	1.82%	0.9322	0.35%	-0.966	-0.31%	0.1956	0.05%	-16.88	-59.59%	7.1105	48.32%	6.7521	17.71%	7.8636	8.48%	-0.073	-6.57%	0.0217	1.77%
Spring Tide Ebb	3071	3076	52.916	118.34%	29.646	18.72%	32.746	15.43%	34.674	13.65%	35.722	12.14%	5.6877	1.52%	-20.95	-63.63%	12.882	255.40%	15.934	63.23%	19.365	23.44%	0.0044	0.13%	-0.12	-8.73%
Neap Tide Flood	3971	3976	-6.836	-17.36%	-10.53	-19.95%	-10.08	-16.22%	-10.02	-14.09%	-12.92	-12.37%	-3.57	-2.01%	-6.052	-81.91%	4.3794	145.93%	4.2135	44.94%	4.44	15.72%	0.0102	0.62%	-4E-04	-0.14%
Neap Tide Ebb	4002	4007	-6.835	-15.83%	-11.59	-17.12%	-9.135	-11.73%	-9.212	-10.53%	-9.211	-9.30%	-4.026	-2.35%	-5.866	-83.31%	6.6433	294.91%	7.7894	87.36%	9.5749	36.74%	0.0324	0.76%	-0.02	-1.96%
Mean Tide Flood	3350	3355	11.826	26.37%	-3.365	-3.25%	-2.594	-2.03%	-3.159	-2.13%	-3.507	-2.09%	-0.385	-0.16%	-13.1	-76.37%	6.6704	121.33%	5.4002	28.18%	5.8564	11.63%	0.1983	21.21%	-0.129	-19.16%
Mean Tide Ebb	3380	3385	24.709	72.34%	9.7218	9.20%	12.763	9.50%	13.843	8.71%	14.857	8.19%	-0.43	-0.18%	-19.17	-77.53%	10.703	647.36%	10.437	67.66%	11.334	24.35%	-0.221	-7.43%	0.0367	3.24%
Alternative 6			ENV12		ENV9		ENV10		ENV11		ENV13		ENV14		ENV1		ENV6		ENV7		ENV8		ENV4		ENV5	
			Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change
Spring Tide Flood	3040	3045	5.6702	7.29%	-6.915	-3.50%	-7.147	-2.87%	-4.652	-1.66%	-3.521	-1.13%	-1.105	-0.26%	-14.26	-50.18%	7.1151	48.35%	6.3681	16.71%	5.7734	6.22%	0.0096	0.87%	0.0653	5.38%
Spring Tide Ebb	3071	3076	6.1157	13.68%	-7.048	-4.45%	-8.268	-3.90%	-7.813	-3.08%	-7.77	-2.64%	-3.962	-1.06%	-17.45	-58.06%	13.62	270.03%	16.715	66.40%	19.319	29.37%	-0.032	-2.78%	-0.141	-10.32%
Neap Tide Flood	3971	3976	3.7104	9.35%	-3.249	-4.77%	-4.305	-5.34%	-4.462	-4.83%	-4.414	-4.22%	-1.402	-0.81%	-5.98	-81.00%	5.5754	185.79%	5.3915	56.73%	5.7076	20.21%	-0.006	-0.37%	0.0004	0.14%
Neap Tide Ebb	4002	4007	2.5578	5.81%	-3.305	-4.88%	-3.774	-4.84%	-4.458	-5.09%	-3.572	-3.61%	-1.743	-1.02%	-5.889	-84.21%	8.7236	373.87%	10.048	113.48%	12.058	46.27%	-0.009	-0.35%	0.0956	9.33%
Mean Tide Flood	3350	3355	4.9827	11.37%	-6.364	-6.15%	-6.149	-4.81%	-4.834	-3.26%	-4.194	-2.51%	-1.454	-0.62%	-11.87	-69.19%	7.9492	145.30%	6.5604	34.23%	6.8293	13.63%	-0.003	-0.37%	-0.144	-21.33%
Mean Tide Ebb	3380	3385	9.7833	28.64%	-9.327	-8.62%	-10.64	-7.32%	-10.68	-6.71%	-10.91	-6.02%	-5.397	-2.21%	-18.26	-73.07%	12.854	778.17%	13.348	86.52%	15.656	34.47%	0.0872	2.95%	0.034	3.00%
Alternative 7			ENV12		ENV9		ENV10		ENV11		ENV13		ENV14		ENV1		ENV6		ENV7		ENV8		ENV4		ENV5	
			Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change	Δ Flux	% Change
Spring Tide Flood	3040	3045	34.794	44.74%	8.5662	4.34%	1.6745	0.67%	-0.929	-0.33%	-2.62	-0.84%	0.1565	0.04%	-16.14	-56.79%	8.775	60.37%	8.3999	22.04%	9.1817	9.83%	-0.066	-5.36%	0.0465	3.79%
Spring Tide Ebb	3071	3076	52.855	118.20%	31.058	19.61%	28.952	13.65%	31.136	12.26%	32.462	11.03%	4.5947	1.23%	-20.59	-68.51%	15.815	313.54%	19.784	78.53%	23.768	36.13%	-0.027	-0.82%	-0.144	-10.53%
Neap Tide Flood	3971	3976	-7.039	-17.73%	-13.93	-20.45%	-15.04	-18.64%	-15	-16.24%	-14.83	-14.25%	-4.842	-2.80%	-6.1	-82.62%	5.5474	184.85%	5.3254	56.04%	5.5398	19.61%	0.0112	0.66%	-0.01	-3.31%
Neap Tide Ebb	4002	4007	-7.136	-16.38%	-11.72	-17.30%	-11.31	-14.50%	-11.34	-12.96%	-11.26	-11.38%	-4.94	-2.88%	-5.923	-84.70%	8.815	377.79%	10.008	113.03%	12.026	46.14%	0.079	3.22%	0.0555	5.45%
Mean Tide Flood	3350	3355	11.77	26.85%	-2.89	-2.80%	-4.533	-3.54%	-4.859	-3.28%	-4.912	-2.93%	-0.175	-0.07%	-12.98	-75.66%	8.4792	154.99%	6.8686	35.84%	7.5012	14.97%	0.1945	20.79%	-0.164	-24.30%
Mean Tide Ebb	3380	3385	25.163	73.67%	10.807	10.22%	9.0874	6.77%	10.412	6.60%	11.574	6.38%	-1.611	-0.74%	-18.73	-75.77%	13.151	786.16%	13.552	87.85%	15.104	33.25%	-0.223	-7.55%	0.0683	6.03%

Figure 11 : Flux Change all Alternatives

4. Sedimentation Alternative Impacts

Since one of the two main objectives of the study is to evaluate which alternative is most likely to reverse shoaling in Umbrella Creek, and conceptual sedimentation model was developed. The specific means and methods for model development are discussed at length in the DSLLC Final Report, from January 2017. A fully validated sediment model requires a significant amount of site specific data, which was not collected during this effort. The model results should be interpreted only on a base-to-plan basis, and not as absolute quantities. Additionally, due to the compounding uncertainties and model duration simulation, long term sediment transport patterns and how the system will ultimately react to any cut closures is impossible to predict with confidence.

Each scenario was examined using multiple dataset outputs, in order of confidence. Datasets with the lowest uncertainty are evaluated first, and descending into other useful but more uncertain model outputs. The outputs that are evaluated are listed below, in order of confidence.

- Velocity
- Shear Stress
- Bed Displacement
- TSS

Additionally, each alternative was assessed visually and qualitatively by examining the time-series outputs of each dataset.

The sediment model was started on 1-March-1995 to allow time for spin-up of the sediment bed. This amount of time is sufficient for the sediment bed to adjust vertically to achieve quasi-equilibrium conditions and to adjust bed sediment distributions and parameters across the model domain. The analysis on outputs that follow are computing using outputs from 1-April-1995 to 31-June-1995.

Areas of which these datasets were examined

- Umbrella Creek
- Dover Creek
- ORR
- Noyes Cut (Bed Displacement only)

Evaluation of existing and plan tidal nodes, location and magnitudes as well.

4.1. Velocity

Sediment movement is driven primarily by higher velocities. The velocity output dataset does not contain any specific sedimentation input parameters or output, thereby reducing the amount of built in uncertainty. Velocity output is therefore the first piece of information to analyze when estimating sedimentation patterns. Since spring tides produce the highest velocity magnitudes, most of the particle mobility occurs during spring tides. A flood spring tide within the model occurs for a 6 hours period between T3040 and T3045 on May 6th 2016. As such, a snapshot of the velocity profile was extracted at T=3043 along three reaches for the base condition and each of the 7 alternatives.

Umbrella Creek

Longitudinal orientation for the profile shown is such that the stationing begins on the west side at the confluence of Dover, and extends a distance of 4935 meters east toward the ocean. The vertical black lines represent the first dock at approximately station 1690 and the last dock at station 2980.

In the area of interest between the two docks, it appears that alternative 4, alternative 5 and alternative 6 are the only ones that increase the velocity. Velocity increases on the order of .1 to .15 m/s are experienced. In addition, these alternatives seem to eliminate the tidal node experienced in the base condition at approximately station 1000. Zero velocities are still experienced under alternatives 4, 5, and 7 at station 400 due to rock closure. The common thread in these alternatives is all of them contain Dynamite Cut closure.

Dover Creek

Longitudinal orientation for the profile shown is such that the stationing begins on the west confluence with Noyes cut, and extends a distance of 6440 meters east to the Alternate AIWW.

The velocity on Dover Creek appears to increase from the base condition at alternative 1, alternative 2, alternative 4 and alternative 6. The largest velocity increases are experienced within the first 2000 meters, on the order of .3 to .4 m/s. At approximately station 2000 to 4000, the velocity increases are on the order of ~.1 m/s, and further ocean ward velocity changes are close to zero. There is not necessarily any common thread in these four alternatives in terms of which closures are implemented.

ORR

Longitudinal orientation for the profile shown is such that the stationing begins on the northwest confluence with Dover Creek, and extends a distance of 900 meters southeast to the Umbrella Creek.

The velocity criteria for ORR is different than that of Dover Creek and Umbrella Creek. In the larger creeks, the objective is a higher velocity to reduce shoaling and possibly scour. The objective in looking at velocity in ORR is to determine if the cut would continue to close or open back up with the implementation of any selected alternative. The model clearly shows that for alternative 1, the velocity in ORR stays largely the same as the base condition. The velocity increases dramatically for alternative 4 and alternative 5, which is not desirable. Neither of these alternatives have closing ORR as a component. The velocity in dramatically decreases in alternative 2, alternative 3, alternative 6, and alternative 7. All of these have closing ORR as a component (at station ~550). This indicates that there is a likelihood of ORR re-opening in the future for alternative 4 or alternative 5, thereby negating any future habitat lift.

Figure 12 : Umbrella Creek Transect - Velocity

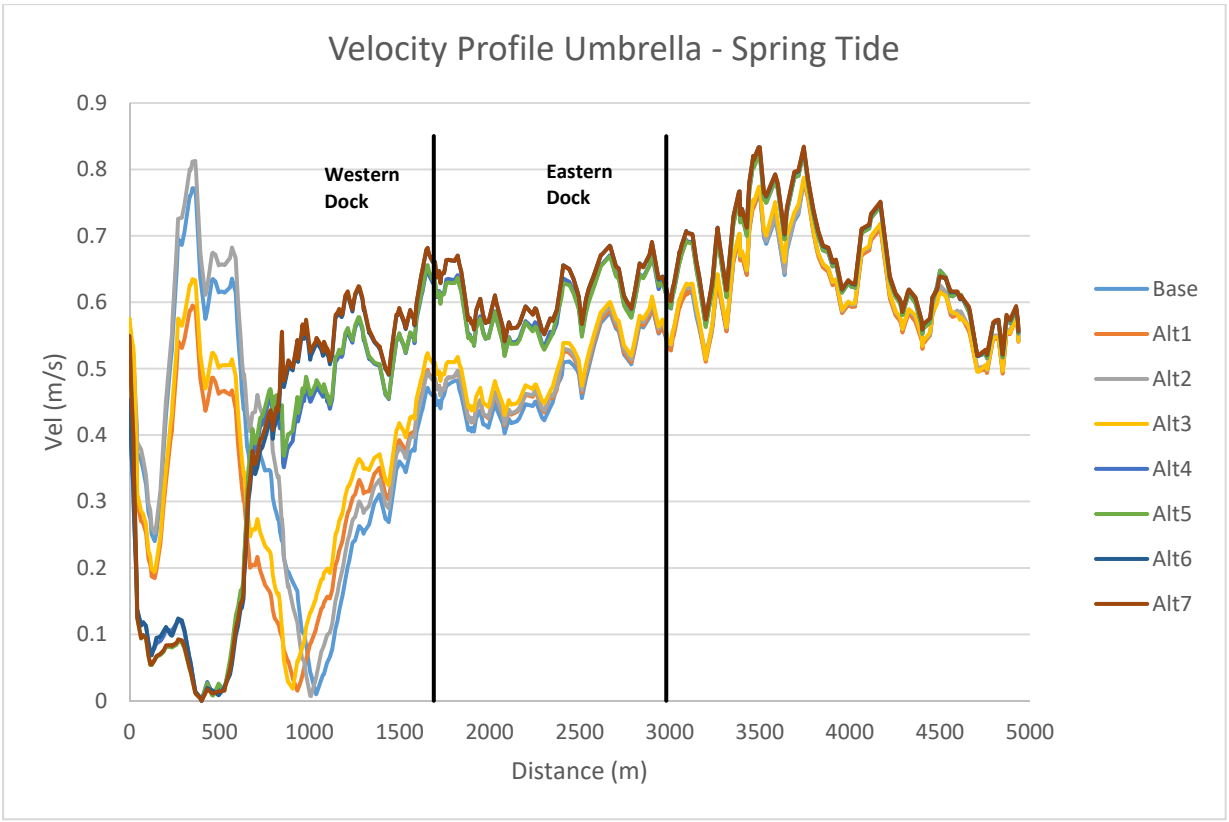

Figure 13 : Velocity Profile Umbrella Creek, Spring Tide, Base + 7 Alts

Figure 14 : Dover Creek Transect - Velocity

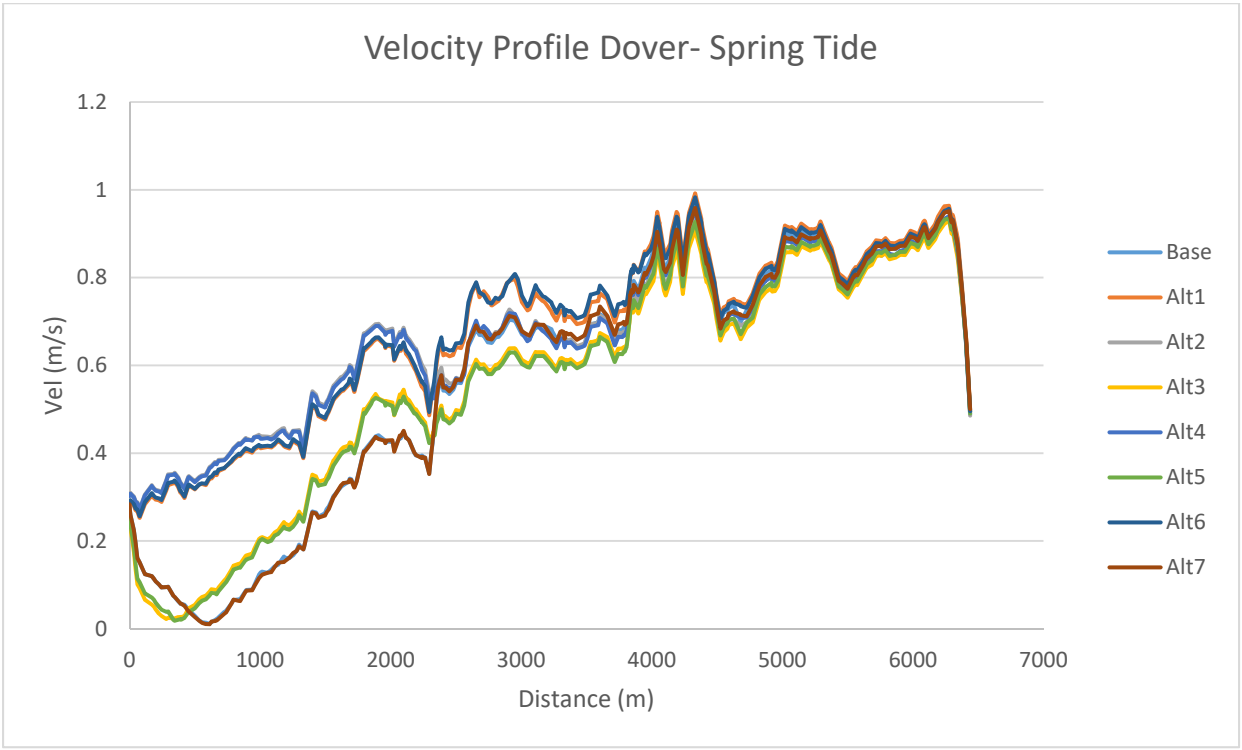

Figure 15 : Velocity Profile Dover Creek, Spring Tide, Base + 7 Alts

Figure 16 : ORR Transect

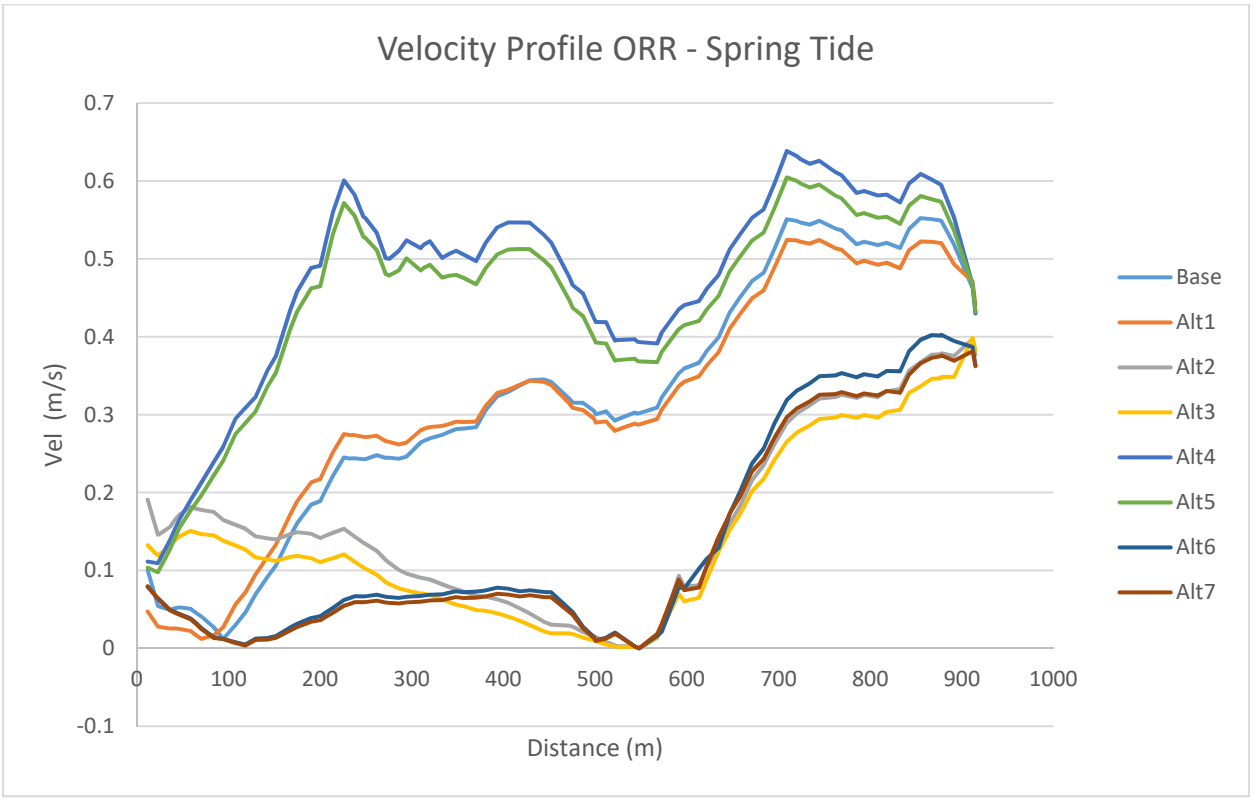

Figure 17 : Velocity Profiles ORR, Spring Tide, Base + 7 Alts

4.2 Shear Stress

The model output dataset with the second highest confidence (second lowest uncertainty) in relation to sediment transport is shear stress (bed shear, or BSH). Chart shows non-exceedance probability on the vertical and modeled output shear stress on the horizontal. Critical shear stress (Tau-Critical, or T_{cr}) is the value of shear stress that must be experienced for a particle to mobilize. In the model, this is estimated to be 0.8, but there is a lot of uncertainty and the plans should be evaluated on how each curve looks as a whole. The model output for shear stress is a reach-averaged value taken from seven points in Umbrella, two points in ORR, and a single point in Noyes.

The curves are saying that (Y-axis) percent of the time, the reach average shear stress is lower than (X-axis) value. So, curves that are further DOWN are saying that lower non-exceedance (higher exceedance) chance that the modeled shear stress does not exceed the shear on the X-axis.

As an example in Umbrella Creek: There is a 99.7 % chance that the experienced shear is lower than the T_{cr} of 0.8 in the base condition. There is a 90.9 % chance that the experienced shear is lower than T_{cr} of 0.8 in the Alternative 7 condition. Similarly, 80% of the time, the shear stresses do not exceed 0.2 in the base condition. 80% of the time, the shear stresses do not exceed 0.35 in the Alternative 7 condition.

Therefore, in general, curves that are further to the down and further to the right experience higher erosive forces, and curves that are further up and to the left experience lower erosive forces.

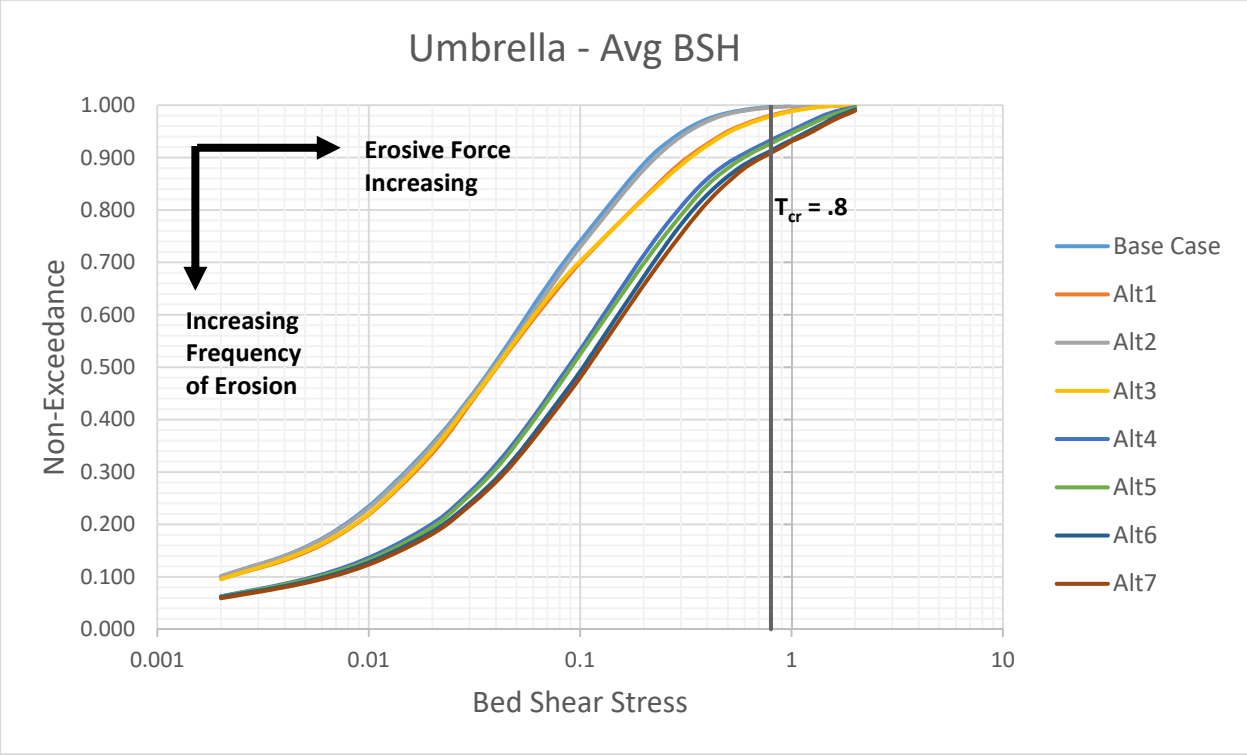

Figure 18 : Non-exceedance Bed Shear Stress – Umbrella Creek

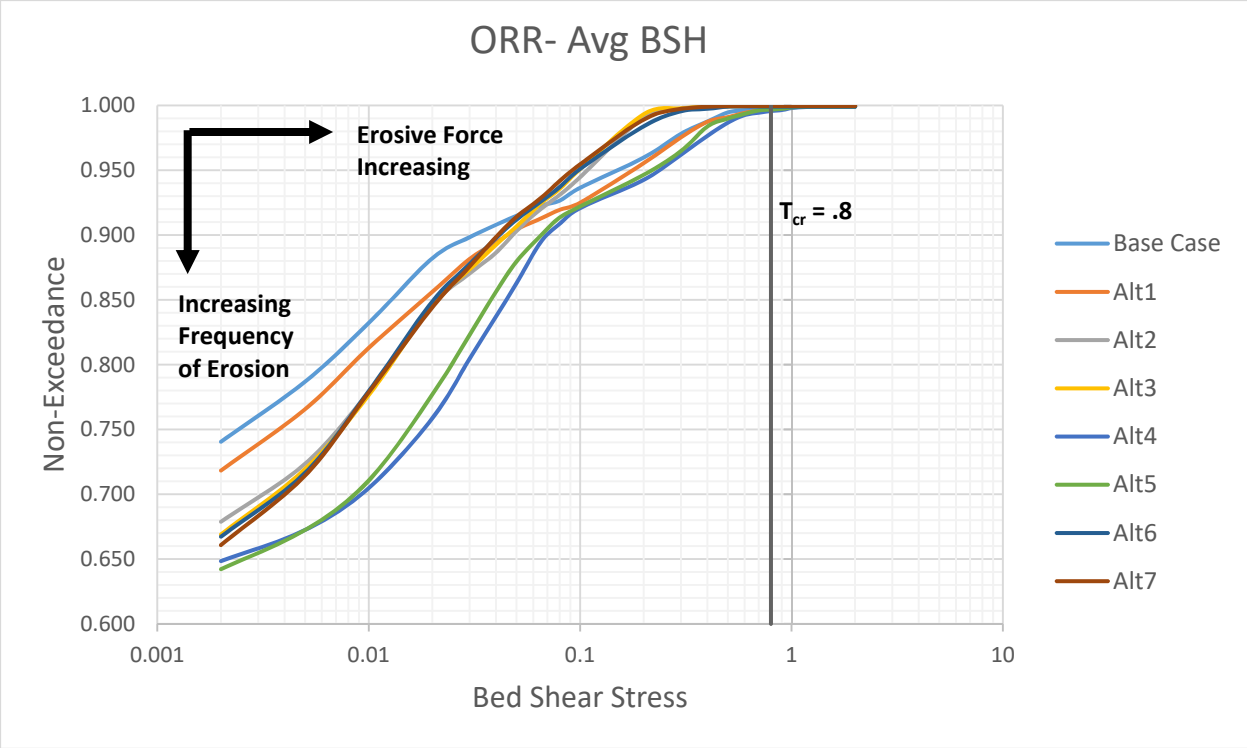

Figure 19 : Non-exceedance Bed Shear Stress – ORR

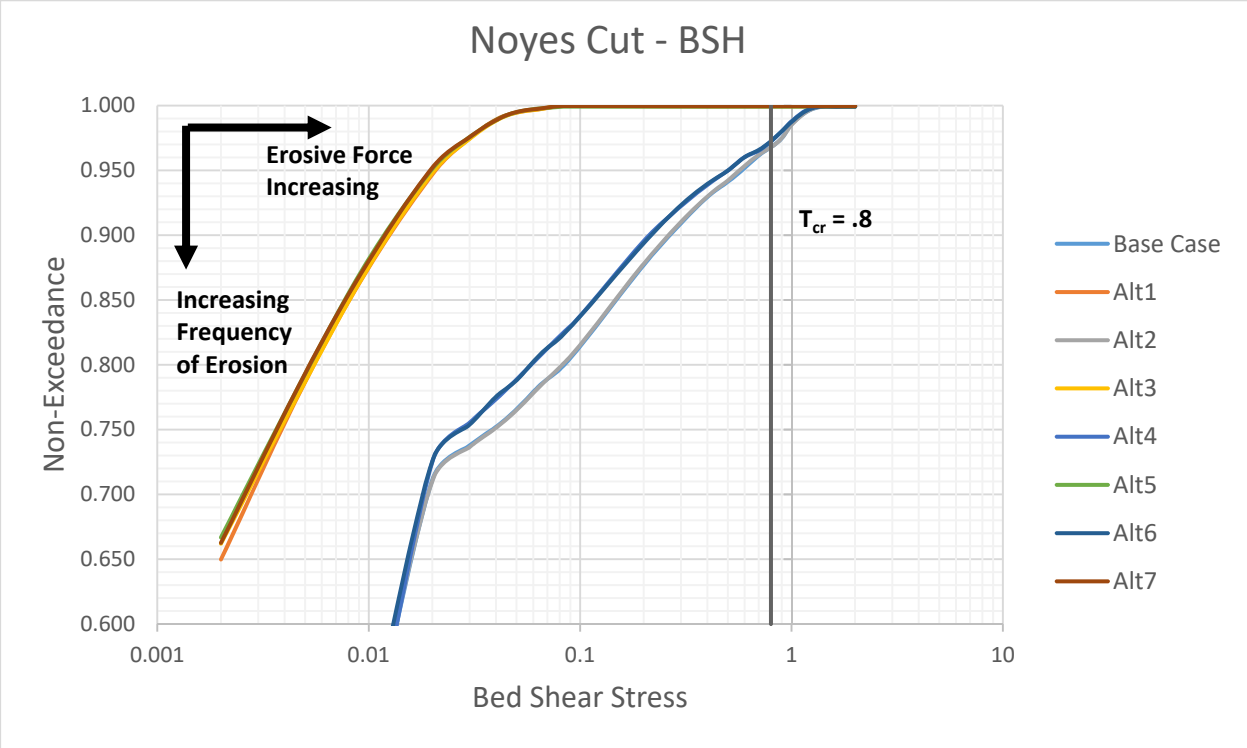

Figure 20 : Non-exceedance Bed Shear Stress – Noyes Cut

Observations to consider

- As discussed above, this is the output dataset with the second lowest uncertainty
- As discussed above, these output datasets can show the trend and direction of erosive forces between base and alternatives, but the uncertainty in T_{cr} makes it difficult to say an area will certainly erode and in what amount of time.
- Umbrella Creek is the primary area of concern for increase shoaling. The average reach bed shear graphs in Figure 18. The average bed shear does not increase substantially from the base condition for alternative 1, alternative 2, or alternative 3. The average bed shear does increase substantially for alternative 4, alternative 5, alternative 6, and alternative 7. Alternative 7 shows the largest increase in bed shear, although it is not substantially more than alternatives 4-6.
- ORR reach is not a large shoaling concern, however it has been closing off at a relatively rapid pace in recent years (as determined from aerial imagery). It is important to evaluate how this reach will react with other changes to the system. If ORR were to begin to scour and re-open, realized project benefits may be negated. Figure 19 shows that shear stress increases from base condition in alterative 1, alternative 4 and alternative 5. None of these alternatives have "close ORR" as a component. Alternative 2, alternative 3, alternative 6 and alternative 7 do show some more frequent shear stresses of 0.1 to 0.5 Pa, however these are lower than the assumed 0.8 PA critical stress level.
- The Noyes Cut reach does not seem to be impacted much at all under any alternative that does not contain a closure within Noyes Cut. Alternative 1, alternative 3, alternative 5, and alternative 7 all experience a significant reduction in shear stress, due to each of these alternatives having a closure within Noyes Cut.

4.3 Bed displacement

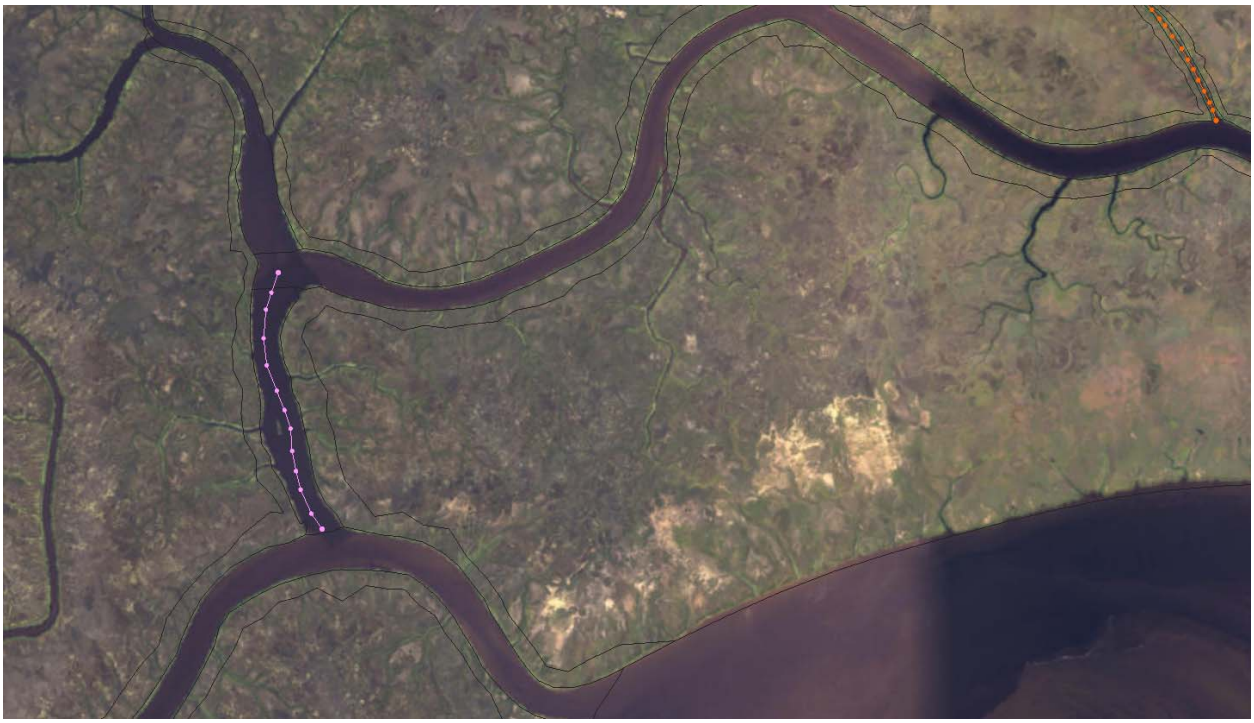

Figure 21 : Noyes Cut Transect

The model output dataset with the lowest confidence (most uncertainty) in relation to sediment transport is bed displacement (DPL). This output dataset is built upon the velocity model, bed shear model, critical shear stress, and sediment parameters. Each of these have their own level of uncertainty, therefore bed DPL contains uncertainty at least as high as the sum of the other uncertainty.

Bed displacement in particular should be viewed in base-to-plan comparisons. At the beginning of a model simulation, the hydrodynamics cause the bathymetry and sediment layers to change immediately to somewhat of a stable condition. Therefore, large scour areas that appear on the profiles should not necessarily be construed as areas of scour.

Bed displacement is the only sedimentation output dataset that shows cumulative effects of an area throughout the simulation period. Output such as velocity, bed shear, and salinity are instantaneous in time and space. As such, the DPL profiles on Figure 22 - Figure 27 show total displacement on the final day of the 4-month simulation.

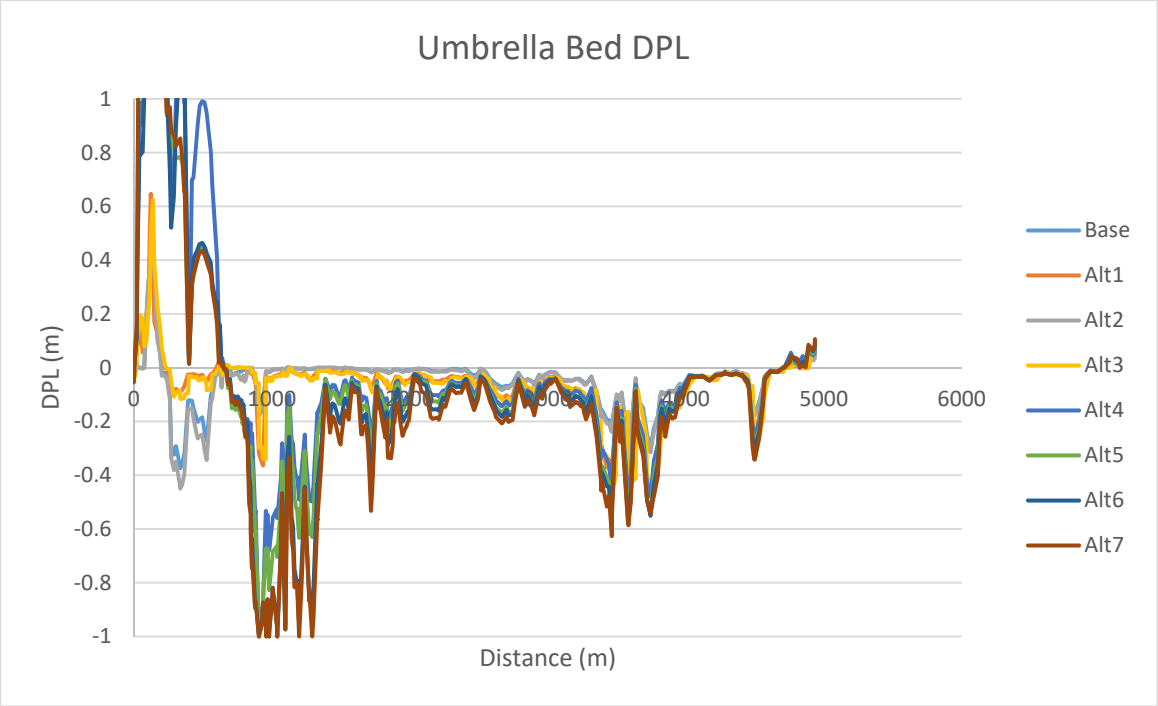

Figure 22 : Umbrella Creek Bed DPL

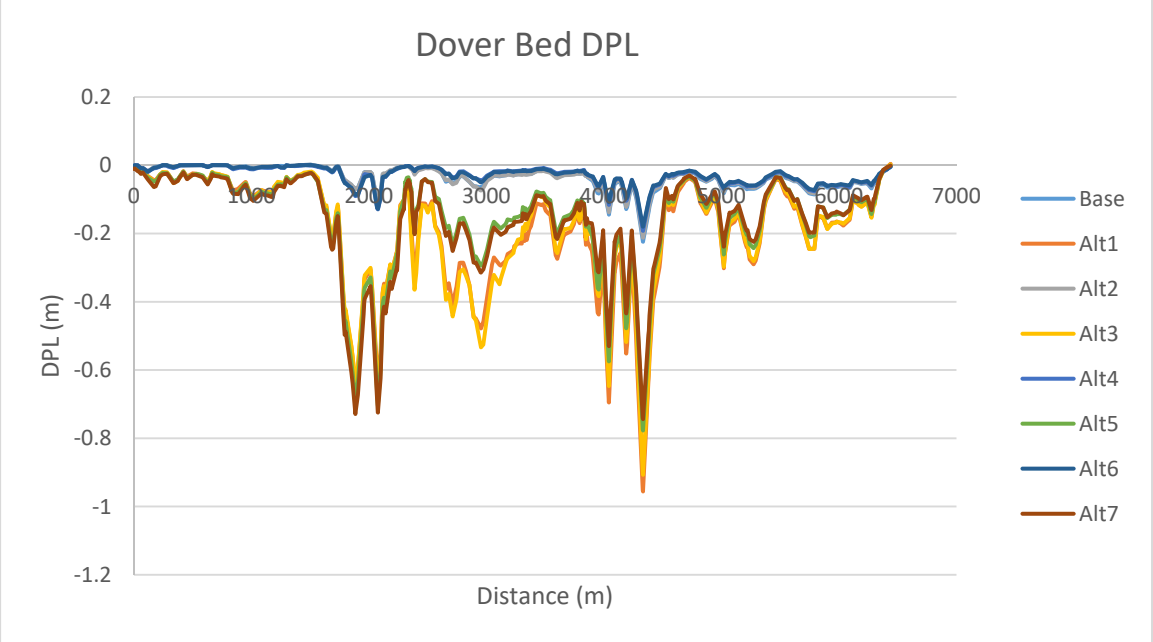

Figure 23 : Dover Creek Bed DPL

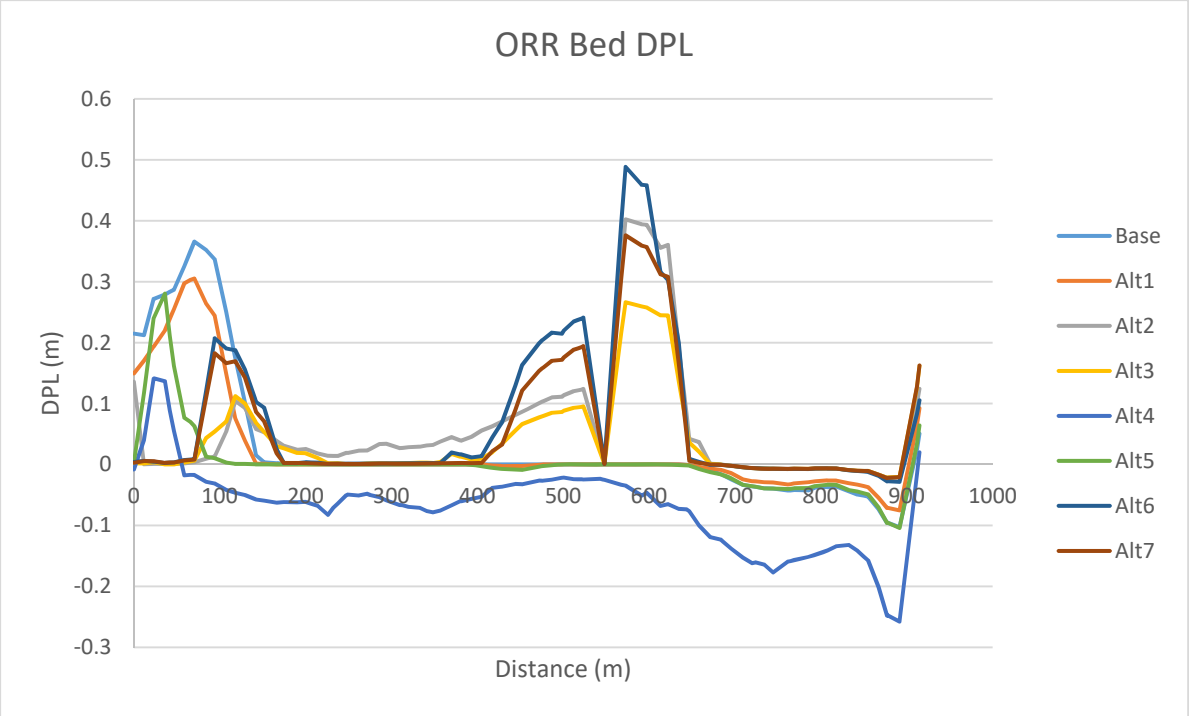

Figure 24 : ORR Bed DPL

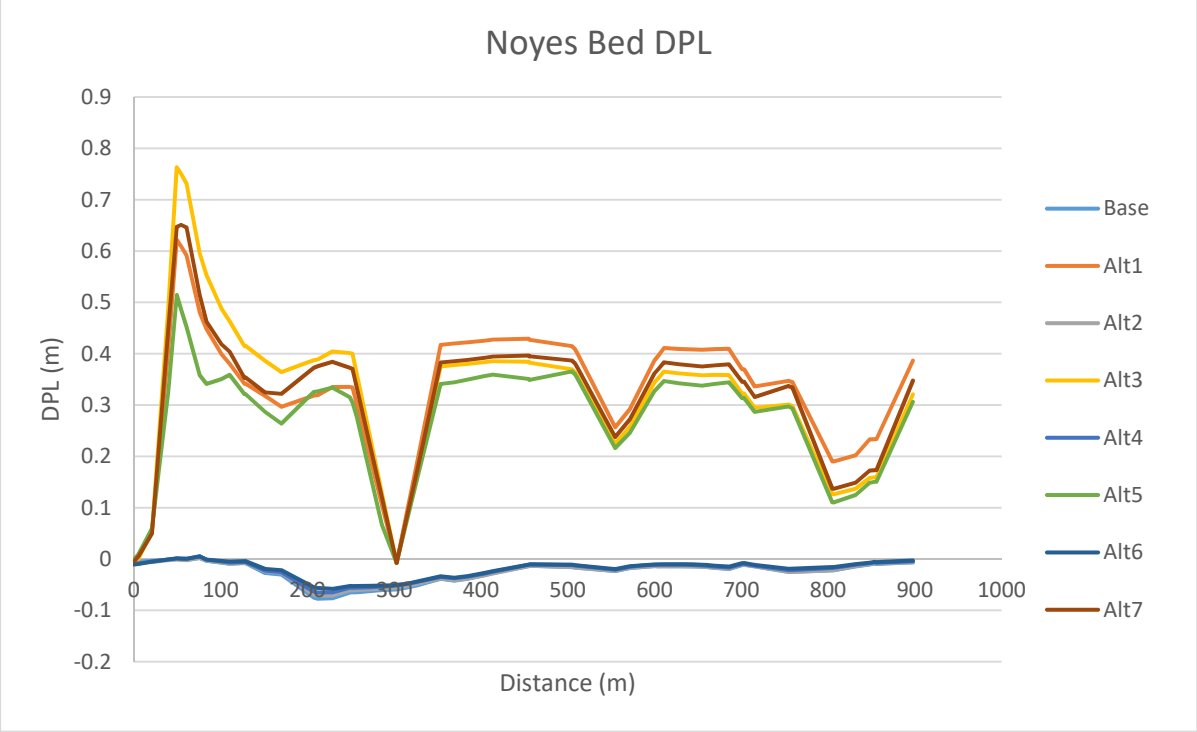

Figure 25 : Noyes Cut Bed DPL

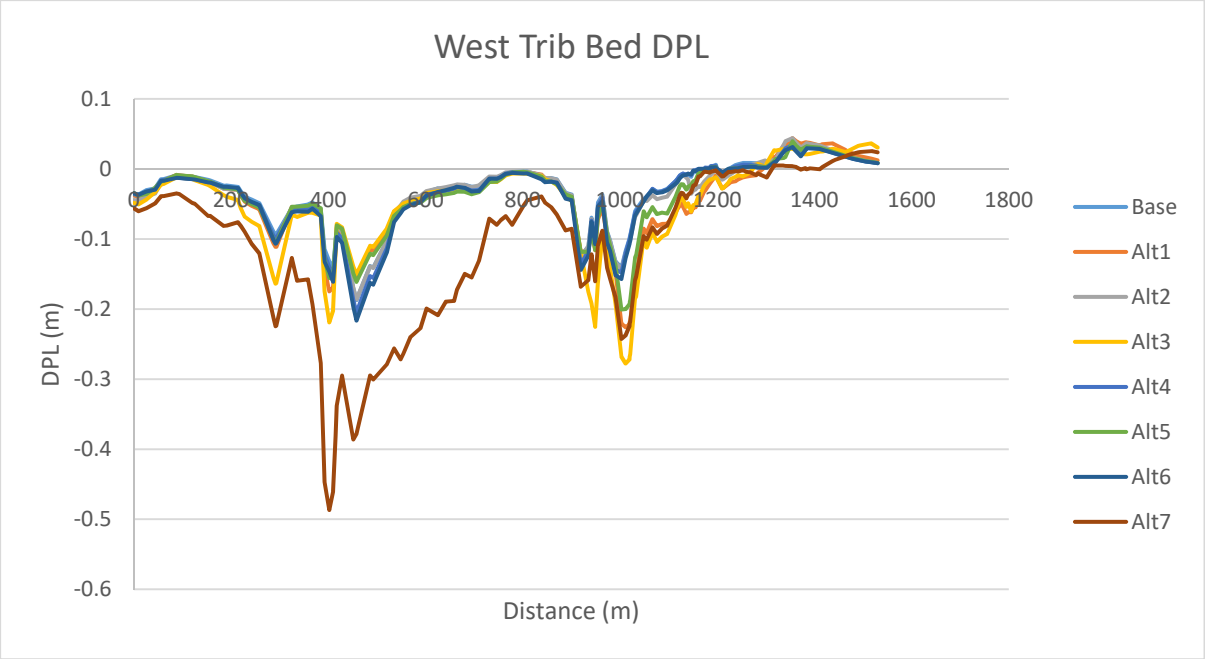

Figure 26 : West Tributary Bed DPL

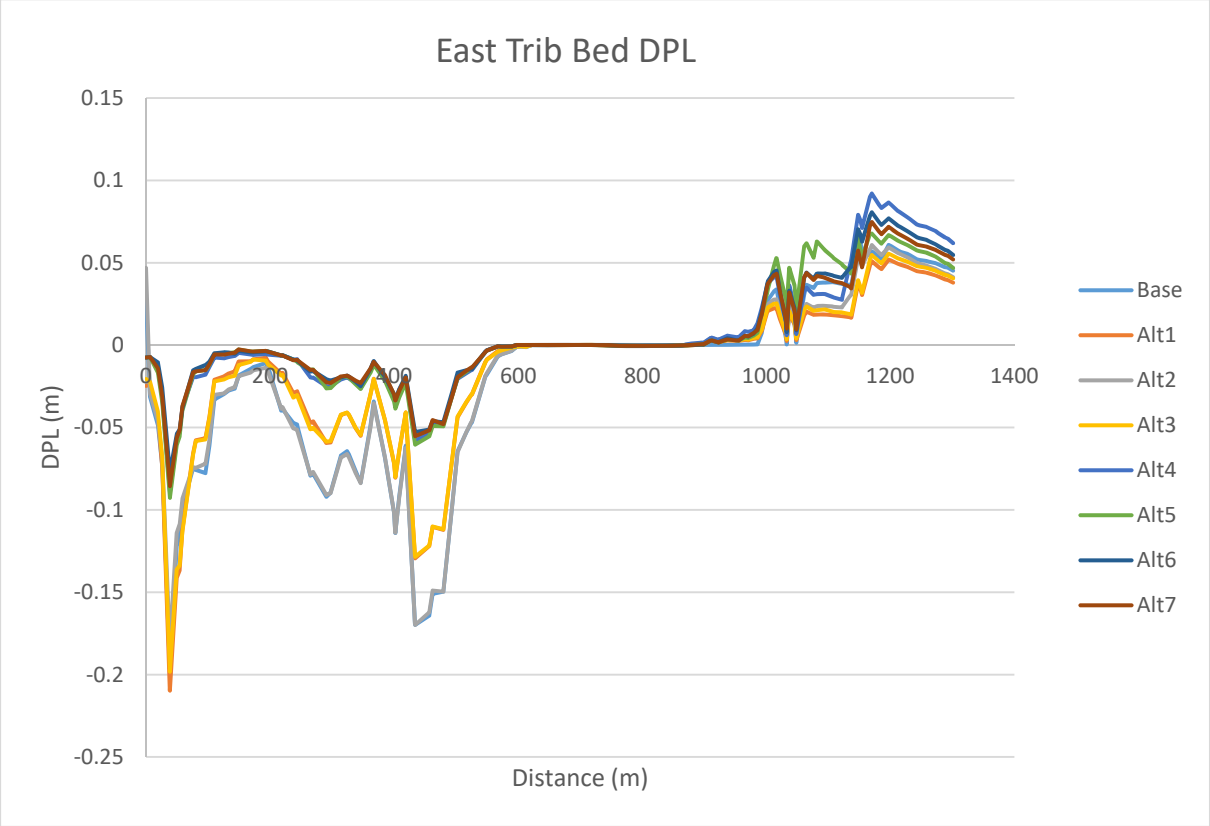

Figure 27 : East Tributary Bed DPL

Observations to consider

- As discussed above, this is the output dataset with the lowest uncertainty
- As discussed above, it is critical to view the outputs as base-to-plan comparison.
- The West Tributary appears to have negligible change from base condition in alternatives 1-6. Alternative 7 appears to be the only alternative with significantly more scour.
- The East Tributary appears to have negligible change from base condition in alternatives 2-3. All other alternatives produce additional deposition.
- Umbrella Creek appears to have negligible change from base condition in alternatives 1-3. All other alternatives produce more scour than the base condition, with alternative 7 showing the largest change.
- Dover Creek appears to have negligible change from base condition in alternative 2, alternative 4, and alternative 6. All other alternatives produce similar amounts of scour.
- ORR appears to have negligible change from base condition in alternative 1 and alternative 5. Alternative 4 appears to dramatically increase the scour rate along the whole reach. Alternative 2, alternative 3, alternative 6 and alternative 7 appear to induce shoaling in the vicinity of the closure location.
- Noyes Cut appears to have negligible change from base condition in alternative 2, alternative 4 and alternative 6. All remaining alternatives appear to induce shoaling in the vicinity of the closure location.

5. Civil Design Project Features

5.1 Design Requirements

The basis of design requirements for each plug location is to block tidal flow in an effective and cost efficient manner. Each plug should reduce velocities in the channel, alter the salinity regime favorably, and trap sediment on both sides to create marshland. The structures must tie in to marshland far enough to prevent side cutting around the structures and negating benefits.

5.2 Conceptual Design

The conceptual design at each closure location is virtually identical, with the exception of material volume required. The alternatives analysis are simple different combinations of closures to alter flow patterns. Each closure structure consists of a PZC-13 sheet piling at the marsh tie in points, and GDOT Type-1 Armor rock placed in a trapezoidal shape through the centerline of the structure across the channel. Sheet pile is used at the marsh tie-in to minimize environmental impacts. The crest width of rock placement will be 6', with 3:1 (H:V)side sloped to channel bottom closure. The crest elevation has been set at 3' NAVD88, which will act as a complete barrier to flow approximately 90% of the time, except for spring tide conditions.

5.3 Construction Methods

Construction will be completed primarily from barges. There will likely be multiple barges at any given time, for material storage and pile driving. The tie in length into the marshland will be as long as possible given the constraint of arm length from the barges, and is estimated to be approximately 40'. No machinery would be used in the delicate marshlands to minimize adverse impacts.

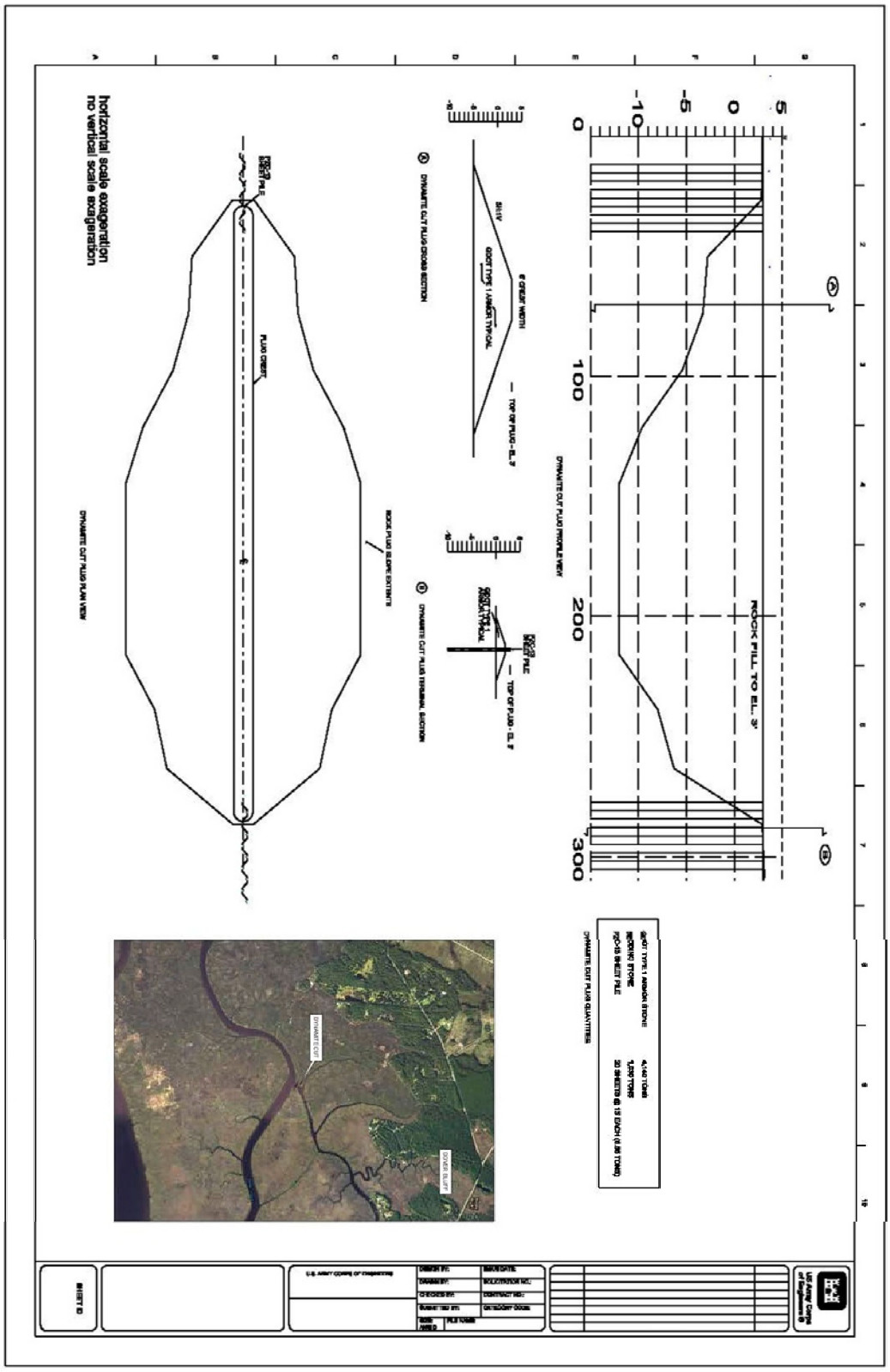

Figure 28 : Dynamite Cut Plansheet

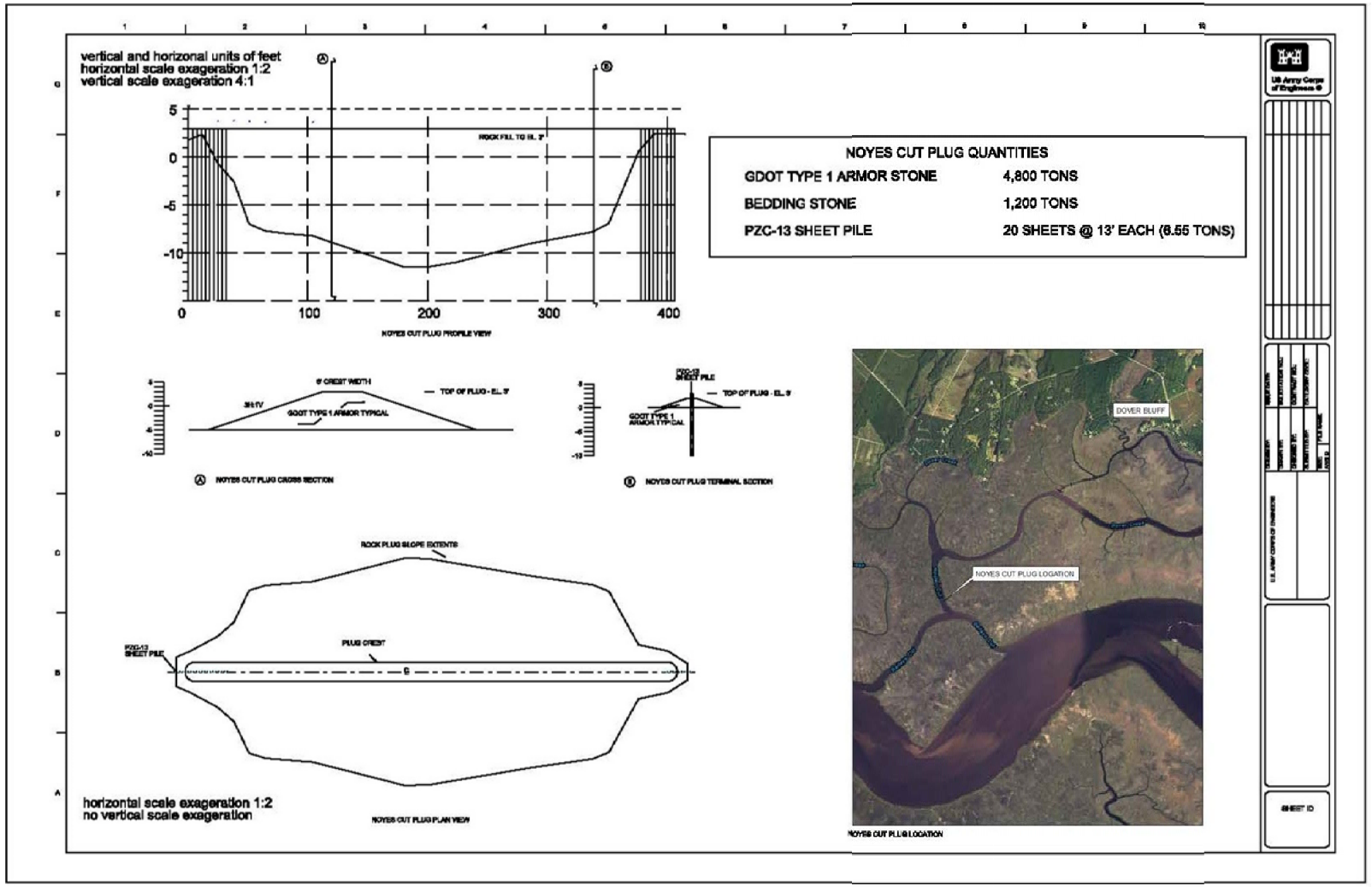

Figure 29 : Noyes Cut Plansheet

Figure 30 : ORR Plansheet

5.4 Quantity Estimate Summary

Construction quantities were generated based on the design template, bathymetric surveys and rock template designs shown in Figure 28 - Figure 30. Quantities were used to develop screening level costs for use in economics appendix and Benefit-Cost ratio. More details on costs can be found in the Cost Engineering appendix.

DESCRIPTION	UNITS	QUANTITY
Noyes Cut		
Sheet Pile End Walls - Materials	TON	6.56
Sheet Pile End Walls - Installation	SF Wall	604.11
Bedding Stone	TON	1200.00
Rip Rap, GDOT Type 1	TON	4800.00
ORR		
Sheet Pile End Walls - Materials	TON	6.56
Sheet Pile End Walls - Installation	SF Wall	604.11
Bedding Stone	TON	320.00
Rip Rap, GDOT Type 1	TON	1100.00
Dynamite Cut		
Sheet Pile End Walls - Materials	TON	6.56
Sheet Pile End Walls - Installation	SF Wall	604.11
Bedding Stone	TON	1030.00
Rip Rap, GDOT Type 1	TON	4140.00

Figure 31 : Quantity Estimates

6. Supplemental Information

6.1 Regional Geology

The proposed restoration property is in eastern Camden County, in the marshlands north of the Satilla river and near the St Andrews Sound. Camden County is located in the Satilla Coastal Lowland Plain(or Satilla Plain), a subset of the Coastal Plain Physiographic Province. The Satilla Plain is a low marine terrace approximately 20-35 miles wide bordering the Atlantic Ocean. The western edge is marked by a 20-40 ft high escarpment and marked by sandy flat plains and longleaf pines. The eastern coastline edge is an irregular network of sea-islands, sounds, tidal river and marshes. There are two classes of swampland, the upland swamp and the tidal swamp. The project is located in the tidal swamp area, and is partially submerged at high tide.[1]

6.2 Sea Level Rise

For the study area, sea level is predicted to rise 9 inches over the 50-year period of analysis. The tidal marsh in the study area would be very adaptable to increases in sea level rise due to the large tidal range, available sediment supply, and the ability of the existing marsh to create its own sediment from detritus (NOAA 2011). Therefore, no decrease in tidal marsh habitat is projected in the without project condition for the 50-year period.

6.3 Model Stratification

For the study area, the 2-D depth-averaged ADH model code was selected over the 3-D version. The relatively shallow estuaries and the semi-diurnal tide conditions suggest that the system is well mixed and that this assumption is appropriate. The area of the domain where this may not be a good assumption is in the main Satilla River reach, where depths are large enough for stratification. However, there is no hydraulic or environmental analysis being done on model outputs on the Satilla River reach.

The TSS data that was collected in 1995 at the Satilla River anchor stations was in the form of TSS profiles. These profiles were depth averaged for comparison to the 2-D model. A 3-D model would have been useful in this instance as well, however the overall benefits 2-D assumption outweigh the gains to be captured by using a 3-D model.

6.4 Climate

The climate is mild with hot humid summers and abundant yearly rainfall. Brief frost and freeze events occur in winter. Snowfall is rare, occurring on average less than once per year. Winters are usually short and mild with occasional cold periods of short duration. Average daily winter temperatures range from 46 to 65°F and average 55°F. Summers are long, hot, and typically very wet. Average daily summer temperatures range from 75 to 91°F and average 83°F. Average annual precipitation is approximately 50 inches. The average rainfall intensity from 1988 to 1997 was 4.28 inches. Maximum rainfall generally occurs in August.

[1] Vaughn, T. Wayland, Otto Veatch, and Llyod William Stephenson. *Preliminary Report on the Geology of the Coastal Plain of Georgia*. Bulletin No. 26. Atlanta: Foore & Davies, 1911. USGS & EPD, 4 Dec. 2009. Web. 1 Aug. 2017. Pages 36-39

6.5 Climate Change

USACE screening level climate change vulnerability assessment (VA) tool was utilized to assess the potential impacts and likelihood of climate change impacts to this region. The tool operates on a HUC-4 level spatial scale, and it used to quickly assess climate change vulnerably. The tool can be found on https://maps.crrel.usace.army.mil/apex/f?p=170:2:963367691217::NO:::

The parameters that were used are as follows:

Division: South Atlantic

District: Savannah

HUC: - Altamaha-St Mary's HUC0307

Business line: Ecosystem Restoration

> Indicators under selected business line: At Risk Freshwater Plants, Mean Annual Runoff, Monthly Cov, Runoff Precipitation, Sediment, Macroinvertebrates, Flood Magnification, Low Flow Reduction

Climactic Data Source: CMIP-5 (2014)

Threshold: 20%

ORness: 0.7[2]

[2] Specifies how risk-averse the analysis should be. Value should be between 0.5 and 1.0. Higher ORness values weigh the more vulnerable indicators more heavily, resulting in greater perceived vulnerability overall (more risk-averse). Lower ORness values weigh all indicators in a business line more equally, resulting in lower perceived vulnerability overall because less vulnerable indicators average out more vulnerable indicators (less risk-averse). Typical value is 0.7

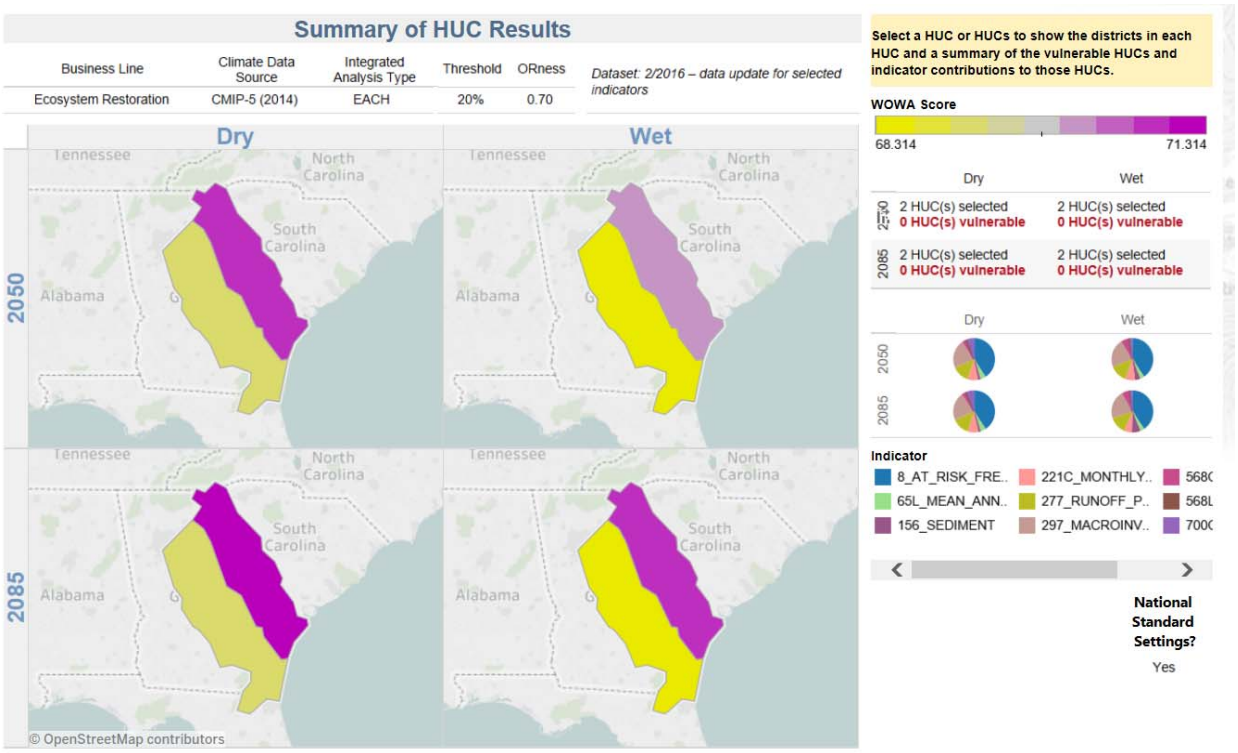

Figure 32 : HUC0307 Summary Results

WOWA Scores[3]:

	Dry	Wet
2050	69.154	68.314
2085	69.139	68.459

The WOWA Score of the Altamaha-St Mary's watershed is a standardized way to compare climate change vulnerability to other basins throughout the United States. The WOWA score for the basins throughout the country under the Flood Risk Reduction Business line ranges from 54.69 to 89.84. **Figure 33** shows how the project basin is related to the rest of the country.

The Altamaha-St Mary's watershed WOWA score does not exceed the vulnerability threshold for the Ecosystem Restoration business line, and is at a relatively low risk for impacts to climate change compared to the rest of the continental United States.

[3] WOWA stands for "Weighted Ordered Weighted Average," which reflects the aggregation approach used to get the final score for each HUC. After normalization and standardization of indicator data, the data are weighted with "importance weights" determined by the Corps (the first "W"). Then, for each HUC-epoch-scenario, all indicators in a business line are ranked according to their weighted score, and a second set of weights (which are the OWA weights," are applied, based on the specified ORness level. This yields a single aggregate score for each HUC-epoch-scenario called the WOWA score. WOWA contributions/indicator contributions are calculated after the aggregation to give a sense of which indicators dominate the WOWA score at each HUC.

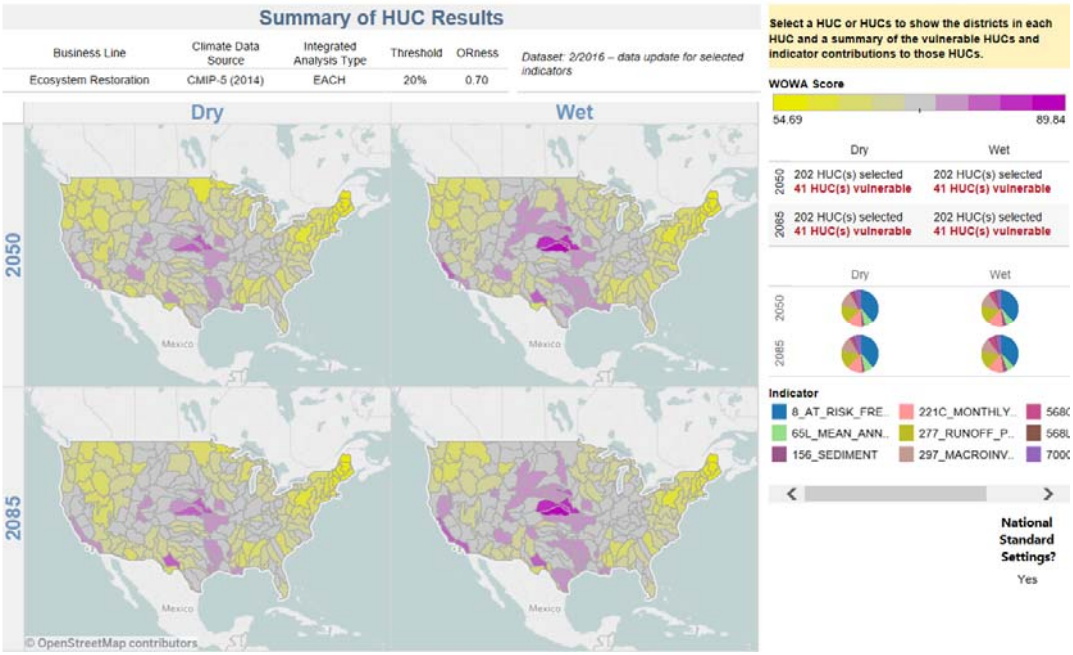

Figure 33 : Nationwide HUC Comparison

The vulnerability WOWA score was also evaluated over time, from the period 2050 to 2085. During a both dry and wet hypothetical future scenario, the WOWA score can be expected to decrease approximately .17%.

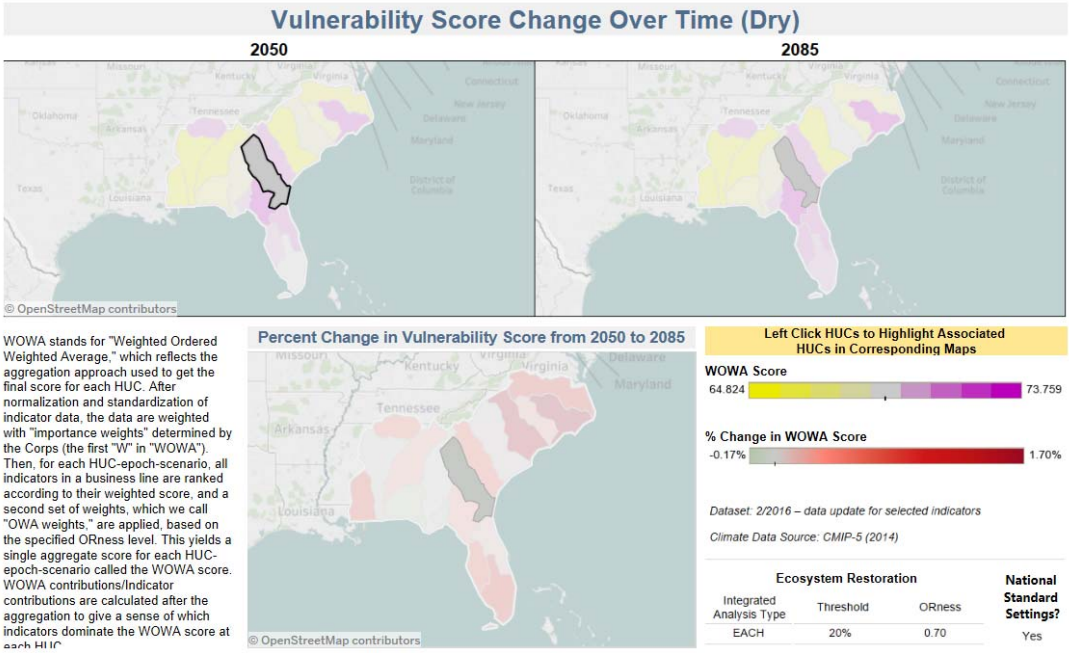

Figure 34 : HUC Vulnerability over time

6.6 Morphological History

The project area is a dynamic system and continually evolving toward and equilibrium. In the past decade, there has been enough human influence to the area such that the natural equilibrium has not yet been achieved. Figure 35 shows a portion of a county map drawn based on survey data collected between 1981-1917. Prior to all manmade cuts, the system appears very simple with headwaters to the west with a steady gradient toward the ocean.

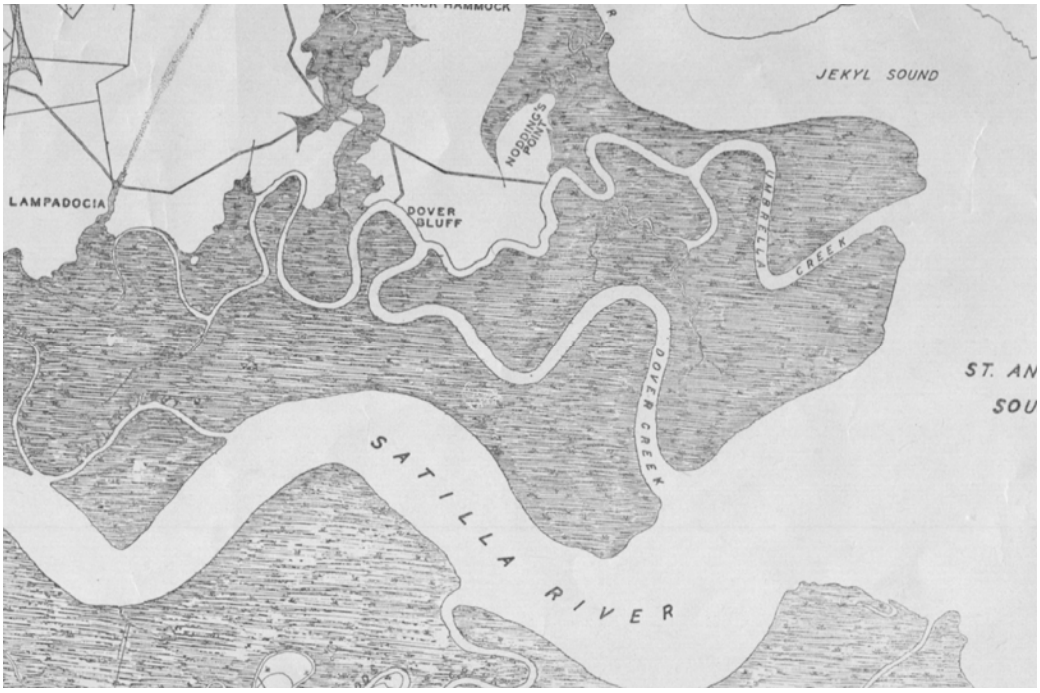

Figure 35 : Map of area ~1900

Since the year 1900, multiple cuts have been introduced to the system without any real concern for long term impacts. Below is an approximate timeline of man-made changes, each of which have a butterfly-effect on the natural long term morphological response. The system in the current state is shown in Figure 36.

Early Timeline

- 1900: No manmade cuts in system
- 1910: Noyes Cut dug by local interest
- 1915: Dover and Umbrella cuts dug by USACE
- 1939: Federal Alternate AIWW Cut
- 1971: Wing dam built on Umbrella Creek, failed.

Recent natural morphological changes can be evaluated via google earth aerial imagery dating back to 1988. The most apparent change is ORR visibly closing from ~140’ wide to ~25’ wide.

Figure 36 : Map of area ~2013

APPENDIX C
Public/Agency Comments on Draft Report

1. **Stakeholders/Public Comments and USACE responses**
2. **Letters and Emails from Stakeholders/Public Responding to Draft Report**

Organization/Public	Comment	Response
National Marine Fisheries Service Charleston, SC (EFH)	"…we have reviewed both documents and have no objection to the proposed action (Alternative 7). We accept the conclusion that the proposed action (Alternative 7) has the most beneficial impacts and the least adverse impacts."	USACE agrees with the NMFS conclusion regarding the beneficial impacts on EFH from the TSP and appreciates the support of NNMFS.
National Marine Fisheries Service St. Petersburg, FL (Section 7 Office)	No response	Coordination resent to NMFS on March 12, 2018, requesting response by March 28.
U.S. Environmental Protection Agency		Thank you for the comments. Responses to individual comments follow:
	The EPA recommends the USACE provide documentation that the USFWS (for the wood stork and West Indian Manatee) and NMFS (for the Shortnose Sturgeon) have concurred with their *may affect, but not likely to adversely affect* determinations with the Final EA. Additionally, the EPA recommends that all coordination with these agencies be included in Appendix C of the Final EA.	This document was released for a 30-day review period on Dec 8, 2017. The concurrence letters from the resource agencies are included in the integrated final report.
	The EPA recommends the USACE provide a discussion of the findings from this draft report and GHPD and Seminoles Section 106 determination within *Chapter 4: Evaluation of Alternatives and Environmental Impacts – Cultural Resources Section* within the Final EA.	This document was released for a 30-day review period on Dec 8, 2017. The concurrence letters from the tribes and Georgia SHPO are included in the integrated final report.
	Environmental Justice: the EPA recommends the USACE provide data or supporting information that support their claim that minority and/or low income populations do not recreate in the project area in the Final EA.	Section 2.3.10.6 has been updated to explain that "the evidence for a lack of low income/minority recreational use came largely through general surveys and reconnaissance of the area. This includes anecdotal information obtained through interviews and meetings with local residents (who do use the area for recreation), the Satilla Riverkeeper, and the Georgia DNR.
	Alternative Analysis: USACE states that they eliminated an alternative because H&H modeling showed that it did not improve conditions and *may cause problems (page 29).* The EPA recommends the USACE elaborate on what problems this alternative might cause and why it was eliminated from further consideration in the Final EA.	Table 6 has been added to Section 3.3 to illustrate rational for elimination of alternatives.
	The EPA appreciates the USACE developing a monitoring and adaptive management plan (MAMP) for this project. The EPA thinks that using the adaptive management approach to project delivery especially for ecosystem restoration projects will ensure its success. However, the EPA notes that there is no mention of the commitments made in the MAMP within the FONSI. The EPA recommends the USACE include commitments outlined in the MAMP (including monetary commitments) within the FONSI.	The commitments in the MAMP were summarized in the FONSI as a design commitment (see Section 3 *Environmental Design Commitments #2*). All of the details of the MAMP may be found in the main report.

One Hundred Miles	One Hundred Miles supports the findings of the Draft Integrated Report, and “we fully support the ACOE’s efforts to restore the Satilla estuary system and habitat.”	Thank you for your comment of support.
Jessica Reichmuth	“I would like to commend USACE’s efforts in running the report to determine the best course of action to restore EFH in Umbrella and Dover Creeks”…. “the best course of action in this case is the proposed alternative #7…I agree that this solution will result in the largest amount of restored salt marsh in addition to a restored salinity gradient that has been missing from this portion of the Satilla River.”	Thank you for your comment of support.
	“In terms of the dimensions spanning the tidal channels, these will be tall enough to block flood tide stages? Or projected storm surges in the area if frequency of storms increases?”	The structures are all tall enough to prevent tidal exchange within the channel during normal high tide and spring tide stages. These structures will not prevent sheet flow across the marsh during normal tide cycles. The structures were not intended to serve as flood protection.
	“In looking at the cap construction used in the Savannah River with marsh vegetation covering the cap almost 10 years later, is this the time frame expected with Umbrella and Dover Creeks?	The expectation is for sedimentation in the channel will occur with marsh forming adjacent to the closure structures. The sedimentation portion of the model indicates sedimentation and marsh formation but is not accurate enough to provide a timeline.
	Are you expecting marsh vegetation growth to keep up with projected sea level rise?	Yes, we are expecting marsh vegetation growth to keep up with projected sea level rise. Section 3.1.5 (Assumptions) states “…The tidal marsh in the study area would be very adaptable to increases in sea level rise due to the large tidal range, available sediment supply, and the ability of the existing marsh to create its own sediment from detritus (NOAA 2011). Therefore, no decrease in tidal marsh habitat is projected in the without project condition for the 50-year period.”
Georgia Conservancy	“On behalf of the Georgia Conservancy, I would like to express strong support for the Noyes Cut Ecosystem Project, which will not only aid in improving thousands of acres of the Satilla River estuary, but also serve as an example of marsh ecosystem restoration for other impacted locations throughout the south Atlantic Bight.”	Thank you for your comment of support
	“The web of life is most critical and fragile at the edge, where land and water meet, and where freshwater and saltwater merge.... Noyes Cut and other manmade modifications in this area of the Satilla River estuary have reduced the ecological function and resilience. This project is an important priority because it will restore natural flow patterns, rendering many benefits.”	Thank you for your comment of support.

	"The Noyes Cut Project seeks to repair the significant impacts causing channelization of the marsh, which have been ongoing since 1930's. As envisioned in this COE action, the project will restore more natural depths and circulation patterns to Umbrella and Dover Creeks and improve aquatic habitat for resident species (e.g. blue crabs, shrimp). The project also provides better connectivity and improved salinity gradients for migratory species (e.g. striped bass, American eels, and shad, river herring, etc.) in the upper reaches of the estuary."	USACE agrees with this assessment outlining the many types of benefits to the ecosystem from the proposed action.
Satilla Riverkeeper December 8, 2017	The Satilla Riverkeeper expressed general support of the proposed action (Alternative 7) and concurs with the many different ecosystem benefits outlined in the Draft Integrated Report.	Thank you for your comment of support.
	"We request a more detailed explanation be included in the report of why a diversion works (or some similar plan to divert water, rather than cut off flow completely) at Dynamite Cut was not a preferred alternative for achieving restoration goals."	Typically, a diversion structure is a good solution to use when flow is uni-directional. As an example, McCoy's cut diversion structure is outside of the tidal influence zone in Savannah, and it diverts fresh water inflow from the Savannah River into the Wildlife Refuge to mitigate for excessive salinity in the marshes. In this project site, the entire area is under tidal influence at all times. Any diversion structure would simply move the existing flow centerline east or west a small distance, but not really change the flow or salinity patterns within the system as a whole. In addition, a structure that is not keyed in on both sides is very likely to experience either scour on the opposite bank, destructive eddy currents on a reverse tide, or both. In addition, partial diversion structures were eliminated because of potential safety issues from high velocities through the openings.
Satilla Riverkeeper January 26, 2018	The Satilla Riverkeeper expressed strong support of the proposed action (Alternative 7) and concurs with the many different ecosystem benefits outlined in the Draft Integrated Report. These benefits are expected from the restoration of more natural hydrologic flow and salinity gradient.	Thank you for your comment of support
Georgia Department of Natural Resources, Coastal Resources Division	GADNR CRD concludes that the proposed action is consistent with the applicable enforceable policies of the Georgia Coastal Management Program	Thank you
Georgia Department of Natural Resources, Wildlife Resources Division	Responded in email dated March 19, that "We do not have any comments David. Good luck with the project."	Thank you
USFWS	The USFWS concurs with the District's conclusion that the project will not adversely impact protected species.	Thank you for your comment of support
Ginny Kittles	"From the meeting I learned that the model can generate output data for specific areas. Accordingly, please provide this information for the following Google Earth coordinates at or near my property: [9 Points given in attached letter]	Please see the responses to the specific questions below. They were informed based on the coordinates that you provided.
	Page 6, Section 1.4 - Does better access include what the Study refers to as the "East Tributary"?	The Feasibility report does not use the terminology "better access". In Section 1.4, the final paragraph states "Deep water access would also be restored to residential developments adjacent to the estuary that currently have access only at high tide." This primarily focuses areas identified for increase shoaling and restricted access within Umbrella Creek. The report will be amended to specifically identify Umbrella Creek.

	Page 24, Section 2.3.10.3 - Does this reference to limited access include the area where I live? If not please include it.	Yes, this paragraph reference limited access as an overall impact of all resident in the vicinity. Report has been amended as follows: “Current recreational activities include boating and fishing for residents of local communities, to include but not limited to, Dover Bluff Community, Piney Bluff Community, and River Marsh Landing.”
	Page 28, Section 3.2 – Do the calculations upon which predictions are made take into account factors such as the 2 hurricanes and the tornadic activity in this estuary during times other than the collection months?	Extreme storm activity was not considered in the analysis. Primary objectives were reduce shoaling in Umbrella and restore salinity gradient. These are driven primarily by non-extreme circumstances that the estuary area experiences most of the time. This study and the structures proposed within are not meant to mitigate for extreme natural weather occurrences.
	Page 28, Section 3.3 – What portions of the estuary have excess shoaling?	The shoaling area specifically noted by the sponsor was in Umbrella Creek. Umbrella Creek was the main focus of shoaling analysis. There may be shoaling in other portions of the system that were not identified by the sponsor and were not targeted during alternative analysis. However, increased flux should contribute to decrease shoaling in other areas besides Umbrella Creek.
	Page 32, Is this the latest placement for the Dynamite Cut closure?	Yes, this is the conceptual closure structure location.
	Appendix A, Page 3 – utilizing the above dock coordinates, is my property in the ENV5 region in Figure 2?	Yes, the dock portion is within ENV5 region.
	If so, it looks like my channel is depositional and will have decreased flux per Table 1. Won’t this affect my channel depth and access to the docks along my channel?	The model represent the points for your dock as a marsh where sheet flow will occur. Your channel was not explicitly modeled due to its size in relation to the model grid. The channel in the model terminates prior to reaching your property. The change in flux across the point near your dock is very small indicating there will be minimal change from current condition with implementation of Alternative 7.
	What is the longitude and latitude of the ENV pin in Figure 2?	ENV5 is 31° 1'9.04"N 81°32'37.50"W
	EN Appendix, Page 3.5 – assuming I’m in ENV5, are there any alternative that don’t adversely affect flux in my area?	Alternatives 4, 5, 6, and 7 have similar impacts on point ENV5. Alternatives 1, 2, and 3, as modeled will have slightly less impact to point ENV5. However, ENV5 is not representative of your channel as denoted in GPS points GK1, GK2, and GK7. Your Channel was not explicitly modeled due to its size being very small in relation to the system as a whole and increased computational time required to extrapolate date to ancillary model nodes.
	Do you project any bluff erosion at the upland interface from storm surge under any alternatives?	Neither extreme storm surge nor bluff erosion were considered during the model analysis. This study and the structures proposed within are not meant to mitigate for extreme natural weather occurrences.
	How will each alternative affect low and high tides	Water Surface Elevation for Base Condition vs. Alt 7 Mean Tide – model results indicate negligible change. Water Surface Elevation for Base Condition vs. Alt 7 Spring Tide – model results indicate Low tide ~0.08m lower

		Water Surface Elevation for Base Condition vs. Alt 7 Neap Tide – model results indicate High tide ~0.05m lower
	Under each alternative, what will happen to the tidal collision node that is causing my channel to fill?	Model analysis indicates Alternative 7 is the only alternative which eliminates both nodes. Other alternative only eliminate 1 of the 2 nodes.
	Will the channel deepen instead?	The change in flux across the point near your dock is very small indicating there will be minimal change from current condition with implementation of Alternative 7.
	Since I cannot leave my dock until water is higher than around mid-tide or so, my kayaking time is already very limited. Will my kayak time decrease?	Based on tidal analysis, it is unlikely that your kayak time will decrease.
	Can you take any steps to prevent losing my access faster than it is now?	Based on velocity analysis, it is unlikely that your channel will experience increased or decreased shoaling in any significant magnitude, however, there is inherent uncertainty.
	Can you take any steps to increase my access – which was formerly significant (see EN Appendix, Figure 35), in line with a project goal to restore historic, pre-cut equilibrium?	The authority for which the study is being performed and proposed implementation is limited in scope. It is unlikely that your channel will experience increased or decreased shoaling in any significant magnitude, however, there is inherent uncertainty. Restoration to the 1900's condition is not a project goal and virtually impossible to accomplish.
	What can you do to decrease uncertainty in your ability to estimate what will happen near my dock?	Model uncertainty could be decreased in your area by adding mesh resolution on the second tributary near dynamite cut, and potentially the reach in front of your dock. These were not included in the mesh because it would have increased the number of nodes and computational time by 10-20%, with no significant impact of the system analysis as a whole. Additional soils samples and laboratory testing to get more precise values for critical shear stress would decrease uncertainty throughout the system and in your specific area. These additional efforts were not included in the initial scoping. Additional cost of the field work and lab testing would exceed the study budget amount for these activities.
	Will you monitor channel depth at my dock after the project construction?	The Monitoring Plan is detailed in section 10.1, page 67 of the integrated report. The Monitoring Plan includes monitoring of flux, salinity, and comprehensive bathymetric channel surveys of the whole system where depths are large enough for vessel access will be performed. This plan is subject to availability of funds and subject to change. Your dock will not specifically be monitored.
Dr. Clay Montague, Former Satilla Riverkeeper Professor Emeritus, Dept. of Environmental Engineering Sciences. University of Florida	**Overall Assessment**: The draft report and appendices include adequate evidence to support the USACE determination of an optimal restoration plan. The alignment of two objectives, to restore both habitat and access, has been a hallmark of success of this project. …I believe the TSP very well accomplishes the stated goals under the various constraints within the Section 1135 program.	Thank you for your comment of support. The objectives of this 1135 project is ecosystem restoration and not recreational access. Access improvements for migratory species is an objective, which may incidentally improve recreational access.
	Suggested report improvements listed below:	
	Please rephrase a statement attributed to me. Page 58, para 5.	Statement has been revised as recommended.

	Importance of the Upper Reach of Dover Creek (West Tributary). The study report may undervalue the benefits of closing Noyes Cut to the upper reach of Dover Creek (called "West Tributary" in the report). Please consider adding statements in Section 4 that bring better focus to this area (perhaps in Section 4.1, 4.2, 4.3, or 4.13). (Much more information provided additional ecosystem benefits and the ancillary benefits to recreational boat access to this area.	USACE is appreciative of this valuable information provided of the potential for additional ecosystem benefits and the ancillary benefits to recreational boat access to this area. Reference to response to C.K Murray letter below: "Channel deepening is expected throughout the system as a whole. Specific locations for sediment transport or shoaling was not evaluated. It is likely that some areas will experience a small degree of sediment accumulation, however, the net result within the system will be sediment transport leading to channel deepening." Therefore, we did not believe it appropriate to make predictions for specific locations.
	Locations of closures differ in the Engineering Appendix (Appendix B).	The locations of closures in Figure 11 of report are the most updated design (but not final design). Closure locations in the EA Appendix represent model data. Minor variations of locations within the hydrodynamic model do not substantially affect the model results thus the model has not been re-run.
	Risk of upland flooding from storm surge. Page 44, Section 4.1, para 1, lines 4-6 state that the action alternatives may increase flood potential from storms…	Upland flooding and extreme storm simulations were not modeled.
	Local concern about sedimentation in East Tributary. According to Section 4.3, of the EN Appendix, the East Tributary area should experience increased sedimentation if Dynamite Cut is closed. The East Tributary area has a tidal node. Sediment continues to fill the channel near all 4 of the docks in that area and marsh grass has grown over much of the channel. Presently, boats can move to and from these docks only at high water between mid-flood and mid-ebb tide. Those who use this creek wonder if conditions will significantly worsen there or improve after closing Dynamite Cut. It is not clear if the project affects the rate of filling, or can reverse the problem to some degree. The model does not capture this area, and the fate of this node is not addressed in the study. Post project monitoring in the node area of the East Tributary area would help USACE and local residents evaluate the effect of the project and take steps to make adjustments to improve access in this area.	Concur: Primary goals of the sponsor during initial scoping were to reduce shoaling in Umbrella Creek and restore salinity gradient in Dover Creek and tributaries. The modeling approach taken in the area of East Tributary was to represent the freshwater inflow, which is a combined inflow from the East Tributary, the other small un-modeled reach to the southwest, and the freshwater under Dover Bluff Road. Salinity gradients in East Tributary were assumed to be a surrogate for salinity gradients in all nearby similar reaches. Explicitly modeling every channel would have increased model run time and file output size substantially, while not changing the output in the project focus areas. A cursory evaluation of the East Tributary and ENV 5 was done to address the comments from Ginny Kitty, and are shown above. Alternative 7 may decrease velocities by a small amount relative to the gains shown in other areas. The post construction monitoring plan will include surveys of the whole project domain, to the extent that survey vessels are able to access the waterways. Local docks that are interested in their shoaling rates may benefit from installing staff gages.
	Non-federal funding clarification needed. In Table 11 on page 42, this amount seems to be $1,901,250. However, on page 68, the asterisk for the Grand Total on the first line mentions $65,000 of monitoring costs that occur in the PED Phase. ….Appendix F identifies $5,375 of real estate costs is the non-federal share of these real estate costs already included in the costs given on page 42, or are these additional costs that must be added?	Table 11 is designed to .present the total non-federal portion ($1,901,250) and all other referenced costs are part of that total. Appendix F identifies the anticipated real-estate cost associated with design and implementation of alternative 7. The total cost is to be shared among federal and non-federal funds. The non-federal portion of this cost is $3,125. It is included in the cost represented in Table 11.

	Local concern about post-project tide heights. Many residents of the upland edge of the project area have expressed concern that tide heights would be different. Most are concerned about having enough tidewater to launch small boats and kayaks, but some are concerned about flooding and whether unusual rainfall events will drain from the upland as easily and flow out. This latter concern may arise from a belief that the closures will act like dams and hold water back, keeping it from flowing out to the estuary. A brief discussion of model-predicted tide heights and the fate of rainfall and runoff could help alleviate these concerns. A table of change in high tide elevations at the given environmental points under the various alternatives would also be helpful.	Extreme storms were not evaluated. Cursory analysis in evaluating Ginny Kitty's location and Olin & Marian Fraser indicate no substantial water surface elevation change (> 0.1m) during normal tidal conditions. During extreme tidal conditions, the marsh will be flooded and should convey a large percentage of the overall water volume in and out.
	Comments on Appendices:	
	Appendix A: See my comment about Table 1 (find it on Page 3 of this document) [Note: comment below was missing in letter; obtained later via email] "As you probably can tell from other comments, several local people think that when Noyes Cut is closed, a lot more Dover Creek water would flow eastward through Dynamite Cut on ebb tide. Apparently, however, the model shows continued westward ebb flow through Dynamite Cut. I believe eliminating the tidal node caused by this "reverse" flood and ebb flow is why Dynamite Cut has now been proposed for closure. Some evidence pertinent to this decision may be apparent in Table 1, however further explanation of the table seems needed, in particular the formula used for the flux calculations and whether the results presented in Table 1 of Appendix A are affected by flow direction. Notice Alternative 1, at map point Env 6. With only Noyes Cut closed, the table indicates the largest reduction in flood tide flux (-129%) anywhere in the table, and likewise the largest reduction in ebb flux anywhere in the table (-19%). However, a point of confusion arises because of the known "reverse" flow direction at Env 6 (which accounts for the tidal node near there), which some think would turn around with Noyes Cut closed. So is the flux calculation sensitive to flow direction? I hope the formula for flux calculation can be given. Personally, I hope the flux formula is based on absolute values of flow and not values signed by direction. This could make sign reversals look like reductions in flux, and I hope that is not the case here. However, if that did happen, then a double check of the reasons for closing Dynamite Cut seems warranted. Everyone needs to be certain that if only Noyes Cut alone is closed, ebb water at Env 6 will still flow westward through Dynamite Cut into Dover Creek (albeit perhaps with the 19% reduction in flux shown in the table)."	The formula used for flux calculations used absolute values and is therefore not sensitive to flow direction.
	Engineering Appendix: the label **"**Appendix B" is missing	EN Appendix will be correctly labeled as Appendix B
	Engineering Appendix: see comment 3 above	The location of closures in Figure 11 of the report are the most updated design (not indicative of final design). Closure locations in the Appendix B represent model locations. Minor variations of location within the hydrodynamic model do not substantially affect the model results thus the model has not been re-run.

	Engineering Appendix, Section 5.2: it is stated that the closures may be overtopped by tides approximately 10% of the time. Will overtopping significantly shorten life and increase maintenance of these closures over taller structures? On the other hand, could taller structures contribute to erosion of the marsh near each end of the closure?	No, overtopping will not shorten the life of the structure or increase maintenance. The thought behind setting the crest elevation at 3' to overtop 10% of the time, is during a spring tide, the adjacent marshes are already flooding. The structures do not need to be completely water tight, 100% of the time to realize benefits. Even during a spring tide, the channels will be largely blocked from flow even though some overtopping will occur. This should save substantial cost in rock volume, while still realizing the same amount of benefits. Additionally, if adaptive management is required, it is easier to place additional rock on existing structures than remove rock.
	Appendix C: I was impressed that all Native American tribes were contacted. I was also struck by the contrast in tone between the response from the Seminole Nation of Oklahoma and that from the Cherokee Nation.	Thank you for your input.
	Appendix G: This appendix is an impressive document that could serve as an example to others who must prepare a Federal Consistency Determination for the Georgia Coastal Management Program. Nice Job! I hope the State of Georgia thinks it is as good as it seems to me.	Thank you for your input.
	Conclusion: the report takes a very cautious approach to sediment movement by using only the results of a 4-month simulation to create a rough estimate of bed displacement. The estimate is based on good velocity predictions from the model, but uses an arbitrary value of sediment shear strength. The report cautions that bed displacement estimates are the least reliable in the report. Furthermore, the evidence presented only seems applicable over a very short term under background conditions of tidal forces. Sediment movement seems likely to increase under chronic disturbance by boat traffic, and acute disturbance from major storms (e.g., storms with a return frequency of twice per year or less). Therefore, for a long-term prognosis, it seems reasonable to expect greater amounts of channel deepening than indicated by the short term model analysis in the report. Resettlement of sediments from the problem shoals at the core of this project should be anticipated in the quiet waters that will form near the closures proposed in the TSP.	The 4-month simulation time period was selected as a balance between computation effort and reasonable base-to-plan output for alternative evaluation. A slightly longer simulation such as 1 year time period, would likely produce similar results for alternative analysis and at three times the computational time. With really long simulations, such as 10 years, the uncertainty is such that the results would not be useful. Shear strength values are not arbitrary, however they could be further refined with a more comprehensive sample set and technical analysis. Sediment lab testing for characterization of materials for the small data set collected for this study cost approximately $1,500.00. Sediment core samples and sed-flume laboratory testing could be done to refine the Tcr values. This level of effort and the cost associated would have negligible change on the base-to-plan outputs, but would give more confidence to the absolute value of mobilized sediment. Additionally, we concur with the long-term prognosis and hope for continued channel deepening in Umbrella Creek.
	Specific editorial comments by page or section	Comments will be reviewed and integrated into Final Report as appropriate. Most are minor editorial changes and not all are detailed below but have be revised in Final Report.
	c-e. these 3 comments regard the study assumption that habitat will not continue to degrade under the NAA.	c-e. the funding constraints within this study authority required some assumptions to be made. For the habitat valuation methodology, an assumption was made that the baseline condition of No Action did not involve further degradation to the system.
	g. comment regarding the study assumption that habitat will not continue to degrade under the NAA.	g. same response as comments c-e.
	l. page 55, (Section 4.10.2), lines 4-5: "roughly 70 houses are .5 to 1.5 miles away from the 3 proposed construction areas. The residents will be concerned about noise. I suggest replacing the following statement	l. Concur: Suggestion has been integrated into Final Report.

	"however, this impact is expected to be negligible due to the very sparse population in the project area" with "The population is sparse in the area. Noise will be comparable to noise from building construction, will be at least .5 miles from nearby residents, and will be limited to the duration of construction." The reason for this change of wording is to respect the nearby population rather than seeming to disregard them. A year or so ago, fighter jets were on low-altitude practice runs down the Satilla River estuary. The noise shook houses and caused breakage of items falling off shelves. Residents will want to be assured that the noise will not do that.	
	n. page 55: move the following oddly placed phrase to the NAA section: "In addition to the adverse impacts that have occurred to recreational fishing resulting from the habitat degradations that have occurred since the opening of all of the 8 man-made cuts in the study area in the 1900 to 1939 timeframe." As it is now, the phrase seems very out of place in this section on action alternatives. Therefore, the reader could easily misunderstand this to mean that there will in fact be the same negative impacts on fishing with the action alternatives as experienced under the No Action Alternative.	n. Non-concur: It is important to state that there are no negative impacts after it is clearly stated in the first and second sentences. First sentence: "Implementation of any of the closures is expected to improve recreational fishing in the project vicinity." and second sentence: "The past habitat degradations have adversely impacted recreational fishing for game species and the restoration of historical circulation patterns to the estuary is expected to improve the habitat for all of these game species." The reader is presented the overall picture, allowing them to weigh the positive impacts with potential negative impacts Therefore, the reader will understand the action alternatives will have overall beneficial impacts (as clearly stated in sentences 1 & 2), and that no adverse impacts have been assessed (sentence 3).
	x. spell out acronyms on page 67.	x. revised as recommended
	aa. "Montague is not a resident of Dover Bluff, nor a member of Dover Bluff Club. Please replace "Dover Bluff Community" with "Deerwood Creek Estates, Camden County, Georgia."	aa. Report has been revised, as advised
Dr. Loren Mathews	**Overall Assessment of Project:** I hope you will accept this email as a record of my support of the TSP (Alternative 7).	Thank you for your comment of support.
	Overall Assessment of Report: Overall, I feel like the report did a good job describing the model used, its outputs, and the logic behind eliminating earlier proposed alternatives. The data provided on habitat units (Table 6), cost benefits (Table 8), salinity gradients (Figure 15), and changes in flow (Appendix A, Table 1) were the most effective in my opinion at helping the public understand why Alternative 7 is the best course of action. Thank you for your time and dedication to this project. We look forward to hearing how the plans progress. We also would be very interested in receiving information about any future opportunities to collaborate with the Corps with respect to this project. We would be happy to discuss with you our ongoing sampling efforts in the Satilla Estuary as they may align with your plans for pre- and post-construction monitoring.	Thank you for your comment of support.

	Specific editorial comments by page or section	
	Page 1 - section 1.3 – "I would italicize Spartina with reference to the type of marsh since that is a scientific genus. This would be my same comment throughout the report since there is no consistency about when it is italicized and when it is not."	Spartina is italicized in report when referred to a specific species (e.g. *Spartina alterniflora*); and is not italicized when referring to a type of marsh (e.g. Spartina marsh).
	Page 7 - 2nd paragraph - The sentence "a channel 5 feet deep and 50' wide seems out of place since that seems to describe Noyes Cut (as described in the first paragraph on that page). Here the Satilla Cut is being described with mention that this new route made Noyes Cut obsolete.	Duplicate description of Noyes Cut has been deleted.
	Page 8 - paragraph starting with "In 1991, this study was terminated" – Is there any additional information that you could include in this section as to why the study was terminated and the funds reprogrammed? It is difficult for an outsider to understand why such efforts would have been stopped after the 1990 study supported the closure of Bull Whirl Cut and potentially Noyes Cut.	The following information has been added to the report: "On June 6, 1990, Congressman Lindsay Thomas notified the Savannah District of his position to oppose further funding/work to carry out construction of the demonstration project authorized in WRDA 1986. On June 6, 1991, correspondence from Congressman Thomas informed USACE that he did not feel it would be useful to pursue further study of the area at the time. On May 2, 1991, Major Elias Smith, Acting Savannah District Commander, informed the Commander of South Atlantic Division of Congressman Thomas' position and that the $450,000 remaining funds should be reprogrammed."
	Page 9 - Section 2.2 - This paragraph contains "Error, reference source not found"	this has been revised
	Page 14; Table 2 - can you explain why the restoration is not likely to benefit sturgeon? Since both these species navigate through estuaries towards upriver freshwater areas for spawning, couldn't the restoration of flow patterns and salinity gradients be beneficial to the local populations?	Our assessment of not benefiting sturgeon was largely made due to feedback from sturgeon experts. The assessment was based on the opinion that sturgeon require freshwater that is deeper than what this project is likely to provide in order to spawn successfully.
	Page 35, Table 7 – could spacing on this page be corrected so that this table does not get cut off and split between two pages?	As suggested, spacing changed to not cut off table.
River Committee of Dover Bluff Club	Questions 1-6 apply to project as proposed and the goal of restoring deeper channels throughout areas of shoaling. These questions pertain specifically to the portion of Umbrella Creek between Dynamite Cut and the docks at Dover Bluff, which includes shoaling in Umbrella Creek and its named tributaries: Rings End Creek and Piney Bluff Creek.	
	With Noyes Cut closed, can the ongoing accumulation of sediment in the referenced subject areas be stopped without also closing Umbrella Creek at Dynamite Cut?	See plots in section 4 of the engineering appendix, alternative 1. Some benefits may be realized, but this alternative will not eliminate all tidal nodes, and does not have as high of a Benefit Cost Ratio as alternative 7.
	In your professional opinion, what is the certainty of the evidence that Dynamite Cut must be closed to cure the shoaling problems experienced	Alternative 7 is 95% more likely to be successful than Alternative 1.

	by boat traffic originating from Dover Bluff, Piney Bluff, and Deerwood Creek Estates? (>90%, 50:50, <10%).	
	What factors now contribute to the shoaling and creek narrowing that has been experienced for decades in Rings End Creek, Piney Bluff Creek and the portion of Umbrella Creek between Dynamite Cut and the docks at Dover Bluff?	Rings End Creek and Piney Bluff creek were not evaluated specifically. The Umbrella Creek shoaling is caused by tidal nodes that are caused by multiple paths for ebb and flood tide in the same vicinity.
	After the proposed project, will the accumulated sediment now in the referenced subject areas redistribute in a way that deepens channels, or might it further constrict channels in Rings End Creek, Piney Bluff Creek, or elsewhere in Umbrella Creek?	Rings End Creek and Piney Bluff creek were not evaluated specifically. Suspended sediment clouds would not completely move out of the area under any single tidal cycle. Figure 22 in the Appendix B shows that almost the entire length of Umbrella creek experiences a negative bed displacement. The area that experiences a positive bed displacement is in the near vicinity of the proposed dynamite cut closure, which is expected.
	What is the certainty of the evidence that channels will deepen through the sediment shoals now in Umbrella Creek, Piney Bluff Creek, Rings End Creek, and the upper reach of Dover Creek if the proposed project goes forward?	Rings End Creek and Piney Bluff creek were not evaluated. A detailed description on model uncertainty is provided in section 8 of the DSLLC modeling report, and a summary of uncertainty values are in Table 6 of the DSLLC modeling report. Since the sediment transport model was not validated, a quantitative estimate of uncertainty is not calculated, but the model will exhibit uncertainty at least as large as the hydrodynamic uncertainty, which is 17% in absolute terms or 9% in base-to-plan comparisons.
	Roughly how long will the anticipated redistribution of accumulated sediments take, say, to reach about halfway to an expected pseudo-equilibrium condition? (months, years, decades)	This extrapolation is near impossible to quantify. Hydrodynamic changes will be observable after project construction. Identification of trends in sedimentation movement will be possible within 2-5 years after construction, to at least validate that the system was nudged in a beneficial direction. Given that it has taken 70-100 years for the system to degrade to the current condition, pseudo-equilibrium may take decades.
	Questions 7-11 related to the same referenced subject areas as Questions 1-6, but assume a modification of the project as proposed, namely, Noyes Cut and the Old River Run (ORR) are both closed but Dynamite Cut is left open:	
	What is the likelihood that the causes of shoaling in the referenced subject areas will continue if Dynamite Cut remains open but Noyes Cut and the Old River Run (ORR) are closed? (Highly likely, uncertain, likely)	Highly likely tidal node will remain.
	Given sufficient uncertainty, what would prevent USACE from staging the closures as follow: close Noyes Cut and the Old River Run (ORR) first, then wait for a suitable amount of time while monitoring what happens in Umbrella Creek before deciding whether or not to close Umbrella Creek at Dynamite Cut?	The Integrated Feasibility Report adequately illustrates that Alternative 7 is the best solution for achieving the goals of the study. There is no uncertainty in regards to its success or correct application of engineering and environmental science. The USACE is required to recommend full and complete actions. A partial alternative, or staged approach violates all three of the federal statutes governing the use of federal funds.
	If Dynamite Cut remains open, would a diversion works be needed to adequately apportion some of the ebb flow of water from the upper reach of Dover Creek through Dynamite Cut in order to meet project goals of habitat and access restoration?	Diversion structures are not generally used in tidal areas with multi directional flow.
	If a diversion works would be required, what type of diversion works could be designed and constructed that would direct an appropriate amount of	

	ebb water through Dynamite Cut to achieve restoration goals while preserving boat access through Dynamite Cut?	A diversion structure is not required for this project. Construction of a diversion structure was not evaluated in the final array of alternatives. Specification for a diversion structure cannot be given.
	If a successful diversion works could be designed and built, would the cost of doing so be similar to, less than, or more than double the cost of simply closing Dynamite Cut?	Construction of a diversion structure was not evaluated in the final array of alternatives. A cost value cannot be assigned to this effort.
	Questions 12-14 refer to access to the Alternate Atlantic Intracoastal Waterway (Alt-AIWW)	
	Will access for boat traffic originating at Dover Bluff, Piney Bluff, & Deerwood Creek Estates, and intending to go southbound on the Alt-AIWW to the mouth of Dover Creek or the Satilla River, be eliminated because of this project (leaving access only via a long and wave-exposed route out Jekyll sound and around the east side of Raccoon Key Split)?	No, this project will not affect boat traffic along the Alt-AIWW.
	Based on model predictions and USACE experience, what is the certainty that access to the southbound Alt-AIWW from Dover Bluff will remain if the project is competed as proposed?	This project will not affect or alter boat traffic along the Alt-AIWW.
	What assurances can be given that access to the southbound Alt-AIWW from Dover Bluff will remain if the project is completed as proposed? Note: if Dynamite Cut is closed by USACE, it is of paramount importance to nearby residents that alternative low-tide access to the Alt-AIWW for southbound traffic from Dover Bluff remain available. Assurance is needed that such access will be restored should it close for any reason (project-related or not). Note: background for this question is in attached letter from River Committee	This project will not affect or alter boat traffic along the Alt-AIWW.
	Questions 15-17 relate to the sediment accumulation and shoaling in the upper reach of Dover Creek immediately upstream of the northern end of Noyes Cut.	
	Will the channel deepen through the large sediment accumulation in the upper reach of Dover Creek near River Marsh Landing?	Channel deepening is expected throughout the system as a whole. Specific locations for sediment transport or shoaling was not evaluated. It is likely that some areas will experience a small degree of sediment accumulation, however, the net result within the system will be sediment transport leading to channel deepening.
	Roughly how long will the redistribution at the upper reach of Dover Creek take to achieve about halfway to pseudo-equilibrium?	This extrapolation is near impossible to quantify. Hydrodynamic changes will be observable after project construction. Identification of trends in sedimentation movement will be possible within 2-5 years after construction, to at least validate that the system was nudged in a beneficial direction. Given that it has taken 70-100 years for the system to degrade to the current condition, pseudo-equilibrium may take decades.

	To what areas will the sediment from that shoal likely relocate?	Specific locations for sediment transport or shoaling was not evaluated. The net shoaling rate for the system should decrease.
	Question 18 is about the coastal resilience function of the project as proposed. 18. Will the proposed closures reduce flood potential from major storms that potentially flood land adjacent to the entire project area from River Marsh Landing to Dover Bluff? Background: Some evidence may exist that the proposed project could alter the elevation of high tides and increase the delay of tidal surge. If tide height is reduced or surge delayed, then storm damage reduction on land might be expected in proportion.	Extreme storm surge was not evaluated. The model mesh does not contain any upland cells, which is defined as areas that are not wetted during normal tidal conditions. However, normal tide levels are not expected to change significantly (>0.1 meters)
Mr./Mrs. Olin & Marian Fraser Email dated January 25 Email dated January 22	They are concerned that closure of Dynamite Cut may prevent flood water from draining into marsh and back floodwater into home on their 8-acre property.	(Elevations of the home are provided in attachment) Extreme storms were not evaluated. During extreme tidal conditions, the marsh will be flooded and should convey a large percentage of the overall water volume in and out. Since upland areas were not included in the model mesh, Water surface elevations were taken from the model mesh at the marsh nearest the property. During the largest tide condition modeled, WSE-Base = 1.45m (4.76 ft) and WSE-Alt7 = 1.43m (4.69 ft). Elevations from attachment at the property corner is 15.82 ft, and the creek bed elevation is 7.83 ft.
Larry Rentz Email dated 1/26/18	“Go #7 Go”	Thank you for your comment of support.
Alvin Tuten Handwritten comment dated 1/22/18	Letter supports Alternative 7, which is closing Noyes Cut, ORR, and Bull Whirl Cut.	Thank you for your comment of support.
Nicole Branch Email dated 1/23/18	Letter supports the TSP (Alternative 7) and encourages the State of Georgia to come up the NFS share of the construction costs.	Thank you for your comment of support.
Heather Colvin Email dated 1/23/18	Letter supports the TSP (Alternative 7) and encourages the State of Georgia to come up the NFS share of the construction costs.	Thank you for your comment of support.
Hank Stewart Email dated 1/23/18	Letter supports the TSP (Alternative 7) and encourages the State of Georgia to come up the NFS share of the construction costs.	Thank you for your comment of support.
Alvin Tuten (property owner)	Please support alternate plan 7 for the Noyes cut closing plan, I believe this would be the best to restore the fish and wildlife like it was before the man made cuts were done	Thank you for your comment of support.
Amy Fletcher	I am writing to you in support of Alternative 7. Returning the Dover river and Umbrella creek to their own unique basins is going to make a tremendous impact on the fisheries and all aquatic life that thrive in this natural environment.	Thank you for your comment of support.
Fred Voigt	Thank you for agreeing to meet with us mainly to clarify conflicting assumptions about Dynamite Cut. We are glad to go to Savannah to meet with you at any time you can arrange prior to the closing date for	Thank you for your comment of support.

	comments. Alternatively, more might be accomplished if you and your team could come observe the points we need to discuss. You state that you will go with Alternate 7 unless a better solution can be found and that is what we need to explore. Otherwise, we will gladly accept Alternate 7 and proceed with all speed.	
Ann Voigt	After attending the meeting at the Dover Bluff Club clubhouse on September 19 and hearing explanations of the proposed closing of Noyes Cut, Dynamite Cut and the Old River Run by the USACE representatives, I fully support Alternative 7.	Thank you for your comment of support.
Hank Stewart	I attended your public hearing at Dover Bluff Club Friday evening. I have read the public report of the Satilla Restoration Project. I am writing this letter in support of alternative 7. Returning the Dover river and Umbrella creek to their own unique basins is an incredible and exciting prospect. The opportunity to return these systems and the surrounding marsh back to a state prior to the man made cuts will be beneficial for the fisheries and all aquatic life that thrives in this natural environment.	Thank you for your comment of support.
Jimmy Stewart III	I attended your public hearing at Dover Bluff Club Friday evening. I have read the public report of the Satilla Restoration Project. I am writing this letter in support of alternative 7. Returning the Dover river and Umbrella creek to their own unique basins is an incredible and exciting prospect. The opportunity to return these systems and the surrounding marsh back to a state prior to the man made cuts will be beneficial for the fisheries and all aquatic life that thrives in this natural environment.	Thank you for your comment of support.
Robert Lewis	I attended the public hearing at Dover Bluff Club Friday evening. I have read the report of the Satilla River Restoration Project and I am writing a letter in support of alternative 7. This is an exciting project that will be beneficial for the fisheries and aquatic life that we find in our river.	Thank you for your comment of support.
Sarah Beth Cuello	I was unable to attend the public hearing at Dover Bluff Club Friday evening. I have read the report of the Satilla River Restoration Project and I am writing a letter in support of alternative 7. This is an exciting project that will be beneficial for the fisheries and aquatic life that we find in our river.	Thank you for your comment of support.
Sherri and Wilton DeLoach (property owners)	My husband and I own property at Dover Bluff Hunting and Fishing club, we fully support closure of all three cuts to restore the estuary that was damaged when these cuts we're constructed many years ago. Yes, closure of Dynamite Cut my cause slight inconveniences but it is well worth the slight delay.	Thank you for your comment of support.
Wilton DeLoach	As a property owner and President of Dover Bluff Club my purpose in writing is to let you know I fully support the closure of Noyes Cut. Closure	Thank you for your comment of support.

	is a huge step in the right direction to restore water flow thru the Umbrella River Basin. While I must admit I am concerned with the Dynamite Cut closure, if this is the best method for habitat restoration and returning ebb & flow to the Umbrella River I fully support the efforts! Hopefully the abrasive effects of an outgoing tide will eventually help remove sedimentation and restore Umbrella Creek. Certainly these efforts have the potential to become the model for habitat restoration which could be replicated up and down the Eastern Seaboard. It is my desire, once complete, monitoring will continue to ensure both habitat and navigation are restored and sustained.	
National Oceanic and Atmospheric Administration National Marine Fisheries Service	NMFS has no objections to alternative 7 and agree that it would have the least adverse impacts.	Thank you for your comment of support.
The Satilla Riverkeeper	Satilla Riverkeeper is submitting this comment letter in strong support of the proposed project described in the Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study. Satilla RiverWatch Alliance, Inc DBA Satilla Riverkeeper is a 501c3 nonprofit organization. Our mission is to protect, restore, and educate about the ecological values and unique beauty of the Satilla River. We have been invested in finding a solution to the compromised hydrology in the Satilla River estuary in the vicinity of Noyes Cut for years, and we support the Tentatively Selected Plan (TSP) in the draft report to close Noyes Cut, Dynamite Cut, and Old River Run (Alternative 7). Based on the model results in the draft report, we expect this solution to restore a more natural hydrologic flow pattern, as well as a more natural salinity gradient. Restoring the salinity gradient will provide marine species the cues needed to navigate to and from spawning habitat, and is very important to the overall goal of restoring fish habitat in the Satilla River estuary. We expect improved habitat for local and migratory species including shrimp, blue crabs, striped bass, American shad, river herrings, seatrout, and red drum as a result of the TSP. We also expect the additional benefit of improved small boat navigation in areas of Umbrella Creek that have experienced increasing sedimentation and restricted access.	Thank you for your comment of support.
Carlton and Janice Dubberly	We are in support of the closure of Noyes Cut at Dover Bluff. We feel it will be very beneficial in many ways.	Thank you for your comment of support.
Dana Chancey	I fail to support the Army Corps of Engineer’s closure of Noyes Cut and Dynamite Cut.	Thank you for your comment of support.
Rusty Dubberly	I am writing this in support of closing Noyes and Dynamite Cut so that Dover bluff can once see the tides and flows that it once saw.	Thank you for your comment of support.

Daniel DeLoach	Our family has a house at Dover Bluff in Camden County, Georgia. Over the years the Umbrella River in front of our house has filled with mud and sediment. I am in full support of closing Noyes Cut, Dynamite Cut and the small connection Creek to restore some sort of ebb and flow to the river. If something isn't done I think the river will completely fill in in another 20 years. I'm told this also has the benefit of restoring several 1000's of acres of fish habitat, that sounds great too!	Thank you for your comment of support.
Dawn Strickland	I fully support closure of all three cuts to restore the estuary that was damaged when these cuts we're constructed many years ago. Yes, closure of Dynamite Cut my cause slight inconveniences but it is well worth the slight delay.	Thank you for your comment of support.

Dereck DeLoach	Please help us fix the river at Dovers Bluff so that when my kids get older they can enjoy a nice view of the river from the front porch. And be able to get boats up and down the river. Fix it like it's supposed to be. Thank you for your generosity and support and every donation is greatly appreciated!!	Thank you for your comment of support.
Sennie and Olin Harrell	It was with great interest that we attended the public hearing , Friday, January 21, 2018, at the Dover Bluff clubhouse for the Satilla Restoration Project. The presentation was skillfully presented and the proposed solution appears to be well designed to fix the problem we're having with silting in Dover Creek, Umbrella Creek and elsewhere. We have owned property in Camden County since 1971 and have observed with our own eyes some of the degradation of the habitat. We are very much in favor of this project (alternative 7) and hope it begins as soon as possible.	Thank you for your comment of support.
Don Revels	I attended your public hearing at Dover Bluff Club Friday evening. I have read the public report of the Satilla Restoration Project. I am writing this letter in support of alternative 7. I am very much looking forward to having the Dover river and Umbrella creek return to their own unique basins and think this is an incredible and exciting prospect. The opportunity to return these systems and the surrounding marsh back to a state prior to the man made cuts will be beneficial for the fisheries and all aquatic life that thrives in this natural environment.	Thank you for your comment of support.
Deen Stewart	I am writing to tell you I support alternative 7 on the Satilla river project. The opportunity o return these systems and surrounding marsh back to a state. Prior to man made cuts will be beneficial for the fisheries and all aquatic life.	Thank you for your comment of support.
Don Wellons	I attended your public hearing at Dover Bluff Club Friday evening. I have read the public report of the Satilla Restoration Project. I am writing this letter to let you know that I am excited and support Alternative 7 100%. Returning the Dover river and Umbrella creek to their own unique basins is an incredible and exciting prospect. The opportunity to return these systems and the surrounding marsh back to a state prior to the man made cuts will be beneficial for the fisheries and all aquatic life that thrives in this natural environment.	Thank you for your comment of support.

Edison Watkins	The following statements are concerning the proposed actions contained in the Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study. I and other members sincerely appreciate the sincere and comprehensive manner the Savannah District Corps of Engineers (COE) used in the development of this project. The team of three sent to conduct the briefing and explain this complex issues and the approach used by the COE could not have been more respectful, courteous or comprehensive. They knew the material and were able to explain it to the satisfaction of attendees, some of who were not originally supportive; some of them became supporters after being provided information they needed. The Draft Report stated three objectives for the environmental restoration project and the team demonstrated the complex evaluations used to develop the family of potential solutions. They then showed how the data helped to develop the best solution to address all three objectives. Although complex, the data provided in the Appendix A-D leads to the actions of closing Noyes Cut, closing ORR cut and also closing Dynamite Cut (Alternative 7). This results in two separate water systems, Dover River and Umbrella Creek. Each has its own separate tidal flow with no nodes which should result in reversal of the silting we have experienced. Each has its own desirable salinity gradient. The three objectives have been met.	Thank you for your comment of support.
Jessica Deal	I fully support the closure of all three cuts to restore the estuary that was damaged when these cuts were constructed many years ago. Yes, closure of Dynamite Cut may cause slight inconveniences but the benefits are well worth the slight delay.	Thank you for your comment of support.
Linda Wilkins	I fully support closure of all three cuts to restore the estuary that was damaged when these cuts we're constructed many years ago. Yes, closure of Dynamite Cut my cause slight inconveniences but it is well worth the slight delay	Thank you for your comment of support.
Mary Ellen Kerby Rozier	I am in support of alternative 7.	Thank you for your comment of support.
Sam Stewart	I have read the public report of the Satilla Restoration Project. I am writing this letter in support of alternative 7. Returning the Dover river and Umbrella creek to their own unique basins is an incredible and exciting prospect. The opportunity to return these systems and the surrounding marsh back to a state prior to the manmade cuts will be beneficial for the fisheries and all aquatic life that thrives in this natural environment. Thank you for your hard work and I look forward to this projects completion.	Thank you for your comment of support.
Martha Weeks	Your hearing at Dover Bluff Club on Friday, January 19, 2018 was both informative and encouraging. Five generations of my family have enjoyed the beauty of the Dover Bluff Club which was established as a preserve	Thank you for your comment of support.

	almost one hundred years ago and Alternative #7 appears to be what is needed to restore the Dover River and Umbrella Creek to their former states. The prospect of restoring over forty-five hundred acres of habitat is a worthy goal.	
Elaine Tuten Handwritten comment dated 1/22/18	Letter supports Alternative 7, which is closing Noyes Cut, ORR, and Bull Whirl Cut. She believes this action will help fish and wildlife and water flows in the area.	Thank you for your comment of support.
C.K. Murray Letter dated 1/25/18	"My concern is that once Noyes Cut is closed there will be less water into the Western Tributary, slower flow velocities on the incoming tides, slower velocity on the outgoing tides, and therefore more sedimentation in this area. These tributaries provide water access to several home sites in the River Marsh Landings subdivision. Docks have been built and water access impacts the financial value of the property. The upper reaches of the Western Tributary can currently be used by small boats at all times except for a 2- hour period of each tidal cycle (1 hour each side of low tide)…… Less water entering the area from closing Noyes Cut will result in velocity slowing down, more sedimentation, shallower tributaries, and no small boat access. Please prove to me that I'm wrong."	Channel deepening is expected throughout the system as a whole. Specific locations for sediment transport or shoaling was not evaluated. It is likely that some areas will experience a small degree of sediment accumulation, however, the net result within the system will be sediment transport leading to channel deepening.
	"My second concern is drainage during tropical storms, hurricanes, Full Moons, and climate conditions that produce rain and strong NE winds for several days. All of these events push the ocean waters against our local shore line. The hook in Atlantic Coast between Jacksonville and Savannah acts as a trap to collect the Ocean waters. Our high tides are higher than normal, completely flooding our marsh basin, the winds hold the ocean against our sea shore and our low tides do not drop to their normal levels. The end result of these conditions is that our tidal cycle is altered. More water comes in but less water gets out. Compound this situation with several days of hard rain (6 to 12 inches), the runoff from thousands of acres of timber land that drains into the Western Tributaries and we begin to flood……..Please prove to me that we will not have water entering our homes."	None of the alternatives considered in this report alter the storm tides. The closures structures proposed in Alternative 7 are not designed nor are they intended to mitigate for extreme weather events.
	"My 3rd concern is the viability of building a closure for Noyes Cut. Your handout for the meeting describes Noyes Cut to be 500 feet wide and the closure to be 432 feet long. Is this a typo error? Does the closure not completely close the cut? "Either way, if you build a dyke across Noyes Cut that is 72 feet wide and 11 feet high, then when the water level rises above the marsh floor as described in my second area of concern, water will flow around the ends of the closure on the outgoing tide. What will prevent a wash out at each end of the closure and the re-establishment of a new Noyes Cut? "	The cut closure structures will be designed as bank-to-bank plus sheet pile extending into the marsh to reduce risk of erosion around the structure.
	"My 4th concern is funding. Who is going to clean all of this mess up if it doesn't work as planned?	The construction project will be fully funded. A component of the funding does include adaptive management for the performance of the overall project. Details can be found in the report under the Adaptive Management Section.

Section 106 Comments:		
Cherokee Nation	The Cherokee Nation (CN) is in receipt of your correspondence about **Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study**, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time.	USACE thanks the Cherokee Nation for the information and its response.
Seminole Nation	Based on the information provided and because the potential for buried cultural resources, the proposed project has an extreme probability of affecting archaeological resources, some of which may be eligible for listing in the National Register of Historic Places (NRHP). We recommend that an intensive literature/phase survey of the nearby archaeological sites from the states master site files be completed and other CRS surveys.	Cultural resources investigations were conducted to identify historic properties in August and October 2017. None were located during the survey. A copy of the report was transmitted to the tribe for review and comment on 5 December 2017.
	Also, we request that a listing of the flora in the affected area be provided.	Information regarding flora was provided in the draft integrated feasibility study report. The report was provided to the tribe for review and comment in December 2017.
	We do request that if cultural or archeological resource materials are encountered at all activity cease and the Seminole Nation of Oklahoma and other appropriate agencies be contacted immediately.	USACE will notify the tribe in the event of an inadvertent discovery
	Furthermore, due to the historic presence of our people in the project area, inadvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur we request all work cease and the Seminole Nation of Oklahoma and other appropriate agencies be immediately notified.	USACE will notify the tribe in the event of an inadvertent discovery.
Georgia Historic Preservation Division	The Historic Preservation Division (HPD) has reviewed the draft report entitled, *A Phase I Remote-Sensing Archaeological Survey in Noyes Cut and Dynamite Cut and a Low Water Visual Survey of Noyes Cut, Dynamite Cut and Old River Run, Satilla River Estuary, Camden County, Georgia,* prepared by LG2 Environmental Solutions, Inc. and dated November 2017. Our comments are offered to assist the US Army Corps of Engineers (USACE) in complying with the provisions of Section 106 of the National Historic Preservation Act (NHPA). Based on the information contained in the report, HPD concurs that no historic properties that are listed or eligible for listing in the National Register of Historic Places will be affected by this undertaking, as defined in 36 CFR Part 800.4(d)(1). This letter evidences consultation with our office for compliance with Section 106 of the NHPA.	USACE thanks HPD for the response. Section 106 consultation is complete.

From: Alvin Tuten
To: CESAS-PD, SAS
Subject: [Non-DoD Source] Satilla basin at Dover bluff.
Date: Friday, January 26, 2018 8:22:53 AM

Dear mr Walker: Please support alternate plan 7 for the noyes cut closing plan,I believe this would be the best to restore the fish and wildlife like it was before the man made cuts were done.thank you very much.alvin Tuten.
Sent from my iPad

From: Wimberly, Taylor L CIV USARMY CESAS (US)
To: Dayan, Nathan S CIV USARMY CESAS (US); Walker, David A CIV USARMY CESAS (US)
Subject: FW: Satilla River Basin
Date: Friday, January 26, 2018 9:20:48 AM

-----Original Message-----
From: Amy Fletcher [mailto:amys@stewartcandy.com]
Sent: Friday, January 26, 2018 7:47 AM
To: Wimberly, Taylor L CIV USARMY CESAS (US) <Taylor.L.Wimberly@usace.army.mil>
Subject: [Non-DoD Source] Satilla River Basin

Dear Mr. Wimberly,

Thank you for all of your hard work on this very important project. I am writing to you in support of Alternative 7. Returning the Dover river and Umbrella creek to their own unique basins is going to make a tremendous impact on the fisheries and all aquatic life that thrive in this natural environment.

You will never know how much we all appreciate what you have done, and we look forward to the completion of this project.

Sincerely,

Amy Fletcher

From: Fred Voigt
To: CESAS-PD, SAS
Subject: [Non-DoD Source] Alternative 7
Date: Friday, January 26, 2018 3:02:19 PM

Dear Mr. Walker,

After attending the meeting at the Dover Bluff Club clubhouse on September 19 and hearing explanations of the proposed closing of Noyes Cut, Dynamite Cut and the Old River Run by the USACE representatives, I fully support Alternative 7.

Thank you for all the work on this very important project!

Sincerely yours,
Ann M. Voigt
Dover Bluff Club member

From: Janice Dubberly
To: CESAS-PD, SAS
Subject: [Non-DoD Source] Noyes Cut
Date: Friday, January 26, 2018 5:15:39 PM

We are in support of the closure of Noyes Cut at Dover Bluff. We feel it will be very beneficial in many ways. Thank you for your help!!
Carlton and Janice Dubberly
Waycross, Ga
Sent from my iPhone

From: Dana Chancey
To: CESAS-PD, SAS
Subject: [Non-DoD Source] Notes Cut Support
Date: Friday, January 26, 2018 2:52:51 PM

I fail to support the Army Corps of Engineer's closure of Noeys Cut and Dynamite Cut.

Dana Chancey

Finance Director

(912) 287-2964

From:	Wilton DeLoach
To:	CESAS-PD, SAS
Subject:	[Non-DoD Source] Closure of Noyes
Date:	Friday, January 26, 2018 4:53:43 PM

Our family has a house at Dover Bluff in Camden County, Georgia. Over the years the Umbrella River in front of our house has filled with mud and sediment. I am in full support of closing Noyes Cut, Dynamite Cut and the small connection Creek to restore some sort of ebb and flow to the river. If something isn't done I think the river will completely fill in in another 20 years.

I'm told this also has the benefit of restoring several 1000's of acres of fish habitat, that sounds great too!

Thanks for anything you can do to make this a reality!

Daniel DeLoach
Dover Bluff
Waverly, GA

From: 9122885173@mypixmessages.com
To: CESAS-PD, SAS
Subject: [Non-DoD Source]
Date: Friday, January 26, 2018 3:02:07 PM
Attachments: ATT00001.txt

USACE,

I fully support closure of all three cuts to restore the estuary that was damaged when these cuts we're constructed many years ago. Yes, closure of Dynamite Cut my cause slight inconveniences but it is well worth the slight delay.

Thanks for seeing this project thru to completion.

Dawn Strickland

CESAS-PD@usace.army.mil

From: Wimberly, Taylor L CIV USARMY CESAS (US)
To: Dayan, Nathan S CIV USARMY CESAS (US); Walker, David A CIV USARMY CESAS (US)
Subject: Fw: [Non-DoD Source] Satilla Restoration Project
Date: Friday, January 26, 2018 6:03:31 PM

Sent from my BlackBerry 10 smartphone on the Verizon Wireless 4G LTE network.
From: Deen Stewart <deens@stewartcandy.com>
Sent: Friday, January 26, 2018 12:44 PM
To: Wimberly, Taylor L CIV USARMY CESAS (US)
Subject: [Non-DoD Source] Satilla Restoration Project

Dear Taylor,

I am writing to tell you I support alternative 7 on the Satilla river project. The opportunity o return these systems and surrounding marsh back to a state

Prior to man made cuts will be beneficial for the fisheries and all aquatic life. Thank you for all your hard work.

Sincerely,

Deen Stewart

From: dereckdeloach123
To: CESAS-PD, SAS
Subject: [Non-DoD Source] Noah"s cut.
Date: Friday, January 26, 2018 5:51:19 PM

Please help us fix the river at Dovers Bluff so that when my kids get older they can enjoy a nice view of the river from the front porch. And be able to get boats up and down the river. Fix it like it's suppose to be.. Thank you for your generosity and support and every donation is greatly appreciated!!

From: Wimberly, Taylor L CIV USARMY CESAS (US)
To: Dayan, Nathan S CIV USARMY CESAS (US); Walker, David A CIV USARMY CESAS (US)
Subject: FW: [EXTERNAL] Satilla River Basin Project
Date: Thursday, January 25, 2018 11:23:56 AM

-----Original Message-----
From: mimi revels [mailto:mdrevels1@att.net]
Sent: Thursday, January 25, 2018 11:21 AM
To: Wimberly, Taylor L CIV USARMY CESAS (US) <Taylor.L.Wimberly@usace.army.mil>
Subject: [EXTERNAL] Satilla River Basin Project

Dear Taylor,

I attended your public hearing at Dover Bluff Club Friday evening. I have read the public report of the Satilla Restoration Project. I am writing this letter in support of alternative 7. I am very much looking forward to having the Dover river and Umbrella creek return to their own unique basins and think this is an incredible and exciting prospect. The opportunity to return these systems and the surrounding marsh back to a state prior to the man made cuts will be beneficial for the fisheries and all aquatic life that thrives in this natural environment. Thank you for all of your hard work and I look forward to this projects completion.

Sincerely,

Don Revels

From: Dayan, Nathan S CIV USARMY CESAS (US)
To: Walker, David A CIV USARMY CESAS (US)
Subject: FW: [EXTERNAL] Satilla river basin project
Date: Wednesday, January 24, 2018 2:37:31 PM

Thank You
Nathan Dayan
Environmental Team Leader
Planning Branch - Planning, Programs, and Project Management Division USACE - Savannah District
912-652-5172

-----Original Message-----
From: DON [mailto:dwdover@gmail.com]
Sent: Wednesday, January 24, 2018 2:16 PM
To: Wimberly, Taylor L CIV USARMY CESAS (US) <Taylor.L.Wimberly@usace.army.mil>; Dayan, Nathan S CIV USARMY CESAS (US) <Nathan.S.Dayan@usace.army.mil>
Cc: Jimmy Stewart III <jimmyiii@stewartcandy.com>
Subject: [EXTERNAL] Satilla river basin project

Dear Taylor,

I attended your public hearing at Dover Bluff Club Friday evening. I have read the public report of the Satilla Restoration Project. I am writing this letter to let you know that I am excited and support Alternative 7 100%.

Returning the Dover river and Umbrella creek to their own unique basins is an incredible and exciting prospect. The opportunity to return these systems and the surrounding marsh back to a state prior to the man made cuts will be beneficial for the fisheries and all aquatic life that thrives in this natural environment.

Thank you for your hard work and I look forward to this project's completion.

Sincerely,

Don Wellons

From: Edison Watkins
To: CESAS-PD, SAS
Subject: [Non-DoD Source] Written Statements RE NOES Cut
Date: Sunday, January 28, 2018 6:57:31 PM

Statements by E. L. Watkins III RADM USN(RET)

The following statements are concerning the proposed actions contained in the Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study

I and other members sincerely appreciate the sincere and comprehensive manner the Savannah District Corps of Engineers (COE) used in the development of this project. The team of three sent to conduct the briefing and explain this complex issues and the approach used by the COE could not have been more respectful, courteous or comprehensive. They knew the material and were able to explain it to the satisfaction of attendees, some of who were not originally supportive; some of them became supporters after being provided information they needed.

The Draft Report stated three objectives for the environmental restoration project and the team demonstrated the complex evaluations used to develop the family of potential solutions. They then showed how the data helped to develop the best solution to address all three objectives. Although complex, the data provided in the Appendix A-D leads to the actions of closing Noes Cut, closing ORR cut and also closing Dynamite Cut (Alternative 7). This results in two separate water systems, Dover River and Umbrella Creek. Each has its own separate tidal flow with no nodes which should result in reversal of the silting we have experienced. Each has its own desirable salinity gradient. The three objectives have been met.

From:	Fred Voigt
To:	Wimberly, Taylor L CIV USARMY CESAS (US)
Cc:	Dayan, Nathan S CIV USARMY CESAS (US); Clay Montague; Ellen & Harold Voigt; Wilton Deloach; Tommy Zachry; Jimmy Stewart III
Subject:	[EXTERNAL] Meeting on Dynamite Cut
Date:	Saturday, January 20, 2018 10:00:34 PM

Dear Taylor,

We certainly appreciate your presentation Friday night. It was well received with only a few exceptions.

Thank you for agreeing to meet with us mainly to clarify conflicting assumptions about Dynamite Cut. We are glad to go to Savannah to meet with you at any time you can arrange prior to the closing date for comments. Alternatively, more might be accomplished if you and your team could come observe the points we need to discuss.

You state that you will go with Alternate 7 unless a better solution can be found and that is what we need to explore. Otherwise, we will gladly accept Alternate 7 and proceed with all speed.

Sincerely,

Fred Voigt, Jr.

From: Dayan, Nathan S CIV USARMY CESAS (US)
To: Walker, David A CIV USARMY CESAS (US)
Subject: Fw: [EXTERNAL] Satilla river basin project
Date: Wednesday, January 24, 2018 9:17:33 AM

Sent from my BlackBerry 10 smartphone on the Verizon Wireless 4G LTE network.
From: Hank Stewart <hank@phillipsgalis.com>
Sent: Wednesday, January 24, 2018 9:09 AM
To: Wimberly, Taylor L CIV USARMY CESAS (US)
Cc: Dayan, Nathan S CIV USARMY CESAS (US)
Subject: [EXTERNAL] Satilla river basin project

Dear Taylor,

I attended your public hearing at Dover Bluff Club Friday evening. I have read the public report of the Satilla Restoration Project. I am writing this letter in support of alternative 7. Returning the Dover river and Umbrella creek to their own unique basins is an incredible and exciting prospect. The opportunity to return these systems and the surrounding marsh back to a state prior to the man made cuts will be beneficial for the fisheries and all aquatic life that thrives in this natural environment. Thank you for your hard work and I look forward to this projects completion.

Sincerely,

Hank Stewart

Phillips~Galis Insurance, Inc.
1401 Union St.
Brunswick, Ga. 31520
Work - (912) 265-1810 Ext. 113
Cell - (912) 288-0065
Fax - (912) 265-9289 <tel:%28912%29%20265-9289>

Blockedwww.phillipsgalis.com

From:	Hank Stewart
To:	Wimberly, Taylor L CIV USARMY CESAS (US); Dayan, Nathan S CIV USARMY CESAS (US); CESAS-PD, SAS; william.ligon@senate.ga.gov; tyler.harper@senate.ga.gov; jason.spencer@house.ga.gov; john.corbett@house.ga.gov; chad.nimmer@house.ga.gov; don.hogan@house.ga.gov; dominic.lariccia@house.ga.gov; jeff.jones@house.ga.gov; sam.watson@house.ga.gov; jesse.petrea@house.ga.gov; jason.shaw@house.ga.gov; lynn.smith@house.ga.gov
Subject:	[EXTERNAL] Satilla River estuary
Date:	Tuesday, January 23, 2018 1:32:26 PM

To whom it may concern,

Local residents and visitors to the Satilla River estuary have been complaining for decades to the US Army Corps of Engineers (USACE) about disappearing boat access in Dover and Umbrella Creeks in Camden County, Georgia. Now the USACE is proposing to do something about it. They have found a way to restore access in miles of tidal creeks while also restoring thousands of acres of habitat for important fishery species. The State of Georgia and the Satilla Riverkeeper are co-sponsoring the project with the USACE. I fully support this effort.

The USACE has completed a feasibility study and can pay for 75% of the $8-million design and construction costs. The project involves closing Noyes Cut, which is an obsolete navigation cut under authority of the USACE. Two other smaller openings are also proposed for closure as part of this project. The goal is to restore more natural water flows that will help deepen channels instead of make them shallower, and improve the water quality for fish and shellfish migrations. The study concluded that this is feasible. The results should be noticeable to local, state, and national fishery managers. The improved boating access to this habitat should also be locally noticeable. The USACE will be ready to start this project as early as this coming April.

Although federal funds will pay for 75%, I hope the State of Georgia will provide the other 25%. The nonfederal share of the costs amounts to about $2 million. The use of state funds to match the federal contribution for this project seems natural and in the State's interests in both promoting a healthy fishery, and having good access to tidal creeks. I wholly approve.

Please help find the necessary matching funds for this restoration project.

Yours truly,

Hank Stewart

Phillips~Galis Insurance, Inc.
1401 Union St.
Brunswick, Ga. 31520
Work - (912) 265-1810 Ext. 113
Cell - (912) 288-0065
Fax - (912) 265-9289 <tel:%28912%29%20265-9289>

Blockedwww.phillipsgalis.com <Blockedhttp://www.phillipsgalis.com/>

From:	Heather Colvin
To:	Wimberly, Taylor L CIV USARMY CESAS (US); Dayan, Nathan S CIV USARMY CESAS (US); CESAS-PD, SAS; william.ligon@senate.ga.gov; tyler.harper@senate.ga.gov; jason.spencer@house.ga.gov; john.corbett@house.ga.gov; chad.nimmer@house.ga.gov; don.hogan@house.ga.gov; dominic.lariccia@house.ga.gov; jeff.jones@house.ga.gov; sam.watson@house.ga.gov; jesse.petrea@house.ga.gov; jason.shaw@house.ga.gov; lynn.smith@house.ga.gov
Subject:	[EXTERNAL] Satilla River estuary
Date:	Tuesday, January 23, 2018 1:50:18 PM

To whom it may concern,

Local residents and visitors to the Satilla River estuary have been complaining for decades to the US Army Corps of Engineers (USACE) about disappearing boat access in Dover and Umbrella Creeks in Camden County, Georgia. Now the USACE is proposing to do something about it. They have found a way to restore access in miles of tidal creeks while also restoring thousands of acres of habitat for important fishery species. The State of Georgia and the Satilla Riverkeeper are co-sponsoring the project with the USACE. I fully support this effort.

The USACE has completed a feasibility study and can pay for 75% of the $8-million design and construction costs. The project involves closing Noyes Cut, which is an obsolete navigation cut under authority of the USACE. Two other smaller openings are also proposed for closure as part of this project. The goal is to restore more natural water flows that will help deepen channels instead of make them shallower, and improve the water quality for fish and shellfish migrations. The study concluded that this is feasible. The results should be noticeable to local, state, and national fishery managers. The improved boating access to this habitat should also be locally noticeable. The USACE will be ready to start this project as early as this coming April.

Although federal funds will pay for 75%, I hope the State of Georgia will provide the other 25%. The nonfederal share of the costs amounts to about $2 million. The use of state funds to match the federal contribution for this project seems natural and in the State's interests in both promoting a healthy fishery, and having good access to tidal creeks. I wholly approve.

Please help find the necessary matching funds for this restoration project.

Sincerely,

H

Heather Colvin

Phillips ~ Galis Insurance

1401 Union Street

Brunswick, GA 31520

Phone: (912)265-1810 ext. 103

Fax: (912)265-9289

Blockedwww.phillipsgalis.com <Blockedhttp://www.phillipsgalis.com/>

From: Jessica Deal
To: CESAS-PD, SAS
Subject: [Non-DoD Source] Dynamite Cut
Date: Friday, January 26, 2018 3:54:55 PM
Attachments: image001.png

USACE,

I fully support the closure of all three cuts to restore the estuary that was damaged when these cuts were constructed many years ago. Yes, closure of Dynamite Cut may cause slight inconveniences but the benefits are well worth the slight delay.

Thank you for seeing the this project through to completion.

Jessica King Deal, P.E.

City Engineer - City of Waycross

P.O. Drawer 99 - 417 Pendleton Street

Waycross, Georgia 31502-0099

Telephone: 912.287.2945

Fax: 912.287.2948

Blockedwww.waycrossga.com <Blockedhttp://www.waycrossga.com/>

From:	Reichmuth, Jessica
To:	CESAS-PD, SAS
Subject:	[EXTERNAL] Joint Public Notice of Draft Feasibility Report/Environmental Assessment of Noyes Cut
Date:	Monday, January 8, 2018 2:02:19 PM

Dear Mr. Walker,

I am writing this email to offer public comments on Draft Feasibility Report/Environmental Assessment of Noyes Cut published on December 8.

First, I would like to commend the USACE's efforts in running the report to determine the best course of action to restore Essential Fish Habitat in Umbrella and Dover Creeks.

Second, the best of course of action in this case is the proposed Alternative #7: closure of Noyes Cut, Dynamite Cut, and the ORR. I agree that this solution will result in the largest amount of restored salt marsh in addition to a restored salinity gradient that has been missing from this portion of the Satilla River. I do have a few questions, mostly with the construction of the caps:

1) In terms of the dimensions spanning the tidal channels, these will be tall enough to block flood tide stages? Or projected storm surges in the area if frequency of storms increases?

2) In looking at the cap construction used in the Savannah River with marsh vegetation covering the cap almost 10 years later, is this the time frame expected with Umbrella and Dover Creeks? Are you expecting marsh vegetation growth to keep up with projected sea level rise?

Thank you for taking the time to read these comments. If I can be of any further assistance, please do not hesitate to contact me.

Best regards,

Jessica

Jessica M. Reichmuth, Ph.D.

Associate Professor, Biological Sciences

Augusta University

Summerville Campus, Science Hall, C-2002

Phone: 706.667.4073

Email: jreichmu@augusta.edu <mailto:jreichmu@augusta.edu>

From: Jimmy Stewart III
To: Wimberly, Taylor L CIV USARMY CESAS (US)
Cc: Dayan, Nathan S CIV USARMY CESAS (US)
Subject: [EXTERNAL] Satilla river basin project
Date: Monday, January 22, 2018 12:09:04 PM

Dear Taylor,

I attended your public hearing at Dover Bluff Club Friday evening. I have read the public report of the Satilla Restoration Project. I am writing this letter in support of alternative 7. Returning the Dover river and Umbrella creek to their own unique basins is an incredible and exciting prospect. The opportunity to return these systems and the surrounding marsh back to a state prior to the man made cuts will be beneficial for the fisheries and all aquatic life that thrives in this natural environment. Thank you for your hard work and I look forward to this projects completion.

Sincerely,

Jimmy Stewart 111

From: Larry Rentz
To: CESAS-PD, SAS
Subject: [Non-DoD Source] #7 Lets go #7
Date: Friday, January 26, 2018 8:25:31 PM

From: 9122565218@vzwpix.com
To: CESAS-PD, SAS
Subject: [Non-DoD Source]
Date: Friday, January 26, 2018 2:55:47 PM

USACE,

I fully support closure of all three cuts to restore the estuary that was damaged when these cuts we're constructed many years ago. Yes, closure of Dynamite Cut my cause slight inconveniences but it is well worth the slight delay.

Thanks for seeing this project thru to completion.

Linda Wilkins

CESAS-PD@usace.army.mil

From:	A Loren Mathews
To:	CESAS-PD, SAS; Wimberly, Taylor L CIV USARMY CESAS (US)
Cc:	Clay Montague; Reichmuth, Jessica; Risa Cohen
Subject:	[Non-DoD Source] Comments in Support of the Noyes Cut Restoration Study
Date:	Friday, January 26, 2018 8:08:31 PM

Dear Mr. Walker and Wimberly,

Although I am not a resident or local landowner in the vicinity of the Satilla Estuary, I have become quite familiar with the system, particularly with respect to the Noyes Cut project, over the past 5 years. In the spring of 2013, I had the opportunity to hear Dr. Clay Montague speak at a regional estuarine research conference about the history of the Satilla Estuary and the hydrological and water quality issues pertaining to the man-made cuts made there in the early 1900s. That presentation sparked a conversation between myself, Dr. Jessica Reichmuth at Augusta University, and Dr. Montague about a need for a baseline understanding of the movement of water and sediments with respect to the biological community across multiple ecosystem levels (micro- and macro- flora and fauna). What was to follow was the formation of a interdisciplinary collaboration between Georgia Southern University, Augusta University, local experts, nearby landowners, citizen scientists, and dozens of other volunteers. In the summer of 2014, we began our efforts to sample on a monthly basis three sites we believed to be impacted by Noyes Cut and one unimpacted site to serve as a reference. Over the past few years, we have observed first-hand the unusual salinity gradient, the shifting and deposition of sediments, and the variable community structures across both space and time.

Fast forward to this current fiscal year, it has been exciting to learn more about the USACE's investigation into and plans to address these same issues, which were initially rasied by the local landowners some four or more decades ago. I wanted you to know that I have read the draft feasibility study report and attended the public meeting held on January 19th. I hope you will accept this email as a record of my support of the tentatively selected plan (alternative 7).

As part of the public comment period, I have a few suggestions for things that I feel need attention to make the report more readable and understandable.

pg. 1 - section 1.3 - I would italicize Spartina with reference to the type of marsh since that is a scientific genus. This would be my same comment throughout the report since there is no consistency about when it is italicized and when it is not.

pg. 7 - 2nd full paragraph - The sentence 'A channel 5 feet deep and 50 feet wide' seems out of place since that seems to describe Noyes Cut (as described in the first parapraph on that page). Here the Satilla Cut is being described with mention that this new route made Noyes Cut obsolete.

pg. 8 - paragraph starting with 'In 1991, this study was terminated' - Is there any additional information that you could include in this section as to why the study was terminated and the funds reprogrammed? It is difficult for an 'outsider' to understand why such efforts would have been stopped after the 1990 study supprted the closure of Bull Whirl Cut and potentially Noyes Cut.

pg. 9 - section 2.2 - This paragraph contains an awkward 'Error; Reference source not found.'

pg. 14 - Table 2 - Can you explain why the restoration is not likely to benefit Shortnose and Atlantic Sturgeons? Since both of these species navigate through estuaries towards upriver freshwater areas for spawning, couldn't the restoration of flow patterns and salinity gradients be beneficial to th local populations? One could expect that their use of the Satilla River for these purposes might increase if the salinity cues were more obvious and easier to follow. The information presented in this table seems to contradict these ideas, which are also shared on pg. 52 in the first paragraph.

pg. 35 - Table 7 - Could the spacing on this page be corrected so that this table does not get cut off and split between two pages?

Overall, I feel like the report did a thorough job describing the model used, its outputs, and the logic behind eliminating earlier proposed alternatives. The data provided on habitat units (Table 6), cost benefits (Table 8), salinity gradients (Figure 15), and changes in flow (Appendix A, Table 1) were the most effective in my opinion at helping the public understand why Alternative 7 is the best course of action.

Thank you for your time and dedication to this project. We look forward to hearing how the plans progress. We also would be very interested in receiving information about any future opportunities to collaborate with the Corps with respect to this project. We would be happy to discuss with you our ongoing sampling efforts in the Satilla Estuary as they may align with your plans for pre- and post-construction montioring.

Sincerely,

Loren Mathews

--
A. Loren Mathews, Ph.D.
Lecturer of Biology
Georgia Southern University

PO Box 8042-1, Statesboro, GA 30460
912-478-1164 / amathews@georgiasouthern.edu <mailto:amathews@georgiasouthern.edu>

From: Wimberly, Taylor L CIV USARMY CESAS (US)
To: Dayan, Nathan S CIV USARMY CESAS (US); Walker, David A CIV USARMY CESAS (US)
Subject: Fw: [Non-DoD Source] Alternative 7
Date: Friday, January 26, 2018 7:55:36 PM

Sent from my BlackBerry 10 smartphone on the Verizon Wireless 4G LTE network.
From: Kelley Wright <kmwright1975@gmail.com>
Sent: Friday, January 26, 2018 7:13 PM
To: Wimberly, Taylor L CIV USARMY CESAS (US)
Subject: [Non-DoD Source] Alternative 7

Mr. Taylor,

I am in support of alternative 7.

Mary Ellen Kerby Rozier

From:	Nicole Branch
To:	Wimberly, Taylor L CIV USARMY CESAS (US); Dayan, Nathan S CIV USARMY CESAS (US); CESAS-PD, SAS; william.ligon@senate.ga.gov; tyler.harper@senate.ga.gov; jason.spencer@house.ga.gov; john.corbett@house.ga.gov; chad.nimmer@house.ga.gov; don.hogan@house.ga.gov; dominic.lariccia@house.ga.gov; jeff.jones@house.ga.gov; sam.watson@house.ga.gov; jesse.petrea@house.ga.gov; jason.shaw@house.ga.gov; lynn.smith@house.ga.gov
Subject:	[EXTERNAL] Satilla River Estuary
Date:	Tuesday, January 23, 2018 3:51:55 PM

To whom it may concern,

Local residents and visitors to the Satilla River estuary have been complaining for decades to the US Army Corps of Engineers (USACE) about disappearing boat access in Dover and Umbrella Creeks in Camden County, Georgia. Now the USACE is proposing to do something about it. They have found a way to restore access in miles of tidal creeks while also restoring thousands of acres of habitat for important fishery species. The State of Georgia and the Satilla Riverkeeper are co-sponsoring the project with the USACE. I fully support this effort.

The USACE has completed a feasibility study and can pay for 75% of the $8-million design and construction costs. The project involves closing Noyes Cut, which is an obsolete navigation cut under authority of the USACE. Two other smaller openings are also proposed for closure as part of this project. The goal is to restore more natural water flows that will help deepen channels instead of make them shallower, and improve the water quality for fish and shellfish migrations. The study concluded that this is feasible. The results should be noticeable to local, state, and national fishery managers. The improved boating access to this habitat should also be locally noticeable. The USACE will be ready to start this project as early as this coming April.

Although federal funds will pay for 75%, I hope the State of Georgia will provide the other 25%. The nonfederal share of the costs amounts to about $2 million. The use of state funds to match the federal contribution for this project seems natural and in the State's interests in both promoting a healthy fishery, and having good access to tidal creeks. I wholly approve.

Please help find the necessary matching funds for this restoration project.

Yours truly,

Nicole D. Branch

Phillips-Galis Insurance

1401 Union Street

Brunswick, GA 31520

Phone: (912)265-1810 ext. 104

Fax: (912)265-9289

Blockedwww.phillipsgalis.com

PLEASE NOTE THAT OUR OFFICE IS CLOSED FROM 12-1 EVERY DAY FOR LUNCH

From:	MARIAN FRASER
To:	riverkeeper@satillariverkeeper.org; taylorwimberly@usace.army.mil; Dayan, Nathan S CIV USARMY CESAS (US); CESAS-PD, SAS
Subject:	[EXTERNAL] Re: Fwd: Noyes Cut feasibility study
Date:	Thursday, January 25, 2018 2:26:11 PM

We need to have someone qualified to come to our property to see this Piney Bluff Creek that is 50 feet from our home to understand why closing these cuts will cause flooding. Piney Bluff Creek not only drains our property, but all property from I-95 8 miles away to the marsh. The property owners at the Dover Bluff Club who are spearheading these closings obviously own docks which should be maintained by the owners. A dock is optional; we are talking about taxpayers homes that will be negatively impacted. Please reply as soon as possible so that an appointment can be arranged as we have a security gate.
Thank You,
Olin and Marian Fraser

On Thursday, January 25, 2018 2:07 PM, MARIAN FRASER <tropicaltre26096@bellsouth.net> wrote:

On Tuesday, January 23, 2018 7:05 PM, MARIAN FRASER <tropicaltre26096@bellsouth.net> wrote:

On Monday, January 22, 2018 4:06 PM, MARIAN FRASER <tropicaltre26096@bellsouth.net> wrote:

On Monday, January 22, 2018 3:24 PM, MARIAN FRASER <tropicaltre26096@bellsouth.net> wrote:

mor

On Monday, January 22, 2018 3:13 PM, olin fraser <olinfraser@gmail.com> wrote:

---------- Forwarded message ----------
From: olin fraser <olinfraser@gmail.com <mailto:olinfraser@gmail.com> >
Date: Mon, Jan 22, 2018 at 2:20 PM
Subject: Fwd: Noyes Cut feasibility study
To: Taylor.Wimberly@usace.army.mil <mailto:Taylor.Wimberly@usace.army.mil> ,
Nathan.Dayan@usace.army.mil <mailto:Nathan.Dayan@usace.army.mil>

From:	olin fraser
To:	CESAS-PD, SAS
Subject:	[EXTERNAL] Noyes Cut feasibility study
Date:	Monday, January 22, 2018 2:15:46 PM

My wife and I attended the community engagement meeting at Dover Bluff Club in Camden County on Jan. 19, 2018. From the looks of a map that was presented at the meeting we feel that we could be directly impacted (possibly negatively) by these closures, especially the one labeled Dynamite closure. If you will go to Google Maps and enter my address, 100 Mossy Oak Lane, Waverly, Ga. 31565, you will see my house and shed. They sit on 8 acres that we own. A small tributary called Piney Bluff creek runs north to south directly through the center of our property and actually becomes umbrella creek. It is impossible to see the creek on the satellite image on the map because the tree canopy over the creek hides the creek from the satellite. Piney Bluff Creek is a natural drain, there is nothing man made about it. If you will click on the "map" rather than the "satellite" you will see the upper reach of umbrella creek on my property. This is known as Piney Bluff creek to locals and is also labeled as Piney Bluff on plats. This creek runs beneath Lampadoshia Road and extends North onto what I call "paper company land", to the North of Lampadoshia Road. Piney Bluff Creek drains these areas including large swaths of clear cuts which are now planted pines and dumps the water into the marsh directly in front of my house into Umbrella Creek. This marsh area floods at high tide and then moves out with the ebb tide through both Umbrella creek and another small creek which is the possible site of Dynamite Cut and this is our concern. We have concerns that Umbrella Creek has filled in with mud, as we have heard, and the bulk of my outfall for Piney Bluff Creek goes to another branch which appears to be where the Dynamite Cut closure is destined to be. I need all of the outfall I can get. During Hurricane Irma we had almost 10" of rain. The Satilla River Basin flooded at high tide with all the rain and the storm surge. Piney Bluff Creek could no longer drain into the marsh and the water rose and eventually flooded my garage beneath my house. The garage is the bottom floor of my home. We built in 2003 using all of the flood requirements and this is the first flood we have had since building. It was 8-10 inches deep in the garage.

Special consideration needs to be given to positive drainage of these paper company lands that I aforementioned. Huge amounts of water pass beneath Lampadoshia Road, through my property, and finally to the marsh through Piney Bluff Creek. Any impedance by structures in the marsh area, such as the dynamite cut closure could have devastating effects on my property including my home, neighbors homes, and finally the Lampadoshia Road itself. Now, if Umbrella Creek could be opened back up it may help my situation, I just don't know. Big risk. The flood we suffered back in September was, needless to say a hardship on my wife and myself. I am 70 and she is 62 and when we built we considered all of the drainage and it seemed to be all good until Irma. I am afraid that the dynamite cut closure will cause frequent flooding for me as this was my main source of outfall.

I can be reached at 912-270-2572 if you would like for me to show you this area in the field.

Sincerely,
Mr. and Mrs. Olin Fraser

From: Robert Lewis
Sent: January 24, 2018
To: Taylor Wimberly
Subject: Satilla river basin project

Dear Taylor,

I attended the public hearing at Dover Bluff Club Friday evening. I have read the report of the Satilla River Restoration Project and I am writing a letter in support of alternative 7. This is an exciting project that will be beneficial for the fisheries and aquatic life that we find in our river.

Thank you for your hard work.

Sincerely,

Robert Lewis

From: Rusty Dubberly
To: CESAS-PD, SAS
Subject: [Non-DoD Source] Noyes Cut and Dynamite Cut
Date: Saturday, January 27, 2018 1:07:20 PM

I am writing this in support of closing Noyes and Dynamite Cut so that Dover bluff can once see the tides and flows that it once saw.

Sent from my Verizon, Samsung Galaxy smartphone

From: Wimberly, Taylor L CIV USARMY CESAS (US)
To: Dayan, Nathan S CIV USARMY CESAS (US); Walker, David A CIV USARMY CESAS (US)
Subject: Fw: [Non-DoD Source] dover bluff
Date: Friday, January 26, 2018 6:04:04 PM

Sent from my BlackBerry 10 smartphone on the Verizon Wireless 4G LTE network.
From: Sam Stewart <sams@stewartcandy.com>
Sent: Friday, January 26, 2018 2:12 PM
To: Wimberly, Taylor L CIV USARMY CESAS (US)
Subject: [Non-DoD Source] dover bluff

I have read the public report of the Satilla Restoration Project. I am writing this letter in support of alternative 7. Returning the Dover river and Umbrella creek to their own unique basins is an incredible and exciting prospect. The

opportunity to return these systems and the surrounding marsh back to a state prior to the manmade cuts will be beneficial for the fisheries and all aquatic life that thrives in this natural environment. Thank you for your hard work

and I look forward to this projects completion.

Thank you for all you have done

Sam Stewart

From: Sarah Beth Cuello
Sent: January 26,2018
To: Taylor Wimberly
Subject: Satilla river basin project

Dear Taylor,

I was unable to attend the public hearing at Dover Bluff Club Friday evening. I have read the the report of the Satilla River Restoration Project and I am writing a letter in support of alternative 7. This is an exciting project that will be beneficial for the fisheries and aquatic life that we find in our river. Thank you for your hard work.

Sincerely,

Sarah Beth Cuello

From:	Sennie Harrell
To:	Wimberly, Taylor L CIV USARMY CESAS (US)
Cc:	Dayan, Nathan S CIV USARMY CESAS (US)
Subject:	[EXTERNAL] Satilla River basin project
Date:	Wednesday, January 24, 2018 3:53:32 PM

Dear Taylor,

It was with great interest that we attended the public hearing , Friday, January 21, 2018, at the Dover Bluff clubhouse for the Satilla Restoration Project. The presentation was skillfully presented and the proposed solution appears to be well designed to fix the problem we're having with silting in Dover Creek, Umbrella Creek and elsewhere. We have owned property in Camden County since 1971 and have observed with our own eyes some of the degradation of the habitat. We are very much in favor of this project (alternative 7) and hope it begins as soon as possible. Thank you for your hard work.

Sennie and Olin Harrell
sennieo@bellsouth.net

From: Wilton DeLoach
To: CESAS-PD, SAS
Subject: [Non-DoD Source] Noyes Cut closure
Date: Friday, January 26, 2018 7:51:12 AM

My husband and I own property at Dover Bluff Hunting and Fishing club, we fully support closure of all three cuts to restore the estuary that was damaged when these cuts we're constructed many years ago. Yes, closure of Dynamite Cut my cause slight inconveniences but it is well worth the slight delay.

Thanks for seeing this project thru to completion.

Sherri DeLoach

From:	Wilton Deloach
To:	CESAS-PD, SAS
Cc:	talor.l.wimberly@usace.army.mil; Dayan, Nathan S CIV USARMY CESAS (US)
Subject:	[EXTERNAL] Noyes Cut Closure Support
Date:	Monday, January 22, 2018 10:28:35 AM

USACE,

As a property owner and President of Dover Bluff Club my purpose in writing is to let you know I fully support the closure of Noyes Cut. Closure is a huge step in the right direction to restore water flow thru the Umbrella River Basin. While I must admit I am concerned with the Dynamite Cut closure, if this is the best method for habitat restoration and returning ebb & flow to the Umbrella River I fully support the efforts! Hopefully the abrasive effects of an outgoing tide will eventually help remove sedimentation and restore Umbrella Creek.

Certainly these efforts have the potential to become the model for habitat restoration which could be replicated up and down the Eastern Seaboard. It is my desire, once complete, monitoring will continue to ensure both habitat and navigation are restored and sustained.

Unfortunately due to a death in my family I was unable to attend the information gather session at Dover Bluff on Friday, January 19, 2018 but understand it was well attended. Thank you for the efforts dedicated to this project. It is my hope that closure will solve the problem that never could have been anticipated by the USACE when constructed in 1932.

We have already begun working with our elected officials to secure funding for the non-Federal portion.

Thanks in advance,

Wilton DeLoach

Wilton DeLoach

261 Dover Dr.

Waverly, GA 31565

100 MILES

Preserving Georgia's Coast. Forever.

January 8, 2018

Department of the Army
Savannah District, Corps of Engineers
100 W. Oglethorpe Avenue
Savannah, Georgia 31401-3604

RE: Section 1135 Environmental Restoration of Noyes Cut in the Satilla River estuarine system, Georgia

To whom it may concern:

Please accept this letter of support on behalf of One Hundred Miles for the U.S. Army Corps of Engineers (ACOE) ecosystem restoration efforts related to Noyes Cut, Dynamite Cut and Old River Run in the Satilla River estuarine system in coastal Georgia.

One Hundred Miles is a non-profit, advocacy organization dedicated to the preserving, protecting and enhancing Georgia's 100-mile coast. We fully support the ACOE's efforts to restore the historic depth and flow patterns to Umbrella Creek and Dover Creek. We understand that the federal project's original intent was to improve navigation in the 1940s, but since the project began, substantial change in flow have occurred that has led to habitat degradation. We appreciate the acknowledgement of this degradation and the ACOEs efforts to find restoration options suitable to restore the natural ecosystem. The habitat and cultural impacts of a system-wide restoration project will be beneficial to the system and to the communities surrounding these creeks.

One Hundred Miles supports the findings of the feasibility report and environmental assessment, and we fully support the ACOE's efforts to restore the Satilla estuary system and habitat.

Feel free to contact me if you have any questions or need additional information. I can be reached at 912.230.6494 or alice@onehundredmiles.org. Thank you for your service to our state.

Sincerely,

Alice M. Keyes
Vice President of Coastal Conservation

P.O. Box 2056, Brunswick, Georgia 31521
(912) 264-4111

F-22-18
USACE

Dear Mr. Wimberly:

I heard much last Friday night at the Dover meeting and I want to express the Noyes cut and other cuts closures. It sounds like it will help the fish, wildlife and river flows.

Thank you for your help and I hope the project will continue as fast as possible.

Sincerely,

Alvin R. Tatum, Jr.
Alvin R. Tatum, Jr.

P.S. I own property at Power Bluff.

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CHEROKEE NATION®
P.O. Box 948 • Tahlequah, OK 74465-0948 • 918-453-5000 • cherokee.org

Office of the Chief

Bill John Baker
Principal Chief
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S. Joe Crittenden
Deputy Principal Chief
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January 2, 2018

U.S. Army Corps of Engineers, Savannah District
ATTN: David Walker (PM-P)
100 West Oglethorpe Avenue
Savannah, GA 31401-3640

Re: Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study

Mr. David Walker:

The Cherokee Nation (CN) is in receipt of your correspondence about **Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study**, and appreciates the opportunity to provide comment upon this project.

The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time.

However, the CN requests that the U.S. Army Corps of Engineers (USACE) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project.

Additionally, the CN requests that USACE conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs

Elizabeth Toombs, Special Projects Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389

Clay L. Montague's comments on reading the USACE report entitled*:*

Noyes Cut Section 1135 Ecosystem Restoration Study, Satilla River Basin, Georgia, Draft Integrated Feasibility Study and Environmental Assessment

Report Released 08 December 2017

Submitted by email: 25 January 2018 (within a weather-induced extended comment period)
Submitted to the Attention of Mr. David Walker (PM-P)
100 West Oglethorpe Avenue
Savannah, Georgia 31401-3640
Email address: CESAS-PD@usace.army.mil

Overall assessment: The draft feasibility study report and appendices include adequate evidence to support the USACE determination of an optimal restoration plan, namely, to close Noyes Cut, Dynamite Cut, and the Old River Run (ORR). The alignment of two objectives, to restore both habitat and access, has been a hallmark of success of this project. This Tentatively Selected Plan (TSP) accomplishes these twin goals. Restoration of the salinity gradient and a normal flood-ebb flux in both Dover Creek and Umbrella Creek will simultaneously improve habitat for coastal migratory fishes and invertebrates, will benefit the coastal fishery, and will stop the shoaling problem that formed the main complaint by local residents. I believe the TSP will work as described to accomplish the stated objectives. I believe the plan is the optimal plan for meeting the objectives, given the constraints on coastal engineering projects in general, and in particular those using Section 1135 funding available to the USACE for ecosystem restoration.

The analysis tools used by the USACE are the standard of practice and are in highly capable hands at Dynamic Solutions, LLC and the Savannah District of the USACE. From the beginning of this project, the main goal for many boaters was to stop the shoaling in Umbrella Creek that was occurring especially in the vicinity of Dover Bluff and Piney Bluff. The main goal of the Satilla Riverkeeper was to restore habitat and access in the Dover Creek and Umbrella Creek ecosystem. Agreed upon constraints from the USACE included no dredging of muddy shoals, and accomplishing the work under the rules of environmental restoration developed within the USACE for implementing Section 1135 of the 1986 Water Resources Development Act of the US Congress. I believe the TSP very well accomplishes the stated goals under the constraints.

Long-term benefits are understated. The report seems to understate the possible long-term benefits of the Tentatively Selected Plan (TSP). Evidence is adequately presented that by closing two artificial cuts (Noyes and Dynamite) and another smaller opening (ORR), the TSP stops the main causes of channel shoaling both in Umbrella Creek and at the entrance to the upper reach of Dover Creek (called West Tributary in the report). The report also points to these problem shoals in the main channels as having reduced the value of habitat and limited access by both fish and boat traffic. The report acknowledges that the closures create areas of sedimentation adjacent to the closures. It is clear in the report that these new sediment traps will begin to fill, eventually becoming vegetated marshland. However, the report seems to underemphasize that the problem channel shoals will deepen and the shoal sediments relocate to the newly created traps. Yet the hydraulic configuration created by the TSP should encourage that relocation of sediments as a natural consequence. The tidal hydraulic forces, assisted by

sediment disturbance from boat traffic and rare storms, seem likely to eventually deepen shoaled areas, with much of the transported sediment relocating to the traps and marshlands. This could take years, but it seems probable. In contrast, it seems much less plausible that the nearby shoals will fail to deepen, and that the sediment traps will instead fill with sediments from greater depths and distances. Near the end of this document, I provide a more detailed concept for long term response in a section entitled, "A Positive Outlook Hypothesis and Professional Opinion."

My professional background: At the end of this document, I have provided a brief resumé relevant to my involvement with this restoration project as a volunteer professional with experience with estuarine habitat and coastal engineering projects.

Suggested Report Improvements

1--Please rephrase a statement attributed to me. Page 58, Paragraph 5, last sentence references me (Montague 2017d), but I would like you to add some important context for this remark because I also have a special consultant's role for Camden County in the environmental issues of the spaceport. **Please replace the sentence** that begins with "Spaceport activities would not be…" with "*If the FAA approves a spaceport license, spaceport activities would not be anticipated to negatively impact the fish and shellfish habitat that would be improved by the USACE's Tentatively Selected Plan given in this feasibility report (Montague 2017d).*" (NOTE: Some impacts could occur adjacent to the spaceport that would be insufficient to prevent FAA giving a spaceport license to Camden County).

2--Importance of the Upper Reach of Dover Creek (West Tributary). The study report may especially undervalue the benefits of closing Noyes Cut to the upper reach of Dover Creek (called "West Tributary" in the report). Please consider adding statements in Section 4 that bring better focus to this area (perhaps in Section 4.1, 4.2, 4.3, or 4.13).

Immediately north of the northern end of Noyes Cut, a large shoal greatly limits access to the upper reach of Dover Creek by fishes, invertebrates, and boat traffic alike. Moreover, this upper reach receives the main freshwater sources for Dover Creek. When Noyes Cut is closed, this region should eventually become prime habitat for migrating fishes and invertebrates. Furthermore, it seems likely that boat access at low tide should become easier to and from the community that lives on the upland adjacent to the West Tributary (a neighborhood known as River Marsh Landing).

Some residents of River Marsh Landing (West Tributary upland area) are concerned about increased shoaling and loss of tidal elevation near the upland. If both occurred, this would greatly limit their boating access**. Post-project monitoring in the creek adjacent to River Marsh Landing could help the USACE and the residents tell whether a problem occurs, and evaluate what might be done about it**.

3--Locations of closures differ in the Engineering Appendix (Appendix B). The location of the closures shown in Figures 1, 2, and 3 of the Engineering Appendix differ from those indicated in Figure 11 on page 32 of the Draft Integrated Feasibility Study report. The Draft Integrated Feasibility Study report should clearly state how these location differences affect the interpretation of the Engineering Appendix results. The study report should also tell whether or not the model has been (or will be) run using these revised locations, and if not, explain why it is unnecessary to do so.

I believe the locations in Figure 11 are preferable because they create larger and better positioned sediment trap areas. Being closer to the ends of the openings, they may also be easier to construct.

Unfortunately, the fact that the locations were changed means that the results in the Engineering Appendix are less relevant to the actual plan. The location inconsistency reduces the value of the otherwise excellent presentation of quantitative results given throughout Appendix B. In particular, the location of the closure at Dynamite Cut may affect local concerns about the possible deposition of sediments into the East Tributary as shown in Figure 27 of the Engineering Appendix.

4--Risk of upland flooding from storm surge. Page 44 (Section 4.1), Paragraph 1, lines 4-6 states that the action alternatives may increase flood potential from storms, but has this been examined in the model? Might less storm surge reach the East Tributary and West Tributary upland areas once the back door routes for water (Noyes Cut and Dynamite Cut) are closed? Even without a storm surge simulation, existing model results may help answer this question. For example, does the model show water elevations in these areas during high tide that are somewhat different than the base case elevations? Lower water level, could indicate lesser storm flood potential. Please check the H&H model for high tide elevations and incorporate that knowledge into the statement about storm damage potential.

5--Local concern about sedimentation in the East Tributary. According to Section 4.3 of the Engineering Appendix (Appendix B), the East Tributary area should experience increased sediment deposition if Dynamite Cut is closed. The East Tributary area has a tidal node. Sediment continues to fill the channel near all four of the docks in that area and marsh grass has grown over much of the channel. Presently, boats can move to and from these docks only at high water between mid-flood and mid-ebb tide. Those who use this creek wonder if conditions will significantly worsen there or improve after closing Dynamite Cut.

It is not clear if the project affects the rate of filling, or can reverse the problem to some degree. The model does not capture this area, and the fate of this node is not addressed in the study. **Post-project monitoring in the node area of the East Tributary area would help the USACE and local residents evaluate the effect of the project and take steps to make adjustments to improve access in this area**.

6--Non-federal funding clarification needed. For the most effective non-federal funding effort to be possible, we need to know as closely as possible how much non-federal funding must be sought. In Table 11 on page 42, this amount seems to be $1,901,250. However, on page 68, the asterisk for the Grand Total on the first line mentions $65,000 of monitoring costs that occur in the PED phase: Please clarify. Are the amounts mentioned at this point already included somewhere in the construction costs given in Table 11 on Page 42, or are these amounts in addition to those totals? If in addition, then what portion of these costs must be covered by non-federal sources? Likewise, Table 1.22-1 on Page 7 of Appendix F identifies $5,375 of real estate costs. Is the non-federal share of these real estate costs already included in the costs given on Page 42, or are these additional costs that must be added?

7--Local concern about post-project tide heights. Many residents of the upland edge of the project area have expressed concern that tide heights would be different. Most are concerned about having enough tidewater to launch small boats and kayaks, but some are concerned about flooding and whether unusual rainfall events will drain from the upland as easily and flow out. This latter concern may arise from a belief that the closures will act like dams and hold the runoff back, keeping it from flowing out to the estuary. A brief discussion of model-predicted tide heights and the fate of rainfall and runoff could help alleviate these concerns. A table of change in high tide elevations at the given environmental points under the various alternatives would also be helpful.

Specific remarks by page or section, including some basic editorial comments.

I. Comments on Draft Integrated Feasibility Report

a. Page 9 (Section 2.2), line 5: Provide reference and delete "Error! Reference source not found."
b. Page 33 (Section 3.4), paragraph 4, line 5: Change "was used in prepare…" to "was used to prepare…"
c. Page 43 (Section 4.1, Future Conditions with No Action Alternative), Lines 2-4. I think it may be incorrect to say that the "NAA would not be expected to have further adverse impacts to the hydraulic malfunctions… ." Is it reasonable to expect shoaling caused by these cuts to eventually completely close some creeks to fish migrations and boat traffic? Perhaps the sentence would be improved by inserting "in addition" after "adverse impacts" and before "to the hydrologic malfunctions…"
d. Page 44 (Section 4.2, Future Conditions with No Action Alternative): Would it be fair to say that habitat would continue to degrade through additional tidal creek shoaling and erosion of Noyes Cut? It seems unlikely that adverse impacts have stopped increasing, which is how the statement might be interpreted. See how this was stated on Page 54, Section 4.9. The simple statement used there seems more appropriate, namely, "This alternative would allow processes that are currently in place to continue."
e. Page 45 (Section 4.3, Future Conditions with No Action Alternative: Again, would it be fair to say that essential fish habitat would continue to degrade as shoaling continues to further block tidal creek access by fishes? It seems like an ongoing process, but the statement sounds like the habitat degradation has stabilized and would not become worse. Please clarify which is meant here (and likewise in Section 4.2).
f. Page 49 (Section 4.4, Future Conditions with No Action Alternative): Delete "be" after "not".
g. Page 50 (Section 4.5, Future Conditions with No Action Alternative): Again, it seems fair to say that the habitat degradations will continue. It could seem like the habitat degradations have reached an end point, but they probably have not. Shoaling may continue to increase the number of blockages in creeks, and reduce the free movement of wildlife, such as river otters, dolphins, diamondback terrapins, and sea turtles, all of which use the creeks in the area.
h. Page 51 (Section 4.6, Future Conditions with No Action Alternative): Please delete "be" after "not" and also consider rephrasing to open the possibility that degradation to animal free access to tidal creeks will continue as long as shoaling creates additional blockages. In particular, manatees are large, lumbering, and seek fresh water. With no action, additional blockages may continue to restrict access by manatees to needed habitat resources at the ends of tidal creeks.
i. Page 53 (Section 4.8, Future Conditions with No Action Alternative): The way this is put here seems fine (namely, "further impacts <u>in addition to the shoaling… .</u>" This kinds of statement might be adequate for use in the other NAA sections, if you prefer in order to address the comments I made in those.
j. Page 53, Section 4.8, Future Conditions with Project Action Alternatives 1, 6, and 7, Line 2: Delete "in" between "occurs" and "along… ."
k. Page 54, Section 4.9, Future Conditions with No Action Alternative): I like the way the consequences of the NAA were put in the second sentence. Perhaps use something like this statement in those other NAA sections too (Sections 4.2 – 4.6).

l. Page 55, (Section 4.10.2, Future Conditions with Action Alternatives 1, 6, and 7), Lines 4-5: Roughly 70 houses are 0.5 to 1.5 miles away from the three proposed construction areas. The residents will be concerned about noise. I suggest replacing the following statement "*However, this impact is expected to be negligible due to the very sparse population in the project area*" with "*The population is sparse in the area. Noise will be comparable to noise from building construction, will be at least 0.5 miles distant from the nearest residents, and will be limited to the duration of construction*." The reason for this change of wording is to respect the nearby population rather than seeming to disregard them. A year or so ago, fighter jets were on low-altitude practice runs down the Satilla River estuary. The noise shook houses and caused breakage of items falling off of shelves. Residents will want to be assured that the noise will not do that.

m. Page 55 (Section 4.10.3, Future Conditions with No Action Alternative), Lines 4-5: Not only will habitat remain limited, but it may get worse over time with the NAA because of continued shoaling that may block additional creeks, or make already shoaling areas shallower.

n. Page 55, last line and continuing to the top of Page 56: Move the following oddly placed phrase to the NAA section: "*in addition to the adverse impacts that have occurred to recreational fishing resulting from the habitat degradations that have occurred since the opening of all of the 8 main-made cuts in the study area in the 1900 to 1939 timeframe*." As it is now, the phrase seems very out of place in this section on action alternatives. Therefore the reader could easily misunderstand this to mean that there will in fact be the same negative impacts on fishing with the action alternatives as experienced under the No Action Alternative.

o. Page 57 (Section 4.12, NAA): What is said here about the NAA is a good way to put it. It might be something to also say in other NAA sections, namely, that the degradations would continue and not be offset by any of the improvements from the alternative actions. Consider adding something like this to the NAA sections of Sections 4.2 – 4.6.

p. Also, rather than use the acronym NAA in that subsection heading for Section 4.12 (Page 57), for consistency, go ahead and spell it out like in all the other NAA subsections.

q. Page 58, last paragraph, Line 2: Change "is similarly" to "are similarly… ."

r. Page 59, Paragraph 2, Line 3: Delete "case" (or change to "In case" and delete "If").

s. Page 59, Paragraph 3, Line 4: Please clarify the statement about past plans. Two known past plans considered and written about by the USACE were never implemented: closing Bull Whirl Cut, and building a diversion works at the present intersection of Umbrella and Dover Creeks. If it does not seem germane to go into this in this study, then perhaps just delete the word "past."

t. Page 59, Section 4.13 title: Please spell out the acronym P&G. I think this may refer to "Principles and Guidelines," but few other citizen readers will know this.

u. Page 59, Section 4.13.1, first paragraph of section, last line: Might be better to replace "to the objective" with "of the objective."

v. Page 61, Section 4.13.5, third paragraph of section, Line 3: Delete "about" between "is" and "intended."

w. Page 66, Section 10.1, Item 1): In general, please when using an acronym for the first time, please spell it out with the acronym following in parentheses. I think PED is used first here. So please replace "PED costs" with "Pre-Construction Engineering and Design (PED) costs."

x. Page 67, item 2), bulleted item "Performed by EN-H." Please spell out the meaning of the acronym EN-H. Item 3) spell out first use of acronyms OP-N, EN, PD, and SAD.

y. In addition, please make sure all acronyms are in the acronym list. None of those that appear in this section are included in the acronym list. One or more may have the same meaning with ones that are included in the list, so an internal consistency check may be in order.
z. Page 69, Table header information (gray area) seems misplaced. Please place at the top of this page, and again at the top of Page 70 as the table continues.
aa. Page 73, all Montague citations: Montague is <u>not</u> a resident of Dover Bluff, nor a member of the Dover Bluff Club. Please replace "Dover Bluff Community" with "Deerwood Creek Estates, Camden County, Georgia."

II. <u>Comments on Appendices</u>
a. Appendix A: See my comment about Table 1 (find it on Page 3 of this comment document).
b. Engineering Appendix: The label "Appendix B" is missing.
c. Engineering Appendix. See section in narrative above entitled, <u>Locations of closures differ in the Engineering Appendix (Appendix B)</u>.
d. Engineering Appendix, Section 5.2. It is stated that the closures may be overtopped by tides approximately 10% of the time. Will overtopping significantly shorten the life and increase maintenance of these closures over taller closures? On the other hand, could taller closures contribute to erosion of the marsh near each end of the closure?
e. Appendix C: I was impressed that all the Native American tribes were contacted. I was also struck by the contrast in tone between the response from the Seminole Nation of Oklahoma and that from the Cherokee Nation.
f. Appendix G: This appendix is an impressive document that could serve as an example to others who must prepare a Federal Consistency Determination for the Georgia Coastal Management Program. Nice job! I hope the State of Georgia thinks it is as good as it seems to me.

A Positive Outlook Hypothesis and Professional Opinion. As an estuarine scientist with good familiarity and experience in tidal marsh systems, sediment transport science, and coastal engineering projects, I believe the report underemphasizes the long-term value to habitat and access likely to result from the Tentatively Selected Plan (TSP). The Engineering Appendix (Appendix B) discusses bed displacement only for a four-month period after the project (the duration of model simulation). Sediment movement will go on for much longer, perhaps decades, continually improving both habitat and access. What does the long term look like?

Over the coming decade or more, I anticipate channel deepening especially in the following three areas: 1) Umbrella Creek, from the Dover Bluff dock area described in the report to the intersection with Piney Bluff Creek; 2) the entrance to the upper reach of Dover Creek, beginning just north of the northern end of Noyes Cut (called West Tributary in the report); and 3) the eastern creek into the area called East Tributary in the report. I believe a large amount of the sediment now blocking channels will, over time, move and resettle in the quiet waters created by the closures and in adjacent marsh.

The evidence is exceptionally good that the Noyes Cut channel will change to quiet water and will have a very large capacity for sediment settling. Some or most sediments displaced from the massive shoal at the entrance to the West Tributary seem likely to eventually settle in the Noyes Cut channel and help build marshland there.

The closure of the Old River Run (ORR) between Umbrella Creek and Dover Creek, when placed as planned adjacent to Dover Creek, should provide capacity and quiet water in the ORR for natural resettlement of some of the sediment now shoaling the main channel of Umbrella Creek. The evidence given in the report for this effect is also very good.

The proposed placement of the closure at Dynamite Cut adjacent to Dover Creek should likewise provide capacity for settlement of sediments in Umbrella Creek. Evidence in the report suggests this area will experience sediment deposition. Although the western channel was not included in the model, it seems possible that sediment may eventually block the western channel into the East Tributary marshland. Nevertheless, such a blockage there could have a positive effect on both habitat and access in the East Tributary marshes, as I will explain next.

Reasons for possible improvement of the East Tributary. I live along the marshland of the East Tributary area. The two creeks that bring tidewater into the East Tributary from Umbrella Creek meet in the middle and form a tidal collision node. Early maps clearly show that these two creeks were formed from an oxbow of the old Dover Creek that made when two artificial cuts were completed (Dynamite Cut and an unnamed cut roughly 700 meters to the east). Sedimentation caused by the tidal node near the middle of the oxbow gives the appearance of two separate creeks, but they still have a small connection with one another. The connection continues to fill with sediment, and has noticeably done so over the last 15 years of my personal observations. Therefore, both habitat and access continue to deteriorate in the East Tributary area. Would closure of the western creek restore habitat and access in this area too?

I think it could. The western creek connects to Umbrella Creek just east of the proposed closure of Dynamite Cut. The evidence shows that this area will become quiet and will fill with sediment. Beneficially, however, if the mouth of this western channel is blocked by sediment accumulation there, the tidal node in the East Tributary area should disappear, allowing normal tidal flood and ebb to develop in the remaining eastern channel. With normal tidal flow, this eastern channel may become less impeded over time.

Moreover, freshwater drainage enters the tidal marsh via a small creek at the northwest corner (near Lat 31°01.351'N; Long 81°33.003'W). This drainage now connects to the two-channel system, but would seem likely to remain connected and create one long, narrow channel to Umbrella Creek via the eastern channel. The single creek system could then experience increased tidal exchange compared to the two-creek system, and contain an improved salinity gradient: hence better habitat.

Boating access may also improve if the channel becomes better defined that at present. If the tidal node is eliminated, the cause of shoaling should be stopped. I live along this creek and have watched it fill in. I'm confident enough to take a chance that it will improve, or at least stop getting worse.

Conclusion: The report takes a very cautious approach to sediment movement by using only the results of a 4-month simulation to create a rough estimate of bed displacement. The estimate is based on good velocity predictions from the model, but uses an arbitrary value of sediment shear strength. The report cautions that bed displacement estimates are the least reliable in the report. Furthermore, the evidence presented only seems applicable over a very short term under background conditions of tidal forces. Sediment movement seems likely to increase under chronic disturbance by boat traffic, and acute disturbance from major storms (e.g., storms with a return frequency of twice per year or less). Therefore, for a long-term prognosis, it seems reasonable to expect greater amounts of channel

deepening than indicated by the short term model analysis in the report. Resettlement of sediments from the problem shoals at the core of this project should be anticipated in the quiet waters that will form near the closures proposed in the TSP.

Background information on Clay Montague pertaining to Noyes Cut. Clay L. Montague, PhD, is a coastal systems ecologist with advanced degrees in science and engineering, and 40+ years of experience in the estuaries and coasts of the southeastern United States. He is Associate Professor Emeritus in the Department of Environmental Engineering Sciences in the College of Engineering at the University of Florida (retired in 2010). Most of his academic research has involved estuarine and coastal habitat for fishes and shellfishes. He has worked with coastal engineers on many projects, including other USACE ventures. He has reviewed several other USACE projects as a member of Independent Expert Review Panels. He served on the Ecosystems Panel of the National Science Foundation, which evaluates scientific research proposals. He was the only ecologist on the State of Florida's Coastal Engineering Technical Advisory Committee. He served as President of the Southeastern Estuarine Research Society in the early 1990's. He was the managing member of Montague Investments LLC. More recently, for a year in 2012, he was Interim Executive Director and Riverkeeper for the Satilla Riverkeeper organization (Satilla RiverWatch Alliance, Inc). He is currently a member of the State of Georgia's Coastal Advisory Committee, and a consultant for Camden County, Georgia on environmental issues related to their Spaceport Camden project. He serves as Treasurer and Member of the Board of Directors of the Satilla RiverWatch Alliance, Inc. Since 2011, he has been a fulltime resident of Camden County. He is a stakeholder in this project, who lives along the shore of the area to be restored by the Tentatively Selected Plan described in the feasibility study report.

In November 2011, Dr. Montague was asked by then Satilla Riverkeeper Mr. Bill Miller if he would be willing to volunteer to look into complaints by residents of the Dover Bluff community concerning shoaling in Umbrella Creek, and to recommend what could be done about it. Since then, he has been involved in promoting the idea to restore habitat and access in the Dover and Umbrella Creek System in the Satilla River Estuary. He has worked especially closely with the River Committee of the Dover Bluff community, the residents of which have registered their shoaling complaints with the USACE and the Satilla Riverkeeper for decades.

Specifically for this effort, Dr. Montague personally reviewed many documents and maps on the history, excavation, and management of Noyes Cut, the original configuration of Dover and Umbrella Creeks prior to the eight cuts now in the system, the USACE plan in the 1980's to close Noyes Cut and Bull Whirl Cut, and earlier history of USACE involvement in the shoaling issue in Umbrella Creek dating back to the first recorded complaint in 1935. He has also reviewed habitat requirements of coastal and estuarine fishes and invertebrates that use the Satilla River Estuary. He has discussed this restoration concept with many individuals in the environmental community, the estuarine science and fishery management communities, the coastal engineering community, state and federal legislators, and residents of the area adjacent to the proposed restoration. In his opinion, the Tentatively Selected Plan will work as described by the USACE engineers in the feasibility study report and should have long-term benefits to habitat and access that go above and beyond the USACE's description.

QUESTIONS AND COMMENTS FOR THE SAVANNAH DISTRICT OF THE US ARMY CORPS OF ENGINEERS

Pertaining to a report released on 08 December 2017 entitled:

Noyes Cut Section 1135 Ecosystem Restoration Study, Satilla River Basin, Georgia, Draft Integrated Feasibility Study and Environmental Assessment

Submitted by the

River Committee, Dover Bluff Club

Fred Voigt, Jr.; Wilton Deloach; Jimmy Stewart, III; Tommy Zachry; Harold Voigt, in collaboration with Clay Montague of University of Florida and Laura Early of the Satilla RiverWatch Alliance, Inc.

11 December 2017

Narrative: The River Committee of the Dover Bluff Club is an excellent source of local knowledge for this habitat and access restoration project. Its members are designated by the Dover Bluff Hunting and Fishing Club because they are the most experienced boaters and fishermen in the Dover Bluff community. The five members each have at least 50 years of navigational and fishing experience originating at Dover Bluff and traversing Umbrella Creek, Dover Creek, and the Alternate Atlantic Intracoastal Waterway (Alt-AIWW) into Jekyll Sound, the Satilla River, and points distant. Few if any alive today have as great a first-hand knowledge of the present condition of the area and its deterioration over the past half century or more.

Therefore, we as the River Committee of the Dover Bluff Club would like first to recognize that the environmental restoration plan proposed by the US Army Corps of Engineers (USACE) is well thought out using modern tools and analysis, and should work as described. We strongly agree that Noyes Cut will have to be closed to achieve the restoration goals. We also agree that closing the Old River Run (ORR) as described seems necessary. We question only whether Dynamite Cut should also be closed.

We have two reasons to leave Dynamite Cut open: First, we think habitat and access restoration can be achieved sooner and with greater efficacy by skillful direction and use of ebbing tidewater from upstream in Dover Creek. Second, we are hesitant to sacrifice a major passage for boat traffic. Boaters traverse Dynamite Cut to reach either the mouth of Dover Creek, or the Alternate Atlantic Intracoastal Waterway Cut southbound to the Satilla River (markers A16 and A17). Because of these perceived advantages of leaving Dynamite Cut open, we need to understand completely how closing it becomes the preferred alternative.

With Dynamite Cut open, we imagine that some of the water flowing out of the upper reach of Dover Creek (ebbing tidewater and land runoff) could be directed through Dynamite Cut to help stimulate tidal exchange and to deepen the very shallow channel there. We want to know if this could happen naturally after Noyes Cut is closed. If not, we imagine that a diversion works could be placed in Dover Creek to direct the required amount of water through Dynamite Cut in order to achieve all restoration and access goals, and do so sooner.

Moreover, for the last 85+ years much of the water in the upper reach of Dover Creek has exited via Noyes Cut. If both Noyes Cut and Dynamite Cut are closed, we wonder if too much water will flow down the main channel of Dover Creek and cause further problems in the Alternate Atlantic Intracoastal

Waterway (Alt-AIWW) downstream. In particular, we want to know whether more ebb water in Dover Creek at Alt-AIWW marker A14 would create additional sedimentation in the "Dover Cut" segment of the Alternate Atlantic Intracoastal Waterway (Markers A8 to A14). We imagine that more water would flow north into Dover Cut past Marker A14 and collide with ebbing water moving southward in the Alt-AIWW. We imagine that this could add more sedimentation to the already choking sediment found around Marker A8, extending the shallows south past Marker A12 to A14. With Dynamite Cut closed and Dover Cut filling with sediment, this could eventually cut off all access to the mouth of Dover Creek via the Alt-AIWW. To travel southward, boat traffic originating in the vicinity of Dover Bluff would be required to exit the Alt-AIWW north through Umbrella Cut into Jekyll Sound and take a long, wave-exposed passage around the east side of Raccoon Key Spit.

In summary, for us it seems that if Noyes Cut and the Old River Run (ORR) are closed, but Dynamite Cut is left open, then some of the water available in the upper reaches of Dover Creek could be directed to flow out through Dynamite Cut. We wonder if the cost of building any necessary diversion works to accomplish that would be greater than the cost of closing Dynamite Cut. We want to know if greater restoration of habitat and access can be accomplished by using this ebb flow water effectively, given that at the same time it would preserve the ability to reach the mouth of Dover Creek and the Satilla River from Dover Bluff, Piney Bluff, and Deerwood Creek Estates.

Below is a series of specific questions many of which relate to our need to understand why closing Dynamite Cut is part of the recommended solution. Other questions relate to the large accumulation of sediment in the upper reach of Dover Creek (just upstream of the north end of Noyes Cut), and the possible role of this project in reducing potential damage from storms.

Questions for the USACE

Questions 1 – 6 apply to the project <u>as proposed</u> and the goal of restoring deeper channels throughout areas of shoaling. These questions pertain specifically to the portion of Umbrella Creek between Dynamite Cut and the docks at Dover Bluff, which includes shoaling in Umbrella Creek and its named tributaries: Rings End Creek and Piney Bluff Creek. These portions are accessible to boaters from dock, boat ramp, or boat hoist at Dover Bluff, Piney Bluff, and Deerwood Creek Estates. **NOTE**: Rings End Creek (named on Camden County Tax Map 140) is an oxbow cutoff called "East Tributary" in the Engineering Appendix (Appendix B, see Figure 7). Flux into its upper reach was evaluated using Environmental Analysis Point ENV5 in the Habitat Evaluation (Appendix A). Rings End Creek is accessible to five residences on the western side of Piney Bluff and three on the southeastern side of Deerwood Creek Estates. Four docks are currently on Rings End Creek.

1. *With Noyes Cut closed, can the ongoing accumulation of sediment in the referenced subject areas be <u>stopped</u> without also closing Umbrella Creek at Dynamite Cut?*
2. *In your professional opinion, what is the <u>certainty</u> of the evidence that Dynamite Cut must be closed to cure the shoaling problems experienced by boat traffic originating from Dover Bluff, Piney Bluff, and Deerwood Creek Estates? (>90%, 50:50, <10%)*
3. *What factors now contribute to the shoaling and creek narrowing that has been experienced for decades in Rings End Creek, Piney Bluff Creek, and the portion of Umbrella Creek between Dynamite Cut and the docks at Dover Bluff?*

4. *After the proposed project, will the accumulated sediment now in the referenced subject areas redistribute in a way that deepens channels, or might it further constrict channels in Rings End Creek, Piney Bluff Creek or elsewhere in Umbrella Creek?*
5. *What is the certainty of the evidence that channels will deepen through the sediment shoals now in Umbrella Creek, Piney Bluff Creek, Rings End Creek and the upper reach of Dover Creek if the proposed project goes forward?*
6. *Roughly how long will the anticipated redistribution of accumulated sediments take, say, to reach about halfway to an expected pseudo-equilibrium condition? (months, years, decades)*

Questions 7- 11 relate to the same referenced subject areas as Questions 1-6, but assume a modification of the project as proposed, namely, Noyes Cut and the Old River Run (ORR) are both closed, but Dynamite Cut is left open:

7. *What is the likelihood that the causes of shoaling in the referenced subject areas will continue if Dynamite Cut remains open but Noyes Cut and the Old River Run (ORR) are closed? (Highly likely, uncertain, unlikely).*
8. *Given sufficient uncertainty, what would prevent the USACE from staging the closures as follows: close Noyes Cut and the Old River Run (ORR) first, then wait for a suitable amount of time while monitoring what happens in Umbrella Creek before deciding whether or not to close Umbrella Creek at Dynamite Cut?*
9. *If Dynamite Cut remains open, would a diversion works be needed to adequately apportion some of the ebb flow of water from the upper reach of Dover Creek through Dynamite Cut in order to meet project goals of habitat and access restoration?*
10. *If a diversion works would be required, what type of diversion works could be designed and constructed that would direct an appropriate amount of ebb water through Dynamite Cut to achieve restoration goals while preserving boat access through Dynamite Cut?*
11. *If a successful diversion works could be designed and built, would the cost of doing so be similar to, less than, or more than double the cost of simply closing Dynamite Cut?*

Questions 12 – 14 refer to access to the Alternate Atlantic Intracoastal Waterway (Alt-AIWW)

12. *Will access for boat traffic originating at Dover Bluff, Piney Bluff, & Deerwood Creek Estates, and intending to go southbound on the Alternate Atlantic Intracoastal Waterway (Alt-AIWW) to the mouth of Dover Creek or the Satilla River, be eliminated because of this project (leaving access only via a long and wave-exposed route out Jekyll Sound and around the east side of Raccoon Key Spit)?*
13. *Based on model predictions and USACE experience, what is the certainty that access to the southbound Alt-AIWW from Dover Bluff will remain if the project is completed as proposed?*
14. *What assurances can be given that access to the southbound Alt-AIWW from Dover Bluff will remain if the project is completed as proposed?*

NOTE: If Dynamite Cut is closed by the USACE, it is of paramount importance to nearby residents that alternative low-tide access to the Alt-AIWW for southbound traffic from Dover Bluff remain available. Assurance is needed that such access will be restored should it close for any reason (project-related or not).

Background for Question 14: At this time, three areas of shoaling in the vicinity of Dover Bluff seem to be growing that could eliminate any southbound Alt-AIWW route from Dover Bluff to the mouth of Dover Creek or the Satilla River. One of these is the shallow westward passage from Dover Bluff to Dover Creek through Dynamite Cut. That access would be intentionally cut off by the proposed closure at Dynamite Cut, leaving only the eastward two passages to the Alt-AIWW (both involving the USACE's "Dover Cut" on navigation charts). These two passages also have growing sediment accumulations, including a recent bank breach. The best known accumulation is in the Alt-AIWW at markers A8 and A10. The second growing shoal could restrict access to the channel that leads to Alt-AIWW at marker A12. Shoaling involves a recent change that has created an oxbow cutoff in Umbrella Creek. Five years ago, a bank eroded between the lower reach of Parsons Creek and Umbrella Creek, which created the oxbow cutoff. At the southwestern bend of that cutoff is a channel that leads southwest to the Alt-AIWW at marker A12. This is now the least hazardous eastern alternative route from Dover Bluff for southbound boat traffic in the Alt-AIWW. It is imperative that this route remain open, especially if Dynamite Cut is closed. The longer route for southbound traffic to reach the Alt-AIWW involves a sharp right turn into the shallow and very narrow channel at A8 and A10. Moreover, with Dynamite Cut closed, if one result is that more water flows into Dover Cut from Dover Creek, we fear a tidal node could form in Dover Cut that increases the shoaling between Alt-AIWW Markers A12 and A14, or in the channel that connects the Alt-AIWW from Umbrella Creek to the Alt-AIWW at Marker A12 (See paragraph before the list of questions).

Questions 15-17 relate to the sediment accumulation and shoaling in the upper reach of Dover Creek immediately upstream of the northern end of Noyes Cut.

15. *Will the channel deepen through the large sediment accumulation in the upper reach of Dover Creek near River Marsh Landing?*

16. *Roughly how long will the redistribution at the upper reach of Dover Creek take to achieve about halfway to pseudo-equilibrium?*

17. *To what areas will the sediment from that shoal likely relocate?*

Question 18 is about the coastal resilience function of the project as proposed.

18. *Will the proposed closures reduce flood potential from major storms that potentially flood land adjacent to the entire project area from River Marsh Landing to Dover Bluff*?

Background: Some evidence may exist that the proposed project could alter the elevation of high tides and increase the delay of tidal surge. If tide height is reduced or surge delayed, then storm damage reduction on land might be expected in proportion.

Savannah District, US Army Corps of Engineers (USACE)
Noyes Cut Section 1135 Ecosystem Restoration Study
Draft Environmental Assessment (EA)
Satilla River Basin, Georgia
US Environmental Protection Agency (EPA)
January 18, 2018

Background: The USACE proposes to construct an ecosystem restoration project in Camden County, just south of Brunswick, Georgia. The project area includes Noyes Cut, Dover and Umbrella Creeks as a part of the lower Satilla River estuary. The Georgia Department of Natural Resources and the Satilla Riverkeeper are the non-federal cost share sponsors for this project. The purpose of the project was to close man-made cuts to restore hydrology to a more natural state in the Dover and Umbrella Creeks section of the Satilla River estuary. The USACE initially evaluated seven action alternatives and a no action alternative, but eliminated four action alternatives. The remaining three action alternatives (Alternatives 1, 6 and 7) and the no action alternative were moved forward for further consideration. The USACE determined that Alternative 7 would be the tentatively selected plan (TSP). Alternative 7 features include closing Noyes Cut, Dynamite Cut and Old River Run with a combination of rip rap, bedding stone and sheet pile end walls.

Comments:

Endangered Species: The USACE discusses the action alternatives impacts to endangered species that might occur in the project area to include the Atlantic and Shortnose Sturgeon (*Acipenser oxyrinchus oxyrinchus* and *Acipenser brevirostrum*), Wood Stork (*Mycteria americana*) and West Indian Manatee (*Trichechus manatus*) (pages 17-21). Additionally, the USACE makes the determination that all action alternatives *may affect, but not likely to adversely affect* the Shortnose Sturgeon, Wood Stork and West Indian Manatee (pages 51-52). Throughout these discussions, the USACE makes reference to a correspondence (email) from the US Fish and Wildlife Service (USFWS), Georgia Ecological Services (page 74) regarding endangered species coordination; however, this email is not listed in Appendix C (Coordination and Permits). Additionally, there does not appear to be any documentation with the National Marine Fisheries Service (NMFS) or USFWS regarding Section 7 consultation of the Endangered Species Act. **Recommendation:** The EPA recommends the USACE provide documentation that the USFWS (for the Wood Stork and West Indian Manatee) and NMFS (for the Shortnose Sturgeon) have concurred with their *may affect, but not likely to adversely affect* determinations within the Final EA. Additionally, the EPA recommends that all coordination with these agencies be included in Appendix C of the Final EA.

Cultural Resources: The USACE discusses the action alternatives impacts to cultural resources (page 54). The EPA notes that the USACE has determined that *No historic architectural resource would be affected, nor would the constructed closure structures have an adverse visual effect.* However, there is no mention of the State Historic Preservations Officers (SHPO) or Tribal Historic Preservation Officer (THPO) concurrence with this determination. The USACE

states that Section 106 of the National Historic Preservation Act (NHPA) consultation with both the Georgia Historic Preservation Division (GHPD) and the Seminole Nation of Oklahoma (Seminoles) are ongoing and that a draft report will be submitted to GHPD and the Seminoles for final approval (page 64). **Recommendation:** The EPA recommends that the USACE provide a discussion of the findings from this draft report and GHPD and Seminoles Section 106 determination within *Chapter 4: Evaluation of Alternatives and Environmental Impacts - Cultural Resource Section* within the Final EA. Additionally, the EPA recommends that any mitigation measures that might result from the Section 106 consultation be included as a commitment within the Finding of No Significant Impact (FONSI).

Environmental Justice: The USACE states in both *Chapter 2: Existing Conditions and Affected Environment-Environmental Justice* section (page 25) and *Chapter 4: Evaluation of Alternatives and Environmental Impacts-Environmental Justice* section (page 56) that minority or low income populations do not recreate in the project area (page 25); however, there is no data or information that substantiates this claim. **Recommendation:** The EPA recommends the USACE provide data or supporting information that supports their claim that minority and/or low income populations do not recreate in the project area in the Final EA.

Alternative Analysis: The USACE states that they eliminated an alternative because hydraulics and hydrology modeling showed that it did not improve conditions and it *may cause problems* (page 29). **Recommendation:** The EPA recommends the USACE elaborate on what problems this alternative might cause and why it was eliminated from further consideration in the Final EA.

Monitoring and Adaptive Management: The EPA appreciates the USACE developing a monitoring and adaptive management plan (MAMP) for this project (page 66-70). The EPA thinks that using the adaptive management approach to project delivery especially for ecosystem restoration projects will ensure its success. However, the EPA notes that there is no mention of the commitments made in the MAMP within the FONSI. **Recommendation:** The EPA recommends the USACE include commitments outlined in the MAMP (including monetary commitments) within the FONSI.

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION

MARK WILLIAMS
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

January 3, 2018

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

RE: Ecosystem Restoration Study, Satilla River, Noyes Cut, St Andrews Sound
Camden County, Georgia
HP-170501-021

Dear Mr. Bailey:

The Historic Preservation Division (HPD) has reviewed the draft report entitled, *A Phase I Remote-Sensing Archaeological Survey in Noyes Cut and Dynamite Cut and a Low Water Visual Survey of Noyes Cut, Dynamite Cut and Old River Run, Satilla River Estuary, Camden County, Georgia*, prepared by LG2 Environmental Solutions, Inc. and dated November 2017. Our comments are offered to assist the US Army Corps of Engineers (USACE) in complying with the provisions of Section 106 of the National Historic Preservation Act (NHPA).

Based on the information contained in the report, HPD concurs that no historic properties that are listed or eligible for listing in the National Register of Historic Places will be affected by this undertaking, as defined in 36 CFR Part 800.4(d)(1).

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

Please refer to project number **HP-170501-021** in any future correspondence regarding this project. If we may be of further assistance, please do not hesitate to contact Emma Mason, Compliance Archaeologist, at emma.mason@dnr.ga.gov or (770) 389-7877 or me at jennifer.dixon@dnr.ga.gov or (770) 389-7851.

Sincerely,

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

JEWETT CENTER FOR HISTORIC PRESERVATION
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Coastal Office
428 Bull Street, Suite 210
Savannah, GA 31401
tel 912.447.5910
fax 912.447.0704
cmcmillan@gaconservancy.org
georgiaconservancy.org

January 8, 2018

U.S. Army Corps of Engineers (COE), Savannah District
Attn; Mr. David Walker (PM-P)
100 West Oglethorpe Ave.
Savannah, Georgia 31401

Via Email

RE: Comment on Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut, Section 1135 Ecosystem Restoration Study, Satilla River, Camden County, Georgia

Dear Mr. Walker:

On behalf of the Georgia Conservancy, I would like to express strong support for the Noyes Cut Ecosystem Restoration Project (Noyes Cut Project), which will not only aid in improving thousands of acres of the Satilla River estuary, but also serve as an example of marsh ecosystem restoration for other impacted locations throughout the south Atlantic Bight.

The Georgia Conservancy is a statewide conservation organization that works to develop solutions to protect Georgia's environment through advocacy and collaboration on conservation issues. Founded in 1967, we are one of Georgia's oldest conservation-based nonprofit organizations and have a long history of advocating for coastal protection. We have had a coastal office since 1972.

The web of life is most critical and most fragile at the edge, where land and water meet, and where freshwater and saltwater merge. Through our Coastal Policy, the Georgia Conservancy envisions *a healthy resilient and diverse coastal ecosystem that can endure natural and human disturbances, continue to perform its functions, and support self-sustaining populations of native fish, birds, wildlife and plants.* Noyes Cut and other manmade modifications in this area of the Satilla River estuary have reduced the ecological function and resilience. This project is an important priority because it will restore natural flow patterns, rendering many benefits.

The Noyes Cut Project seeks to repair the significant impacts caused channelization of the marsh, which have been ongoing since 1930's. As envisioned in this COE action, the project will restore more natural depths and circulation patterns to Umbrella and Dover Creeks and improve aquatic habitat for resident species (e.g. blue crabs, shrimp). The project also provides better connectivity and improved salinity gradients for migratory species (e.g. striped bass, American eels, and shad, river herring, etc.) in the upper reaches of the estuary.

We salute the actions and leadership provided by the Satilla Riverkeeper and Coastal Resource Division that have brought this project to this point of development. The State of Georgia has unique stewardship role with respect to coastal marshlands, waterbottoms and estuarine systems that is critical to preserving the integrity of the saltmarsh ecosystem and the public's safe access and enjoyment of our common coastal treasures.

Thank you for your consideration, and please let me know if I may be of assistance on this matter.

Sincerely,

Charles H. McMillan, III, P.E.
Coastal Director

Ginny Kittles
341 Deerwood Creek Estates
Waverly, GA 31565

January 26, 2018

VIA EMAIL (CESAS-PD@usace.army.mil)

U.S. Army Corps of Engineers
Savannah District
Attn: Mr. David Walker (PM-P)
100 West Oglethorpe Avenue
Savannah, GA 31401-3640

RE: Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study

Dear Mr. Walker:

I am writing to provide Public Comments to the proposed action set forth in the above Study. This communication is timely given, following the public hearing held at the Dover Bluff community on Friday, January 19, 2018.

First, I want to thank you, your staff and the many individuals who have dedicated countless hours to the Study. I also appreciate the presentations and feedback given by Taylor, Nathan and Tracy at last week's hearing.

Second, as a stakeholder and recreational consumer of the estuary, I have questions and concerns regarding access, channel depth, tide levels, and property values to name a few, and I welcome this opportunity to make them known. I live upland along the East Tributary. I frequently kayak and enjoy other boating activities in the area. I cannot access my dock on all tides. Interestingly, after reviewing the Study, I noticed there is at least one other node near my property that was not identified, and which may be instrumental in determining outcomes.

MODEL DATA

From the meeting I learned that the model can generate output data for specific areas. Accordingly, please provide this information for the following Google Earth coordinates at or near my property:

31° 1' 13.46" N 81° 32' 51.04" W	Beginning of my dock
31° 1' 12.34" N 81° 32' 49.45" W	End of my dock

31° 1' 1.14" N
81° 32' 57.84" W

31° 00' 43.93" N
81° 32' 54.75" W

31° 1' 14.97" N
81° 32' 46.88" W

31° 1' 17.15" N
81° 32' 44.67" W

31° 1' 12.34" N
81° 32' 49.45" W

31° 1' 19.27" N
81° 32' 38.93" W

31° 0' 39.18" N
82° 32' 48.04" W

QUESTIONS/COMMENTS/CONCERNS - DRAFT DOCUMENT

1. P. 6, 1.4
   Does better access include what the Study refers to as the "East Tributary"?

2. P. 24, 2.3.10.3 Recreation
   Does this reference to limited access include the area where I live? If not, please include it.

3. P. 28, 3.2
   Do the calculations upon which predictions are made take into account factors such as the 2 hurricanes and the tornadic activity in this estuary during times other than the collection months?

4. P. 28, 3.3
   What portions of the estuary have excess shoaling?
   There is shoaling in my creek.

5. P. 32
   Is this the latest proposed placement for the Dynamite Cut closure?
   It appears the most favorable position, should this cut be approved.
   Note: I frequently kayak a loop which approaches this intersection.

6. Appendix A, P. 3
   Utilizing the above dock coordinates, is my property in the ENV5 region in Figure 2?
   If so, it looks like my channel is depositional and will have decreased flux per Table 1.
   Won't this affect my channel depth and access to the docks along my channel?
   What is the longitude and latitude of the ENV5 pin in Figure 2?

7. Engineering Appendix, 3.5
   Assuming I'm in ENV5, are there any alternatives that don't adversely affect flux in my area?

8. Do you project any bluff erosion at the upland interface from storm surge under any alternative?

9. How will each alternative affect high and low tides?

10. Under each alternative, what will happen to the tidal collision node that is causing my channel to fill?
    Will the node area fill faster than it is now?
    Will the channel deepen instead?
    Since I cannot leave my dock until water is higher than around mid-tide or so, my kayaking time is already very limited. Will my kayaking time decrease?

11. Can you take any steps to prevent losing my access faster than it is going now?

12. Can you take any steps to *increase* my access - which was formerly significant (see Engineering Appendix, Figure 35), in line with a project goal to restore historic, pre-cut equilibrium?

13. What can you do to decrease the uncertainty in your ability to estimate what will happen near my dock?

14. Will you monitor channel depth at my dock after the project construction?

Please feel free to call me to discuss this further. My work number is 912.261.2263.

Very truly yours,

Ginny Kittles

January 25, 2018

To: Taylor Wimberly – Senior Project Manager
Taylor.L.Wimberly@usace.army.mil
Re: proposal to restore habitat in Dover River and Umbrella Creek

Dear Mr. Wimberly,

Your hearing at Dover Bluff Club on Friday, January 19, 2018 was both informative and encouraging. Five generations of my family have enjoyed the beauty of the Dover Bluff Club which was established as a preserve almost one hundred years ago and Alternative #7 appears to be what is needed to restore the Dover River and Umbrella Creek to their former states. The prospect of restoring over forty-five hundred acres of habitat is a worthy goal. My family appreciates all of your diligent work to get us to this point and we thank you.

Martha Thwaite Weeks
Granddaughter of co-founder Robert Bernard Zachry
843-441-1304
mztweeks@gmail.com

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

December 21, 2017 F/SER47:CC/pw

(Sent via Electronic Mail)

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

Attention: David Walker

Dear Colonel Griffin:

NOAA's National Marine Fisheries Service (NMFS) reviewed the *Noyes Cut Section 1135 Ecosystem Restoration Study Satilla River Basin, Georgia - Draft Integrated Feasibility Study and Environmental Assessment* and associated Joint Public Notice issued on December 8, 2017. The Section 1135 Ecosystem Restoration project is designed to restore hydrology within the estuary of Dover and Umbrella Creeks. The NMFS has reviewed both documents and has no objection to the proposed action (Alternative 7). We accept the conclusion that the proposed action (alternative 7) has the least adverse impacts and the most beneficial impacts among the alternatives.

The NMFS appreciates the opportunity to provide these comments. Please direct related correspondence to the attention of Cindy Cooksey at our Charleston Area Office. She may be reached at (843) 460-9922 or by e-mail at Cynthia.Cooksey@noaa.gov.

Sincerely,

/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: COE, David.A.Walker@usace.army.mil
GADNR CRD, Karl.Burgess@gadnr.org
GADNR EPD, bradley.smith@dnr.ga.gov
EPA, Somerville.Eric@epa.gov
FWS, Karen_Mcgee@fws.gov
SAFMC, Roger.Pugliese@safmc.net
F/SER4, David.Dale@noaa.gov
F/SER47, Cynthia.Cooksey@noaa.gov

Satilla RIVERKEEPER®

January 26, 2018

US Army Corps of Engineers, Savannah District
ATTN: Mr. David Walker (PM-P)
100 West Olgethorpe Avenue
Savannah, GA 31401-3640
VIA Email: CESAS-PD@usace.army.mil

RE: Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study

Dear Mr. David Walker:

Satilla Riverkeeper is submitting this comment letter in strong support of the proposed project described in the Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study. Satilla RiverWatch Alliance, Inc DBA Satilla Riverkeeper is a 501c3 nonprofit organization. Our mission is to protect, restore, and educate about the ecological values and unique beauty of the Satilla River.

We have been invested in finding a solution to the compromised hydrology in the Satilla River estuary in the vicinity of Noyes Cut for years, and we support the Tentatively Selected Plan (TSP) in the draft report to close Noyes Cut, Dynamite Cut, and Old River Run (Alternative 7). Based on the model results in the draft report, we expect this solution to restore a more natural hydrologic flow pattern, as well as a more natural salinity gradient. Restoring the salinity gradient will provide marine species the cues needed to navigate to and from spawning habitat, and is very important to the overall goal of restoring fish habitat in the Satilla River estuary.

We expect improved habitat for local and migratory species including shrimp, blue crabs, striped bass, American shad, river herrings, seatrout, and red drum as a result of the TSP. We also expect the additional benefit of improved small boat navigation in areas of Umbrella Creek that have experienced increasing sedimentation and restricted access.

We sincerely appreciate the time the project team has spent to engage with stakeholders at an informal community informational meeting. We also appreciate their patience and professionalism in addressing concerns and questions from stakeholders. Thank you for the opportunity to comment on this draft report and collaborate with the USACE, Savannah District to restore this estuarine ecosystem.

Sincerely,

Laura Early

Laura Early
Riverkeeper and Executive Director

Satilla RIVERKEEPER®

January 8, 2018

US Army Corps of Engineers, Savannah District
ATTN: Mr. David Walker (PM-P)
100 West Olgethorpe Avenue
Savannah, GA 31401-3640
VIA Email: CESAS-PD@usace.army.mil

RE: Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study.

Dear Mr. David Walker:

Satilla Riverkeeper is submitting this comment letter in general support of the proposed project described in the Draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study.

We have been invested in finding a solution to the compromised hydrology in the Satilla River estuary in the vicinity of Noyes Cut for years, and we are pleased with the Tentatively Selected Plan in the draft report to close Noyes Cut, Dynamite Cut, and Old River Run. Based on the model results presented in the draft report, we expect this solution to restore a more natural hydrologic flow pattern, as well as a more natural salinity gradient. Restoring the salinity gradient will provide marine species the cues needed to navigate to and from spawning habitat, and is very important to the overall goal of restoring fish habitat in the Satilla River estuary.

We expect improved habitat for local and migratory species including shrimp, blue crabs, striped bass, American shad, river herrings, seatrout, and red drum as a result of the Tentatively Selected Plan. We also expect the additional benefit of improved small boat navigation in areas of Dover Creek and Umbrella Creek that have experienced increasing sedimentation and restricted access.

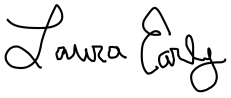
Over the years, there has been great community support for this restoration project. We would like to request that USACE reschedule the community engagement meeting, originally scheduled for Jan. 3, 2018, and to extend the public comment period to at least five days following the rescheduled meeting to allow community members enough time to submit comments after the meeting, if desired.

We also request that a more detailed explanation be included in the report of why a diversion works (or some similar plan to divert water, rather than cut off flow completely) at Dynamite Cut was not a preferred alternative for achieving restoration goals.

* PO Box 697, Woodbine, GA 31569 * Office: 305 Bedell Avenue , Woodbine, GA 31569 *
* 912-510-9500 * Toll Free: 866-476-8452 * www.satillariverkeeper.org *

We appreciate the opportunity to comment on this draft report, and the opportunity to collaborate with the U.S. Army Corps of Engineers, Savannah District to restore this estuarine ecosystem.

Sincerely,



Laura Early
Riverkeeper and Executive Director

* PO Box 697, Woodbine, GA 31569 * Office: 305 Bedell Avenue , Woodbine, GA 31569 *
* 912-510-9500 * Toll Free: 866-476-8452 * www.satillariverkeeper.org *

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SAVANNAH DISTRICT
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3604

DEC 07 2017

Planning Branch

U. S. Fish and Wildlife Service
105 Westpark Drive, Suite D
Athens, GA 30606 ; 706-613-9493

FWS Log No.
2016-0485

Based on information provided, we concur with your determination that the project is not likely to adversely affect federally-listed species. No further action is required under Section 7(a)(2) of the Endangered Species Act. However, consultation should be resumed if the project changes, a new species is listed, or new data shows impacts to listed species may occur.

Gail Martinez for
Donald W. Imm, Ph.D., Field Supervisor

12/20/2017
Date

Mr. Don Imm
Field Supervisor
U.S. Fish and Wildlife Service
Georgia Ecological Services Field Office
105 West Park Drive, Suite D
Athens, Georgia 30606

Dear Mr. Imm:

The Savannah District, U.S. Army Corps of Engineers (USACE), has prepared a Draft Integrated Feasibility Report/Environmental Assessment to evaluate the impacts of the Noyes Cut Section 1135 Study. Section 1135 of the Water Resources Development Act (WRDA) (P.L. 99-662) of 1986, as amended, is intended for modifications to existing Federal projects for environmental benefits. The modifications proposed in this study would be to the federally authorized Atlantic Intracoastal Waterway (AIWW) project.

The proposed action is designed to restore the hydrology within the estuary of Dover and Umbrella Creeks. We do not expect any long term adverse impacts from this project and anticipate many benefits to the ecosystem. The non-Federal sponsors for this study are the Georgia Department of Natural Resources and the Satilla Riverkeeper.

The draft report that documents our evaluations and conclusions on the proposed action is available and can be found at http://www.sas.usace.army.mil/About/Divisions-and-Offices/Planning-Division/Plans-and-Reports/. I've enclosed a Public Notice announcing the availability of the draft report and will transmit a copy to all the parties on the USACE Regulatory mailing list in Georgia for the project area.

Pursuant to Section 7 of the Endangered Species Act and NEPA, I request you provide any comments you may have within 30 calendar days of receipt of this letter to

January 25, 2018

To: U.S. Army Corps of Engineers, Savannah District
Attn: Mr. David Walker (PM-P)
100 West Oglethorpe Avenue
Savannah, Ga. 31401-3640

From: Clifford K. Murray
133 Highland Park Drive
Brunswick, Ga. 31523

Subject: Noyes Cut Closure Public Comments

Dear Mr. Walker:

Thank you and your associates for the time, travel, preparation, and presentation given at Dover Bluff Club last Friday night. It was a job well done. I have attached my questions/comments below. If you have any questions I can be reached @ 912-269-2941 or ken@maxiload.com

Sincerely,

Clifford K. Murray (Ken)
912-269-2941

Public Comments

Re:

Noyes Cut Feasibility Study Community Engagement Meeting

I attended the Community Engagement Meeting presented by the Savannah District of the US Army corps of Engineers (USACE) on January 19th at the Dover Bluff Clubhouse. I have 4 areas of concern and would like to see any modeling results and/or hydrology data that show my concerns are not valid.

1. My first concern is that once Noyes Cut is closed there will be less water into the Western Tributary, slower flow velocities on the incoming tides, slower velocity on the outgoing tides, and therefore more sedimentation in this area. These tributaries provide water access to several home sites in the River Marsh Landings Subdivision. Docks have been built and the water access greatly impacts the financial value of these home sites. The upper reaches of the Western Tributary can currently be used by small boats at all times except for a two hour period of each tide cycle. 1 hour either side of low tide. Any additional sedimentation will greatly impact the quality of life for the families that built their homes along these tributaries for the sole purpose of access to the local rivers and ocean. My concern is based on the idea that it is the tidal cycle that fills and drains this marsh basin. As the sea level rises on the incoming tide, the hydraulic head at all inlets to our marsh basin increases and forces flow into the basin. The larger our "inlet pipes" are the more water we will take in. Close one of our "pipes" (Noyes Cut) and we take in less water. The Volumetric capacity of the Western Tributaries does not change when you close Noyes Cut. It remains the same. Put less water into it and the velocity slows down. More sedimentation occurs. The tributaries become shallow and with time there is no small boat access at all. Please prove to me that I am wrong.

2. My second concern is drainage during tropical storms, hurricanes, Full Moons, and climate conditions that produce rain and strong North East Winds for several days. All of these events push the waters of the Atlantic Oceans against our local shore line. The hook in Atlantic Coast between Jacksonville and Savannah acts as a trap to collect the Ocean waters. Our high tides are higher than normal, completely flooding our marsh basin, the winds hold the Ocean against our sea shore and our low tides do not drop to their normal levels. The end result of these conditions is that our tidal cycle is altered. More water comes in but less water gets out.

Compound this situation with several days of hard rain (6 to 12 inches), the runoff from thousands of acres of timber land that drains into the Western Tributaries and we begin to flood. Sea water enters our yards and threatens to enter our houses. Close one of our "drain pipes" (Noyes Cut) and the flooding is greater. Please prove to me that we will not have water entering our homes.

3. My third concern is the viability of building a closure for Noyes Cut. Your handout for the meeting describes Noyes Cut to be 500 feet wide and the closure to be 432 feet long. Is this a "typo error"? Does the closure not completely close the cut, or do I simply misunderstand your plan? Either way, if you build a dyke across Noyes Cut that is 72 feet wide and 11 feet high, then when the water level rises above the marsh floor as described in my second area of concern, water will flow around the ends of the closure on the outgoing tide. What will prevent a wash out at each end of the closure and the re-establishment of a new Noyes Cut?

4. My fourth concern is funding. Who is going to clean all of this mess up if it does not work as planned? If any one of my first 3 concerns proves to be true we have a problem. If more than one proves to be true, we have a disaster. Construction on this project should never be started unless an equal amount of money is approved and set aside for closure removals. These funds should be allocated to the USACE and held in reserve for 5 years to remove the closures or correct the unintended consequences.

Clifford K. Murray
133 Highland Park Drive
Brunswick, Ga. 31523
ken@maxiload.com
912-269-2941

I am a property owner within the River Marsh Subdivision and I have eight family members living on the Western Tributary.

1-22-18
USACE

Dear Mr. Walker:

I enjoyed the meeting last Friday night and it was very informative and I approve the USACE plan to close Noyes cut and maybe other outlets. It appears this action will help the fish and wildlife and the water flow. Umbrella and Dover creeks are drying up.

Thanks for your help and I hope this project will continue at a fast pace.

Yours Truly,
Elaine Tatum
Elaine Tatum
24 Forest Ave.

P.S. I own property in the Dover Bluff area.

From: Montague,Clay L
To: Walker, David A CIV USARMY CESAS (US)
Subject: [Non-DoD Source] RE: Noyes Cut Report
Date: Thursday, February 15, 2018 12:07:19 PM

Dear David,

Thanks so much for contacting me about this. I removed the comment on Page 3, but failed to notice the reference to that comment in my list on Page 6. So here is my comment about Table 1 in Appendix A:

As you probably can tell from other comments, several local people think that when Noyes Cut is closed, a lot more Dover Creek water would flow eastward through Dynamite Cut on ebb tide. Apparently, however, the model shows continued westward ebb flow through Dynamite Cut. I believe eliminating the tidal node caused by this "reverse" flood and ebb flow is why Dynamite Cut has now been proposed for closure. Some evidence pertinent to this decision may be apparent in Table 1, however further explanation of the table seems needed, in particular the formula used for the flux calculations and whether the results presented in Table 1 of Appendix A are affected by flow direction. Notice Alternative 1, at map point Env 6. With only Noyes Cut closed, the table indicates the largest reduction in flood tide flux (-129%) anywhere in the table, and likewise the largest reduction in ebb flux anywhere in the table (-19%). However, a point of confusion arises because of the known "reverse" flow direction at Env 6 (which accounts for the tidal node near there), which some think would turn around with Noyes Cut closed. So is the flux calculation sensitive to flow direction? I hope the formula for flux calculation can be given. Personally, I hope the flux formula is based on absolute values of flow and not values signed by direction. This could make sign reversals look like reductions in flux, and I hope that is not the case here. However, if that did happen, then a double check of the reasons for closing Dynamite Cut seems warranted. Everyone needs to be certain that if only Noyes Cut alone is closed, ebb water at Env 6 will still flow westward through Dynamite Cut into Dover Creek (albeit perhaps with the 19% reduction in flux shown in the table).

Thanks for the opportunity to address this issue. Please let me know if I can be of any further help. I know the job of sorting through the comments must be very tedious!

Yours truly,

Clay

Clay L. Montague, PhD

Associate Professor Emeritus

Howard T. Odum Center for Wetlands

Department of Environmental Engineering Sciences

University of Florida

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
COASTAL RESOURCES DIVISION
ONE CONSERVATION WAY · BRUNSWICK, GA 31520 · 912.264.7218
COASTALGADNR.ORG

MARK WILLIAMS
COMMISSIONER

DOUG HAYMANS
DIRECTOR

February 26, 2018

USACE Savannah District
Attn: Mr. David Walker (PM-P)
100 West Oglethorpe Avenue
Savannah, Georgia 31401-3640

RE: Federal Consistency Determination Concurrence: Notice of Availability of Draft Integrated Feasibility Report and Environmental Assessment of the Noyes Cut Section 1135 Ecosystem Restoration Study, Lower Satilla River Estuary, Camden County, Georgia

Dear Mr. Walker:

Staff of the Georgia Coastal Management Program has reviewed your December 7, 2017 letter and above referenced December 8, 2017 joint public Notice of Availability of the Draft Integrated Feasibility Report and Environmental Assessment of the Noyes Cut Section 1135 Ecosystem Restoration Study to evaluate the potential impacts of closing man-made cuts to restore hydrology in the Dover and Umbrella Creeks section of the Lower Satilla River Estuary. The area that could benefit from such closure(s) consists of approximately 4,518 acres and includes tributaries and associated *Spartina* marsh in the vicinity of Noyes Cut. Your request for comments, originally January 6, 2018, was extended until February 26, 2018 vial e-mail due to inclement weather that caused postponement of the Corps' public meeting held in the Dover Bluff area.

The purpose of the project is to restore aquatic habitat (wetlands and tidal creeks) degraded by the Atlantic Intracoastal Waterway (AIWW) in the vicinity of Umbrella and Dover Creeks and improve salinity gradients that provide directional cues for migratory fish, shrimp and crabs. These man-made cuts caused changes in circulation patterns, creating sedimentation that has restricted access to portions of the estuary for shrimp, shellfish, migratory fish, recreational anglers, and commercial crabbers. Modeling has shown that reducing tidal flows through Noyes Cut and Dynamite Cut should restore water depths in Umbrella and Dover Creeks as well as restore the salinity gradient to the upper reaches of these creeks and adjacent tributaries.

The primary objectives of the project are to improve the quality of existing aquatic habitat for resident estuarine species and increase connectivity for migratory species in the upper reaches of the Dover and Umbrella Creeks watershed. White and brown shrimp, river herring, American shad, blue crab, eastern oyster, striped bass and many other estuarine species historically found in the area should benefit from restoring historic tidal flows, water depths, and salinity

gradients. Ancillary benefits may also include the return of sport fishing and commercial fishing/crabbing in Dover and Umbrella Creeks and the restoration of deep water access from residential developments adjacent to the estuary that currently have access only at high tide.

The Alternative formulation process started with 10 alternatives. Preliminary hydraulic and hydrologic (H&H) modeling and other factors reduced the array of alternatives down to 7, which were further analyzed in the H&H model. Modeling results produced 3 alternatives that would further project objectives without causing problems in the estuary:

- Alternative 1: Close Noyes Cut with a 432' long x 72' wide x 11' high rock closure having 40' sheetpile marsh ties at each end. This alternative would impact approximately 0.76 acres of open water and saltmarsh, but the remainder of the cut would be expected to shoal in and vegetate, more than offsetting these impacts. This Alternative would restore 493 Habitat Units, or areas of increased tidal exchange, at a cost of approximately $3,898,044 ($320/unit). The federal cost-share would be approximately $2,923,533 and the non-federal cost share would be approximately $974,511.
- Alternative 6: Close Dynamite Cut with a 312' long x 66' wide x 10' high rock closure having 40' sheetpile marsh ties at each end and close the Old River Run of Bull Whirl Cut with a 112' long x 54' wide x 8' high rock closure having 40' sheetpile mash ties at each end. This alternative would impact approximately 0.61 acres of open water and saltmarsh, but the remainder of the cuts would be expected to shoal in and vegetate, more than offsetting these impacts. This Alternative would restore 1,330 Habitat Units, or areas of increased tidal exchange, at cost of approximately $4,235,636 ($128/unit). The federal cost-share would be approximately $3,176,727 and the non-federal cost-share would be approximately $1,058,909
- Alternative 7: is a combination of Alternative 1 and Alternative 6 whereby Noyes Cut, Dynamite Cut and the Old River Run of Bull Whirl Cut are closed as described above. This alternative would impact approximately 1.37 acres that would be offset by revegetated cuts. This Alternative would restore 1,780 Habitat Units at an approximate total cost of $7,605,000 ($163/unit). The federal cost-share would be approximately $5,703,750 and the non-federal cost-share would be approximately $1,901,250.

Alternative 1, closing Noyes Cut, achieves the objective of restoring salinity gradients to Dover and Umbrella Creeks, but will reduce flows and further reduce connectivity in the upper reaches of both creeks. Alternative 6, closing Dynamite Cut and the Old River Run of Bull Whirl Cut will halt shoaling and promote scour of the accumulated sediments in Umbrella and Dover Creeks to improve connectivity, but will not improve the salinity gradient in Dover Creek. Alternative 7, closing all 3 cuts, is the only alternative that is predicted to achieve both improved salinity gradient and increased connectivity. While it is not the most economically feasible project, costing $163/habitat unit as opposed to the least cost Alternative 6 at $128/habitat unit, it is the only Alternative that achieves all of the project objectives. This

alternative also produces the highest number of habitat units and the most improvement to the estuarine system as a whole.

The Corps has proposed Alternative 7 as the Tentatively Selected Plan. The Division supports selection of Alternative 7 and concurs that this Alternative is consistent with the enforceable policies of the Georgia Coastal Management Plan. Please feel free to contact me or Kelie Moore if we can be of further assistance.

Sincerely,

Doug Haymans,
Director

DH/km

cc: Wimberly Taylor, USACE
Laura Early, Satilla Riverkeeper

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

EPD Director's Office
2 Martin Luther King, Jr. Drive
Suite 1456, East Tower
Atlanta, Georgia 30334
404-656-4713

FEB 27 2018

USACE Savannah District
Attn: Mr. David Walker (PM-P)
100 West Oglethorpe Avenue
Savannah, Georgia 31401-3640

Re: Water Quality Certification
Planning Division-Noyes Cut
Noyes Cut Ecosystem Restoration Project
Lower Satilla River Watershed
Camden County

Dear Mr. Walker:

Pursuant to Section 401 of the Federal Clean Water Act, the State of Georgia issues this certification to the U.S. Army Corps of Engineers, an applicant for a federal permit or license to conduct an activity in, on or adjacent to the waters of the State of Georgia.

The State of Georgia certifies that there is no applicable provision of Section 301; no limitation under Section 302; no standard under Section 306; and no standard under Section 307, for the applicant's activity. The State of Georgia certifies that the applicant's activity will comply with all applicable provisions of Section 303.

1. All work performed during construction will be done in a manner so as not to violate applicable water quality standards.

2. The applicant must notify Georgia EPD of any modifications to the proposed activity.

This certification does not relieve the applicant of any obligation or responsibility for complying with the provisions of any other laws or regulations of other federal, state or local authorities.

It is your responsibility to submit this certification to the appropriate federal agency.

Sincerely,

Richard E. Dunn
Director

cc: Mr. David Walker, Corps
Mr. Taylor Wimberly, Corps
Mr. Eric Somerville, EPA
Mr. Pace Wilber, NMFS
Ms. Kelie Moore, CRD
Mr. Don Imm, FWS
Ms. Janice Wilcox, FWS

APPENDIX D

FISH AND WILDLIFE COORDINATION ACT REPORT

United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606

West Georgia Sub Office
Post Office Box 52560
Fort Benning, Georgia 31995

Coastal Sub Office
4980 Wildlife Drive, NE
Townsend, Georgia 31331

March 19, 2018

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

Dear Colonel Griffin:

The Fish and Wildlife Service (Service) has completed an evaluation of the proposed Noyes Cut Section 1135 Satilla River estuary restoration project, Camden County, Georgia. This letter report contains the Service's analysis of, and position on, the proposed project; it also constitutes the report of the Secretary of the Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

INTRODUCTION

Section 1135 of the Water Resources Development Act of 1986 authorizes the modification of completed Corps of Engineers (Corps) projects for the purpose of improving environmental quality. The Corps Savannah District has proposed a project under that authority for improving water quality in Noyes Cut by restoring the estuarine conditions critical to maintaining healthy ecosystems in the Satilla River estuary in the vicinity of Noyes Cut.

The proposed project would be located in the Satilla River estuary in the vicinity of Noyes Cut. Noyes Cut was excavated in 1910 by citizens of Camden County to provide small boats a safe inland route from Satilla River to Brunswick and transporting barges loaded with timber to coastal sawmills. The U.S. Army Corps of Engineers (USACE) completed construction of Noyes Cut in 1932 as an Atlantic Intracoastal Waterway auxiliary channel to provide small boats a safe inland route from the Satilla River to Brunswick, Georgia and avoid the open waters of St. Andrews Sound.

With authorized dimensions of 50 feet wide by 5 feet deep, Noyes Cut has since grown in size and is now 300-500 feet wide by 7-10 feet deep. The expanded cut has altered flows in the Satilla River watershed and surrounding tidal creeks, most notably Dover Creek and Umbrella Creek. In Dover Creek, decreased tidal flows have increased shoaling blocking access for migratory fish, crabs and shrimp to the creek's former reaches. Portions of the creek that were

once 100 yards wide have now narrowed to ten (10) yards, and the inland reaches of Dover Creek and adjacent Umbrella Creek go dry at low tide. The siltation has also blocked creek access to commercial fisherman whose livelihood depends on harvesting seafood from these waters. The impacts of Noyes Cut are compounded by land use changes in the larger Satilla River watershed that have resulted in chronic low flows and with naturally low oxygen levels in the river. These conditions have driven migratory fish from the river's main stream, making restoration of the river's tidal creeks all the more important for a healthy fishery in the river's estuary which expands across 10,000 acres of Georgia's coast.

FISH AND WILDLIFE RESOURCES OF STUDY AREA

Intertidal Habitat:

It is estimated that between 60 and 80 % of the commercially important fish and shellfish species in the southeast have some life stage associated with salt marsh habitats (DeVoe and Baughman 1986; Crowder 1999). The extensive salt marshes surrounding the Satilla are generally dominated by salt marsh cord grass, (*Spartina alterniflora)* at lower elevations. Areas that are infrequently flooded are dominated with black needle rush, (*Juncus roemerianus)*. Brackish marshes are dominated by big cordgrass (*S. cynosuroides)* and salt marsh cord grass *(S. alterniflora)* along levees, with monospecific stands of black needle rush (*J. roemerianus)* throughout the mid-marsh. Freshwater marshes typically contain a greater diversity of species, including wild rices, (*Zizania aquatic)* and (*Zizaniopsis miliacae)* (Alber et al. 2003).

Many species of crabs live in the marsh including brown squareback crab (*Sesarma cinereum*), purple squareback crab (*S. reticulatum*) and mud crab (*Eurytium limosum*). Two fiddler crab species are the mud fiddler (*Uca pugnax*), the sand fiddler (*U. pugilator*) and the red-jointed fiddler (*U. minax*). Snails commonly found within the salt marshes include three species: the marsh periwinkle (*Littorina irrorata*), the mud snail (*Ilynassa obsoleta*), and the air-breathing coffeebean snail (*Melampus bidentatus*). More than 100 insect species have been identified in Georgia's salt marshes, with the most dominant species the salt marsh grasshopper (*Orchelimum fidicinium*) and the planthopper (*Prokelisia marginata*).

Reptiles inhabiting the salt marsh include the diamondback terrapin (*Malaclemys terrapin*) and alligators (*Alligator mississippiensis*) occasionally feed in the marsh. Three bird species nest in the marsh—the clapper rail (*Rallus longirostris*); seaside sparrow (*Ammodramus maritimus*); and long-billed marsh wren (*Telmatodytes palustris*). Great blue herons (*Ardea herodias*), common and snowy egrets (*Egretta* spp.), and other wading birds commonly forage in the marsh at low tide. Several mammal species also feed in the salt marsh: raccoons (Procyon lotor), marsh rabbits (*Sylvilagus palustris),* mink (Mustela vison), otter (*Lontra canadensis*), and rice rat (Oryzomys palustris). (Seabrook, 2017).

Marine Habitat:

These species have been commercially harvested from the Satilla River since 1972: catfish, black drum, red drum, flounders, whiting mullet, spotted sea trout, sheepshead, sturgeon, crab, whelk, oysters, american eel, american shad, hickory shad, white and brown shrimp (Alber et. Al. 2003). The Atlantic waterways off the coast of Georgia provide habitat for the North Atlantic Right

Whale *(Eubalaena glacialis)*, West Indian Manatee *(Trichechus manatus)*, Green Sea Turtle *(Chelonia mydas),* Leatherback Sea Turtle *(Dermochelys coriacea),* Loggerhead Sea Turtle *(Caretta caretta),* Hawksbill Sea Turtle *(Eretmochelys imbricate),* Kemp's Ridley Sea Turtle *(Lepidochelys kempii),* Bottlenose Dolphin (Tursiops truncatus), Common Dolphin (Delphinus delphis), along with numerous fish species including the popular sportfish striped bass *(Morone saxatilis).*

Federally listed threatened (T) , endangered (E) and candidate (C) species known to occur in Camden County, Georgia include the North Atlantic Right Whale *(Eubalaena glacialis)* (E), West Indian Manatee *(Trichechus manatus)*, (T), Piping Plover *(Charadrius melodus)* (T), Red Knot *(Calidris canutus rufa)* (T), Red-cockaded Woodpecker *(Picoides borealis)* (E), Wood Stork *(Mycteria Americana)* (T), Eastern Indigo Snake *(Drymarchon corais couperi)* (T), Gopher Tortoise *(Gopherus Polyphemus)* (C) , Green Sea Turtle *(Chelonia mydas)* (T), Leatherback Sea Turtle *(Dermochelys coriacea)* (E), Loggerhead Sea Turtle *(Caretta caretta)* (T), Striped Newt *(Notophthalmus perstriatus)* (C), Atlantic Sturgeon *(Acipenser oxyrinchus oxyrinchus)* (E) and Shortnose Sturgeon *(Acipenser brevirostrum*) (E). The Service does not anticipate that project implementation would adversely impact those species.

DESCRIPTION OF PROPOSED PROJECT

The Corps proposes to alter the hydrodynamic environment by closing a combination of one or more man-made cuts (e.g., Noyes; Old River Run (ORR) (near Bull Whirl Cut); and Dynamite Cut) to alter tidal exchange in Dover and Umbrella Creeks. By closing these man-made cuts, it will restore salinity gradients, reduce local sedimentation issues, and increase connectivity for local biota and it is also anticipated to restore historic conditions of salinity regimes along with increasing connectivity for local fauna.

In its current state, the salinity gradients are changed by a large amount of Satilla River water entering through the pathway of Noyes Cut. This volume of estuarine water overwhelms the freshwater that enters the headwater area, which causes the salinity to be constant throughout Dover Creek. Tidal flows through multiple creeks and cuts also causes a tidal node where sediment deposition clogs channels. A reduction in tidal exchange through man-made cuts is anticipated to restore water depths in Dover and Umbrella Creeks, which have silted in as a result of changes in circulation. The sedimentation restricts access to portions of the rivers by migratory fish, shellfish and shrimp.

PROJECT IMPACTS ON FISH AND WILDLIFE RESOURCES

Salt marshes provide feeding areas for wading birds, including the federally threatened wood stork (*Mycteria americana*), the federally threatened piping plover (*Charadrius melodus*), and the federally threatened red knot (*Calidris canutus rufa*). The project area is within the thirteen mile core foraging area for four nearby wood stork nesting colonies as well as within five miles of three bald eagle (*Haliaeetus leucocephalus*) nests and likely provides some forage habitat. The Service removed the bald eagle as threatened under the ESA in August 2007, and published in May 2007, National Bald Eagle Management Guidelines to assist in understanding protections afforded to and prohibitions related to the bald eagle under the BGEPA.

The natural tidal exchange distribution in unaltered tidal creeks is upstream and the proposed project aims to restore this process which will enhance the overall water quality in the Satilla River estuary. Eventually this distribution should redistribute the sediments, create a sandier, deeper creek bottom, and restore gradual salinity gradients from headwaters to mouth. Salinity gradients serve as important cues for orienting migratory fauna and are also key in maintaining tidal exchange processes (e.g., sediment, nutrients, carbon).

The estuarine species historically found in Dover and Umbrella Creeks include shrimp (white and brown), river herring, American shad, blue crabs, eastern oyster, and striped bass. All of these species may benefit from the restoration of tidal exchange, water depths, and salinity gradients in the area. Shad, herring, and striped bass require freshwater for spawning, while blue crabs, oysters, and shrimp require brackish water for successful reproduction. Potential indirect long-term benefits of restoring depths and flows in the study area may include increased dissolved oxygen (DO) levels, decreased Total Suspended Solids (TSS), and improved nutrient exchange between the Satilla River, St. Andrews Sound, and the Atlantic Ocean. In addition to the intended ecosystem benefits, ancillary benefits would include the return of commercial fishing and crabbing and sport fishing in Dover and Umbrella Creeks for the aforementioned species. Residential deep water access would also be restored to residential developments adjacent to the estuary that currently have access only at high tide.

SERVICE POSITION AND RECOMMENDATIONS

The proposed Noyes Cut Section 1135 Project should be designed to provide the greatest incremental increase in fisheries and related aquatic habitat values.

Based on our evaluation, the Service would not object to implementation of the proposed Noyes Cut project, provided that the following recommendations are incorporated into the project:

1) The inclusion of the "Standard Manatee Conditions and Procedures for Aquatic Construction" as special conditions of any permit that would be issued by USACE.

We appreciate the cooperation of your staff during our involvement in this planning effort. Please have your staff contact Gail Martinez of this office at 912/312-8739 (Extension 7), if they have any questions regarding our recommendations.

Sincerely,

Donald Imm, PhD
Field Supervisor

LITERATURE CITED

Wiegert, R.G., and B.J. Freeman. 1990. Tidal Salt Marshes of the Southeast Atlantic Coast: A Community Profile. Biological Report 85(7.29). US Department of the Interior, Fish and Wildlife Service, Washington, DC, 70 pp

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Seabrook, Charles. "Tidal Marshes." New Georgia Encyclopedia. 21 April 2017. Web. 05 July 2017.

From:	Walker, David A CIV USARMY CESAS (US)
To:	"Martinez, Gail"
Cc:	"Donald_Imm@fws.gov"; Dayan, Nathan S CIV USARMY CESAS (US); BAILEY, William G CIV USARMY CESAS (US); Foss, Matthew D CIV USARMY CESAC (US)
Subject:	Noyes Cut - Fish and Wildlife Coordination Act Report (FWCAR)
Date:	Friday, March 9, 2018 1:43:00 PM
Attachments:	Letter - USFWS.pdf

Gail

Thank you for your support of the (TSP) Tentatively Selected Plan in the Draft Fish and Wildlife Coordination Act Report (FWCAR) and the attached Section 7 concurrence. In regard to the 2 recommendations in the draft FWCAR below:

1) construction does not occur from March 1 to November 30 to avoid impacts to manatees.

2) the inclusion of the "Standard Manatee Conditions and Procedures for Aquatic Construction" as special conditions of any permit that would be issued by USACE.

[Note: there are not any terms or conditions in Section 7 concurrence].

We have included recommendation #2 into the design, and believe that will continue to be sufficient to ensure the safety of any manatees that might be in the area during construction activities within the estuary, as it has on our other projects.

From an engineering design standpoint, constructing the project within a 3-month period (9 month construction restriction) is not feasible. Our present construction schedule extends to a minimum of 5 months, with potential for up to 8 months with contract modifications.

Please provide the Final FWCAR by March 27, 2018.

Thank you
David

David Walker
US Army Corps of Engineers
Savannah District Planning Branch
(912) 652-5793

APPENDIX E

SECTION 404 (B) (1) EVALUATION OF DREDGE AND FILL MATERIAL

SECTION 404 (B) (1) EVALUATION

FOR

NOYES CUT SECTION 1135
ECOSYSTEM RESTORATION STUDY
CAMDEN COUNTY, GEORGIA

OCTOBER 2017

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SECTION 404(B) (1) EVALUATION
OF DREDGE AND FILL MATERIAL

NOYES CUT SECTION 1135
ECOSYSTEM STUDY
CAMDEN COUNTY, GEORGIA

1.0 INTRODUCTION

The following evaluation is prepared in accordance with Section 404(b)(1) of the Clean Water Act of 1977 to evaluate the environmental effects of the proposed placement of dredged or fill material in waters of the United States. Specific portions of the regulations are cited and an explanation of the regulation is given as it pertains to the project. These guidelines can be found in Title 40, Part 230 of the Code of Federal Regulations.

2.0 PROPOSED ACTION AND ENVIRONMENTAL SETTING

2.1 ENVIRONMENTAL SETTING

The study area is located in southern Georgia, just south of the town of Brunswick, Georgia, and includes Noyes Cut, Dover and Umbrella Creeks, as part of the lower Satilla River estuary (Figure 1). Dover and Umbrella Creeks are meandering tidal channels generally running parallel to the Satilla River. The Satilla River (along with salt marshes, hammocks, sand bars, and mud flats) combine to make up the northern portion of the St. Andrews Sound estuary. Tidal marshes and creeks are some of the most ecologically productive ecosystems providing critical habitat for fish and shellfish of commercial and recreational importance. Tidal marshes also provide a rich food source for both resident and migratory birds including osprey and eagles and they are used for many traditional, low impact recreational activities.

The lands adjacent to Dover and Umbrella Creeks are sparsely populated with some residential developments along the creeks that include Dover Bluff Community, Piney Bluff Community, and River Marsh Landing.

More information can be found in the Integrated Feasibility Report and Environmental Assessment entitled “Noyes Cut Section 1135 Ecosystem Restoration Study Satilla River Basin, Georgia” and herein incorporated by reference.

2.2 PROPOSED ACTION

2.2.1 General Description

To achieve the project goals, the Recommended Plan will alter the hydrodynamic environment, which will in turn restore salinity gradients, reduce local sedimentation issues, and increase connectivity for local biota. The Recommended Plan results in closing a combination of man-made cuts [e.g., Noyes, Old River Run (ORR) near Bull Whirl Cut, Dynamite] to alter tidal exchange in Dover and Umbrella Creeks (Figure 1).

Closing cuts is anticipated to restore historic conditions of salinity regimes and increase connectivity for local fauna into the upper reaches of Dover and Umbrella Creeks.

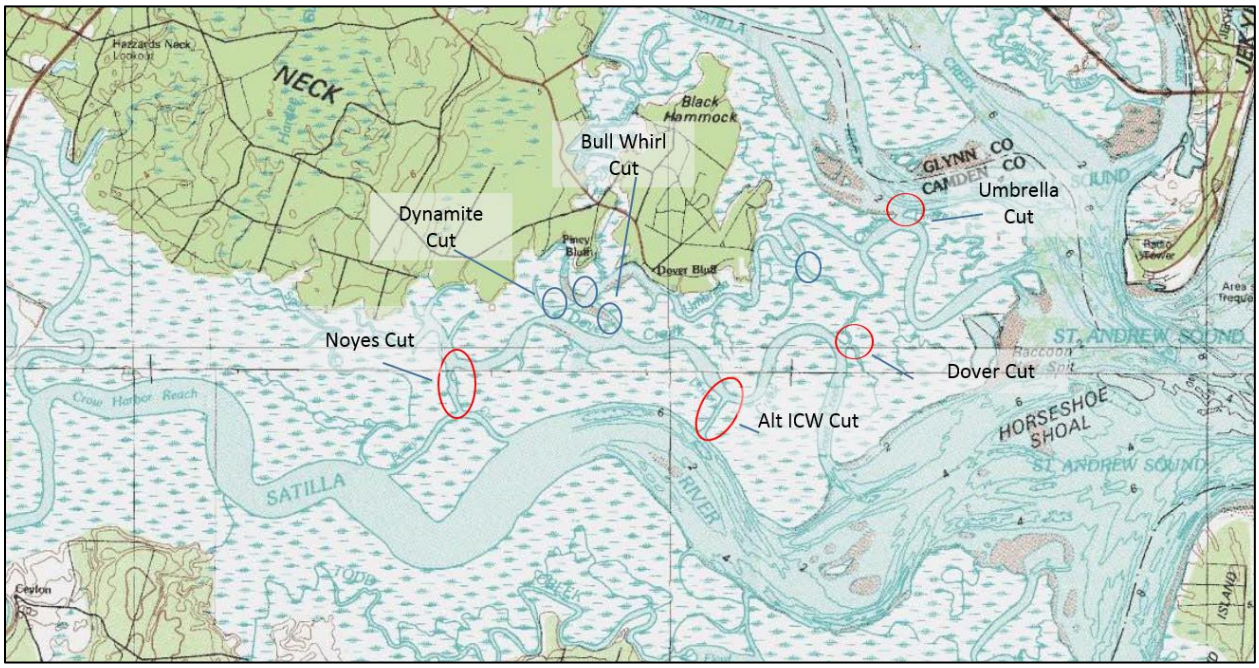

Figure 1 - Satilla River estuary with series of navigation cuts. Congress authorized cuts depicted in red. Blue cuts were created by local citizens.

Action alternatives would increase flow to upstream areas of Dover and Umbrella Creeks and consequently, would be expected to convert brackish water to a more freshwater system in the upper reaches of these creeks. This conversion would restore the hydrologic/salinity regime closer to historical levels. The upper reaches of these creeks contain traditional historic spawning grounds for many species of anadromous fish.

Since the action alternatives involve restoring natural circulation patterns by closing man-made cuts, overall impacts are expected to be beneficial on an individual project and cumulative effects basis.

Description of Actions Subject to Section 404 of Clean Water Act
The Recommended Plan would alter the hydrodynamic environment by closing man-made cuts (Noyes Cut, Dynamite Cut, and ORR) detailed below.

1) Noyes Cut is approximately 3100 feet long and 500 feet wide. The Noyes Cut closure structure would consist of the following:

Sheet Pile End Walls	Materials	6.56 Tons
Sheet Pile End Walls	Installation	604 SF Wall
Bedding Stone		1200 Tons
Rip Rap, GDOT Type 1		4800 Tons

Closure of this cut would result in the filling of 0.64 acres of open water (waters of the U.S.) and 0.12 acres of *Spartina alterniflora* salt marsh (Jurisdictional Wetlands). After installation of the closure, Noyes Cut would be expected to fill in with wetland habitat from natural processes of sedimentation and regeneration of wetland vegetation. This process of natural restoration of tidal salt marsh is expected to offset the loss of the wetlands from the closure structures over the 50-year period of analysis.

2) ORR is approximately feet 3000 feet long and 30 feet wide. The ORR closure structure would consist of the following:

Sheet Pile End Walls	Materials	6.56	Tons
Sheet Pile End Walls	Installation	604	SF Wall
Bedding Stone		320	Tons
Rip Rap (GDOT Type 1)		1100	Tons

Closure of this cut would result in the filling of 0.04 acres of open water (waters of the U.S.) and 0.02 acres of *Spartina alterniflora* salt marsh (Jurisdictional Wetlands). After installation of the closure, ORR would be expected to fill in with wetland habitat from natural processes of sedimentation and regeneration of wetland vegetation. This process of natural restoration of tidal salt marsh is expected to offset the loss of the wetlands from the closure structures over the 50-year period of analysis.

3) Dynamite Cut is approximately 350 feet long and 250 feet wide. The Dynamite Cut closure structure would consist of the following:

Sheet Pile End Walls	Materials	6.56	Tons
Sheet Pile End Walls	Installation	604	SF Wall
Bedding Stone		1030	Tons
Rip Rap, GDOT Type 1		4140	Tons

Closure of this cut would result in the filling of 0.19 acres of open water (waters of the U.S.) and 0.07 acres of *Spartina alterniflora* salt marsh (Jurisdictional Wetlands). After installation of the closure, Dynamite Cut would be expected to fill in with wetland habitat from natural processes of sedimentation and regeneration of wetland vegetation. This process of natural restoration of tidal salt marsh is expected to offset the loss of the wetlands from the closure structures over the 50-year period of analysis.

The natural conversion to tidal salt marsh around the closure structures would displace an equal amount of open water, which is of lower value from a scarcity perspective. This conversion to tidal salt marsh within man-made cuts would restore the area closer to historical conditions. More detail regarding adverse and beneficial impacts to wetlands and jurisdictional waters of the US may be found in the integrated report.

Summary: The closure of the three man-made cuts in the Recommended Plan would result in the loss of a total of 0.87 acres of jurisdictional waters of the U.S.; and the loss of a total of 0.21 acres of jurisdictional wetlands [Spartina salt marsh]. However, these adverse impact

would be expected to be nullified by the restoration of salt marsh habitat within the cuts. The tidal salt marsh restored would displace an equal amount of open water, which is of lower value from a scarcity and ecological perspective. As illustrated by the photographs of New Cut (in Savannah Harbor) in Section 4.4 “Wetland Impacts” of the integrated report, Noyes Cut and ORR may eventually fill in with wetland habitat from natural processes of sedimentation and regeneration of wetland vegetation.

New Cut (in Savannah Harbor) has completely filled due partially to the deposition of fill material and partially due to the natural processes of sedimentation and regeneration of wetland vegetation. All three of the cuts in the Recommended Plan that would be closed are also expected to at least partially fill with wetland habitat from natural processes of sedimentation and regeneration of wetland vegetation.

Threatened, Endangered and other Listed Species
Savannah District has been coordinating the study with the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to obtain their opinions on the potential for impacts to Federally Protected Species. Species protected under the Endangered Species Act are addressed in the integrated report in more detail. This project “May affect but is not likely to adversely affect” any listed species. The Recommended Plan is expected to benefit some of these species.

3.0 SUBPART B - COMPLIANCE WITH THE GUIDELINES

The following objectives should be considered in making a determination of any proposed discharge of dredged or fill material into waters of the U.S.

3.1 RESTRICTIONS ON DISCHARGE - (SECTION 230.10)

"(a) ***except as provided under Section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practical alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."***

No other practicable alternative with less environment impacts on the aquatic ecosystem has been identified. The proposed closures of man-made cuts are designed to restore aquatic habitat and the overall ecosystem. Modeling determined the Recommended Plan would provide more benefits to the ecosystem than all other alternatives.

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

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

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

Fill material requirements for the project's closure of man-made cuts would come from clean sources (e.g. rock and sheet pile).

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

Manatees may move through the study area in the summer months. The potential for adverse impacts to this species would be limited to short term impacts during construction activities associated with the closure structures. The USFWS requires standard construction procedures [if construction activities are performed outside winter months of [December thru March] designed to protect the manatee. These construction procedures for mitigation of potential impacts to manatees will be part of the contractor specifications and must be followed on the project site by the contractors at all times. Construction contractor specifications will include the standard manatee construction limitations provided by the USFWS.

This project "May affect but is not likely to adversely affect" any listed species. The proposed action is expected to benefit some of these species after project implementation. Species protected under the Endangered Species Act are addressed in the integrated report in more detail.

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

No marine sanctuary or other items addressed under this Act would be affected by the proposed work.

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

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

The proposed work is expected to improve water quality and conservation by restoring the hydrologic regime. Therefore, this project is expected to have a beneficial effect on fish, shellfish, wildlife, and special aquatic sites; and may have a beneficial effect on plankton.

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

There would be little potential for the spread of pollutants since the fill material for cut closures consists of rock and sheet pile. During installation of these closure structures, turbidity booms would be used to reduce turbidity and sediment loss during construction of the closures.

Pollutants from existing sediments being disturbed during construction activities are not expected. Historical land use does not warrant sediment testing for contaminants.

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

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

The proposed action would not have potential to produce adverse effects on recreational, aesthetic, or economic values from the discharge of pollutants.

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

As designed (see description under proposed action), the Recommended Plan would have negligible and temporary impacts during construction. The beneficial impacts to the aquatic ecosystem would be substantial and long term. All practical measures will be implemented to minimize the adverse impacts during construction activities.

3.2 FACTUAL DETERMINATION. - (SECTION 230.11)

3.2.1 Physical Substrate Determinations

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

Fill material requirements for the project's closure of man-made cuts would come from clean sources (e.g. rock and sheet pile). After installation of the closure, the cuts would be expected to fill in with wetland habitat from natural processes of sedimentation and

regeneration of wetland vegetation. The natural conversion to tidal salt marsh around the closure structures would displace an equal amount of open water, which is of lower value from a scarcity perspective. This conversion to tidal salt marsh within man-made cuts would restore the area closer to historical conditions.

Possible loss of environmental values

No losses of environmental value are expected and the features in the project design are designed to improve environmental values of the project area.

Actions to minimize impacts

Due to the nature of the proposed action (ecosystem restoration), no other actions to minimize adverse impacts to the physical substrate are deemed appropriate. This project is expected to result in improvements to the ecosystem.

3.2.2 Water Circulation, Fluctuations, and Salinity Determinations

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

The proposed closure of three man-made cuts would substantially alter water circulation patterns. These alterations would restore tidal flows to patterns that existed in the 1930's. As designed, the Recommended Plan is expected to restore aquatic habitat for a wide variety of fauna due to the restoration of the hydrologic regime. This project will increase tidal exchange throughout Dover and Umbrella Creeks. Exchange volume serves as an important surrogate for the restoration of salinity gradients, which influence the wide variety of species occurring in the estuary. Additionally, exchange volumes may be used to assess the predictability of the salinity regime in the estuary and the degree to which it represents the unaltered condition needed for estuarine fauna (i.e., expected upstream-to-downstream, fresh-to-saline patterns).

3.2.2.1 Loss of environmental value

The Recommended Plan is expected to restore the hydrologic/salinity regime to historic levels and no substantial adverse impacts have been identified in this study.

3.2.2.2 Actions to Minimize Impacts

Due to the nature of the proposed action (ecosystem restoration), no other actions to minimize adverse impacts to water circulation, fluctuations, or salinity are deemed appropriate. This project is expected to result in improvements to the ecosystem.

3.2.3 Suspended Particulate/Turbidity Determinations

Effects due to potential changes in the kinds and concentrations of suspended particulate/turbidity in the vicinity of the disposal site. Factors to be considered include grain size, shape and size of any plume generated, duration of the discharge and resulting plume, and whether or not the potential changes will cause violations of applicable water quality standards. Consideration shall include the proposed method, volume, location, and rate of discharge, as well as the individual and combined effects of current patterns, water circulation and fluctuations, wind and wave action, and other physical factors on the movement of suspended particulates.

Due to the use of sheet pile and rock for the closure structures any impacts would be negligible and temporary. In addition, turbidity booms would be used to reduce turbidity and sediment loss during construction of the closures.

3.2.3.1 Loss of Environmental Values

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

Impacts from construction of closures are expected to be minor and temporary and cease soon after construction is completed. After project implementation, potential indirect long-term benefits of restoring depths and flows in the study area may include increased dissolved oxygen (DO) levels, decreased Total Suspended Solids (TSS), and improved nutrient exchange between the Satilla River, St. Andrews Sound, and the Atlantic Ocean.

Indirect beneficial impacts are expected to occur to the aquatic ecosystem and improve habitat for flora and fauna that utilize this habitat.

3.2.3.2 Actions to Minimize Impacts

The Recommended Plan avoids adverse impacts by using barges to construct closures to avoid impacts to surrounding wetlands. Barges and rocks would not be placed within marshes outside of the closure area. Turbidity booms would be used to reduce turbidity and sediment loss during construction of the closures. Closures are designed with sheet pile tying into the marsh (not across the entire structure) on both ends to minimize environmental impacts in the marsh.

In addition, standard BMPs would be implemented to mitigate potential impacts as detailed in Sections 4.6 and 4.11 of the Integrated Report. Due to the nature of the proposed action (ecosystem restoration), no other actions to minimize adverse impacts are deemed appropriate. This project is expected to result in improvements to the ecosystem.

3.2.4 Contamination Determination

Consider the degree to which the proposed discharge will introduce, relocate, or increase contaminants. This determination shall consider the material to be discharged, the aquatic environment at the proposed disposal site, and the availability of contaminants. Consideration of Evaluation and Testing (parts 230.60, and 230.61).

Fill material requirements for the project's closure of man-made cuts would come from sources that are free of any contamination (e.g. rock and sheet pile). Pollutants from existing sediments being disturbed during construction activities are not expected and historical land use does not warrant any sediment testing for contaminants.

3.2.5 Aquatic Ecosystem and Organism Determinations

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

3.2.5.1 Threatened and Endangered Species

Implementation of the Recommended Plan is expected to have no adverse effect on threatened or endangered species and will likely improve habitat for the West Indian manatee and the wood stork.

3.2.5.2 Fish, Crustaceans, Mollusks and other Aquatic Organisms in the Food Web

This project is expected to improve habitat for these animals.

3.2.5.3 Other Wildlife

This project is expected to improve habitat for other wildlife including fish, shellfish, and all the various birds and mammals that feed on fish.

3.2.5.4 Special Aquatic Sites

There are no Special Aquatic Sites in the study area.

3.2.5.5 Potential Effects on Human Use Characteristics

The proposed work is expected to result in positive impacts regarding this issue.

3.2.5.6 Possible Loss of Environmental Values

The proposed work is expected to increase the environmental value of the ecosystem.

3.2.5.7 Actions to Minimize Impacts

The proposed work is expected to result in net positive impacts to the environment.

3.2.6 Proposed Disposal Site Determination

Each disposal site shall be specified through application of the guidelines. The mixing zone shall be confined to the smallest practicable zone within each

specified disposal site that is consistent with the type of dispersion determined to be appropriate by the application of the guidelines.

No sediment disposal sites would be needed for the Recommended Plan and no practicable alternatives are available that produce the same benefits.

3.2.7 Determination of Cumulative Effects on the Aquatic Ecosystem

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

The Satilla River estuary contains a complex network of tidal channels. From 1900 to 1939, eight man-made cuts were made between natural channels to increase the accessibility of the tidal creeks for the timber industry (Figure 1). These cuts changed the circulation patterns in the estuary and (1) altered local patterns of tidal exchange; (2) disrupted gradual salinity gradients from the headwaters to the mouth of the creeks; and (3) reduced access to headwaters for estuarine species due to channel sedimentation.

Currently, salinity gradients are altered by a large volume of Satilla River water entering through the short pathway of Noyes Cut. This large volume of estuarine water overwhelms the freshwater that enters the headwater area and causes the salinity to be nearly constant throughout most of Dover Creek. Additionally, tidal flows through multiple creeks and cuts causes a tidal node where sediment deposition clogs channels.

By closing man-made cuts, the project is expected to improve the aquatic ecosystem by restoring the historic hydrologic regime. These improvements would offset much of the historic adverse impacts to the ecosystem from the eight man-made cuts created since 1900.

3.2.8 Determination of Secondary Effects on the Aquatic Ecosystem

Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material.

Potential indirect long-term benefits of restoring depths and flows in the study area may include increased dissolved oxygen (DO) levels, decreased Total Suspended Solids (TSS), and improved nutrient exchange between the Satilla River, St. Andrews Sound, and the Atlantic Ocean.

Indirect beneficial impacts are expected to occur to the aquatic ecosystem and improve habitat for flora and fauna that use this habitat.

In addition, after cut closures, the entire area within the cuts are expected to fill in with wetland habitat from natural processes of sedimentation and regeneration of wetland vegetation.

4.0 FINDINGS OF COMPLIANCE OR NONCOMPLIANCE WITH RESTRICTIONS ON DISCHARGE – (SECTION 230.12)

4.1 DETERMINATIONS

a. That an ecological evaluation of the discharge of dredged material associated with the proposed action has been made following the evaluation guidance in 40 CFR 230.6, in conjunction with the evaluation considerations at 40 CFR 230.5.

b. That potential short-term and long-term effects of the proposed action on the physical, chemical, and biological components of the aquatic ecosystem have been evaluated and it has been found that the proposed discharge will not result in significant degradation of the environmental values of the aquatic ecosystem. The project as designed would be expected to restore the impaired hydrology and benefit the aquatic ecosystem.

c. That there are no less environmentally damaging practicable alternatives to the proposed work that would accomplish project goals and objectives. Some alternatives were eliminated for not accomplishing all project goals or for not being as cost effective. The No Action alternative is found to be unacceptable.

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

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

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

4.2 FINDINGS

Based on the determinations made in this Section 404 (b) (1) evaluation, the finding is made that, with the conditions enumerated in this document, the proposed action complies with the Section 404(b)(1) Guidelines.

APPENDIX F - REAL ESTATE

NOYES CUT SECTION 1135 ECOSYSTEM RESTORATION STUDY

REAL ESTATE SUMMARY

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SECTION 1. THE REAL ESTATE REPORT

1.1 Statement of Purpose

This report is tentative in nature, focuses on the recommended plan, and is to be used for planning purposes only. There may be modifications to the plans that occur during Pre-construction, Engineering and Design (PED) phase, thus changing the final acquisition area(s) and/or administrative and land cost. The Real Estate Appendix is intended to support the Detailed Project Report and Environmental Assessment for the Noyes Cut Satilla River Basin, Georgia Section 1135 project. The author of this report is familiar with the Project area. The Georgia Department of Natural Resources (DNR) and the Satilla Riverkeeper, are the non-Federal sponsors for the project. Date of this report is July, 2017.

1.2 Study Authority

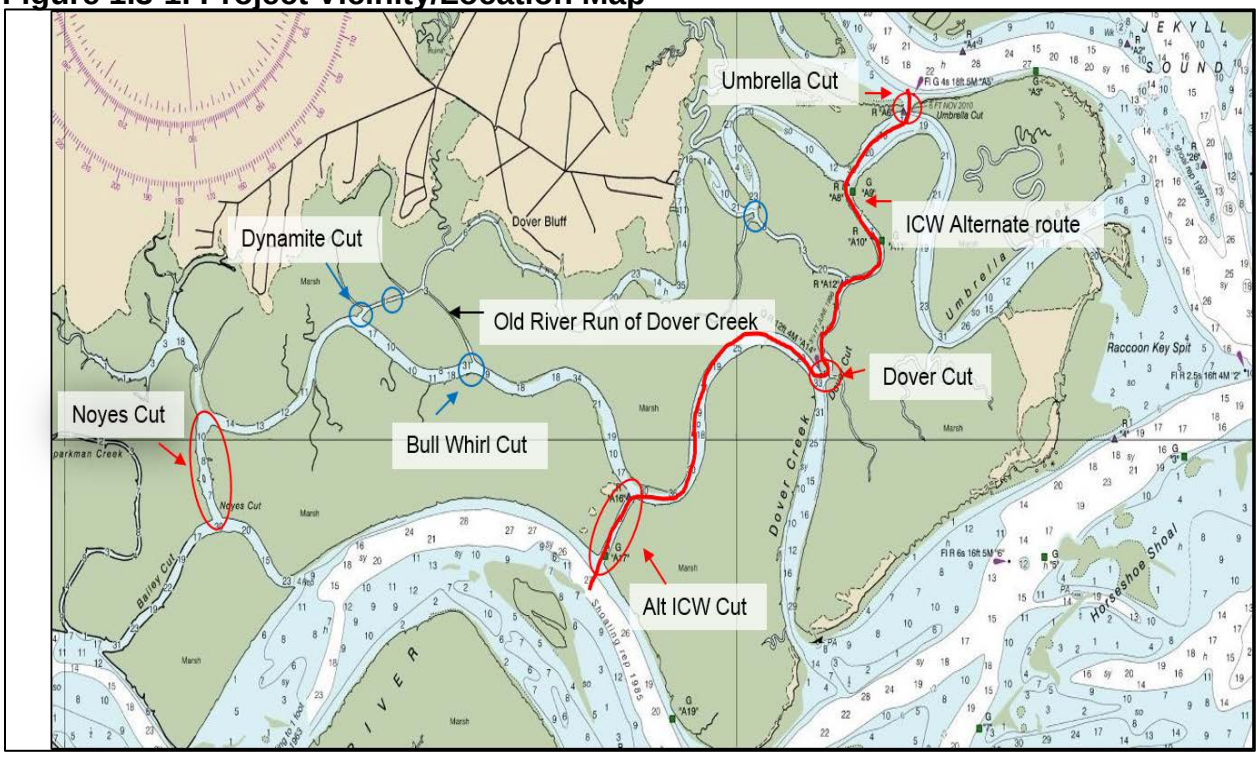
Section 1135 of the Water Resources Development Act (WRDA) (P.L. 99-662) of 1986, as amended provided authority for this study. The modifications proposed in this study would be part of the federally authorized Atlantic Intracoastal Waterway (AIWW) project.

1.3 Project Location

The project area is located in southern Georgia, just south of the city of Brunswick, Georgia, in Camden County and includes Noyes Cut, Dover and Umbrella Creeks, as part of the lower Satilla River estuary (Figure 1.3-1 below). Dover and Umbrella Creeks are meandering tidal channels generally running parallel to the Satilla River. The Satilla River (along with salt marshes, hammocks, sand bars, and mud flats) combine to make up the northern portion of the St. Andrews Sound estuary. Tidal marshes and creeks are some of the most ecologically productive ecosystems providing critical habitat for fish and shellfish of commercial and recreational importance. Tidal marshes also provide a rich food source for both resident and migratory birds including osprey and eagles and they are utilized for many traditional, low impact recreational activities.

The lands adjacent to the study area are sparsely populated with some residential developments along the creeks that include Dover Bluff Community, Piney Bluff Community, and River Marsh Landing. Dover Bluff is a small residential community of 20-30 homes; and Piney Bluff and River Marsh Landing are failed developments consisting of around 15 homes each.

Figure 1.3-1. Project Vicinity/Location Map



1.4 Project Description

The project is the restoration to improve the quality of the existing aquatic habitat for resident species (e.g., blue crabs, shrimp) and increase connectivity for migratory species (e.g., striped bass, American eels, shad, river herring) in the upper reaches of the Dover and Umbrella Creeks. This project will restore the hydrologic connectivity by altering the hydrodynamic environment; and consequently restore the flow circulation in the watershed, restore salinity gradients, reduce local sedimentation issues, and increase connectivity for local species.

This Recommended Plan would close man-made cuts, Noyes Cut, Dynamite Cut, and Old River Run. These closures will restore salinity gradients, reduce local sedimentation issues, and increase connectivity for local biota by increasing tidal exchange in Dover and Umbrella Creeks.

1.5 Real Estate Requirements

There will be minimal Real Estate requirements for this project. Construction will occur in the tidal creeks and wetlands of the State of Georgia and US Government. The nonfederal sponsors will be responsible for obtaining an interagency agreement for the staging and laydown area located at the Georgia Ports Authority Brunswick Terminal.

1.6 Utility/Facility Relocation

There are no utility/facility relocations with this project.

1.7 Existing Projects

With the exception of the existing Intracoastal Waterway Project, there are no other federal projects within the study area.

1.8 Environmental Impacts

Environmental Impacts are addressed in the main report.

1.9 Project Sponsor Responsibilities and Capabilities

The Georgia Department of Natural Resources and Satilla Riverkeeper will be the non-Federal Project Sponsors (NFS). The NFS has the responsibility to acquire all real estate interests required for the Project. The NFS shall accomplish all alterations and relocations of facilities, structures and improvements determined by the government to be necessary for construction of the Project. The sponsor will have operation and maintenance responsibility for the project after construction is completed.

Title to any acquired real estate will be retained by the NFS and will not be conveyed to the United States Government. Prior to advertisement of any construction contract, the NFS shall furnish to the government an Authorization for Entry for Construction (Exhibit "A" to the Real Estate Appendix) to all lands, easements and rights-of-way, as necessary. The NFS will also furnish to the government evidence supporting their legal authority to grant rights-of-way to such lands. The NFS shall comply with applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, approved 2 January 1971, and amended by Title IV of the Surface Transportation Uniform Relocation Assistance Act of 1987, Public Law 100-17, effective 2 April 1989, in acquiring real estate interests for the Project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act(s). An Assessment of the Non-Federal Sponsor's Capability to Acquire Real Estate is at Exhibit "B" to the Real Estate Appendix

The non-Federal sponsor is entitled to receive credit against its share of project costs for the value of lands it provides and the value of the relocations that are required for the project. Generally, for the purpose of determining the amount of credit to be afforded, the value of the LER is the fair market value of the real property interest, plus certain incidental costs of acquiring those interests, that the non-federal sponsor provided for the project as required by the Government.

The NFS should not acquire lands required for the project prior to execution of the Project Partnership Agreement (PPA). Should the NFS proceed with acquisition of lands prior to execution of the PPA, it is at the risk of not receiving credit or reimbursement for any costs incurred in the connection with the acquisition process should the PPA not be signed. There is also risk in acquiring lands either not needed for the project or not acquired in compliance with requirements for crediting purposes in accordance with 49 CFR Part 24, dated March 2, 1989.

1.10 Government Owned Property

The Georgia Port Authority (State of Georgia) is owner of the land proposed for staging areas for the project. Construction will occur in the tidal creeks and wetlands of the State of Georgia and US Government. The US Army Corps of Engineers completed construction of Noyes Cut in 1932 as an AIWW Waterway auxiliary channel to provide small boats a safe inland route from the Satilla River to Brunswick, Georgia. Eleven acres were acquired in fee by the State of Georgia and conveyed to the US Government on 15 Jan 1931.

1.11 Historical Significance

Historical significance is addressed in the Cultural Resources section in the main report.

1.12 Mineral Rights

There are no known mineral activities within the scope of the proposed project.

1.13 Hazardous, Toxic, and Radioactive Waste (HTRW)

No hazardous or toxic waste sites are known to occur in the project area, nor will any toxic substances be introduced as part of this project.

1.14 Navigation Servitude

Navigation Servitude is not applicable to this project.

1.15 Zoning Ordinances

Zoning ordinances are not of issue with this project. Application or enactment of zoning ordinances is not to be used in lieu of acquisition.

1.16 Induced Flooding

There will be no flooding induced by the construction or the operation and maintenance of the project.

1.17 Public Law 91-646, Relocation Assistance Benefits

There are no relocations of individuals, businesses or farms for this project.

1.18 Attitude of Property Owners

The project is fully supported. There are no known objections to the project from landowners within the project area.

1.19 Acquisition Schedule

The project sponsors is responsible for acquiring real estate interests required for the project. The Georgia Ports Authority owns the parcel proposed for the staging area. It

is projected the construction can be accomplished within 3-6 months, and can begin when final plans and specs have been completed and the PPA has been executed. The Project Sponsor, Project Manager and Real Estate Technical Manager will formulate the milestone schedule upon project approval to meet dates for advertisement and award of a construction contract.

1.20 Estates for Proposed Project

There will be minimal real estate acquisition required for this project. An interagency agreement will be entered into between the Georgia Department of Natural Resources and the State Properties Commission for the staging area located at the Georgia Ports Authority Brunswick Terminal.

1.21 Real Estate Estimate

The real estate requirements are minimal for this project. The sponsors will be required to provide a interagency agreement. The estimated real estate costs include the Administrative costs are those costs incurred for verifying ownership of lands, certification of those lands required for project purposes, legal opinions, analysis or other requirements that may be necessary during Planning, Engineering and Design (PED). A 25% contingency is applied to the estimated total for these items. Table 1.21-1 is a summary of the real estate cost.

Table 1.21-1. Real Estate Estimate

Noyes Cut Section 1135 - Real Estate Estimate

a. Lands			$	-
b. Improvements			$	-
c. Mineral Rights			$	-
d. Damages			$	-
e. P.L. 91-646 Relocation costs			$	-
f. Acquisition Cost - Admin (6 ownerships)			$	4,300
Federal	$	1,800		
Non-federal	$	2,500		
	$	4,300		
Sub-Total			$	4,300
Contingencies (25%)			$	1,075
TOTAL			**$**	**5,375**
ROUNDED			**$**	**5,400**

1.22 Chart of Accounts

The cost estimate for all Federal and non-Federal real estate activities necessary for implementation of the project after completion of the feasibility study for land acquisition, construction, LERRD, and other items are coded as delineated in the Cost Work Breakdown Structure (CWBS). This real estate cost estimate is then incorporated into the Total Current Working Estimate utilizing the Microcomputer Aided Cost Engineering System (MCACES).

Table 1.22-1. Chart of Accounts

Noyes Cut Section 1135 - Chart of Accounts

01A	PROJECT PLANNING	FEDERAL	NON-FEDERAL	TOTALS
	Other			
	Project Cooperation Agreement	$	$	$
01AX	Contingencies (25%)	$	$	$
	Subtotal	$	$	$
01B	LANDS AND DAMAGES			
01B40	Acq/Review of PS	$ 1,800.00	$	$ 1,800.00
01B20	Acquisition by PS	$	$ 2,500.00	$ 2,500.00
01BX	Contingencies (25%)	$ 450.00	$ 625.00	$ 1,075.00
	Subtotal	$ 2,250.00	$ 3,125.00	$ 5,375.00
01G	Temorary Permits/Lic/ROEs			
01G10	By Govt			
01G20	By PS	$	$ -	$ -
01G30	By Govt on Behalf of PS	$	$	$
01GX	Contingencies (25%)	$	$ -	$ -
	Subtotal	$	$ -	$ -
01H	AUDIT			
01H10	Real Estate Audit	$	$	$
01HX	Contingencies (15%)	$	$	$
	Subtotal	$	$	$
01R	REAL ESTATE LAND PAYMENTS			
01R1B	Land Payments by PS	$	$ -	$ -
01R2B	PL91-646 Relocation Pymt by PS	$	$ -	$ -
01R2D	Review of PS	$	$	$
01RX	Contingencies (25%)	$	$ -	$ -
	Subtotal	$	$ -	$ -
	TOTALS	$ 2,250.00	$ 3,125.00	$ 5,375.00
	ROUNDED TO			**$ 5,400.00**

Exhibits

Exhibit A - Authorization For Entry For Construction

Exhibit B – Assessment of Non-Federal Sponsor's Real Estate Acquisition Capability

AUTHORIZATION FOR ENTRY FOR CONSTRUCTION

I _____, _____ for the
(Name of accountable official) (Title)

(Sponsor Name) _____, do hereby certify that the ___(Sponsor Name) has acquired the real property interest required by the Department of the Army, and otherwise is vested with sufficient title and interest in lands to support construction for (Project Name, Specifically identified project features, etc.). Further, I hereby authorize the Department of the Army, its agents, employees and contractors, to enter upon _____
(identify tracts)

to construct (Project Name, Specifically identified project features, etc.) as set forth in the plans and specifications held in the U. S. Army Corps of Engineers' (district, city, state)

WITNESS my signature as _____ for the
(Title)

(Sponsor Name) this __ day of _____, 20_____.

BY: _____
(Name)

_____
(Title)

ATTORNEY'S CERTIFICATE OF AUTHORITY

I, _____ , _____ for the
(Name) (Title of legal officer)

(Sponsor Name), certify that _____ has
(Name of accountable official)

authority to grant Authorization for Entry; that said Authorization for Entry is executed by the proper duly authorized officer; and that the Authorization for Entry is in sufficient form to grant the authorization therein stated.

WITNESS my signature as _____ for the
(Title)

(Sponsor Name), this_____day of_____, 20____.

BY: _____
(Name)

_____
(Title)

Exhibit A

Assessment of Non-Federal Sponsor's
Real Estate Acquisition Capability
Noyes Cut Satilla River Basin Section 1135

I. Legal Authority:

a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes? **YES**

b. Does the sponsor have the power to eminent domain for this project? **YES**

c. Does the sponsor have "quick-take" authority for this project? **YES**

d. Are any of the land/interests in the land required for this project located outside the sponsor's political boundary? **NO**

e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? **NO**

II. Human Resource Requirements:

a. Will the sponsor's in-house staff require training to become familiar with the real estate requirements of Federal projects including P. L. 91-646, as amended? **NO**

b. If the answer to II.a. is "yes", has a reasonable plan been developed to provide such training? (yes/no)

c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project? **YES**

d. Is the sponsor's projected in-house staffing level sufficient considering its other work load, if any, and the project schedule? **YES**

e. Can the sponsor obtain contractor support, if required in a timely fashion? **YES**

f. Will the sponsor likely request USACE assistance in acquiring real estate? **YES - only in advisory capacity**

III. Other Project Variables:

a. Will the sponsor's staff be located within reasonable proximity to the project site? **YES**

b. Has the sponsor approved the project/real estate schedule/milestones? **NO – Project Milestone will be developed during PED; will be joint effort between RE, PM and NFS**

Exhibit B
1st page

IV. Overall Assessment:

a. Has the sponsor performed satisfactory on other USACE projects? **YES**

b. With regard to the project, the sponsor is anticipated to be: **Highly capable**

V. Coordination:

a. Has this assessment been coordinated with the sponsor? **YES**

b. Does the sponsor concur with this assessment? **YES**

Prepared by:

_____
Patricia Casey
Senior Realty Specialist

Reviewed and approved by:

_____
Ralph J. Werthmann
Chief, Real Estate Division

Exhibit B
2nd page

APPENDIX G

Federal Consistency Determination for the Georgia Coastal Zone Management Program

NOYES CUT ECOSYSTEM RESTORATION STUDY

Camden County, Georgia

November 2017

US Army Corps of Engineers
Savannah District
South Atlantic Division

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Table of Contents

1.0 Summary Determination

The Federal Coastal Zone Management Act (CZMA), 16 U.S.C. 1451 et seq., as amended, requires each Federal agency activity performed within or outside the coastal zone (including development projects) that affects land or water use, or natural resources of the coastal zone to be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs. A direct Federal activity is defined as any function, including the planning and/or construction of facilities, which is performed by or on behalf of a Federal agency in the exercise of its statutory responsibilities. A Federal development project is a Federal activity involving the planning, construction, modification or removal of public works, facilities or other structures, and the acquisition, use or disposal of land or water resources.

To implement the CZMA and to establish procedures for compliance with its Federal consistency provisions, the US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), has promulgated regulations which are contained in 15 C.F.R. Part 930. This Consistency Determination is being submitted in compliance with Part 930.30 through 930.44 of those regulations.

Much of the information contained within this Consistency Determination is also contained in the draft Integrated Feasibility Report and Environmental Assessment prepared for the proposed action. References to that document are included in some of the discussions on the Project's compliance with certain individual state policies. Should further information concerning the proposed project be desired, please refer to the draft Integrated Feasibility Report and Environmental Assessment, to which this Determination is an Appendix.

In accordance with the CZMA, Savannah District has determined that the proposed ecosystem restoration project at Noyes Cut would be carried out in a manner which is fully consistent with the enforceable policies of the Georgia Coastal Management Program. The evaluations supporting that determination are presented in Sections 6 through 9 of this document. In addition, this determination is supported by information and analysis in the draft Integrated Feasibility Report and Environmental Assessment, which is incorporated by reference to the extent relevant to Georgia coastal zone consistency issues.

Much of the information contained within this Consistency Determination is also contained in the draft Integrated Feasibility Report and Environmental Assessment prepared for the proposed action. References to that document are included in some of the discussions on the Project's compliance with certain individual state policies. Should further information concerning the proposed project be desired, please refer to the draft Integrated Feasibility Report and Environmental Assessment, to which this Determination is an Appendix.

2.0 Background

2.1 Purpose

This Consistency Determination addresses the consistency of the proposed action to close a combination of man-made cuts to alter tidal exchange in Dover and Umbrella Creeks to restore historic conditions of salinity regimes and increase connectivity for local fauna into within the project with the Georgia Coastal Management Program, as required by the CZMA. For purposes of the CZMA, the enforceable policies of the Georgia Coastal Management Plan constitute the approved state program.

The objectives of this ecosystem restoration project are to improve the quality of the existing aquatic habitat for resident species and increase connectivity for migratory species (e.g., striped bass, American eels, shad, river herring) in the upper reaches of the Dover and Umbrella Creek watersheds. To achieve these objectives, the proposed action will restore the hydrologic connectivity by restoring the historic flow patterns in the watershed. These changes would restore salinity gradients and reduce local sedimentation issues; both of which will improve access to upstream spawning habitat for local migratory species.

2.2 Authority

The Federal Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et seq., as amended, is the legislative authority regarding the consistency of Federal actions with state coastal policies. Section 1456(c)(1)(A) of the CZMA states: "Each Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall he carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs." A Federal activity is defined as any function, including the planning and/or construction of facilities that is performed on behalf of a Federal agency in the exercise of its statutory responsibilities.

To implement the CZMA and to establish procedures for compliance with its federal consistency provisions, the US Department of Commerce, National Oceanographic and Atmospheric Administration, has promulgated regulations, 15 C.F.R. Part 930. This Consistency Determination was prepared in compliance with § 930.30

through 930.44 of those regulations.

3.0 Project Description

A description of the alternatives that were evaluated as part of the Noyes Cut Study, including the No Action Alternative, can be found in Section 3.3.2 of the draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Section 1135 Ecosystem Restoration Study. The Recommended Plan can be identified as Alternative 7 and its description can be found in Section 3.3.2.2 of the draft report.

4.0 Effects of Proposed Project

Effects of the proposed project can be found in Section 4.0 of the draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Ecosystem Restoration Study.

5.0 Other Areas of Environmental Concern

Environmental impacts associated with the proposed project can be found in Section 4.1 to 4.12 of the draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Ecosystem Restoration Study.

6.0 State Enforceable Policies

6.1 Introduction

The goals of the Georgia Coastal Management Program are attained by enforcement of the policies of the State as codified within the Official Code of Georgia Annotated. "Policy" or "policies" of the Georgia Coastal Management Program means the enforceable provisions of present or future applicable statutes of the State of Georgia or regulations promulgated duly there under (O.C.G.A. 12-5-322). The statutes cited as policies of the Program were selected because they reflect the overall Program goals of developing and implementing a balanced program for the protection of the natural resources, as well as promoting sustainable economic development of the coastal area.

The list of state laws shown below, which -- along with their associated regulations – describe the legal authority for the state’s regulation of its salt marshes, beaches and dune fields, and tidal water bottoms. Each of the coastal resources and use areas of concern is discussed separately in this section, in alphabetical order. For each coastal resources and use areas of concern, a policy statement is provided with a

direct citation to Georgia law. The laws are not cited in their entirety. Instead, the purpose of the statute, or a pertinent section of the statute, is cited. The Program policies are the enforceable provisions of the laws cited. A policy statement for each law describes the spirit of the law, directly cited from statements set out in the particular law. In each case, the citation for the statement is provided. The particular statements may or may not be enforceable as written, but the laws to which they relate contain enforceable provisions that have been enacted by the Georgia General Assembly to implement the policies as stated. The policies cited here are, therefore, supported by legally binding laws of the State of Georgia, through which Georgia is able to exert control over impacts to the land and water uses and natural resources in the coastal area. The statutes referenced herein can be found in the Official Code of Georgia Annotated (O.C.G.A.), copies of which are located in headquarters offices of State and local agencies, most public libraries, local courthouses, and numerous other public offices.

A paragraph titled “General Description” is included after each cited policy to serve as a quick reference to the relevant provisions of the law. The General Description is not intended to be, nor should it be interpreted as, law, policy, or restatement of the law. It is merely provided for the convenience of the reader to gain an initial concept as to the content of the related law. The reader is advised to refer to the actual law cited, and not to rely on the General Description as a basis for a legal interpretation of the law on any particular issue. The “Policy Statement” and “General Description” paragraphs were copied directly from the Georgia CZM Program. A paragraph titled “Consistency” follows those two paragraphs to explain Savannah District’s position on the extent to which the proposed project is consistent with that enforceable provision.

6.2 List of Pertinent State Laws and Authorities

Georgia Coastal Management Act
Coastal Marshlands Protection Act
Department of Natural Resources Authority
Endangered Wildlife Act
Game and Fish Code
Georgia Aquaculture Development Act
Georgia Air Quality Act
Historic Area Act
Georgia Boat Safety Act
Georgia Administrative Procedures Act (Revocable License Program)
Georgia Comprehensive Solid Waste Management Act
Georgia Environmental Policy Act
Georgia Erosion and Sedimentation Control Act
Georgia Fisheries Law Pertaining to Shellfish
Georgia Hazardous Waste Management Act
Georgia Heritage Trust Act
Georgia Natural Areas Act
Georgia Environmental Policy Act

Georgia Oil and Gas Deep Drilling Act
Georgia River and Harbor Development
Georgia Safe Dams Act
Georgia Safe Drinking Water Act
Georgia Scenic Rivers Act
Georgia Scenic Trails Act
Georgia Surface Mining Act
Georgia Underground Storage Tank Act
Georgia Water Quality Control Act
Groundwater Use Act
Licenses to Dig, Mine, and Remove Phosphate Deposits
Protection of Tidewaters Act
River Corridor Protection Act
Title 31 - Health (Septic Tank Law)
Shore Protection Act
Water Wells Standards Act
Wildflower Preservation Act

6.3 Aquaculture

6.3.1 Policy Statement

Georgia Aquaculture Development Act (O.C.G.A. 27-4-251, et seq.) 27-4-254. Duty of commission to develop aquaculture development plan; contents of plan; meetings of commission; staff support. The commission shall make a thorough study of aquaculture and the potential for development and enhancement of aquaculture in the state. It shall be the duty of the commission to develop, distribute, and, from time to time, amend an aquaculture development plan for the State of Georgia for the purpose of facilitating the establishment and growth of economically viable aquaculture enterprises in Georgia. (Code 1981. SS 27-4-254, enacted by Ga.L. 1992, p. 1507, SS 8.)

6.3.2 General Description

The Georgia Aquaculture Development Act was enacted in 1992 to study aquaculture development in Georgia. A 14-member Aquaculture Development Commission composed of industry representatives, scientists, agency representatives, and others is created. The Department of Natural Resources, with assistance from the Department of Agriculture and the Department of Industry, Trade, and Tourism provides staff support for the Commission.

6.3.3 Consistency

This policy is not applicable to the proposed project

6.4 Air Quality

6.4.1 **Policy Statement.**

Georgia Air Quality Act (0.C.G.A. 12-9-1, et seq.) 12-9-2. Declaration of public policy. It is declared to be the public policy of the State of Georgia to preserve, protect, and improve air quality and to control emissions to prevent the significant deterioration of air quality and to attain and maintain ambient air quality standards so as to safeguard the public health, safety, and welfare consistent with providing for maximum employment and full industrial development of the state. (Code 1933, 88-901, enacted by Ga.L. 1967, p. 581, SS 1; Ga.L. 1978, p. 275, SS 1; Ga.L. 1992, p. 918, SS 2; Ga.L. 1992, p. 2886, SS 1.)

6.4.2 **General Description**

The Georgia Air Quality Act provides authority to GA DNR's Environmental Protection Division to promulgate rules and regulations necessary to abate or to control air pollution for the State as a whole or from area to area, as may be appropriate. Establishment of ambient air quality standards, emission limitations, emission control standards, and other measures are necessary to provide standards that are no less stringent than the Federal Clean Air Act are mandated. The Act also requires establishment of a program for prevention and mitigation of accidental releases of hazardous air contaminants or air pollutants, training and educational programs to ensure proper operation of emission control equipment, and standards of construction no less stringent than the federal Act. The Environmental Protection Division administers the Georgia Air Quality Act throughout the State. The Memorandum of Agreement between the Georgia Coastal Resources Division and the Environmental Protection Division ensures cooperation and coordination in the achievement of the policies of the Program.

6.4.3 **Consistency**

There would be no long term impacts to air quality from proposed action. There would be some short term negligible impacts from air emissions during construction of the closure structures. The project area is currently in attainment for the NAAQS for all criteria pollutants. Therefore, implementation of any of the alternatives would not be expected to contribute to a change in this designation.

6.5 **Boating Safety**

6.5.1 **Policy Statement**

Georgia Boat Safety Act (O.C.G.A. 52-7-1. et seq.) 52-7-2. Declaration of policy. It is the policy of this state to promote safety for persons and property in and connected with the use, operation, and equipment of vessels and to promote the uniformity of laws relating thereto (Ga.L. 1973, p. 1427, SS 2).

6.5.2 **General Description**

The Georgia Boat Safety Act provides enforceable rules and regulations for safe boating practices on Georgia's lakes, rivers, and coastal waters. This Act establishes boating safety zones for a distance of 1,000 feet from the high-water mark on Jekyll Island, Tybee Island, St. Simons Island, and Sea Island. All motorized craft, including commercial fishing vessels, jet skis, and powerboats, are prohibited from these waters, except at certain pier and marina access points. This Act defines "abandoned vessels" as any left unattended for five days and provides for their removal. The Law Enforcement Section of the Georgia Department of Natural Resources, Wildlife Resources Division and the Georgia Bureau of Investigation enforces these regulations.

6.5.3 **Consistency**

The proposed action as part of the Federal navigation channel would comply with all required US Coast Guard safety regulations. The AIWW channel would be identified with the required US Coast Guard buoys and channel markers.

6.6 **Coastal Management**

6.6.1 **Policy Statement**

Georgia Coastal Management Act (0.C.G.A. 12-5-320, et seq.) 12-5-321. Legislative purpose. The General Assembly finds and declares that the coastal area of Georgia comprises a vital natural resource system. The General Assembly recognizes that the coastal area of Georgia is the habitat of many species of marine life and wildlife, which must have clean waters, and suitable habitat to survive. The General Assembly further finds that intensive research has revealed that activities affecting the coastal area may degrade water quality or damage coastal resources if not properly planned and managed. The General Assembly finds that the coastal area provides a natural recreation resource, which has become vitally linked to the economy of Georgia's coast and to that of the entire state. The General Assembly further finds that resources within this coastal area are costly, if not impossible, to reconstruct or rehabilitate once adversely affected by human-related activities and it is important to conserve these resources for the present and future use and enjoyment of all citizens and visitors to this state. The General Assembly further finds that the coastal area is a vital area of the state and that it is essential to maintain the health, safety, and welfare of all the citizens of the state. Therefore, the General Assembly declares that the management of the coastal area has more than local significance, is of equal importance of all citizens of the state, is of state-wide concern, and consequently is properly a matter for coordinated regulation under the police power of the state. The General Assembly further finds and declares that activities and structures in the coastal area must be regulated to ensure that the values and functions of coastal waters and natural habitats are not impaired and to fulfill the responsibilities of each generation as public trustees of the coastal waters and habitats for succeeding generations.

6.6.2 General Description

The Coastal Management Act provides enabling authority for the State to prepare and administer a coastal management program. The Act does not establish new regulations or laws; it is designed to establish procedural requirements for the Department of Natural Resources to develop and implement a program for the sustainable development and protection of coastal resources. It establishes the Department of Natural Resources as the State agency to receive and disburse federal grant moneys. It establishes the Governor as the approving authority of the program and as the person that must submit the program to the Federal government for approval under the Federal Coastal Zone Management Act. It requires other State agencies to cooperate with the Coastal Resources Division when exercising their activities within the coastal area.

6.6.3 Consistency

Preparation of this Consistency Determination is evidence that the U.S. Army Corps of Engineers agrees that Georgia's coast is a vital natural resource that deserves protection from unwise use. The proposed project fully adheres to the state's enforceable policies concerning development on the coast. The proposed project is fully consistent with this policy.

6.7 Coastal Marshlands

6.7.1 Policy Statement

Georgia Coastal Management Act (0.C.G.A. 12-5-320, et seq.) 12-5-321. Legislative purpose. The General Assembly finds and declares that the coastal area of Georgia comprises a vital natural resource system. The General Assembly recognizes that the coastal area of Georgia is the habitat of many species of marine life and wildlife, which must have clean waters, and suitable habitat to survive. The General Assembly further finds that intensive research has revealed that activities affecting the coastal area may degrade water quality or damage coastal resources if not properly planned and managed. The General Assembly finds that the coastal area provides a natural recreation resource, which has become vitally linked to the economy of Georgia's coast and to that of the entire state. The General Assembly further finds that resources within this coastal area are costly, if not impossible, to reconstruct or rehabilitate once adversely affected by human-related activities and it is important to conserve these resources for the present and future use and enjoyment of all citizens and visitors to this state. The General Assembly further finds that the coastal area is a vital area of the state and that it is essential to maintain the health, safety, and welfare of all the citizens of the state. Therefore, the General Assembly declares that the management of the coastal area has more than local significance, is of equal importance of all citizens of the state, is of state-wide concern, and consequently is properly a matter for coordinated regulation under the police power of the state. The General Assembly further finds and declares that activities and structures in the coastal area must be regulated to ensure that the values and functions of coastal waters and natural habitats

are not impaired and to fulfill the responsibilities of each generation as public trustees of the coastal waters and habitats for succeeding generations (Code 1981, SS 12-5-281, enacted by Ga.L. 1992, p. 2294, SS 1.).

6.7.2 **General Description**

The Coastal Marshlands Protection Act provides the Coastal Resources Division with the authority to protect tidal wetlands. The Coastal Marshlands Protection Act limits certain activities and structures in marsh areas and requires permits for other activities and structures. Erecting structures, dredging, or filling marsh areas requires a Marsh Permit administered through the Coastal Management Program. In cases where the proposed activity involves construction on State-owned tidal water bottoms, a Revocable License issued by the Coastal Resources Division may also be required. Marsh Permits and Revocable Licenses are not issued for activities that are inconsistent with the Georgia Coastal Management Program.

The jurisdiction of the Coastal Marshlands Protection Act extends to "coastal marshlands" or "marshlands", which includes marshland, intertidal area, mudflats, tidal water bottoms, and salt marsh area within estuarine area of the state, whether or not the tidewaters reach the littoral areas through natural or artificial watercourses. The estuarine area is defined as all tidally influenced waters, marshes, and marshlands lying within a tide-elevation range from 5.6 feet above mean high-tide level and below. Exemptions from the jurisdiction of the Act include: Georgia Department of Transportation activities, generally; agencies of the United States charged with maintaining navigation of rivers and harbors; railroad activities of public utilities companies; activities of companies regulated by the Public Service Commission; activities incident to water and sewer pipelines; and, construction of private docks that don't obstruct tidal flow.

Any agricultural or silvicultural activity that directly alters lands within the jurisdictional areas of the Coastal Marshlands Protection Act must meet the permit requirements of the Act and must obtain a permit issued by the Coastal Resources Division on behalf of the Coastal Marshlands Protection Committee. Permits for marinas, community docks, boat ramps, recreational docks, and piers within the jurisdiction of the Coastal Marshlands Protection Act are administered by the Coastal Resources Division. To construct a marina, a marina lease is required. Private-use recreational docks are exempt from the Coastal Marshlands Protection Act, but must obtain a Revocable License and a State Programmatic General Permit.

6.7.3 **Consistency**

The project would be constructed in Georgia waters and would affect wetlands within the jurisdiction of the Georgia Coastal Marshlands Protection Act. Construction of the closures in Noyes Cut, Dynamite Cut, and ORR would result in the loss of a total of 0.87 acres of jurisdictional waters of the U.S.; and the loss of a total of 0.21 acres of jurisdictional wetlands [*Spartina* salt marsh]. However, this adverse impact would be

expected to be more than offset by the restoration of wetlands (tidal salt marsh habitat) within the cuts.

6.8 Dams

6.8.1 Policy Statement

Georgia Safe Dams Act (O.C.G.A. 12-5-370, et seq.) 12-5-371. Declaration of purpose. It is the purpose of this part to provide for the inspection and permitting of certain dams in order to protect the health, safety, and welfare of all the citizens of the state by reducing the risk of failure of such dams. The General Assembly finds and declares that the inspection and permitting of certain dams is properly a matter for regulation under the police powers of the state (Ga.L. 1978, p. 795. SS 2).

6.8.2 General Description

The Georgia Safe Dams Act provides for the inspection and permitting of certain dams to protect the health, safety, and welfare of Georgia residents. The Environmental Protection Division of the Georgia Department of Natural Resources is responsible for inspecting and certifying dams.

6.8.3 Consistency

Construction or operation of a dam is not included as part of the proposed action.

6.9 Department of Natural Resources

6.9.1 Policy Statement

12-2-3. Departmental purposes. It shall be the objectives of the department: a. To have the powers, duties, and authority formerly vested in the Division of Conservation and the commissioner of conservation; b. By means of investigation, recommendation, and publication, to aid: (1) In the promotion of the conservation and development of the natural resources of the state; (2) In promoting a more profitable use of lands and waters; (3) In promoting the development of commerce and industry; and In coordinating existing scientific investigations with any related work of other agencies for the purpose of formulating and promoting sound policies of conservation and development. c. To collect and classify the facts derived from such investigations and from the work of other agencies of the state as a source of information accessible to the citizens of the state and to the public generally, which facts set forth the natural, economic, industrial, and commercial advantages of the state; and d. To establish and maintain perfect cooperation with any and every agency of the federal government interested in or dealing with the subject matter of the department. (Ga. L. 1937, p. 264, SS 4; Ga. L. 1949, p. 1079, SS 1; Ga.L. 1992, p. 6. SS 12.)

6.9.2 **General Description**

The authority for the Department of Natural Resources is found at O.C.G.A. 12-21, et seq. The objectives for the Department are described, including to aid: in promoting the conservation and development of the State's natural resources; in promoting a more profitable use of lands and waters; in promoting the development of commerce and industry; and in coordinating existing scientific investigations with related work of other agencies for the purpose of formulating and promoting sound policies of conservation and development. The Act also requires the Department to establish and maintain perfect cooperation with any and every agency of the federal government interested in or dealing with the subject matter of the department."

The powers of the Department are established, including: investigations of the natural mining industry and commercial resources of the State and promotion of the conservation and development of such resources; the care of State parks and other recreational areas now owned or to be acquired by the State; examination, survey, and mapping of the geology, mineralogy, and topography of the State, including their industrial and economic utilization; investigation of the water supply and water power of the State with recommendations and plans for promoting their more profitable use and promotion of their development; investigations of existing conditions of trade, commerce, and industry in the State, with particular attention to the causes that may hinder or encourage their growth, and recommendations of plans that promote development of their interests.

The Department is set up in several Divisions. The Wildlife Resources Division is empowered to acquire land areas and to enter into agreements with landowners and the federal government for purposes of managing wildlife species and establishing specific sanctuaries, wildlife management areas, and public fishing areas. The Wildlife Resources Division administers a management plan for each area, which establishes short- and long-term uses, and guidelines for protection and use of each specific area. These areas owned and/or managed by the Wildlife Resources Division are important resources of the coastal area for conservation of wildlife and also for recreational hunting and fishing opportunities. Wildlife management areas within the jurisdiction of the Coastal Marshlands Protection Act and/or Shore Protection Act receive the additional protection provided by said legislation. The Environmental Protection Division is empowered to manage the State's air and water resources. The Coastal Resources Division is charged with management of coastal resources, which includes implementation of the Coastal Marshlands Protection Act and the Shore Protection Act. The Coastal Resources Division responsibilities also include management of marine fisheries resources. The Pollution Prevention Assistance Division provides technical assistance and education for reducing pollution throughout Georgia, including development of Best Management Practices for various industries. The Historic Preservation Division is charged with cataloging, protecting, and preserving the State's historic sites and areas. The Parks, Recreation, and Historic Sites Division has primary responsibility for development and maintenance of the State's parks and historic sites. The Program Support Division provides administrative support for the Department.

6.9.3 Consistency

The draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Ecosystem Restoration Study will be coordinated with GA DNR. The proposed project is consistent with this policy.

6.10 Endangered Wildlife

6.10.1 Policy Statement

Endangered Wildlife Act (0.C.G.A. 2 7-3-130, et seq.) 27-3-132. Powers and duties of department and board. The department shall identify and inventory any species of animal life within this state which it determines from time to time to be rare, unusual, or in danger of extinction; and, upon such determination, such species shall be designated protected species and shall become subject to the protection of this article.

The board shall issue such rules and regulations as it may deem necessary for the protection of protected species and for the enforcement of this article. Such rules and regulations shall not affect rights in private property or in public or private streams, nor shall such rules and regulations impede construction of any nature. Such rules and regulations shall be limited to the regulation of the capture, killing, or selling of protected species and the protection of the habitat of the species on public lands.

6.10.2 General Description

The Endangered Wildlife Act provides for identification, inventory, and protection of animal species that are rare, unusual, or in danger of extinction. Additional species may be added by the Board of Natural Resources at any time. The protection offered to these species is limited to those that are found on public lands of the State. It is a misdemeanor to violate the rules prohibiting capture, killing, or selling of protected species, and protection of protected species habitat on public lands. The rules and regulations are established and administered by the Department of Natural Resources for implementation of this Act.

Projects permitted under the authority of the Coastal Marshlands Protection Act, the Shore Protection Act, and the Revocable License require full compliance with the protection of endangered and protected species. Outside the jurisdiction of these laws, for those areas that are not public lands of Georgia, protection of endangered species is provided by the federal Endangered Species Act, which has jurisdiction over both private and public lands.

6.10.3 Consistency

Impacts associated with the proposed action on rare, threatened, and endangered species within the project area can be found in Section 4.6 of the draft Integrated

Feasibility Report and Environmental Assessment for the Noyes Cut Ecosystem Restoration Study.

6.11 Environmental Policy

6.11.1 Policy Statement

Georgia Environmental Policy Act (0.C.G.A. 12-16-1, et seq.) 12-16-2. Legislative findings. The General Assembly finds that: a. The protection and preservation of Georgia's diverse environment is necessary for the maintenance of the public health and welfare and the continued viability of the economy of the state and is a matter of the highest public priority; b. State agencies should conduct their affairs with an awareness that they are stewards of the air, land, water, plants, animals, and environmental, historical, and cultural resources; c. Environmental evaluations should be a part of the decision-making processes of the state; and d. Environmental effects reports can facilitate the fullest practicable provision of timely public information, understanding, and participation in the decision-making processes of the state. (Code 1981, SS 12-16-2, enacted by Ga. L. 1991, p. 1728, SS 1.)

6.11.2 General Description

The Georgia Environmental Policy Act (GEPA) requires that all State agencies and activities prepare an Environmental Impact Report as part of the decision-making process. This is required for all activities that may have an impact on the environment. Alternatives to the proposed project or activity must be considered as part of the report.

6.11.3 Consistency

This Coastal Zone Management Consistency Determination is a component of the draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Ecosystem Restoration Study, which evaluates the impacts of the proposed project. Although GEPA does not directly apply to a Federal navigation project, Federal agencies must comply with a similar law, the National Environmental Policy Act (NEPA). Preparation of the draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Ecosystem Restoration Study is fully consistent with both this state law and NEPA.

6.12 Erosion and Sedimentation

6.12.1 Policy Statement

Georgia Erosion and Sedimentation Act (O.C.G.A. 12-7-1. et seq.) 12-7-2. Legislative findings; policy of state and intent of chapter. It is found that soil erosion and sediment

deposition onto lands and into waters within the watersheds of this state are occurring as a result of widespread failure to apply proper soil erosion and sedimentation control practices in land clearing, soil movement, and construction activities and that such erosion and sediment deposition result in pollution of state waters and damage to domestic, agricultural, recreational, fish and wildlife, and other resource uses. It is therefore declared to be the policy of this state and the intent of this chapter to strengthen and extend the present erosion and sediment control activities and programs of this state and to provide for the establishment and implementation of a state-wide comprehensive soil erosion and sediment control program to conserve and protect the land, water, air, and other resources of this state. (Ga. L. 1975, p.994, SS 2.)

6.12.2 **General Description**

The Georgia Erosion and Sedimentation Act requires that each county or municipality adopt a comprehensive ordinance establishing procedures governing land disturbing activities based on the minimum requirements established by the Act. The Erosion and Sedimentation Act is administered by the Environmental Protection Division of the Georgia Department of Natural Resources, and by local governments. Permits are required for specified "land-disturbing activities," including the construction or modification of manufacturing facilities, construction activities, certain activities associated with transportation facilities, activities on marsh hammocks, etc. With certain constraints, permitting authority can be delegated to local governments.

One provision of the Erosion and Sedimentation Act requires that land-disturbing activities shall not be conducted within 25 feet of the banks of any State waters unless a variance is granted (O.C.G.A. 12-7-6-(15)). Construction of single-family residences under contract with the owner are exempt from the permit requirement but are still required to meet the standards of the Act (O.C.G.A. 12-7-17-(4)). Large development projects, both residential and commercial, must obtain a permit and meet the requirements of the Act. According to the Georgia Coastal Management Act, any permits or variances issued under the Erosion and Sedimentation Act must be consistent with the Georgia Coastal Management Program. Permits within the jurisdiction of the Coastal Marshlands Protection Act and the Shore Protection Act can include requirements that certain minimum water quality standards be met as a condition of the permit.

There are specific exemptions to the requirements of the Erosion and Sedimentation Act (O.C.G.A. 12-7-17 - Exemptions). The exemptions include: surface mining, granite quarrying, minor land-disturbing activities such as home gardening, construction of single-family homes built or contracted by the homeowner for his own occupancy, agricultural practices, forestry land management practices, dairy operations, livestock and poultry management practices, construction of farm buildings, and any projects carried out under the supervision of the Natural Resource Conservation Service of the US Department of Agriculture. Exemptions from the requirements of the Act also apply to any project involving 1.1 acres or less, provided that the exemption does not apply to any land-disturbing activities within 200 feet of the bank of any State waters.

Construction or maintenance projects undertaken or financed by the Georgia Department of Transportation, the Georgia Highway Authority, or the Georgia Tollway Authority, or any road or maintenance project undertaken by any county or municipality, are also exempt from the permit requirements of the Act, provided that such projects conform to the specifications used by the Georgia Department of Transportation for control of soil erosion. Exemptions are also provided to land-disturbing activities by any airport authority, and by any electric membership corporation or municipal electrical system, provided that such activities conform as far as practicable with the minimum standards set forth at Code Section 12-7-6 of the Erosion and Sedimentation Act. The Georgia Department of Transportation has developed a "Standard Specifications -- Construction of Roads and Bridges," which describes contractor requirements, including controls for sedimentation and erosion. The specifications describe the requirements for both temporary control measures for use during the construction phase, and permanent erosion and sedimentation control measures that need to be incorporated into the design of the project. Failure to comply with the provisions of the specification will result in cessation of all construction activities by the contractor, and may result in the withholding of moneys due to the contractor according to a schedule of non-performance of erosion control, enforced by the Georgia Department of Transportation. Forestry and agricultural land-disturbing activities are subject to the Best Management Practices of the Georgia Forest Commission and the Georgia Soil and Water Conservation Commission, respectively.

6.12.3 **Consistency**

The proposed action recommends closing a combination of man-made cuts to restore historic conditions of salinity regimes and increase connectivity for local fauna into the upper reaches of Dover and Umbrella Creeks. Impacts from construction of closures are expected to be minor and temporary and cease soon after construction is completed. After project implementation, potential indirect long-term benefits of restoring depths and flows in the study area may include increased dissolved oxygen (DO) levels, decreased Total Suspended Solids (TSS), and improved nutrient exchange between the Satilla River, St. Andrews Sound, and the Atlantic Ocean. Indirect beneficial impacts are expected to occur to the aquatic ecosystem and improve habitat for flora and fauna that use this habitat.

Fill material requirements for the project’s closure of man-made cuts would come from clean sources that are free of sediment (e.g. rock and sheet pile). Due to the use of sheet pile and rock for the closure structures any impacts would be negligible and temporary. In addition, turbidity booms would be used to reduce turbidity and sediment loss during construction of the closures. During the D/I Phase of this project, coordination will occur with GADNR to obtain all required permits (e.g Buffer Variance, Erosion Control, etc.).

The proposed project is therefore consistent with this policy.

6.13 Game and Fish

6.13.1 Policy Statement

27-1-3. Ownership and custody of wildlife; privilege to hunt, trap, or fish; general offenses. (Game and Fish Code) The ownership of, jurisdiction over, and control of all wildlife, as defined in this title, are declared to be in the State of Georgia, in its sovereign capacity, to be controlled, regulated, and disposed of in accordance with this title. All wildlife of the State of Georgia are declared to be within the custody of the department for purposes of management and regulation in accordance with this title. However, the State of Georgia, the department, and the board shall be immune from suit and shall not be liable for any damage to life, person, or property caused directly or indirectly by any wildlife.

To hunt, trap, or fish, as defined in this title, or to possess or transport wildlife is declared to be a privilege to be exercised only in accordance with the laws granting such privilege. Every person exercising this privilege does so subject to the right of the state to regulate hunting, trapping, and fishing; and it shall be unlawful for any person participating in the privileges of hunting, trapping, fishing, possessing, or transporting wildlife to refuse to permit authorized employees of the department to inspect and count such wildlife to ascertain whether the requirements of the wildlife laws and regulations are being faithfully complied with. Any person who hunts, traps, fishes, possesses, or transports wildlife in violation of the wildlife laws and regulations violates the conditions under which this privilege is extended; and any wildlife then on his person or within his immediate possession are deemed to be wildlife possessed in violation of the law and are subject to seizure by the department pursuant to Code Section 27-1-21.

It shall be unlawful to hunt, trap, or fish except during an open season for the taking of wildlife, as such open seasons may be established by law or by rules and regulations promulgated by the board or as otherwise provided by law.

It shall be unlawful to hunt, trap, or fish except in compliance with the bag, creel, size, and possession limits and except in accordance with such legal methods and weapons and except at such times and places as may be established by law or by rules and regulations promulgated by the board.

It shall be unlawful to hunt, trap, or fish for any game species after having obtained the daily or season bag or creel limit for that species.

A person who takes any wildlife in violation of this title commits the offense of theft by taking. A person who hunts, traps, or fishes in violation of this title commits the offense of criminal attempt. Any person who violates any provision of this Code section shall be guilty of a misdemeanor.

If any court finds that any criminal violation of the provisions of this title is so egregious as to display a willful and reckless disregard for the wildlife of this state, the court may,

in its discretion, suspend the violator's privilege to hunt, fish, trap, possess, or transport wildlife in this state for a period not to exceed five years. Any person who hunts, fishes, traps, possesses, or transports wildlife in this state in violation of such suspension of privileges shall be guilty of a misdemeanor of a high and aggravated nature and upon conviction thereof shall be punished by a fine of not less than $1,500.00 nor more than $5,000.00 or imprisonment for a period not exceeding 12 months or both. (Ga. L. 1968, p. 497, SS 1; Code 1933, SS 45-201, enacted by Ga. L. 1977, p. 396, SS 1; Ga. L. 1978, p. 816, SS 13, 14; Ga. L. 1992, p. 2391, SS 1.) 27-1-4.

Powers and duties of board generally. The board shall have the following powers and duties relative to this title:

a. Establishment of the general policies to be followed by the department under this title;

b. Promulgation of all rules and regulations necessary for the administration of this title including, but not limited to, rules and regulations to regulate the times, places, numbers, species, sizes, manner, methods, ways, means, and devices of killing, taking, capturing, transporting, storing, selling, using, and consuming wildlife and to carry out this title, and rules and regulations requiring daily, season, or annual use permits for the privilege of hunting and fishing in designated streams, lakes, or game management areas; and

c. Promulgation of rules and regulations to protect wildlife, the public, and the natural resources of this state in the event of fire, flood, disease, pollution, or other emergency situation without complying with Chapter 13 of Title 50, the "Georgia Administrative Procedure Act." Such rules and regulations shall have the force and effect of law upon promulgation by the board (Ga. L. 1911, p. 137, SS 1; Ga. L. 1924, p. 101, SSSS 1, 3,4; Ga. L. 1931, p. 7, SS 25; Ga. L. 1937, p. 264, SSSS 1, 4, 9; Ga. L. 1943, p. 128, SSSS 1, 2, 14; Ga. L. 1955, p. 483, SS 3; Ga. L. 1972, p. 1015, SS 1527; Ga. L. 1973, p. 344, SS 1; Code 1933, SS 45-103, enacted by Ga. L. 1977, p. 396, SS 1; Ga. L. 1978, p. 816, SS 7; Ga. L. 1979, p. 420, SS 3; Ga. L. 1987, p. 179, SS 1).

6.13.2 **General Description**

The Official Code of Georgia Annotated, Title 27, Chapter I (known as the Game and Fish Code) provides the ownership of, jurisdiction over, and control of all wildlife to be vested in the State of Georgia. The section declares that custody of all wildlife in the State is vested with the Georgia Department of Natural Resources for management and regulation. The Wildlife Resources Division is the principal State agency vested with statutory authority for the protection, management and conservation of terrestrial wildlife and fresh water wildlife resources, including fish, game, non-game, and endangered species. All licensing of recreational and commercial fish and wildlife activities, excluding shellfish, is performed by the Wildlife Resources Division. The Coastal Resources Division issues shellfish permits, regulates marine fisheries activities including the opening and closing of the commercial shrimp harvesting season, areas of shrimp harvest, regulates marine species size and creel limits, and enforces the

National Shellfish Sanitation Program. The Commissioner of the Department of Natural Resources has directed that there will be cooperation and coordination between the Divisions of the Department in the administration of their respective responsibilities.

6.13.3 Consistency

The proposed project includes no feature to hunt, trap, fish, possess or transport any recreational and commercial fish or wildlife species. Therefore, no such license is required by the project.

6.14 Georgia Heritage

6.14.1 Policy Statement

Georgia Heritage Trust Act (O.C.G.A. 12-3-70, et seq.) 12-3-71. Legislative purpose. The General Assembly finds that certain real property in Georgia, because it exhibits unique natural characteristics, special historical significance, or particular recreational value, constitutes a valuable heritage, which should be available to all Georgians, now and in the future. The General Assembly further finds that much of this real property, because of Georgia's rapid progress over the past decade, has been altered, that its value as part of our heritage has been lost, and that such property, which remains, is in danger of being irreparably altered. The General Assembly declares, therefore, that there is an urgent public need to preserve important and endangered elements of Georgia's heritage, so as to allow present and future citizens to gain an understanding of their origins in nature and their roots in the culture of the past and to ensure a future sufficiency of recreational resources. The General Assembly asserts the public interest in the state's heritage by creating the Heritage Trust Program which shall be the responsibility of the Governor and the Department of Natural Resources and which shall seek to protect this heritage through the acquisition of fee simple title or lesser interests in valuable properties and by utilization of other available methods. (Ga. L. 1975, p. 962, SS 2.)

6.14.2 General Description

Georgia's Heritage Trust Act of 1975 seeks to preserve certain real property in Georgia that exhibits unique natural characteristics, special historical significance, or particular recreational value. This Act created the Heritage Trust Commission, composed of 15 members appointed by the Governor who represent a variety of interests and expertise. The Commission served as an advisory body to the Governor and to the Board of the Department of Natural Resources, making recommendations concerning the identification, designation, and acquisition of heritage areas. Although this Act is still in Georgia law, the Commission's term expired and the implementation and administration of many of the goals of the Act has been superseded by the Heritage 2000 Program.

6.14.3 Consistency

While there are no known designated heritage areas within the proposed project area, a low water shoreline survey of the areas where the sheet pile end walls will be placed will be conducted to identify and evaluate significant archaeological resources. The project is consistent with this policy.

6.15 Groundwater Use

6.15.1 Policy Statement

Groundwater Use Act (O.C.G.A. 12-5-90, et seq.) 12-5-91. Declaration of policy. The general welfare and public interest require that the water resources of the state be put to beneficial use to the fullest extent to which they are capable, subject to reasonable regulation in order to conserve these resources and to provide and maintain conditions, which are conducive to the development and use of water resources (Ga. L. 1972, p. 976, SS 2.).

6.15.2 General Description

The Groundwater Use Act charges the Board of Natural Resources with the responsibility to adopt rules and regulations relating to the conduct, content, and submission of water conservation plans, including water conservation practices, water drilling protocols, and specific rules for withdrawal and utilization of groundwater. The Environmental Protection Division administers these rules and regulations. Groundwater withdrawals of greater than 100,000 gallons per day require a permit from the Environmental Protection Division. Permit applications that request an increase in water usage must also submit a water conservation plan approved by the Director of Environmental Protection Division (O.C.G.A. 12-5-96). The Environmental Protection Division has prepared a comprehensive groundwater management plan for coastal Georgia that addresses water conservation measures, protection from saltwater encroachment, reasonable uses, preservation for future development and economic development issues. The Memorandum of Agreement with the Environmental Protection Division ensures that permits issued under the Groundwater Use Act must be consistent with the Coastal Management Program.

6.15.3 Consistency

Since this project does not involve any dredging or activities associated with dredging, the proposed project is fully consistent with this policy.

6.16 Hazardous Waste

6.16.1 Policy Statement

Georgia Hazardous Waste Management Act (0.C.G.A. 12-8-60, et seq.) F-20 12-8-61. Legislative policy. It is declared to be the public policy of the State of Georgia, in furtherance of its responsibility to protect the public health, safety, and well-being of its citizens and to protect and enhance the quality of its environment, to institute and maintain a comprehensive state-wide program for the management of hazardous wastes through the regulation of the generation, transportation, storage, treatment, and disposal of hazardous wastes (Ga. L. 1979, p. I 1 27, SS 2; Ga. L. 1992, p. 2234, SS 5.).

6.16.2 General Description

The Georgia Hazardous Waste Management Act describes a comprehensive, statewide program to manage hazardous wastes through regulating hazardous waste generation, transportation, storage, treatment, and disposal. Hazardous waste is defined by the Board of Natural Resources, and it includes any waste that the Board concludes is capable of posing a substantial present or future hazard to human health or the environment when improperly treated, transported, stored, disposed, or otherwise managed, based on regulations promulgated by the US Environmental Protection Agency. The Hazardous Waste Management Act is administered and implemented by the Environmental Protection Division.

6.16.3 Consistency

Fill material requirements for the project's closure of man-made cuts would come from sources that are free of any contamination (e.g. rock and sheet pile). Pollutants from existing sediments being disturbed during construction activities are not expected and historical land use does not warrant any sediment testing for contaminants. The probability of encountering new HTRW contamination for the Recommended Plan is very low. If a new environmental condition is identified prior to the construction phase, USACE will take the necessary measures to avoid that recognized environmental condition so that the probability of encountering or disturbing HTRW would continue to be low. The proposed project is fully consistent with this policy.

6.17 Historic Areas

6.17.1 Policy Statement

Historic Areas (0.C.G.A. 12-3-50, et seq.) 12-3-50. 1. Grants for the preservation of "historic properties"; additional powers and duties of department. It is declared to be the public policy of the State of Georgia, in furtherance of its responsibility to promote and preserve the health, prosperity, and general welfare of the people, to encourage the preservation of historic properties, which have historical, cultural, and archeological significance to the state (Code 1981, SS 12-3-50.1, enacted by Ga. L. 1986, p. 399, SS 1; Ga. L. 1996, p. 6, SS 12.).

6.17.2 **General Description**

The authority found at O.C.G.A. 12-3-50 provides the Department of Natural Resources with the powers and duties to "promote and increase knowledge and understanding of the history of this State from the earliest times to the present, including the archeological, Indian, Spanish, colonial, and American eras, by adopting and executing general plans, methods, and policies for permanently preserving and marking objects, sites, areas, structures, and ruins of historic or legendary significance, such as trails, post roads, highways, or railroads; inns or taverns; rivers, inlets, millponds, bridges, plantations, harbors, or wharves; mountains, valleys, coves, swamps, forests, or Everglade; churches, missions, campgrounds, and places of worship; schools, colleges, and universities; courthouses and seats of government; places of treaties, councils, assemblies, and conventions; factories, foundries, industries, mills, stores, and banks; cemeteries and burial mounds; and battlefields, fortifications, and arsenals. Such preservation and marking may include the construction of signs, pointers, markers, monuments, temples, and museums, which structures may be accompanied by tablets, inscriptions, pictures, paintings, sculptures, maps, diagrams, leaflets, and publications explaining the significance of the historic or legendary objects, sites, areas, structures, or ruins." The Department is also required to "promote and assist in the publicizing of the historical resources of the State by preparing and furnishing the necessary historical material to agencies charged with such publicity; to promote and assist in making accessible and attractive to travelers, visitors, and tourists the historical features of the State by advising and cooperating with State, federal, and local agencies charged with the construction of roads, highways, and bridges leading to such historical-points." The Historical Preservation Division is charged with carrying out these duties, and coordinates its activities in the coastal area with the Coastal Resources Division.

6.17.3 **Consistency**

A low water shoreline survey of the areas where the sheet pile end walls will be placed will be conducted to identify and evaluate significant archaeological resources. A remote sensing survey will be conducted within the cuts to identify significant submerged resources. A Memorandum of Agreement would be executed with the Georgia State Historic Preservation Office to mitigate any adverse effects to significant resources that would be impacted.

No historic architectural resources would be affected, nor would the constructed closure structures have an adverse visual effect. The closure structures would help create wetland habitat which is compatible with the viewshed.

Recorded archaeological sites located along the marsh near Umbrella Creek would not be affected by the implementation of this alternative since the sites would not be subjected to increased periods of exposure or longer durations of saturation. The draft Integrated Feasibility Report and Environmental Assessment for the Noyes Cut Ecosystem Restoration Study will be coordinated with the GA SHPO to ensure there are

no adverse impacts from this project. Therefore, the project would be consistent with this policy.

6.18 Natural Areas

6.18.1 Policy Statement

Georgia Natural Areas Act (O.C.G.A. 12-3-90, et seq.) 12-3-91. Legislative findings and declaration of purpose. The General Assembly finds that there is an increasing nation-wide concern over the deterioration of man's natural environment in rural as well as urban areas; that there is a serious need to study the long-term effects of our civilization on our natural environment; that while the State of Georgia is still richly endowed with relatively undisturbed natural areas, these areas are rapidly being drastically modified and even destroyed by human activities; that it is of the utmost importance to preserve examples of such areas in their natural state, not only for scientific and educational purposes but for the general well-being of our society and its people. Therefore, it shall be the purpose and function of the Department of Natural Resources to:

a. Identify natural areas in the State of Georgia, which are of unusual ecological significance;
b. Use its influence and take any steps within its power to secure the preservation of such areas in an undisturbed natural state in order that such areas may:

(1) Be studied scientifically;
(2) Be used for educational purposes;
(3) Serve as examples of nature to the general public; and
(4) Enrich the quality of our environment for present and future generations; and
c. Recommend areas or parts of areas for recreational use. (Ga.L. 1969, p. 750, SS 2; Ga.L. 1972, p. 10 1 5, SS 151 1.) 12-3-92.

"Natural areas" defined. As used in this article, the term "natural areas" means a tract of land in its natural state which may be set aside and permanently protected or managed for the purpose of the preservation of native plant or animal communities, rare or valuable individual members of such communities, or any other natural features of significant scientific, educational, geological, ecological, or scenic value (Ga. L. 1966, p.330, SS 2; Ga. L. 1969, p.750, SS 3.).

6.18.2 General Statement

The Georgia Natural Areas Act authorizes the Department of Natural Resources to identify areas in the State of Georgia, which are of unusual ecological significance, and to secure the preservation of such areas in an undisturbed natural state. The purpose for such acquisition is to allow scientific study of the property, to educate, to "serve as examples of nature to the general public," and to "enrich the quality of our environment for present and future generations." Natural areas, as defined by the Act, are tracts of land in their natural state that are to be set aside and permanently protected or

managed for the purpose of preserving natural plant or animal communities, rare or valuable members of such communities, or any other natural features of significant scientific, educational, geologic, ecological, or scenic value.

6.18.3 **Consistency**

The Georgia Department of Natural Resources, Coastal Resources Division, provided a web link to USACE Savannah District showing the locations of Georgia's Known Occurrences of Conservation Areas on or near the Noyes Cut Ecosystem Restoration Project, Camden County, Georgia. (http://gcmp.maps.arcgis.com/apps/webappviewer/index.html?id=08a1acc235d6462e8aeea6f779341627) One only conservation area was shown to be within the vicinity of the project area, the Satilla River Marsh Island. This area, which is owned by Georgia Department of Natural Resource, is located south of where the project activities will occur and therefore should not be impacted by the proposed project.

6.19 **Oil and Gas and Deep Drilling**

6.19.1 **Policy Statement**

Georgia Oil and Gas and Deep Drilling Act (O.C.G.A. 12-440, et seq.) 12-441. Legislative findings and declaration of policy. The General Assembly finds and declares that its duty to protect the health, safety, and welfare of the citizens of this state requires that adequate protection of underground fresh water supplies be assured in any drilling operation which may penetrate through any stratum which contains fresh water. This duty further requires that adequate protection be assured in any drilling or the use of such drilled wells in certain other environmentally sensitive areas or in other circumstances where the result of such drilling and use may endanger the health, safety, and welfare of the citizens of this state. It is not the policy of the General Assembly to regulate the drilling of shallow exploration or engineering holes except in such environmentally sensitive areas as defined in this part. The General Assembly further finds and declares that, with the current energy shortage which this state and nation face, it must encourage oil and gas exploration to identify new sources of energy, but not at the expense of our important natural resources such as residential, municipal, and industrial supplies of fresh water. The General Assembly further finds and declares that with an increase in oil exploration, it must provide assurances to persons engaging in such exploration that adequate safeguards regarding results of exploration will remain privileged information for a specified time. The General Assembly further finds and declares that it is in the public interest to obtain, protect, and disseminate all possible geologic information associated with drilling operations in order to further the purposes of future energy related research. (Ga. L. 1975, p. 966, SS 1.)

6.19.2 General Description

Georgia's Oil and Gas and Deep Drilling Act regulates oil and gas drilling activities to provide protection of underground freshwater supplies and certain “environmentally sensitive" areas. The Board of Natural Resources has the authority to implement this Act. The Act establishes requirements for drilling, casing, and plugging of wells for oil, gas, or mineral exploration: (1) to alleviate escape of gas or oil from one stratum to another; (2) to prevent the pollution of freshwater by oil, gas, salt water or other contaminants; (3) to prevent drowning of any stratum that might reduce the total ultimate recovery of gas or oil; and, (4) to prevent fires, waste, and spillage of contaminants such as oil.

6.19.3 Consistency

No oil and/or gas drilling operations are proposed for this project.

6.20 Phosphate Mining

6.20.1 Policy Statement

Licenses to dig, mine, and remove phosphate deposits; restrictions on license holders. (O.C.G.A. 12-4-100, et seq.) 12-4-101. Restrictions on license holders. Whenever any person discovers phosphate rock or phosphatic deposits in the navigable streams or waters of this state or in any public land on their banks or margins and files with the Secretary of State notice of such discovery and a description of the location thereof, he shall be entitled to receive from the Secretary of State a license giving him or his assigns the exclusive right, for ten years from the date of the license, of digging, mining, and removing from such location and from an area for a distance of five miles in any or all directions there from the phosphate rock and phosphatic deposits that may be found therein, provided that persons receiving or holding such licenses shall in no way interfere with the free navigation of the streams and waters or the private rights of any citizen residing on or owning the lands upon the banks of such navigable rivers and waters; provided, further, that as long as the license remains in effect, no person, natural or artificial, shall have the privilege of locating a claim within 20 miles of any other claim for which he has received a license (Ga. L. 1884-85, p. 125, SS 1; Civil Code 1895, SS 1726; Civil Code 1910, SS 1977; Code 1933, SS 43-401.).

6.20.2 General Description

The laws found at O.C.G.A. 12-4-100, et seq., describe the State's management of phosphate deposits. There is great interest in phosphate mining in Georgia. In fact, the citizens of Georgia developed the Coastal Marshlands Protection Act in an effort to limit potential adverse environmental impacts from a proposed phosphate mining operation. The Secretary of State is charged with the administration of this statute, and is networked with the Georgia Coastal Management Program.

6.20.3 Consistency

Mining of phosphates is not included in the proposed project.

6.21 Protection of Tidewaters

6.21.1 Policy Statement

Protection of Tidewaters Act (O.C.G.A. 52-1-1. et seq.) 52-1-2. Legislative findings and declaration of policy. The General Assembly finds and declares that the State of Georgia became the owner of the beds of all tidewaters within the jurisdiction of the State of Georgia as successor to the Crown of England and by the common law. The State of Georgia continues to hold title to the beds of all tidewaters within the state, except where title in a private party can be traced to a valid Crown or state grant which explicitly conveyed the beds of such tidewaters. The General Assembly further finds that the State of Georgia, as sovereign, is trustee of the rights of the people of the state to use and enjoy all tidewaters which are capable of use for fishing, passage, navigation, commerce, and transportation, pursuant to the common law public trust doctrine. Therefore, the General Assembly declares that the protection of tidewaters for use by the state and its citizens has more than local significance, is of equal importance to all citizens of the state, is of state-wide concern, and, consequently, is properly a matter for regulation under the police powers of the state. The General Assembly further finds and declares that structures located upon tidewaters which are used as places of habitation, dwelling, sojournment, or residence interfere with the state's proprietary interest or the public trust, or both, and must be removed to ensure the rights of the state and the people of the State of Georgia to the use and enjoyment of such tidewaters. It is declared to be a policy of this state and the intent of this article to protect the tidewaters of the state by authorizing the commissioner of natural resources to remove or require removal of certain structures from such tidewaters in accordance with the procedures and within the timetable set forth in this article. (Code 1981, SS 52-1-2, enacted by Ga. L. 1992, p. 2317, SS 1.)

6.21.2 General Description

The Protection of Tidewaters Act establishes the State of Georgia as the owner of the beds of all tidewaters within the State, except where title by a private party can be traced to a valid British Crown or State land grant. The Act provides the Department of Natural Resources the authority to remove those "structures" that are capable of habitation, or incapable of or not used for transportation. Permits for such structures may not extend past June 30, 1997. The Act provides procedures for removal, sale, or disposition of such structures (This is similar to the Right of Passage Act, except that it is specific to tidewaters rather than all waters of Georgia.).

6.21.3 Consistency

It is understood that the State of Georgia has ownership of the beds of all tidewaters within the state. No structures associated with habitation would be built on these lands. The proposed project is fully consistent with this policy.

6.22 Recreational Docks

6.22.1 Policy Statement

50-16-61. General supervision and office assignment (Under the Administrative Procedures Act, Revocable License Program) The Governor shall have general supervision over all property of the state with power to make all necessary regulations for the protection thereof, when not otherwise provided for.

6.22.2 General Description

The provisions of O.C.G.A. 50-16-61 describe the general supervision of State properties as the responsibility of the Governor. Under this authority, the Department of Natural Resources, Coastal Resources Division issues Revocable Licenses for recreational docks on State-owned tidal water bottoms. In 1995, the Georgia Supreme Court found that the State owns fee simple title to the foreshore on navigable tidal waters and, as a result, owns the river's water bottoms up to the high water mark and may regulate the use of these tidelands for the public good. (Dorroh v. McCarthy 265 Ga. 750, 462 S.E. 2d 708 (1995). The opinion of the State Attorney General states: "In managing tidelands, the Department of Natural Resources acts under the authority of this section and the Department's employment of the extension of property lines method of allocating use of State-owned water bottoms may be generally acceptable, but rigid adherence to such a policy when it denies deep water access to a riparian or littoral owner, may cause inequitable results (1993 Opinion Attorney General No. 93-25). As described in the State Properties Code (O.C.G.A. 50-16-30, et seq.), the term "Revocable License" means "the granting, subject to certain terms and conditions contained in a written revocable license or agreement, to a named person or persons (licensee), and to that person or persons only, of a revocable privilege to use a certain described parcel or tract of the property to be known as the licensed premises for the named purpose." A Revocable License may be revoked, canceled, terminated, with or without cause, at any time by the licensor.

6.22.3 Consistency

This proposed project does not include construction of any recreational docks; therefore, this project is fully consistent with this policy.

6.23 Rights of Passage

6.23.1 Policy Statement

Right of Passage Act (O.C.G.A. 52-1-30, et seq.) 52-1-31. Legislative findings and declaration of policy. The General Assembly finds and declares that by the common law the citizens of this state have an inherent right to use as highways all navigable streams and rivers which are capable of transporting boats loaded with freight in the regular course of trade either for the whole or part of the year and that this right of use extends to the entire surface of the stream or river from bank to bank. The General Assembly further finds that the common law regarding such right of use has not been modified by statute nor is it incompatible with the federal or state constitutions. Therefore, the General Assembly declares that ensuring the right of use by all the citizens of this state of navigable streams and rivers which are capable of transporting boats loaded with freight in the regular course of trade either for the whole or part of the year as highways has more than local significance, is of equal importance to all citizens of the state, is of state-wide concern, and, consequently, is properly a matter for regulation under the police powers of the state. The General Assembly further finds and declares that structures located upon navigable streams and rivers which are used as places of habitation, dwelling, sojournment, or residence interfere with the citizens' right to use the entire surface of such streams and rivers which are capable of transporting boats loaded with freight in the regular course of trade either for the whole or part of the year from bank to bank as highways and must be removed to ensure the rights of the citizens of this state to such usage. It is declared to be a policy of this state and the intent of this article to ensure such rights of the citizens of this state by authorizing the commissioner of natural resources to remove or require removal of certain structures from such streams and rivers which are capable of transporting boats loaded with freight in the regular course of trade either for the whole or part of the year in accordance with the procedures and within the timetable set forth in this article (Code 1981, SS 52-1-31, enacted by Ga. L. 1992, p. 2317, SS 1.).

6.23.2 **General Description**

The Right of Passage Act declares the right of use of all navigable waterways of the state by all citizens of Georgia. The Act establishes the mechanism to remove “structures" that are capable of being used as a place of habitation, are not used as or are not capable of use as a means of transportation, and do not have a permit under the Act. Permits shall not be issued for a term ending after June 30, 1997. The Right of Passage Act is implemented by the Department of Natural Resources Law Enforcement Division. (This is similar to the Protection of Tidewaters Act, except that it is specific to all navigable waters rather than tidewaters Georgia.)

6.23.3 **Consistency**

It is understood that the State of Georgia has ownership of the beds of all navigable waters within the state. No structures associated with habitation would be built on these lands; therefore, the proposed project is fully consistent with this policy.

6.24 River Corridors

6.24.1 Policy Statement

Mountain and River Corridor Protection Act (O.C.G.A. 12-2-1. et seq.) 12-2-8. Promulgation of minimum standards and procedures for protection of natural resources, environment, and vital areas of the state. The local governments of the State of Georgia are of vital importance to the state and its citizens. The state has an essential public interest in promoting, developing, sustaining, and assisting local governments. The natural resources, environment, and vital areas of the state are also of vital importance to the state and its citizens. The state has an essential public interest in establishing minimum standards for land use in order to protect and preserve its natural resources, environment, and vital areas. The purpose of this Code section shall be liberally construed to achieve its purpose. This Code section is enacted pursuant to the authority granted the General Assembly in the Constitution of the State of Georgia, including, but not limited to, the authority provided in Article 111, Section VI, Paragraphs I and 11(a)(1) and Article IX, Section 11, Paragraphs Ill and IV.

The department is therefore authorized to develop minimum standards and procedures, in accordance with paragraph (2) of subsection (b) of Code Section 50-8-7.1 and in accordance with the procedures provided in Code Section 50-8-7.2 for the promulgation of minimum standards and procedures, for the protection of natural resources, environment, and vital areas of the state, including, but not limited to, the protection of mountains, the protection of river corridors, the protection of watersheds of streams and reservoirs which are to be used for public water supply, for the protection of the purity of ground water, and for the protection of wetlands, which minimum standards and procedures shall be used by local governments in developing, preparing, and implementing their comprehensive plans as that term is defined in paragraph (3) of subsection (a) of Code Section 50-8-2 (Code 1981, SS 12-2-8, enacted by Ga. L. 1989, p. 1317, SS 5. 1; Ga. L. 199 1, p. 1719, SS 1; Ga. L. 1992, p. 6. SS 12; Ga. L. 1993, p. 91, SS 12.).

6.24.2 General Description

The statute that is informally known as the Mountain and River Corridor Protection Act (O.C.G.A. 12-2-8) authorizes the Department of Natural Resources to develop minimum standards for the protection of river corridors (and mountains, watersheds, and wetlands) that can be adopted by local governments. The Act is administered by the Environmental Protection Division. All rivers in Georgia with an average annual flow of 400 cubic feet per second are covered by the Act, except those within the jurisdiction of the Coastal Marshlands Protection Act. Some of the major provisions of the Act include: requirements for a 100-foot vegetative buffer on both sides of rivers; consistency with the Georgia Erosion and Sedimentation Act; and local governments must identify river corridors in land-use plans developed under their respective comprehensive planning acts.

Regional Development Centers are instrumental in helping local governments enact the provisions of this Act. The Coastal Georgia Regional Development Center prepared a Regional River Corridor Protection Plan for counties within their jurisdiction. The Plan describes the ten local governments and the associated rivers that are affected by the River Corridor Protection Act, and puts forward a regional plan for the protection of river corridors. Regional plans are preferable to having local governments prepare individual plans. The plan provides for construction of road crossings, acceptable uses of river corridors, maintenance of a vegetative buffer along the river for a minimum of 100 feet from the river's edge (residential structures are allowed within the buffer zone), timber production standards, wildlife and fisheries management, recreation, and other uses. The local governments within the Coastal Regional Development Center jurisdiction affected by the River Corridor Protection Act, and their respective rivers are listed below. Eight coastal counties and two coastal cities (Richmond Hill and Woodbine) are affected.

Adoption of language addressing the River Corridor Protection Act is required in local comprehensive plans. The following counties and cities have adopted a Regional River Corridor Protection Plan.

COUNTY/CITY	RIVER
Bryan County	Canoochee River
City of Richmond Hill	Ogeechee
Camden County	Satilla River St. Mary's
City of Woodbine	Satilla River
Chatham County	Savannah
Effingham County	Ogeechee River
Glynn County	Altamaha River
Liberty County	Canoochee
Long County	Altamaha River
McIntosh County	Altamaha River

Jurisdiction of the River Corridor Protection Act extends along the above named rivers from the limit of Coastal Marshlands Protection Act jurisdiction upstream through the coastal counties.

6.24.3 Consistency

Waters adjacent to the project area are under the jurisdiction of the Coastal Marshlands Protection Act, rather than the River Corridor Protection Act. The proposed project is fully consistent with this policy.

6.25 Rivers and Harbors Development (Includes Burke-Day requirements)

6.25.1 Policy Statement

Rivers and Harbor Development (O.C.G.A. 52-9-2). The State of Georgia recognizes the need for maintaining navigation inlets, harbors, and rivers to promote commercial and recreational uses of our coastal waters and their resources. The State of Georgia further recognizes that dredging activities to deepen or maintain navigation channels within tidal inlets, as well as the entrances to harbors and rivers, often alter the natural drift of sand resources within the littoral zone. This alteration can be exacerbated when the sand resources are deposited in designated upland or offshore disposal areas instead of being returned to the natural river-sand transport-beach system. This alteration can adversely impact natural resources, recreation, tourism, and associated coastal economies. Moreover, the State of Georgia believes in the duties of government to protect life and property. Therefore, it is the policy of this state that there shall be no net loss of sand from the state's coastal barrier beaches resulting from dredging activities to deepen or maintain navigation channels within tidal inlets, as well as the entrances to harbors and rivers. Ga. L. 1967, p. 516; Ga. L. 1972, p. 1015, § 1516; Ga. L. 2002, p. 569, § 2; Ga. L. 2004, p. 784, § 1; Ga. L. 2005, p. 60, § 52/HB 95.

6.25.2 General Description

Disposal of sand and sediment originating from water navigation related projects

(a) With regard to all sand that is suitable for beach replenishment originating from the dredging of navigation channels within tidal inlets, as well as the entrances to harbors and rivers:

(1) Such sand shall be used to replenish the adjacent coastal beaches, if feasible, either by deposition of sand into the nearshore littoral zone or direct placement on affected beaches;

(2) If such sand is placed elsewhere, then a quality and quantity of sand from an alternate location necessary to mitigate any adverse effects caused by the dredging shall be used to replenish affected coastal beaches; provided, however, that this paragraph shall apply only where beach replenishment is necessary to mitigate effects from the dredging and dredged material removal from the natural river-sand transport-beach system of a specific project and beach replenishment from another source is the least costly environmentally sound mitigation option;

(3) The disposition of sand shall be completed in cooperation with and, when required by applicable state or federal law, with the approval of the local governing authority and the Department of Natural Resources according to the requirements of Part 2 of Article 4 of Chapter 5 of Title 12, the "Shore Protection Act"; and

(4) All such activities shall provide protection to coastal marshlands as defined in paragraph (3) of Code Section 12-5-282 and to nesting sea turtles and hatchlings and their habitats.

(b) The Department of Natural Resources and the party undertaking the dredging shall coordinate to determine the option under subsection (a) of this Code section for beach replenishment that is most beneficial to the adjacent or affected coastal beaches, including, where applicable, identifying an alternate source of sand for purposes of paragraph (2) of subsection (a) of this Code section, after taking into consideration environmental impacts and any limitation of applicable state and federal law.

6.25.3 **Consistency**

This proposed project does not include dredging or the need to place any dredged material within Georgia waters. The proposed project does not require the need to get material from nearby channels and no sand sources will be lost or disturbed in and around the project site. Fill material will come from clean sources offsite which will include bedding stone, riprap, and sheet pile. Therefore, the proposed project would be consistent with the River and Harbor Development Policy.

6.26 **Safe Drinking Water**

6.26.1 **Policy Statement**

Georgia Safe Drinking Water Act (0.C.G.A. 12-5-1 70, et seq.) 12-5-171. Declaration of policy; legislative intent; Environmental Protection Division to administer part. As a guide to the interpretation and application of this part, it is declared to be the policy of the State of Georgia that the drinking waters of the state shall be utilized prudently to the maximum benefit of the people and that the quality of such waters shall be considered a major factor in the health and welfare of all people in the State of Georgia. To achieve this end, the government of the state shall assume responsibility for the quality of such waters and the establishment and maintenance of a water-supply program adequate for present needs and designed to care for the future needs of the state.

This requires that an agency of the state be charged with this duty and that it have the authority to require the use of reasonable methods, that is, those methods which are economically and technologically feasible, to ensure adequate water of the highest quality for water-supply systems. Because of substantial and scientifically significant variations in the characteristics, usage, and effect upon public interest of the various surface and underground waters of the state, uniform requirements will not necessarily apply to all waters or segments thereof. It is the intent of this part to confer discretionary administrative authority upon such agency to take the above and related circumstances into consideration in its decisions and actions in determining, under the conditions prevailing in specific cases, those procedures to best protect the public interests. The Environmental Protection Division of the Department of Natural Resources shall be the

state agency to administer the provisions of this part consistent with the above-stated policy (Code 1933, SS 88-2601, enacted by Ga. L. 1964, p.499, SS 1; Ga. L. 1977, p.351, SS 1.).

6.26.2 General Description

The Georgia Safe Drinking Water Act of 1977 charges the Environmental Protection Division with the responsibility for maintaining the quality of drinking water and for maintaining a water-supply program adequate for present and future needs of the State. The Environmental Protection Division is designated as the agency to establish rules and policies for the proper administration of drinking water management programs.

6.26.3 Consistency

The proposed action would not adversely impact the principal drinking water aquifer (upper Floridan) in the coastal area. The closure of the three cuts would not be expected to adversely impact aquifer and production wells in and around the project area. Therefore, the proposed project is consistent with this Act.

6.27 Scenic Rivers

6.27.1 Policy Statement

Georgia Scenic Rivers Act (O.C.G.A. 12-5-350, et seq.) 12-5-352. Rivers comprising the Georgia Scenic River System. The Georgia Scenic River System shall be comprised of the following:

a. That portion of the Jacks River contained within the Cohutta National Wilderness Area and located in Fannin and Murray counties, Georgia, which portion extends a length of approximately 16 miles;

b. That portion of the Conasauga River located within the Cohutta National Wilderness Area and located in Fannin, Gilmer, and Murray counties, Georgia, which portion extends a length of approximately 17 miles;

c. That portion of the Chattooga River and its West Fork which are now designated as part of the Chattooga National Wild and Scenic River and located in Rabun County, Georgia, which portion extends a length of approximately 34 miles; and (4) That portion of Ebenezer Creek from Long Bridge on County Road S 393 to the Savannah River and located in Effingham County, Georgia, which portion extends a length of approximately seven miles. The Georgia Scenic River System shall also be comprised of any river or section of a river designated as a scenic river by Act or resolution of the General Assembly. (Ga. L. 1969, p. 933, SS 3; Ga. L. 1978, p. 2207, SS 1; Ga. L. 1981, p. 459, SS 1.)

6.27.2 General Description

The Georgia Scenic Rivers Act of 1969 defines "scenic river" to mean certain rivers or section of rivers that have valuable scenic, recreational, or natural characteristics that should be preserved for the benefit and enjoyment of present and future generations. Certain sections of rivers are named in the Act, and the process for designating other sections of Georgia rivers is described. The Georgia Scenic Rivers Act is administered by the Environmental Protection Division.

6.27.3 Consistency

The project area does not include any rivers covered under this act. The project is fully consistent with this policy.

6.28 Scenic Trails

6.28.1 Policy Statement

Georgia Scenic Trails Act (O.C.G.A. 12-3-110, et seq.) 12-3-111. Legislative purpose.

In order to provide for the increasing outdoor recreation needs of an expanding population with an increasing amount of leisure time, in order to promote the enjoyment and appreciation of the outdoor areas of Georgia, and in order to provide for a healthful alternative to motorized travel, trails should be established in urban, suburban, rural, and wilderness areas of Georgia. Therefore, the purpose of this article is to provide for a Georgia Scenic Trails System. (Ga. L. 1972, p. 142, SS 2.)

6.28.2 General Description

The Georgia Scenic Trails Act authorizes the Department of Natural Resources to establish a Scenic Trails System in Georgia. The Department is authorized to construct, maintain, and manage trails on lands acquired through purchase, easement, lease or donation. The purpose is to create a balanced system of trails throughout the State, including urban, bicycle, horse, rural hiking, primitive hiking, historical, bikeways and combination trails. The Georgia Department of Transportation is authorized to construct the bicycle trails and bikeways after the Department of Natural Resources has determined their routes.

6.28.3 Consistency

This proposed action would not involve lands that could be considered suitable for establishing a scenic trail; therefore, the proposed project is fully consistent with this policy.

6.29 Septic Tanks

6.29.1 Policy Statement

Title 31 -- Health (O.C.G.A. Title 31 generally) (Septic Tank Law) 31-2-7. Standards for individual sewage management systems.
The Department of Human Resources shall have the authority as it deems necessary and proper to adopt statewide minimum standards for on-site, individual sewage management systems, including but not limited to standards for the size and construction of septic tanks. The Department is authorized to require that any on-site, individual sewage management system be examined and approved prior to allowing the use of such system in the state. Any on-site, individual sewage management system which has been properly approved shall, by virtue of such approval and by operation of law, be approved for installation in every county of the state; provided, however, that such on-site, individual sewage management system shall be required to meet local regulations authorized by law. Upon written request of three or more health districts, the department is authorized to require the reexamination of any such system or component thereof, provided that documentation is submitted indicating unsatisfactory service of such system or component thereof. Before any such examination or reexamination, the department may require the person, persons, or organization manufacturing or marketing the system to reimburse the department or its agent for the reasonable expenses of such examination. (Code 1981, SS 31-2-7, enacted by Ga. L 1992, p. 3308, SS 1; Ga. L. 1994, p. 1777, SS 1.) 31-3-5.1. Regulations for septic tanks for individual sewage management systems in unincorporated areas; conformity to building permit.

No building permit for the construction of any residence, building, or other facility which is to be served by a septic tank or individual sewage management system shall be issued by or pursuant to the authority of a county governing authority unless the septic tank or individual sewage management system installation permit is in conformity with any statewide minimum standards for sewage management systems or the rules and regulations of the county board of health adopted pursuant to the authority of subsection (a) of this Code section. No person, firm, corporation, or other entity shall install a septic tank or individual sewage management system in violation of any state-wide minimum standards or the regulations of a county board of health adopted pursuant to the authority of subsection (a) of the Code section. Each county governing authority shall provide by ordinance or resolution for the enforcement of the provisions of this subsection. (Code 198 1, SS 31-3-5. 1, enacted by Ga. L. 1986, p. 227, SS 1; Ga. L. 1992, p. 3308. SS 2; Ga. L. 1994, p. 1777, SS 2.)

6.29.2 General Description

As stated above, the standards and regulations for individual sewage management systems are found at O.C.G.A. 31-2-7 and 31-3-5.1. The Department of Human Resources and the county boards of health are described and established by Title 31. There are other references for managing septic systems throughout the Code, including

references within the River Corridor Protection Act (O.C.G.A. 12-2-8), the Georgia Water Quality Control Act (O.C.G.A. 12-5-20), and others, which make reference to safe siting of septic systems to ensure that leakage from those systems does not infiltrate the waters of the State. The county board(s) of health is provided the authority and the responsibility to ensure safe installation and maintenance of septic systems.

6.29.3 **Consistency**

No septic tanks are proposed as part of this project; therefore, the proposed project is fully consistent with this policy.

6.30 **Shellfish**

6.30.1 **Policy Statement**

Game and Fish Code (O.C.G.A. 27-1-1. et seq.) 27-4-190. Master collecting and picker's permits; hours for taking shellfish; recreational harvesting.

(a) It shall be unlawful to take or possess shellfish in commercial quantities or for commercial purposes without first having obtained a master collecting permit or without proof of purchase that such shellfish were purchased from a certified shellfish dealer. Master collecting permits shall specify whether the permittee is authorized to take oysters, clams, or other shellfish and shall only be issued to persons certified by the Department of Agriculture to handle shellfish unless permission to take and possess shellfish for mariculture purposes has been granted by the department as described in subsection (d) of Code Section 27-4-197. Such permits shall be provided annually at no cost by the department but shall only be issued to persons with the right to harvest shellfish pursuant to Code Sections 44-8-6 through 44-8-8 or to holders of leases from such persons. A permittee may request authorization from the department for employees or agents, who shall be referred to as pickers, of such permittee to take shellfish from permitted areas. Such request shall be in writing to the department and shall include the name, address, and personal commercial fishing license number of the picker. It shall be unlawful for pickers to take or possess shellfish as authorized under their employer's master collecting permit unless they carry on their person while taking or in possession of shellfish a picker's permit as provided by the department indicating the exact area and circumstances allowed for taking. Such pickers' permits and charts shall be provided annually by the department at no cost and shall be in a form as prescribed by the department. Pickers must possess a valid personal commercial fishing license as provided for in Code Section 27-4-110 and, when a boat is used, a valid commercial fishing boat license as provided in Code Section 27-2-8. Master collecting permits and pickers' permits shall not be issued to persons who have been convicted three times in the two years immediately preceding the filing of an application for a permit of violations of this Code section, subsection

(b) of Code Section 27-4-193, subsections (a) and (b) of Code Section 27-4-195, or Code Section 27-4-199. Master collecting permits and pickers' permits issued to master collecting permittee’s agents shall be surrendered to the department upon termination of Department of Agriculture certification for handling shellfish, upon

termination of right to harvest shellfish, or upon violation of any provision of this title. If a picker is removed from authorization to take shellfish by the master collecting permittee, that picker shall immediately surrender to the department his picker's permit. It shall be unlawful to possess unauthorized pickers' permits or pickers' permits issued to another person.

(c) It shall be unlawful for any person to take or possess shellfish from unauthorized locations and during unauthorized periods of taking. It shall be unlawful to take shellfish except between the hours of one-half hour before sunrise and one-half hour after sunset.

(Code 1981, SS 27-4-190, enacted by Ga. L. 1991, p. 693, SS 6.) 27-4-193. Taking shellfish from unapproved growing areas; operating facility for controlled purification of shellfish.

(a) As used in this Code section, the term "approved growing area" means that area or areas approved by the department for shellfish harvesting and "unapproved growing area" means all other areas.

(b) It shall be unlawful to take or possess shellfish from unapproved growing areas except at such times and places as the department may establish. The department is authorized to close approved growing areas to allow transplanting at any time between January 1 and December 31. It shall be unlawful to engage in transplanting of shellfish from unapproved growing areas without written authorization from the department. Such authorization may condition the transplanting upon compliance with current, sound principles of wildlife research and management. In approving growing areas, the department shall consider such current guidelines as have been established by the National Shellfish Sanitation Program at the time of approval of the growing areas and current, sound principles of wildlife research and management. (Code 1981, SS 27-4-193, enacted by Ga. L. 1991, p. 693, SS 6; Ga. L. 1992, p. 6, SS 27.)

6.30.2 **General Description**

The provisions of O.C.G.A. Title 27 (Game and Fish Code), Part 4 describe the regulation of shellfish in Georgia. The provisions describe the requirements for a commercial shellfish harvester to have a license, issued by the Department of Natural Resources pursuant to the requirements of the US Department of Agriculture. The Department also is authorized to approve shellfish growing areas for commercial harvest, and must consider the guidelines established by the National Shellfish Sanitation Program. The Department conducts water sampling in areas that are approved for shellfish in conjunction with the National Shellfish Sanitation Program.

6.30.3 **Consistency**

No commercial shellfish harvesting areas or shellfish growing areas would be impacted as part of this project. The following web link provided by Georgia Department of Natural Resources, Coastal Resources Division (http://gcmp.maps.arcgis.com/apps/webappviewer/index.html?id=08a1acc235d6462e8

aeea6f779341627) shows the only shellfish locations near the proposed project area. These two area are located far away from where the proposed project would occur. So no adverse impacts to them are expected. The proposed project is fully consistent with this policy.

6.31 Shore Protection

6.31.1 Policy Statement

Shore Protection Act (O.C.G.A. 2-5-230, et seq.) 12-5-231. Legislative findings and declarations. The General Assembly finds and declares that coastal sand dunes, beaches, sandbars, and shoals comprise a vital natural resource system, known as the sand-sharing system, which acts as a buffer to protect real and personal property and natural resources from the damaging effects of floods, winds, tides, and erosion. It is recognized that the coastal sand dunes are the most inland portion of the sand-sharing system and that because the dunes are the fragile product of shoreline evolution, they are easily disturbed by actions harming their vegetation or inhibiting their natural development. The General Assembly further finds that offshore sandbars and shoals are the system's first line of defense against the potentially destructive energy generated by winds, tides, and storms, and help to protect the onshore segment of the system by acting as reservoirs of sand for the beaches. Removal of sand from these bars and shoals can interrupt natural sand flows and can have unintended, undesirable, and irreparable effects on the entire sand-sharing system, particularly when the historical patterns of sand and water flows are not considered and accommodated. Also, it is found that ocean beaches provide an unparalleled natural recreation resource which has become vitally linked to the economy of Georgia's coastal zone and to that of the entire state. The General Assembly further finds that this natural resource system is costly, if not impossible, to reconstruct or rehabilitate once adversely affected by man related activities and is important to conserve for the present and future use and enjoyment of all citizens and visitors to this state and that the sand-sharing system is an integral part of Georgia's barrier islands, providing great protection to the state's marshlands and estuaries. The General Assembly further finds that this sand-sharing system is a vital area of the state and is essential to maintain the health, safety, and welfare of all the citizens of the state. Therefore, the General Assembly declares that the management of the sand-sharing system has more than local significance, is of equal importance to all citizens of the state, is of state-wide concern, and consequently is properly a matter for regulation under the police power of the state. The General Assembly further finds and declares that activities and structures on offshore sandbars and shoals, for all purposes except federal navigational activities, must be regulated to ensure that the values and functions of the sand-sharing system are not impaired. It is declared to be a policy of this state and the intent of this part to protect this vital natural resource system by allowing only activities and alterations of the sand dunes and beaches which are considered to be in the best interest of the state and which do not substantially impair the values and functions of the sand-sharing system and by authorizing the local units of government of the State of Georgia to regulate activities and alterations of the ocean sand dunes and beaches and recognizing that, if the local

units of government fail to carry out the policies expressed in this part, it is essential that the department undertake such regulation. (Code 1981, SS12-5-231, enacted by Ga. L. 1992, p.1362, SS 1.)

6.31.2 **General Description**

The Shore Protection Act is the primary legal authority for protection and management of Georgia's shoreline features including sand dunes, beaches, sandbars, and shoals, collectively known as the sand-sharing system. The value of the sand-sharing system is recognized as vitally important in protecting the coastal marshes and uplands from Atlantic storm activity, as well as providing valuable recreational opportunities.

The Shore Protection Act limits activities in shore areas and requires a permit for certain activities and structures on the beach. Construction activity in sand dunes is limited to temporary structures such as crosswalks, and then only by permit from the Georgia Coastal Resources Division. Structures such as boat basins, docks, marinas, and boat ramps are not allowed in the dunes. Shore Permits, which are administered by the Coastal Resources Division, are not granted for activities that are inconsistent with the Georgia Coastal Management Program. The Shore Protection Act prohibits operation of any motorized vehicle on or over the dynamic dune fields and beaches, except as authorized for emergency vehicles, and governmental vehicles for beach maintenance or research. The Shore Protection Act also prohibits storage or parking of sailboats, catamarans, or other marine craft in the dynamic dune field.

Direct permitting authority regarding any proposed facilities located within the jurisdictional area the Shore Protection Act lies with the Shore Protection Committee. These permits are administered by the Georgia Coastal Resources Division. This authority is a very important aspect of the Georgia Coastal Management Program, since recreation at the water's edge is a significant demand. Providing public access and recreational opportunities at or near the beach while protecting the sand sharing system is an important component of the Program.

6.31.3 **Consistency**

The proposed action is not expected to adversely impact this resource. Positive impacts could occur from closing the cuts by restoring historic conditions of salinity regimes and increasing connectivity for local fauna into the upper reaches of Dover and Umbrella Creeks. Since the action alternatives involve restoring natural circulation patterns by closing man-made cuts, overall impacts are expected to be beneficial on an individual project and cumulative effects basis.

6.32 Solid Waste Management

6.32.1 Policy Statement

Georgia Comprehensive Solid Waste Management Act (0.C.G.A. 12-8-21, et seq.) 12-8-21. Declaration of policy; legislative intent.
(a) It is declared to be the policy of the State of Georgia, in furtherance of its responsibility to protect the public health, safety, and well-being of its citizens and to protect and enhance the quality of its environment, to institute and maintain a comprehensive state-wide program for solid waste management which will assure that solid waste facilities, whether publicly or privately operated, do not adversely affect the health, safety, and well-being of the public and do not degrade the quality of the environment by reason of their location, design, method of operation, or other means and which, to the extent feasible and practical, makes maximum utilization of the resources contained in solid waste.
(b) It is further declared to be the policy of the State of Georgia to educate and encourage generators and handlers of solid waste to reduce and minimize to the greatest extent possible the amount of solid waste which requires collection, treatment, or disposal through source reduction, reuse, composting, recycling, and other methods and to promote markets for and engage in the purchase of goods made from recovered materials and goods which are recyclable. (Code 1981, SS 12-8-21, enacted by Ga. L. 1990, p. 412, SS 1; Ga. L. 1992, p. 3259, SS 1; Ga. L. 1993, p. 399, SSSS 1, 2.)

6.32.2 General Description

The Georgia Comprehensive Solid Waste Management Act defines the rules regarding solid waste disposal in the State. Solid waste handling facilities must be permitted by the State unless an individual is disposing of waste from his own residence onto land or facilities owned by him and disposal of such waste does not adversely affect human health (O.C.G.A. 12-8-30.10). State law mandates that a county, municipality, or group of counties beginning a process to select a site for municipal waste disposal must first call at least one public meeting.

In addition to the above-named jurisdictions, a regional solid waste management authority must hold at least one meeting within the jurisdiction of each participating authority. Meetings held to make siting decisions for any publicly or privately owned municipal solid waste disposal facility must be publicized before the meeting is held (O.C.G.A. 12-8-26). Each city and county is required to develop a comprehensive solid waste management plan that, at a minimum, provides for the assurance of adequate solid waste handling capability and capacity for at least ten years. This plan must identify those sites that are not suitable for solid waste facilities based upon environmental and land use factors (O.C.G.A. 12-8-3 1. 1); these factors may include historic and archeological sites. Solid waste facilities within 5,708 yards of a national historic site are not permitted (O.C.G.A. 12-8-25. 1). Solid waste facilities on property owned exclusively by a private solid waste generator are generally exempt from these provisions. Local governments have the authority to zone areas of environmental,

historic, or cultural sensitivity and to protect those sites from becoming waste disposal areas regardless of whether they are public or privately owned.

6.32.3 Consistency

The proposed action does not include materials that meet the definition of solid waste and therefore do not require treatment as such. The proposed project is fully consistent with this policy.

6.33 Surface Mining

6.33.1 Policy Statement

Georgia Surface Mining Act (O.C.G.A. 12-4-70, et seq.) 12-4-71. Legislative purpose; duty of Environmental Protection Division to administer part.

(a) The purposes of this part are:

(1) To assist in achieving and maintaining an efficient and productive mining industry and to assist in increasing economic and other benefits attributable to mining;

(2) To advance the protection of fish and wildlife and the protection and restoration of land, water, and other resources affected by mining;

(3) To assist in the reduction, elimination, or counteracting of pollution or deterioration of land, water, and air attributable to mining;

(4) To encourage programs which will achieve comparable results in protecting, conserving, and improving the usefulness of natural resources to the end that the most desirable conduct of mining and related operations may be universally facilitated;

(5) To assist in efforts to facilitate the use of land and other resources affected by mining so that such use may be consistent with sound land use, public health, and public safety, and to this end to study and recommend, wherever desirable, techniques for the improvement, restoration, or protection of such land and other resources.

(b) The Environmental Protection Division of the department shall administer this part consistent with the above-stated purposes. (Ga. L. 1968, p. 9, SS 2.)

6.33.2 General Description

Georgia's Surface Mining Act regulates all surface mining in Georgia, including the coastal zone. Dredging or ocean mining of materials are not directly regulated by State authority, except that sand and gravel operations are subject to the Shore Protection Act.

6.33.3 Consistency

The proposed action of closing the three cuts is not considered a mining operation. There is no dredging recommended. Therefore, there won’t be any resultant sediment from the channel that would be sold or processed. The proposed project is fully consistent with this policy.

6.34 Underground Storage Tanks

6.34.1 Policy Statement

Georgia Underground Storage Tank Act (O.C.G.A. 12-3-1. et seq.) 12-13-2. Public policy.

(a) It is declared to be the public policy of the State of Georgia, in furtherance of its responsibility to protect the public health, safety, and well-being of its citizens and to protect and enhance the quality of its environments, to institute and maintain a comprehensive state-wide program for the management of regulated substances stored in underground tanks.

(b) It is the intent of the General Assembly that the Environmental Protection Division of the Department of Natural Resources shall be designated as the state agency to administer the provisions of this chapter. The director of the Environmental Protection Division of the Department of Natural Resources shall be the official charged with the primary responsibility for the enforcement of this chapter. In exercising any authority or power granted by this chapter and in fulfilling duties under this chapter, the director shall conform to and implement the policies outlined in this chapter.

(c) It is the intent of the General Assembly to create an environmental assurance fund which, in addition to those purposes set forth in subsections (f) and (g) of Code Section 1 2-1 3-9, may also be used by owners and operators as an alternate to insurance purchased from insurance companies for purposes of evidencing financial responsibility for taking corrective action and compensation of third parties for bodily injury and property damage caused by sudden and non-sudden accidental releases arising from operating underground storage tanks. (Code 1981, SS 12-13-2, enacted by Ga.L. 1988, p. 2072, SS 1; Ga.L. 1989, p. 14, SS 12.)

6.34.2 General Description

The Underground Storage Tank Law provides the authority for the Environmental Protection Division to define the State criteria for operating, detecting releases, corrective actions, and enforcement of the utilization of underground storage tanks (USTs). The rules, found at Chapter 391-3-15 of the Rules and Regulations of the State of Georgia, establish minimum standards and procedures to protect human health and safety and to protect and maintain the quality of groundwater and surface water resources from environmental contamination that could result from any releases of harmful substances stored in such tanks. These requirements reflect the federal law regulating underground storage tanks as well as the applicable State rules. All facilities with underground storage tanks are subject to these requirements. The Memorandum of Agreement between the Coastal Resources Division and the Environmental Protection Division ensures cooperation and coordination in the implementation of UST standards within the coastal area.

6.34.3 Consistency

No installation of USTs is proposed for this project. The proposed project is fully consistent with this policy.

6.35 Water Quality

6.35.1 Policy Statement

Georgia Water Quality Control Act (O.C.G.A. 12-5-20) 12-5-21. Declaration of policy, legislative intent.

(a) The people of the State of Georgia are dependent upon the rivers, streams, lakes, and subsurface waters of the state for public and private water supply and for agricultural, industrial, and recreational uses. It is therefore declared to be the policy of the State of Georgia that the water resources of the state shall be utilized prudently for the maximum benefit of the people, in order to restore and maintain a reasonable degree of purity in the waters of the state and an adequate supply of such waters, and to require where necessary reasonable usage of the waters of the state and reasonable treatment of sewage, industrial wastes, and other wastes prior to their discharge into such waters. To achieve this end, the government of the state shall assume responsibility for the quality and quantity of such water resources and the establishment and maintenance of a water quality and water quantity control program adequate for present needs and designed to care for the future needs of the state, provided that nothing contained in this article shall be construed to waive the immunity of the state for any purpose.

(b) The achievement of the purposes described in subsection (a) of this Code section requires that the Environmental Protection Division of the Department of Natural Resources be charged with the duty described in that subsection, and that it have the authority to regulate the withdrawal, diversion, or impoundment of the surface waters of the state, and to require the use of reasonable methods after having considered the technical means available for the reduction of pollution and economic factors involved to prevent and control the pollution of the waters of the state.

(c) Further, it is the intent of this article to establish within the executive branch of the government administrative facilities and procedures for determining improper usage of the surface waters of the state and pollution of the waters of the state, and to confer discretionary administrative authority upon the Environmental Protection Division to take these and related circumstances into consideration in its decisions and actions in determining, under the conditions and specific cases, those procedures which will best protect the public interest. (Ga. L. 1957, p. 629, SS 2; Ga. L. 1964, p. 416, SS 2; Ga. L. 1977, p. 368, SS 1.)

6.35.2 General Description

The Georgia Water Quality Control Act grants the Environmental Protection Division authority to ensure that water uses in the State of Georgia are used prudently, are maintained or restored to a reasonable degree of purity, and are maintained in

adequate supply. In the administration of this law, the Environmental Protection Division can revise rules and regulations pertaining to water quality and quantity, set permit conditions and effluent limitations, and set permissible limits of surface water usage for both consumptive and non-consumptive uses through the Board of Natural Resources. Through a Memorandum of Agreement between the Environmental Protection Division and the Coastal Resources Division, the rules and permits of the Environmental Protection Division are administered in a manner consistent with the enforceable policies of the Coastal Management Program.
The authority to regulate the rivers, streams, lakes, and subsurface waters throughout the State for public and private water supply and agricultural, industrial, and recreational uses is provided to the Environmental Protection Division. The Act makes it unlawful for any person to dispose of sewage, industrial wastes, or other wastes, or to withdraw, divert, or impound any surface waters of the State without a permit. Tourism and recreational entities, manufacturing and transportation facilities, and other activities found in the coastal zone covered under the policies of the Georgia Coastal Management Program are responsible for compliance with the regulations implementing the Georgia Water Quality Control Act.

6.35.3 Consistency

A benefit of closing the man-made cuts would be restoring the natural tidal flows that typically occurs in along the length of unaltered tidal creeks. Additional benefits of restoring depths and flows in the study area would include increased dissolved oxygen (DO) levels, decreased Total Suspended Solids (TSS), and improved nutrient exchange between the Satilla River, St. Andrews Sound, and the Atlantic Ocean.

The proposed project will require a Section 401 Water Quality Certification by the Georgia DNR Environmental Protection Division. The proposed project would adhere to any conditions associated with the Certification and therefore, the project would be fully consistent with this policy.

6.36 Water Wells

6.36.1 Policy Statement

Water Wells Standards Act (O.C.G.A. 12-5-120, et seq.) 12-5-121. Legislative intent. It is the intent of the General Assembly to provide in this part for the application of standards for the siting, construction, operation, maintenance, and abandonment of wells and boreholes so as to protect the public health and the water resources of this state. (Ga.L. 1976, p. 974, SS 2; Ga.L. 1985, p. 1192, SS 1.)

6.36.2 General Description

The Water Wells Standards Act of 1985 provides standards for siting, constructing, operating, maintaining, and abandoning wells and boreholes. The Act requires that individual and non- public wells must be located as far removed from known or potential

sources of pollutants as possible. Licensing requirements for drilling contractors are established by the Act, as well a State Water Well Standards Advisory Council. The Council is authorized to adopt and amend rules and regulations that are reasonable to govern the licensing of well contractors. Compliance with the Water Wells Standards Act is required for all activities that utilize well water. The provisions of the Act are enforceable under Georgia law. The Council may file a petition for an injunction in the appropriate superior court against any person that has violated any provisions of the Act.

6.36.3 Consistency

There will be no impacts to wells or boreholes as a result of the proposed action, therefore, the proposed project is fully consistent with this policy.

6.37 Wildflower Preservation

6.37.1 Policy Statement

The Wildflower Preservation Act (O.C.G.A. 12-6-170, et seq.) 12-6-172. Powers and duties of Department and Board of natural Resources as to wildflower preservation. (a) The Department of Natural Resources shall from time to time designate as a protected species and species of plant life within this state which it may determine to be rare, unusual, or in danger of extinction, and upon such designation such species will become subject to the protection of this article. (Ga.L. 1973, p. 333, SS 3; Ga.L. 1982, p. 3, SS 12.)

6.37.2 General Description

The Wildflower Preservation Act provides for designation of and protection of plant species that are rare, unusual, or in danger of extinction. Additional species may be added by the Board of Natural Resources at any time. The protection offered to these species is limited to those that are found on public lands of the State. It is a misdemeanor to transport, carry, convey, sell, cut, pull up, dig up, or remove protected species listed by this Act.

6.37.3 Consistency

The proposed work would not impact any land which contains wildflowers that are considered rare, unusual, or in danger of extinction. The proposed project is fully consistent with this policy.

7.0 Other Management Authorities

The paragraphs in this section describe management authorities which provide the Coastal Resources Division with additional tools and mechanisms to accomplish the

goals of the Georgia Coastal Management Program. Although these authorities are not listed as policies of the Program, they are laws of the State. Most of the statutes referenced here are primarily procedural. These laws and programs are not considered enforceable policies of the Georgia Coastal Management Program and thus are not used in preparing or reviewing Federal Consistency Determinations and certifications.

7.1 Coordinated and Comprehensive Planning by Counties

(Informally known as the Georgia Planning Act) The Georgia Planning Act (O.C.G.A. 45-12- 200, et seq.) requires each local government to develop a comprehensive plan to guide growth and development as a condition to receive State funding assistance. Under the Georgia Planning Act, minimum planning standard was developed for the preparation, adoption, and implementation of local comprehensive plans. The planning standards constitute a three-step planning process: inventory and assessment; needs and goals; and implementation and strategy. The Act establishes Regional Development Centers (RDCs) throughout Georgia. Three of these Centers have jurisdiction within the coastal zone: the Southeast Georgia RDC includes Brantley and Charlton counties; the Heart of Georgia RDC includes Wayne County; and the Coastal Georgia RDC includes the remaining eight counties (Bryan, Camden, Chatham, Effingham, Glynn, Liberty, Long, and McIntosh). The role of the RDCs is to work with local and county governments individually and on a regional basis to improve services and programs, consistent with local comprehensive plans, to benefit residents of the region. The Coastal Management Program works closely with the RDCs to implement the policies of the Program. Many of the goals, objectives and policies of the Georgia Coastal Management Program can be achieved by local comprehensive planning processes and implemented through local land-use controls and the public infrastructure.

The proposed work would take place in Georgia. The Coastal Georgia RDC has jurisdiction for the portion of this project located within Camden County Georgia. The proposed project will be coordinated with stakeholders, interested agencies, the public, and the Coastal Georgia RDC. It is not expected that the proposed work would conflict with any aspect of an existing long term comprehensive land use plan.

7.2 Georgia Administrative Procedures Act

The Georgia Administrative Procedures Act (O.C.G.A. 50-13-4, et seq.) establishes the procedural requirements for adoption, amendment, or repeal of rules and regulations, among other things. New rules require at least 30 days notice of intended action. Similar public comment requirements are required for federal regulatory actions. Public comment and input is important for any regulatory action, both to provide an opportunity for presentation of citizens' ideas and concerns and to provide time for implementation by those entities that may be potentially impacted.

The 30-day public comment period for the draft Integrated Feasibility Report and Environmental Assessment, which is a requirement of the NEPA process, provide a

formal avenue for the public to provide input on the proposed project. The proposed project complies fully with the spirit of the Georgia Administrative Procedures Act.

7.3 Georgia Litter Control Law

The Georgia Litter Control Law (O.C.G.A. 16-7-40, et seq.) makes it unlawful for any person or persons, "...to dump, deposit, throw, or leave or to cause or permit the dumping, placing, throwing, or leaving of litter on any public or private property in this state or any waters in this state" unless the situation meets one of three conditions. Litter may be disposed at a site if (1) the property is designated as a litter disposal site, (2) litter is placed in a proper receptacle, and/or (3) litter is disposed of by permission of the property owner in a manner consistent with the public welfare.

Construction contracts would contain provisions which require the contractors to remove all construction debris from the project sites as part of their demobilization activities. The proposed project complies with the intent of the Georgia Litter Control Law.

7.4 Georgia Uniform Conservation Easement Act

The Georgia Uniform Conservation Easement Act (O.C.G.A. 44-10-1, et seq.) defines "conservation easement" to mean a non-possessory interest in real property, with limitations or affirmative obligations, the purposes of which include retaining or protecting natural property; assuring its availability for agricultural, forest, recreational, or open space use; protecting natural resources; maintaining or enhancing air or water quality; or preserving the historical, archeological, or cultural aspects of real property. A landholder may be a government agency or a charitable organization.

The proposed action would not include or adversely affect any “conservation easements” and therefore the proposed action would be in compliance with the Georgia Uniform Conservation Easement Act.

8.0 State Programs

The following State programs contribute towards effective management of Georgia's coastal resources. As non-regulatory programs, they do not constitute enforceable policies of the Program and are not used in Federal consistency reviews. The District has included a discussion of these programs in this Consistency Determination because of the goals of these programs. In general, these programs would be expected to apply to work in Georgia.

8.1 Acres for Wildlife Program

The Acres for Wildlife Program is administered by the Non-game and Endangered Wildlife Program of the Georgia Department of Natural Resources to provide technical assistance to private landowners for resource and habitat management. The Program

helps to identify wildlife habitat and provides advice to help the landowner manage the property for the welfare of the wildlife.

This program does not apply to the proposed project.

8.2 Certified Burner Program

The Certified Burner Program is administered by the Georgia Forestry Commission to educate the citizens of Georgia about safe burning techniques. The Georgia General Assembly declared that prescribed burning is a resource protection and land management tool that benefits the safety of the public, Georgia's forest resources, the environment and the economy of the State (O.C.G.A. 12-6-146).

The proposed action does not include any prescribed burning.

8.3 Community Wildlife Project

The Community Wildlife Project is the only wildlife habitat certification program directed to the community as a whole. It is designed to encourage and improve management of wildlife habitats found in urban, suburban, and semi-rural areas. The program is administered by local garden clubs affiliated with the Garden Clubs of Georgia in concert with the Non-game and Endangered Wildlife Program of the Georgia Department of Natural Resources. The Community Wildlife Project establishes minimum criteria for community-based habitat management projects.

This policy does not apply to the proposed action.

8.4 Forest Stewardship Program

The Forest Stewardship Program is administered by the Georgia Forestry Commission in cooperation with the Non-game and Endangered Wildlife Division of the Department of Natural Resources. The Program is designed to provide technical assistance to private landowners for management of forest lands. A concomitant Stewardship Incentive Program provides State funding on a cost-sharing basis to implement certain aspects of the program.

This policy does not apply to the proposed action.

8.5 Heritage 2000

Heritage 2000 is a public-private partnership program designed by Governor Miller to acquire historic property and resources throughout Georgia. The initiative is modeled after Preservation 2000.

This policy does not apply to the proposed action.

8.6 Georgia's Non-game Wildlife Conservation and Habitat Fund

Georgia's Non-game Wildlife Conservation and Habitat Fund (O.C.G.A. 12-3-600, et seq.) provides the Department of Natural Resources a mechanism to establish non-game wildlife conservation and habitat acquisition, as well as education programs to enhance the protection of non-game flora and fauna. The Department of Natural Resources may solicit voluntary contributions through an income tax return contribution mechanism, by offers to match contributions, or by fund raising or other promotional techniques. Any funds collected are placed into a "Non-game Wildlife Conservation and Wildlife Habitat Acquisition Fund."

This policy does not apply to the proposed action.

8.7 Preservation 2000

Preservation 2000 is a three-year program implemented by Governor Miller in 1994 to acquire approximately 100,000 acres for the State of Georgia to preserve natural areas, historic sites, parks, wildlife management areas and similar sites. It is funded by a $65 million bond fund, approximately $1.45 million in gifts, and small amounts of Federal funds. Since its inception, over 84,000 acres have been acquired and approximately 33,000 acres are under negotiation during the summer of 1997. There were over 450 nominations of various parcels throughout the State. Currently, there are four natural areas and two wildlife management areas designated within the coastal area as a result of Preservation 2000. Some of the 33,000 acres under negotiation lies within the coastal area. The areas acquired provide such uses as protection for bald eagles and other endangered species, hunting, fishing, boating, nature observation, primitive camping, scientific study and protection of water quality for shellfish. A concomitant part of the Preservation 2000 program is the Georgia Greenways Council, a coalition of trail organizations and local, State and Federal agencies involved with trail development. The coalition promotes the protection of linear corridors and coordinates trail development throughout the State. A proposed Coastal Water Trail, the aquatic equivalent of the Appalachian Trail, would run along Georgia's coast from the Savannah River to the St. Mary's River. This trail would provide routing for sea kayaks and other small craft, and include access trails, boat launching sites and camping areas.

This policy does not apply to the proposed action.

8.8 River Care 2000

River Care 2000 is a public-private partnership program designed by Governor Miller to acquire natural areas and historic property along Georgia's riverbanks. The initiative is modeled after Preservation 2000. River Care 2000 is intended to provide recreation and park land, and to allow better flood management.

This policy does not apply to the proposed action.

9.0 Local Land Use Plans

The draft Integrated Feasibility Report and Environmental Assessment for this project will be coordinated with interested parties in Georgia to ensure the proposed action is in compliance with all local land use plans.

10.0 Conclusion

In accordance with the CZMA, 16 U.S.C. SS 1456(c), as amended, it has been determined that the proposed action of closing a combination of man-made cuts to restore historic conditions of salinity regimes would be carried out in a manner which is fully consistent with the enforceable policies of the Georgia Coastal Management Plan. This determination applies to the proposed alternative and the effects of the preferred alternative on the land or water uses or natural resources of the coastal zone, as directed by 15 C.F.R. SS 930.39.

APPENDIX H

COST APPENDIX

NOYES CUT, SATILLA RIVER BASIN, GEORGIA

Section 1135 – Project Modifications for Improvement of the Environment

1.0 Cost Engineering Appendix – Noyes Cut Environmental Restoration

The goal of the cost appendix is to present a Total Project Cost (construction and non-construction costs) for the Recommended Plan(s) at the constant dollar price level to be used for project justification/authorization and to escalate costs for budgeting purposes. In addition, the costing efforts are intended to produce a final product (cost estimate) that is reliable and accurate, and that supports the definition of the Government's and the non-Federal sponsor's obligations.

The preparation of cost estimate for planning purposes are in accordance with guidelines and policies included in:
• Engineering Regulation (ER) 1110-1-1300 - Cost Engineering Policy and General Requirements, 26 March 1993
• ER 1110-2-1302 - Civil Works Cost Engineering, 15 September 2008
• ER 1105-2-100 – Planning Guidance Notebook, 22 April 2000
• Engineering Manual (EM) 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region III, April 2014
• EM 1110-2-1304, Civil Works Construction Cost Index System (CWCCIS), 31 March 2012 (tables updated 30 September 2015)
• Engineering Technical Letter (ETL) 1110-2-573, Construction Cost Estimating Guide for Civil Works, 30 Sept 2008
• Cost and Schedule Risk Analysis Process, March 2008

The estimate was prepared using MCACES/MII Version 4.2 Unit Price Books, labor rates, and equipment rates to apply unique crews to detailed work items and obtaining material and supply quotes where possible for significant cost items. The resulting estimate is shown in the Total Project Cost Summary (TPCS).

2.0 Project Alternatives

In order to improve the existing aquatic habitat in Umbrella and Dover creeks; the PDT decided to investigate closing Noyes Cut and/or Dynamite Cut and Old River Run or any combination of these features. Seven alternatives were developed. Rough order of magnitude, ROM, estimates were developed to help with the selection of alternatives and to find the most cost effective solution which would not negatively affect navigation in the Atlantic Intracoastal Waterway, AIWW.

3.0 Recommended Plan

Hydraulic modeling revealed that closing all three cuts provided the highest level of benefits. Benefit calculation and and plan selection is covered extensively in Section 3.3, Alternative Formulation Process, of the Noyes Cut Section 1135 Project Modifications for Improvements of the Environment.

4.0 Major Cost Assumptions

The construction uses sheet piling and rock structures to block off 3 creeks and return flow to its original condition. All quantities for the development of the estimate were supplied by Savannah District Design Branch.

The Savannah district has extensive knowledge and experience with rock erosion control projects with our DMCA (Dredged Material Containment Area) and our bid history will provide a valuable tool in checking the unit prices for the rock work and sheet pilling.

4.1 Mobilization

Since the project consists of three distinct work areas, equipment will be require to be setup and moved for each creek closure. Also, the contractor will be required to maintain a land based work site with construction trailers and staging area for materials and contract management. It is anticipated the tugs, and barges and cranes will be utilized by the marine contractor to complete this work.

4.2 Rock Work

Savannah District has developed many successful Best Management Practices (BMP's) for erosion control of banks along tide creeks and rivers in this geographic area. Given this knowledge and type of project a template of #57 bedding Stone under GDOT Type #1 Stone was utilized as the plug material.

4.3 Sheet Pile Wall

Sheet pile wall selected as the least intrusive alternative to tie the rock template into marsh side of each creek plug.

4.4 Acquisition

An acquisition strategy meeting has not taken place. Based on discussions with the PDT and contracting methods used on similar projects it is assumed that a small disadvantaged business (8a) set aside will be used for the project.

5.0 Project Feature Accounts

The baseline cost estimate was prepared and organized according to the Civil Works Breakdown Structure (CWBS). As such, the estimate includes the following feature accounts:

5.1 Levees and Flood Walls

This account feature contains mobilization, rock, and sheet pile work to complete the creek closures.

5.2 Land and Damages

This account feature is listed in the current Total Project Cost Summary but contains no cost line items.

5.3 Planning, Engineering, and Design

This account feature includes project management, project planning, engineering analysis, surveying, final design, preparation of plans and specifications, engineering during construction (EDC),advertisement, opening of bids, and contract award. The cost for the 30 account was provided by the Project Manager.

5.4 Construction Management

The account feature includes onsite supervision, contract administration, Quality Control Plan Reviews, Change Management, and other post construction cost to complete the project.

6.0 Cost Schedule Risk Analysis

Scope Growth – This project will require standard construction techniques and goals of the construction are relatively low-risk and technically simple. SAS perform these types of operations several times yearly in our disposal areas for the rock work and currently constructing a sheet pile diversion structure at the time of this report.

Acquisition Strategy – There is no predefined strategy for acquisition for this project; however, projects of this magnitude are frequently sent to the 8A program. This typically results in 10-15% cost increases due to higher overhead rates for smaller firms. The estimate has been tailored for this exception.

Construction Elements – There is no construction feature in this project that is inherently risky. The design, construction, and all other portions of this project are simple and any reputable site-work contractor should be able to construct. The sheet pile wall is the riskiest element only because this operation is not done frequently. Once plans and specifications have been developed, quantities may change. The contingency should cover any changes.

Design and Quantities – This is one of the major risk drivers. This preliminary design has not been developed to the plans and specifications phase so the quantities may change somewhat. The project lacks a lot of investigative information which will be collected if this project moves forward. The rock quantities are the most likely to increase some as settlement may further be defined as more information is provided.

Cost Estimate Assumptions – Lacking a detailed design causes one to rely upon their judgment and knowledge of similar projects. Placing rock from barges is a normal operation. SAS has historical bid data for all rock erosion control projects which also validates project overheads rates. Furthermore, SAS also have developed overhead rates used by 8A contractors which were used developing this estimate.

External Project Risks – The main external project risk is timely funding. Delaying construction could increase project costs by 2-4% yearly.

The results of the CSRA is a construction contingency rate of 22%. The rate for real estate is a standard 25%. The 30 and 31 accounts contingency is 17%.

7.0 Construction Schedule

Construction is anticipated to start in or around August 2020 and to be completed by the end of the year. Construction should take 6 to 7 months. See attached schedule at the end of this appendix.

8.0 Total Project Cost Summary

The cost estimate for the Recommended Plan is prepared with an identified price level date and inflation factors are used to adjust the pricing to the constant dollar value in the program year. This is known as the Project First Cost. The TPCS also shows the estimate escalated to the midpoint of construction for the various activities. This is known as the Fully Funded Cost. The TPCS includes all Federal and non-Federal costs: Levees and Flood Walls; Lands and Damages; Planning Engineering and Design; Construction Management; Contingency; and Inflation. The TPCS, is attached at the end of this appendix.

Noyes Cut

Construction Schedule

Noyes Cut Section 1135 Ecosystem Restoration Study
Satilla River Basin, Georgia
Draft Integrated Feasibility Study and Environmental Assessment

EXECUTIVE SUMMARY

The non-Federal sponsors, Georgia Department of Natural Resources (GADNR) and the Satilla Riverkeeper, in collaboration with Dover Bluff residents, requested that the Savannah District investigate under Section 1135 the best way to restore the Satilla River estuary system.

In 1933, the U. S. Army Corps of Engineers (USACE) widened and deepened Noyes Cut as part of the Inland Waterway. In 1940, USACE constructed the Atlantic Intracoastal Waterway (AIWW) from Umbrella Creek through the lower reach of Dover Creek. In total, eight man-made cuts account for the degraded ecosystem in the study area.

Those cuts changed the water circulation patterns in the estuary resulting in altered local patterns of tidal exchange; disrupted gradual salinity gradients from the headwaters to the mouth of the creeks; and limited access to headwaters for estuarine species due to channel sedimentation.

The estuarine species historically found in Dover and Umbrella Creeks include shrimp (white and brown), river herring, American shad, blue crabs, eastern oyster, and striped bass. All of these species would benefit from the restoration of tidal flows, water depths, and salinity gradients in the area. Shad, herring, and striped bass require freshwater for spawning, while blue crabs, oysters, and shrimp require brackish water for successful reproduction.

To improve the quality of the existing aquatic habitat for resident species and increase connectivity for migratory species in the upper reaches of the Dover and Umbrella Creek watersheds, the study team suggests closing cuts to restore historic flow patterns in the watershed.

The study team assessed, evaluated, and compared the following final array of action alternatives: closing Noyes Cut alone; closing Dynamite Cut and Old River Run (ORR); and closing Noyes Cut, Dynamite Cut, and ORR.

The team compared the cost effectiveness of the ecosystem benefits for each alternative. The study team identified two cost effective alternatives: Alternative 6, closing Dynamite Cut and ORR and Alternative 7, closing Noyes Cut, Dynamite Cut, and ORR. The team select Alternative 7 as the tentatively selected plan because it provides the greatest amount of ecosystem restoration benefits and the best ecosystem for migratory fish spawning habitat.

WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW CERTIFICATION STATEMENT

For Project No. 402833

SAS – Noyes Cut Section 1135
Satilla River Basin, GA
Ecosystem Restoration

The Noyes Cut Section 1135 presented by Savannah District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of October 13, 2017, the Cost MCX certifies the estimated total project cost:

FY18 Project First Cost:	**$7,087,000**
Total Project Cost, Fully Funded:	**$7,605,000**
Total Federal Costs:	**$6,098,000**

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management through the period of Federal participation.

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2017.10.13 07:19:16 -07'00'

Kim C. Callan, PE, CCE, PM
Chief, Cost Engineering MCX
Walla Walla District

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: **Noyes Cut Section 1135 Ecosystem Restoration**
PROJECT NO: **402833**
LOCATION: **Satilla River Basin, GA**

DISTRICT: **Savannah District, SAS**
PREPARED: **9/27/2017**
POC: **CHIEF, COST ENGINEERING, Paul Smith P.E.**

This Estimate reflects the scope and schedule in report; Draft Integrated Feasibility Study and Environmental Assessment - August 2017

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC):			2018						
						Effective Price Level Date:			1-Oct- 17						
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	REMAINING COST ($K)	Spent Thru: 1-Oct-17 ($K)	TOTAL FIRST COST ($K)	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
11	LEVEES & FLOODWALLS	$4,288	$943	22%	$5,231	1.9%	$4,368	$961	$5,328			5.7%	$4,615	$1,015	$5,630
	CONSTRUCTION ESTIMATE TOTALS:	$4,288	$943		$5,231	1.9%	$4,368	$961	$5,328			5.7%	$4,615	$1,015	$5,630
01	LANDS AND DAMAGES		-			-						-			
30	PLANNING, ENGINEERING & DESIGN	$1,342	$106	8%	$1,448	11.8%	$1,384	$235	$1,619			12.4%	$1,555	$264	$1,819
31	CONSTRUCTION MANAGEMENT	$116	$20	17%	$136	3.1%	$120	$20	$140			11.5%	$133	$23	$156
	PROJECT COST TOTALS:	$5,746	$1,069	19%	$6,815		$5,871	$1,216	$7,087			7.3%	$6,303	$1,302	$7,605

CHIEF, COST ENGINEERING, Paul Smith P.E.
PROJECT MANAGER, Taylor Wimberly
CHIEF, REAL ESTATE, Ralph Werthmann
CHIEF, PLANNING, William Bailey
CHIEF, ENGINEERING, Gordon Simmons P.E.
CHIEF, OPERATIONS, Robert Germann
CHIEF, CONSTRUCTION, Ken Gray
CHIEF, CONTRACTING, Paige Blechinger
CHIEF, PM-C, Mackie McIntosh
CHIEF, DPM, Erik Blechinger

ESTIMATED TOTAL PROJECT COST:		**$7,605**
ESTIMATED FEDERAL COST:	**75%**	$5,704
ESTIMATED NON-FEDERAL COST:	**25%**	$1,901
22 - FEASIBILITY STUDY (CAP studies):		**$688**
ESTIMATED FEDERAL COST:	$100K + 50%	$394
ESTIMATED NON-FEDERAL COST:	50%	$294
ESTIMATED FEDERAL COST OF PROJECT		**$6,098**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Noyes Cut Section 1135 Ecosystem Restoration
LOCATION: Satilla River Basin, GA
This Estimate reflects the scope and schedule in report; Draft Integrated Feasibility Study and Environmental Assessment - August 2017

DISTRICT: Savannah District, SAS
POC: CHIEF, COST ENGINEERING, Paul Smith P.E.

PREPARED: 9/27/2017

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: / Estimate Price Level:			1-Aug-17 / 1-Oct-16	Program Year (Budget EC): / Effective Price Level Date:			2018 / 1 -Oct-17					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	RISK BASED CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	PHASE 1 or CONTRACT 1													
11	LEVEES & FLOODWALLS	$4,288	$943	22.0%	$5,231	1.9%	$4,368	$961	$5,328	2020Q4	5.7%	$4,615	$1,015	$5,630
	CONSTRUCTION ESTIMATE TOTALS:	$4,288	$943	22.0%	$5,231		$4,368	$961	$5,328			$4,615	$1,015	$5,630
01	LANDS AND DAMAGES			25.0%										
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	$25	$4	17.0%	$29	3.1%	$26	$4	$30	2019Q2	4.9%	$27	$5	$32
1.0%	Planning & Environmental Compliance	$45	$8	17.0%	$53	3.1%	$46	$8	$54	2019Q2	4.9%	$49	$8	$57
15.0%	Engineering & Design	$110	$19	17.0%	$129	3.1%	$113	$19	$133	2019Q2	4.9%	$119	$20	$139
1.0%	Engineering Tech Review ITR & VE	$50	$9	17.0%	$59	3.1%	$52	$9	$60	2019Q2	4.9%	$54	$9	$63
1.0%	Contracting & Reprographics	$25	$4	17.0%	$29	3.1%	$26	$4	$30	2019Q2	4.9%	$27	$5	$32
3.0%	Engineering During Construction	$8	$1	17.0%	$9	3.1%	$8	$1	$10	2020Q4	11.5%	$9	$2	$11
2.0%	Planning During Construction	$7	$1	17.0%	$8	3.1%	$7	$1	$8	2020Q4	11.5%	$8	$1	$9
1.0%	Project Operations	$5	$1	17.0%	$6	3.1%	$5	$1	$6	2019Q2	4.9%	$5	$1	$6
1.5%	Pre-Construction Monitoring	$65	$11	17.0%	$76	3.1%	$67	$11	$78	2019Q2	4.9%	$70	$12	$82
6.6%	Post Construction Monitoring	$285	$48	17.0%	$333	3.1%	$294	$50	$344	2020Q4	11.5%	$328	$56	$383
16.7%	Adaptive Management	$717	$122	17.0%	$839	3.1%	$739	$126	$865	2021Q4	16.1%	$858	$146	$1,004
31	CONSTRUCTION MANAGEMENT													
10.0%	Construction Management	$100	$17	17.0%	$117	3.1%	$103	$18	$121	2020Q4	11.5%	$115	$20	$135
2.0%	Project Operation:	$8	$1	17.0%	$9	3.1%	$8	$1	$10	2020Q4	11.5%	$9	$2	$11
2.0%	Project Management	$8	$1	17.0%	$9	3.1%	$8	$1	$10	2020Q4	11.5%	$9	$2	$11
	CONTRACT COST TOTALS:	$5,746	$1,191		$6,937		$5,871	$1,216	**$7,087**			$6,303	$1,302	**$7,605**

APPENDIX I

8-Step Process for EO 11988: Floodplain Management

8-Step Process for
EO 11988: Floodplain Management

Noyes Cut Section 1135 Ecosystem Restoration Study
--Section 205, 1948 FCA (P.L. 80-858), as amended
--Decision Process for E.O. 11988 as Provided by 24 CFR §55.20

Step 1: ***Determine whether the action is located in a 100-year flood plain (or a 500-year flood plain for critical actions).***

This action is inherently located in a 100-year flood plain as it is designed to restore the degraded hydrologic functions of the floodplain. The restoration of the historic hydrology will consequently restore aquatic habitat, which is all inherently located within the 100 year floodplain.

Step 2: ***Notify the public for early review of the proposal and involve the affected and interested public in the decision making process.***

Coordination with the sponsor has been ongoing since approximately 2014. They have acted as the link between the USACE and the public. Some public concerns that were brought to USACE attention are:

- Continued decline to commercial fisheries (i.e. shad, herring, crab, shrimp) from existing hydrologic malfunction related to 8 man-made cuts in study area

- Continued decline in recreational activities include boating and fishing for residents of local communities (i. e. Dover Bluff, Piney Bluff, and River Marsh Landing) due to the extensive sedimentation that has occurred in the area over the decades since Noyes Cut was constructed (Montague 2017). Access for Piney Bluff Community and River Marsh Landing has been restricted to high tide access in skiffs or larger boats that draw less than 2 feet (Montague 2017).

A draft Integrated Feasibility Report/EA was sent out for public review for this project.

Step 3: ***Identify and evaluate practicable alternatives.***

The objective of this study is to restore the hydrologic functions and consequential benefits to the native flora and fauna. All of the alternatives assessed in the Integrated Report are designed to improve the hydrology and ecosystem within the floodplain to varying degrees. The amount of improvement is quantified in the table below for each alternative. The NAA has the lowest amount of improvement and the Recommended Plan (Alternative 7) has the most improvement to the ecosystem.

Table 1 - Noyes Cut Ecosystem Restoration Average Annual Habitat Net Benefits		
Alternative		Plan Outputs (AAHU Increase)
Baseline	NAA	0
1	Close Noyes Cut	493
6	Close Dynamite Cut and ORR	1330
7	Close Noyes Cut, Dynamite Cut and ORR	1780

Step 4: ***Identify Potential Direct and Indirect Impacts of Associated with Flood Plain Development.***

Since all of the components of the Recommened Plan are designed to optimize restoration of hydrologic and ecological functions within the floodplain, there are no adverse floodplain impacts identified.

Step 5: ***Where practicable, design or modify the proposed action to minimize the potential adverse impacts to lives, property, and natural values within the flood plain and to restore, and preserve the values of the flood plain.***

Since all of the components of the Recommened Plan are designed to restore ecological functions, there are no adverse floodplain impacts to minimize.

Step 6: ***Reevaluate the Alternatives.***

Although the Recommended Plan is located within a flood plain, the project is designed to restore flood plain values.

The no action alternative is impracticable because it will not satisfy the need to provide the hydrologic changes to restore the ecosystem.

Step 7: ***Determination of No Practicable Alternative***

It is our determination that there is no practicable alternative for locating the project out of the flood zone. This is due to the inherent need to locate the project within the floodplain since all of the resources to be restored are within the floodplain.

A final notice will be published during the public review of these documents.

Step 8: ***Implement the Proposed Action***

USACE will assure that this plan, as modified and described above, is executed and necessary language will be included in all agreements with participating parties. USACE will also take an active role in monitoring the construction process to ensure no unnecessary impacts occur nor unnecessary risks are taken.