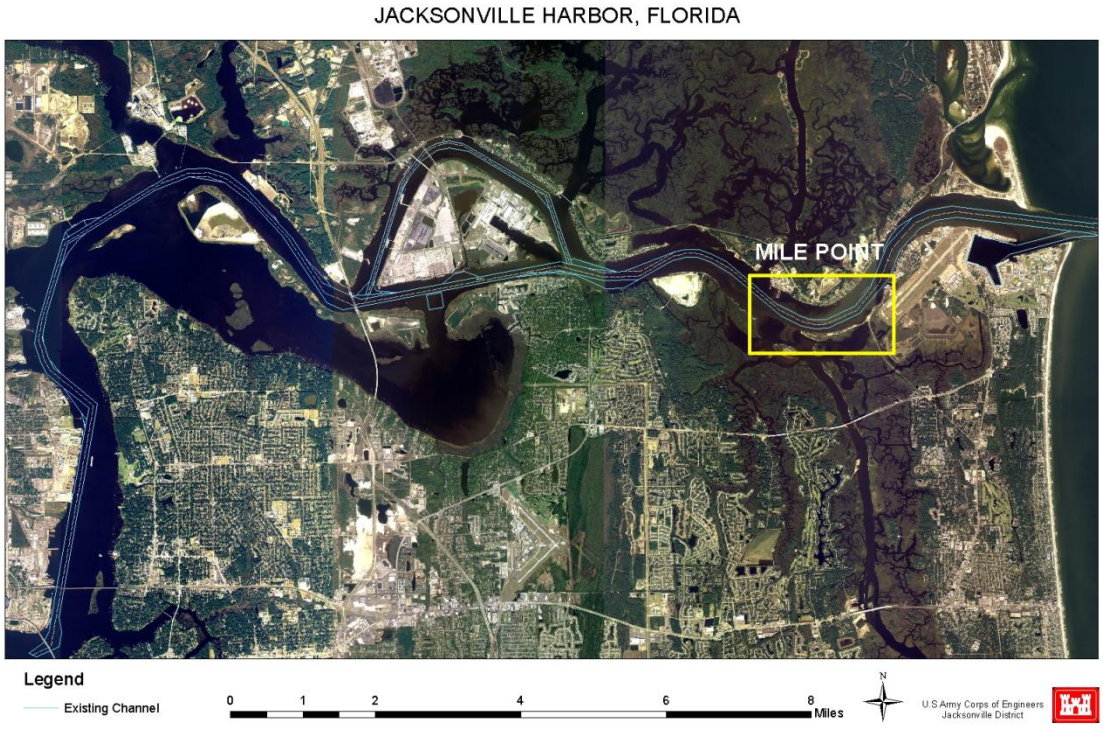
Jacksonville Harbor (Mile Point) Navigation Study, Duval County, Florida

FINAL
INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

March 2012



Navigation Study for Jacksonville Harbor (Mile Point), Final Report, Integrated Feasibility Report and Environmental Assessment, Duval County, Florida

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

JACKSONVILLE HARBOR (MILE POINT) NAVIGATION STUDY

DUVAL COUNTY, FLORIDA

FINDING OF NO SIGNIFICANT IMPACT

I have reviewed the Environmental Assessment (EA) for the proposed action. This Finding incorporates by reference all discussions and conclusions contained in the Environmental Assessment enclosed hereto. Based on information analyzed in the EA, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are in summary:

a. Per the Recommended Plan, the existing Mile Point training wall would be reconfigured in order to redirect difficult crosscurrents. This should reduce or eliminate navigation restrictions impeding the movement of deep draft vessels. Dredged material resulting from the project would be used to restore salt marsh at nearby Great Marsh Island. This beneficial use of dredged material is also the least cost disposal option. A Flow Improvement Channel is being proposed in order to restore the historical connection between Chicopit Bay and the Intracoastal Waterway and St. Johns River. Reconfiguration of the training wall would result in the loss of approximately 8.15 acres of salt marsh and approximately 0.75 acres of oyster habitat; however, this loss would be more than offset by the restoration of up to 53 acres of salt marsh at Great Marsh Island and approximately 2.77 acres of oyster habitat at the island and along the reconfigured wall.

b. Coordination with the US Fish and Wildlife Service and the National Marine Fisheries Service has been completed per Section 7 of the Endangered Species Act.

c. An Environmental Resource Permit (Water Quality Certification) shall be obtained from the State of Florida, and the proposed work would be performed in compliance with Water Quality Certification conditions. A final determination of whether the project is consistent with the Florida Coastal Management Program shall be made by the State with issuance of the permit.

d. A significant cultural resource is located within the project area; however, there should be no adverse effects to this resource with the current project design. Coordination with the State Historic Preservation Officer and appropriate Federally recognized tribes has been completed with no adverse effect.

e. Measures to eliminate, reduce, or avoid potential impacts to environmental and cultural resources shall be implemented.

BARKER, BALLARD C.
LTC, EN
DEPUTY COMMANDER

17 APR 12

FOR: ALFRED A. PANTANO, JR.
Colonel, Corps of Engineers
Commanding

Date

FINAL INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT JACKSONVILLE MILEPOINT JACKSONVILLE, DUVAL COUNTY, FLORIDA

LEAD AGENCY: Jacksonville District, U.S. Army Corps of Engineers

Mile Point is located in Duval County, Florida. It consists of about 5000 feet of shoreline located along the north shore of the St. Johns River and east of the Intracoastal Waterway (IWW). The study will determine plans to evaluate the Mile Point erosion problem and to provide recommendations for reducing or relocating the difficult crosscurrents during the ebb flow at the confluence of the St. Johns River with the IWW that are interfering with safe navigation in the channel. The St. Johns Bar Pilots and the Captain of the Port, United States Coast Guard (USCG), have enacted a restriction which requires inbound vessels with a draft greater than 33 feet inbound and 36 feet outbound to be restricted to transiting close to or on a flood tide before entering the harbor to avoid the difficult ebb flow currents.

The Federal objective of water and related land resources planning is to contribute to National Economic Development (NED) consistent with protecting the nation's environment, in accordance with national environmental statutes, applicable executive orders, and other Federal planning requirements.

For more information, contact Samantha Borer, U.S. Army Corps of Engineers, Planning Division, P.O. Box 4970, Jacksonville, Florida 32232-0019, phone (904) 232-1066 or facsimile (904) 232-3442.

SUMMARY

FINAL
INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT
ON
JACKSONVILLE HARBOR (MILE POINT) NAVIGATION STUDY
DUVAL COUNTY, FLORIDA

The Mile Point Shoreline of Jacksonville Harbor (Jax Mile Point) is located between river miles four and five west of the Atlantic Ocean along the St. Johns River. This area on the north bank of the St. Johns River has been experiencing shoreline erosion. The confluence of the St. Johns River and the Intracoastal Waterway (IWW) is within the Mile Point study area. The IWW enters the main channel of the St. Johns River at an angle of approximately 45° from the north, out of Sisters Creek (**Figure 1)**. From the south, the IWW enters out of Pablo Creek at an angle almost parallel to the main channel flow out of Pablo Creek, with flow usually running in the opposite direction of the flow of the river. On the south bank of the St. Johns River is the Mile Point training wall, also known as the Little Jetties.

The non-federal sponsor is the Jacksonville Port Authority. The purpose of the Jacksonville Mile Point study is to assess Federal interest in navigation improvements and related purposes, with particular reference to erosion of the Mile Point shoreline. An evaluation of benefits, costs, and environmental impacts determines Federal interest. The feasibility study was authorized by a resolution of the House Committee on Transportation and Infrastructure adopted March 24, 1998 for Mile Point, Florida.

Need or Opportunity: The U.S. Army Corps of Engineers (USACE) has been studying the continued erosion of the Mile Point shoreline and the effects of the navigation restrictions. The following erosion and navigation problems related to the existing Mile Point area necessitated this feasibility study. There have been catastrophic failures on the north Mile Point shoreline due to erosion. **Figure 2** highlights a failure event at parcel no.8856 on the Mile Point shoreline. In this particular case, the head scarp appears to have eroded 75 to 100 feet back from the seawall. Other erosion events are documented in **Figure 3** and date from 1986 to 1997. Due to difficult crosscurrents at the confluence of the IWW and the St. Johns River during the ebb tide (**Figure 1**), the St. Johns Bar Pilots have enacted navigation restrictions for inbound vessels with a transit draft greater than 33 feet to avoid transiting during the ebb tide. Due to the angle of entry of the flow at the confluence, there is a danger that large vessels could turn in response to the current and leave the channel resulting in groundings or collisions.

FIGURE 1: CROSSCURRENTS PRODUCED BY PERPENDICULAR INTERSECTION OF THE IWW WITH THE ST. JOHNS RIVER AT PABLO CREEK

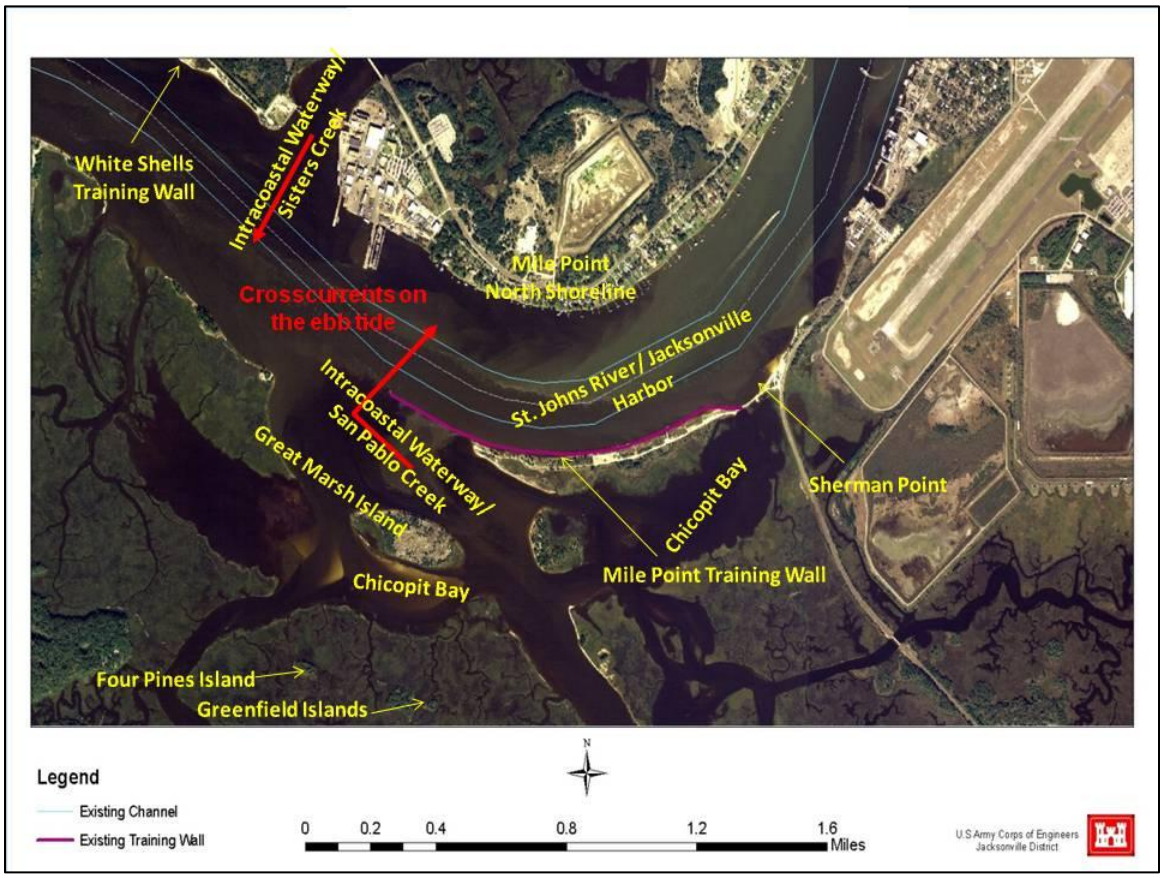


FIGURE 2: POST-EROSION EVENT ON THE NORTH SHORELINE DEC 1990

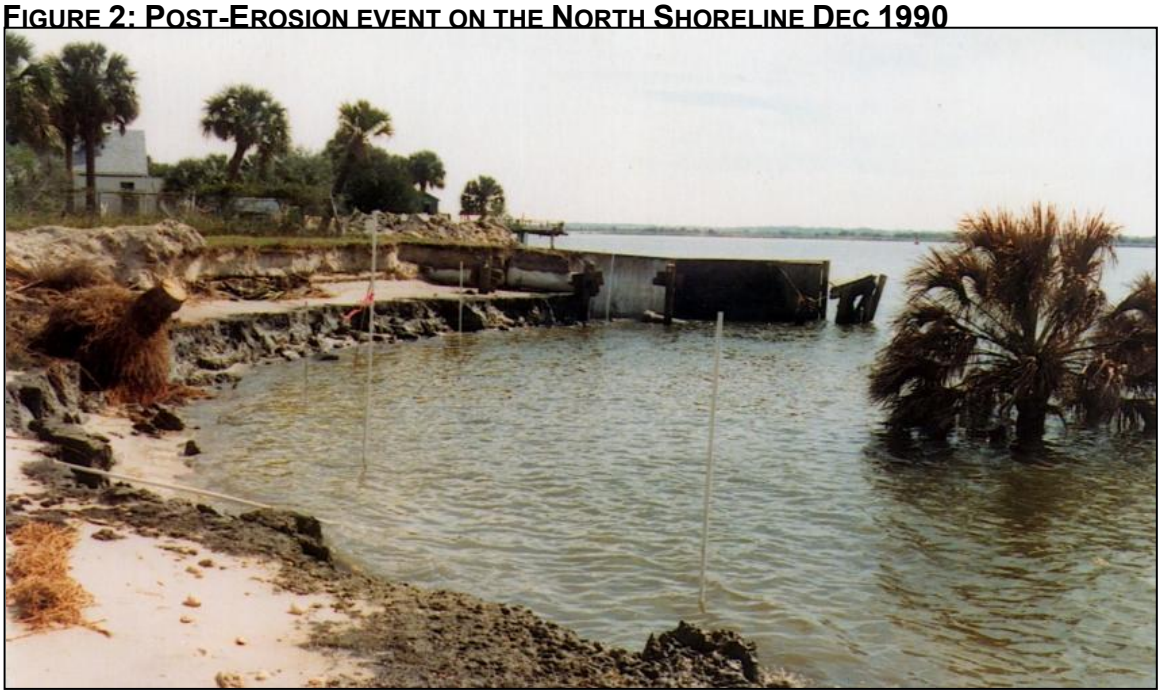


FIGURE 3: EROSION EVENTS DOCUMENTED ON MILE POINT NORTH SHORELINE.

Major Findings and Conclusions: The proposed actions of this report are in the national interest and can be constructed while protecting the environment from unacceptable impacts. Benefits of the proposed action would minimize the impacts of the flows out of the IWW during the ebb tide, slow or redirect the velocities away from the north bank, and slow the progression of erosion. Reducing or redirecting the difficult crosscurrents in the harbor would allow the pilots to reduce or eliminate navigation restrictions impeding the free movement of vessels. As is detailed in the Engineering Appendix (Appendix A) on page A-4, numerical modeling results indicate that the potentially dangerous crosscurrents exiting the IWW southern channel under ebb tide can be redirected to more closely parallel the alignment of the Federal navigation channel instead of being focused toward the erosion prone areas along the northern shoreline of Mile Point. Adverse impacts from the project, that would be mitigated, would include loss of salt marsh adjacent to the existing Mile Point training wall. Measures were taken to avoid, minimize, and compensate for adverse impacts. The restoration of Great Marsh Island is the least cost dredging alternative. It provides beneficial use of dredged material through the creation of habitat beyond the required mitigation. The creation of a flow improvement measure is proposed to prevent any adverse impacts on water quality within Chicopit Bay from restoring Great Marsh Island.

Alternatives: Alternatives that were evaluated include a number of non-structural and structural alternatives.
Non-structural alternatives include:

- Operational measures such as light-loading, use of tide, additional tugs
- No action alternative

Structural alternatives include:

- North shoreline groin field
- San Pablo Creek IWW submerged weir
- Rebuilding of Mile Point Training Wall to original dimensions
- 150-foot training wall reach channel widening of the channel
- Eastern Chicopit Bay diversion channel
- Relocating (Reconfiguration) Mile Point Training Wall
- Short cut widening of the channel
- Removal of the waterward portion of the Mile Point Training Wall under the O&M Program

Combinations of these alternatives were also evaluated.

Preferred Alternative (**Figure 4**): The preferred alternative is to relocate/reconfigure the Mile Point training wall and include a Chicopit Bay Flow Improvement Channel (FIC) (referred to as Alternative VE-3B+FIC in the report). This is the Recommended Plan which combines the reconfiguration of the existing training wall, restoration of Great Marsh Island which is the least cost disposal option, and the creation of a FIC in Chicopit Bay. The training wall reconfiguration includes removal of the western 3,110 feet of the existing Mile Point training wall and the construction of a relocated eastern leg training wall of approximately 2,050 feet. Total estimated quantity of material to be excavated is approximately 889,000 cubic yards (cy). All usable stone material recovered from the existing training wall will be stockpiled for use in either the west or east leg of the relocated training wall and all other material excavated will be placed as beneficial use in the Salt Marsh Restoration Area at Great Marsh Island and as foundation for the relocated training wall. It is estimated that approximately 14,600 cy of armor stone can be recovered for reuse purposes; however, additional geophysical exploration is needed to more precisely ascertain the exact quantities of stone available for reuse.

The east leg training wall incorporates a larger scour apron (25 feet) than the west leg (10 feet) due to the predicted permanent shift of stronger currents in Pablo Creek towards the east especially during the ebb tide. Channel migration of the IWW is anticipated and realignment of the channel to deep water may become necessary. The relocated east leg consists of building approximately 2,050 feet of training wall to tie into the existing structure on Helen Cooper Floyd Park, and the west leg consists of building approximately 4,250 feet of training wall along the breakthrough at Great Marsh Island. Estimated quantities associated with the east leg are 26,900 cy of armor stone and 11,900 cy of bedding stone, and for the west leg are 5,670 cy of concrete (567 units at 10cy/unit) and 32,000 square yards (sy) of geotextile fabric for bags and tubes to

be filled with 40,500 cy of excavated material. Both legs will incorporate the use of a total of approximately 34,900 sy of filter fabric.

The least cost disposal method is to restore the breakthrough at Great Marsh Island by placing dredged material at the island and constructing an approximate 4,250 foot Western Leg training wall. Restoration of this area provides an opportunity to address impacts caused by the physical decay of the ecosystem from erosion of natural habitat caused by the crosscurrents. Without the project, Great Marsh Island will continue to erode. Restoring Great Marsh Island is both the least cost alternative for disposal of dredged material and also provides up to 53 acres of salt marsh restoration. This alternative provides incidental environmental benefits in addition to providing mitigation for the approximate 8.15 acres of salt marsh impacted by the training wall removal.

The Flow Improvement Channel (FIC) would be constructed to offset any adverse effects that would be caused by closing off the breakthrough of Great Marsh Island. If Great Marsh Island is restored and the FIC is not built, then water quality is expected to be degraded within Chicopit Bay due to non-point source pollution loadings from the upstream watershed not flushed out of the hydrological system. This would occur because the restoration would close off the recently formed channel through the eroded portion of Great Marsh Island, which now flushes the bay. The FIC would allow for improved water quality and environmental stability of the project area by potentially improving the flushing of sediment and other waterborne constituents into the adjacent Intracoastal Waterway. The construction of the FIC would also restore the historic channel through Chicopit Bay which has silted in with eroded material from Great Marsh Island. The FIC consists of dredging a channel 80 feet wide and 6 feet deep for a length of approximately 3,620 feet through Western Chicopit Bay. Dredged material from the FIC would be placed back into the Great Marsh Island restoration area. Monitoring and corrective action, if needed, of the FIC will be implemented by the USACE for 5 years.

The Recommended Plan was the only alternative that provides for a redirection or reduction of the erosive ebb flow currents from the Mile Point shoreline and allows for the St. Johns Bar Pilots to lift the restrictions to navigation. There was an extensive Value Engineering (VE) study to refine the design of this alternative which incorporates the beneficial use of dredged material to create a salt marsh mitigation area to restore wetlands lost on Great Marsh Island; the original plan utilized an existing upland site, Buck Island, for disposal of dredged material.

Hydrodynamic modeling of this alternative showed a reduction in the crosscurrents in the navigation channel. It is anticipated that the new realignment of the Mile Point training wall would produce flows coming out of the IWW from the south that are more aligned with the Federal channel. This is expected to provide a decrease in water velocity in the areas north of the channel at Mile Point and possibly slow the progression of the erosion that has occurred

at the north bank of Mile Point. A ship simulation was run to test the effects of the alternatives on the crosscurrents at Mile Point. Members of the St. Johns Bar Pilot Association participated in the ship simulation process. Under the recommended alternative, the ship simulation showed favorable results in reducing the crosscurrents at Mile Point. As expressed in a letter sent by the St. Johns Bar Pilots on May 15, 2008, the results were supported by the majority of the St. Johns Bar Pilots that under these conditions the pilots would reduce or eliminate the restrictions associated with IWW crosscurrents.[1] A second ship simulation was run September 14-17, 2009 to test the Widening Only alternative, as well as the Relocation of the Mile Point training wall alternative. The pilots, after using the wideners in the simulation, stated that they felt the wideners would not reduce tidal restrictions for Mile Point. The second simulation confirmed the first analysis, showing favorable results for the Relocation of the Mile Point training wall alternative in reducing or eliminating tidal restrictions at Mile Point.

The Recommended Plan provides national economic development (NED) benefits from alleviating the navigation restrictions, incidental environmental benefits from restoring Great Marsh Island, and potential incidental erosion benefits from potentially reducing the effects of the crosscurrents on the adjacent shoreline (**Figure 4).** Relocation of the Mile Point Training wall (VE-3B+FIC) has a benefit-to-cost ratio (BCR) of 1.4 with average annual equivalent (AAEQ) Net Benefits of $0.7 million. AAEQ Benefits equal $2.44 million and AAEQ Costs equal $1.74 million. **Table 1** outlines the project costs.

Approximately 51.2 acres of land are under the control of the U.S. Navy. The USACE will coordinate with the U.S. Navy for a license that will allow removal of the real property (uplands). Additionally, the Federal government has navigational servitude over submerged lands impacted by the proposed project. The non-federal sponsor (Jacksonville Port Authority) owns lands in the vicinity of the proposed project, but those lands will not be impacted by the proposed project. The Nature Conservancy, Inc. owns lands in the vicinity of the proposed project that will not be negatively impacted. The Nature Conservancy, Inc. is familiar with the proposed project and has indicated their support for the project.

[1] Letter in Appendix E (Pertinent Correspondence): St. Johns Bar Pilot Association Letter, May 15, 2008.

TABLE 1: TOTAL PROJECT COSTS (OCTOBER 1, 2011 PRICE LEVELS AND FY2012 DISCOUNT RATE)

(October 1, 2011 Price Levels and FY12 discount rate) Cost Summary Relocation (Reconfiguration) + Flow Improvement VE-3B+FIC			
	Total Cost	**Federal Share**	**Non-federal Share**
General Navigation Features	**20-45 ft.**	**75%**	**25%**
Mobilization	**$2,378,000**	**$1,783,000**	**$594,000**
Dredging and Disposal[1]	**$6,687,000**	**$5,015,000**	**$1,672,000**
Turbidity and Endangered Species Monitoring	**$451,000**	**$338,000**	**$113,000**
Bank Stabilization, Dikes & Jetties (Reconfigured Training Wall)	**$19,299,000**	**$14,474,000**	**$4,825,000**
Environmental Mitigation	**$3,088,000**	**$2,316,000**	**$772,000**
Salt Marsh Mitigation	$1,592,000	$1,194,000	$398,000
Oyster Bed Mitigation	$565,000	$424,000	$141,000
Biological Survey	$488,000	$366,000	$122,000
Mitigation Monitoring	$443,000	$332,000	$111,000
Planning, Engineering, and Design	**$2,087,000**	**$1,565,000**	**$522,000**
Construction Management (S&I)	**$1,910,000**	**$1,433,000**	**$478,000**
Subtotal Construction of GNF	**$35,900,000**	**$26,924,000**	**$8,976,000**
Lands and Damages.	**$99,000**	**$74,000**	**$25,000**
Total Project First Costs	**$35,999,000**	**$26,998,000**	**$9,001,000**
Aids to Navigation[2]	**$431,000**	**$431,000**	**$0**
Credit for non-Federal LERR[3]	**-**	**$13,000**	**($13,000)**
10% GNF Non-Federal[4]	**-**	**($3,590,000)**	**$3,590,000**
Total Cost Allocation	**$36,430,000**	**$23,852,000**	**$12,578,000**
AAEQ Benefits			**$2,440,000**
AAEQ Costs			**$1,737,000**
AAEQ Net Benefits			**$703,000**
Benefit-to-Cost Ratio (BCR)			**1.40**

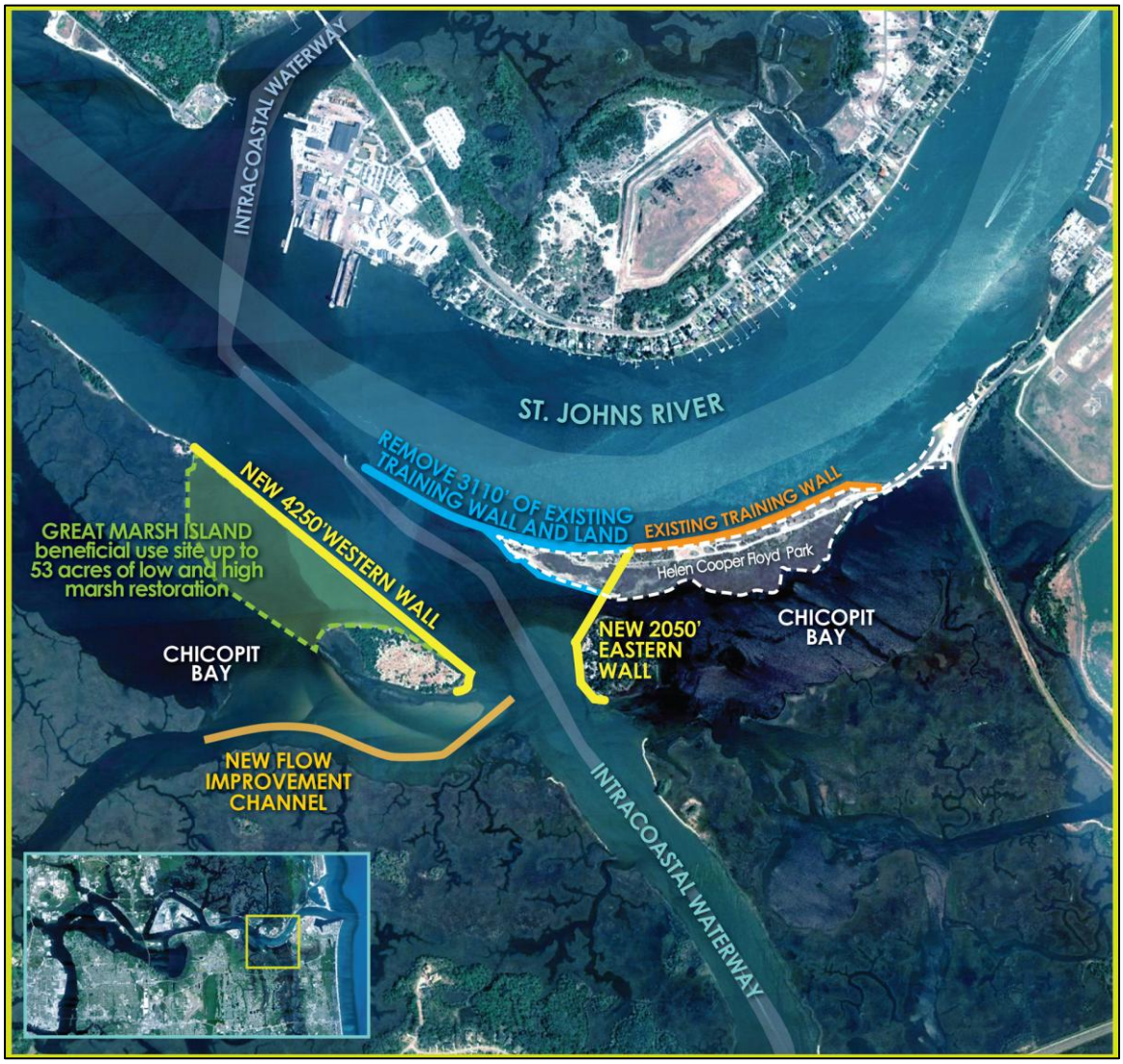
1. Includes Pipeline Dredging Cost.

2. Navigation Aids - 100% Federal

3. Real Estate Costs: Credit is given for the incidental costs borne by the non-Federal sponsor for lands, easments, rights of way and relocations per Section 101 of WRDA 86. The Federal real estate acquisition/ incidental costs include the project real estate planning, review, and incidental (license) costs between the Navy and the USACE.

4. The Non-Federal Sponsor shall pay an additional 10% of the costs of GNF, pursuant to Section 101 of WRDA 86. The value of LERR shall be credited toward the additional 10% payment.

FIGURE 4: THE RECOMMENDED PLAN -RELOCATE (RECONFIGURE) MILE POINT TRAINING WALL AND FLOW IMPROVEMENT CHANNEL



Economics Scenario Run Case 1: Case 1, as discussed in the Economic Appendix B, uses the existing fleet plus an additional container service at 5 weekly calls with growth for the 50-year analysis. The results show NED benefits of $93 million, which justifies the project with a 2.5 Benefit-to-Cost Ratio and AAEQ Net Benefits of $2.6 million.

Issues Raised by the Public and Agencies:

The Florida Department of Environmental Protection (DEP) has stated that the proposed Flow Improvement Channel (FIC) must be maintained. Also, construction sequencing of the western training wall, restoration site, and the FIC must be addressed to prevent flushing impairment within Chicopit Bay. If these issues are not addressed, then the DEP may not have reasonable assurance to

provide State Water Quality Certification for the project. Residents living along Greenfield and Mt. Pleasant Creeks (south of the project area) have also stated that construction of the western training wall, restoration site, and FIC should be properly sequenced so that they have continued access to the IWW and the St. Johns River. The residents have also requested that future maintenance dredging of the FIC be included within the project authorization (please refer to **Section 7.24.4** for more information on this issue). Monitoring and corrective actions, if needed, for a 5-year period have been added to address these concerns. Construction sequencing will be evaluated during the pre-construction engineering and design (PED) phase in order to minimize disruptions to the residents.

Homeowners on the north bank of the river at Mile Point have seen severe erosion of their property and are seriously concerned about future property losses. They have speculated that this erosion has been caused by hydrodynamic effects of dredging done by the USACE in the past, installation of the large Atlantic Marine dry dock, as well as the deterioration of the Mile Point training wall. Hydrodynamic modeling of the Recommended Plan shows a reduction in currents along the north bank with its implementation.

The U.S. Coast Guard (USCG), most harbor pilots, commercial towing company representatives, and tug/barge operators identified the IWW/St. Johns River confluence as the harbor location with the greatest risk. Currently, submerged sections of the Mile Point training wall present a challenge to recreational boaters not familiar with the area. One towing company representative noted that boaters sometimes run aground on unseen submerged sections of the training wall. The recommended plan removes the submerged sections so should improve public safety.

The U.S. Environmental Protection Agency (EPA), Florida Department of Environmental Protection (DEP), Florida Fish and Wildlife Conservation Commission (FWC), St. Johns River Water Management District (SJRWMD), and the public provided comments on the draft Integrated Feasibility Report and Environmental Assessment (refer to **Section 7.24.4** to view the comments and responses).

Areas of Controversy: As previously described, the DEP has stated that the proposed Flow Improvement Channel (FIC) must be maintained and the work properly sequenced. Residents living along the Greenfield and Mt. Pleasant creeks have also expressed concerns about construction sequencing and future maintenance dredging of the FIC so that they retain the ability to access the IWW and St. Johns River. The USACE, Jacksonville District regards the FIC as mitigation for project related impacts, specifically the closure of the breakthrough at Great Marsh Island, which would adversely affect both water quality within Chicopit Bay and local boating access.

Summary of Coordination: A scoping letter, dated August 4, 2004, was sent to stakeholders soliciting views and comments regarding environmental and cultural resources, study objectives, and important features within the study area. Federal and state agencies attended the Jacksonville Harbor (Mile Point) Feasibility Scoping Meeting held on July 30, 2004. The scoping letters were sent to all appropriate agencies. Pursuant to Section 7 of the Endangered Species Act, coordination with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) has been completed. The Jacksonville District and the USFWS have jointly prepared a Memorandum for Record which states that both agencies have agreed to utilize the National Environmental Policy Act review and Endangered Species Act consultation processes to complete coordination responsibilities under the Fish and Wildlife Coordination Act.

The USACE, Jacksonville District met with all landowners within or immediately adjacent to the footprint of the proposed work in January of 2008. These meetings were held in order to discuss the project. They were attended by staff from the Mayport Naval Station, The Nature Conservancy, and the National Park Service-Timucuan Ecological and Historic Preserve. A second scoping letter was issued to all stakeholders on March 31, 2008. Informal coordination between the USACE Jacksonville District and the USFWS, NMFS, Timucuan Ecological and Historic Preserve, Florida Department of Environmental Protection (DEP), as well as The Nature Conservancy was conducted during 2008. As requested, site visits were also made with the USFWS, NMFS, and The Nature Conservancy. A meeting to discuss the numerical hydrodynamic modeling results for the proposed work was held on August 26, 2008 and was attended by the USFWS, NMFS, The Nature Conservancy, and the Mayport Naval Station. Agency coordination letters can be found in Appendix E. A Notice of Availability for the Draft Integrated Feasibility Study and Environmental Assessment was mailed to interested parties on July 07, 2011. Copies of the draft report were made available in selected libraries within the study area and placed on the District website, along with other pertinent study documents. A public workshop was held on August 15, 2011(refer to Section 7.24.4 to view comments received during the workshop as well as comments received on the draft Integrated Feasibility Report and Environmental Assessment). A site visit, as requested, was conducted in August 2011 with the DEP, USFWS, and FWC in order to discuss the mitigation.

Unresolved Issues: There are no unresolved issues. As a result of agency and public coordination, the USACE-Jacksonville District will develop a monitoring and corrective action plan for the FIC. The USACE, Jacksonville District shall continue to coordinate the proposed plan with the USACE, South Atlantic Division and USACE, Headquarters as well as the local sponsor, agencies and concerned public.

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JACKSONVILLE HARBOR (MILE POINT) NAVIGATION STUDY
DUVAL COUNTY, FLORIDA

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1.0 STUDY INFORMATION*

1.1 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Jacksonville District is investigating difficult crosscurrents at the confluence of the St. Johns River with the IWW. This area is known as Mile Point and is located in Jacksonville, Duval County, Florida. Due to these crosscurrents there is a navigational restriction on the ebb tide that affects all vessels that have a transit draft greater than 33 feet inbound and 36 feet outbound, inhibiting the free movement of vessel traffic. The crosscurrents at Mile Point are also of concern for the Mile Point north shoreline, which has experienced erosion.

The investigations described in this report address the feasibility of reducing the effects of the crosscurrents on the Mile Point shoreline and the St. Johns Bar Pilots navigation restrictions in place because of the crosscurrents at Mile Point.

1.2 STUDY AUTHORITY

Resolution, Docket 2550, of House Committee on Transportation and Infrastructure adopted March 24, 1998 for Mile Point, Florida states:

> Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That, the Secretary of the Army is requested to review the report of the Chief of Engineers on Jacksonville Harbor, Florida, published as House Document 214, Eighty-ninth Congress, 1st Session, and other pertinent reports to determine whether any modifications of the recommendations contained therein are advisable at the present time in the interest of navigation and related purposes, with particular reference to erosion of the Mile Point shoreline.

Congress added funding in the appropriations for Fiscal Year (FY) 2000 to begin the reconnaissance study which was completed in 2001. The feasibility study proceeded under that authorization in 2003.

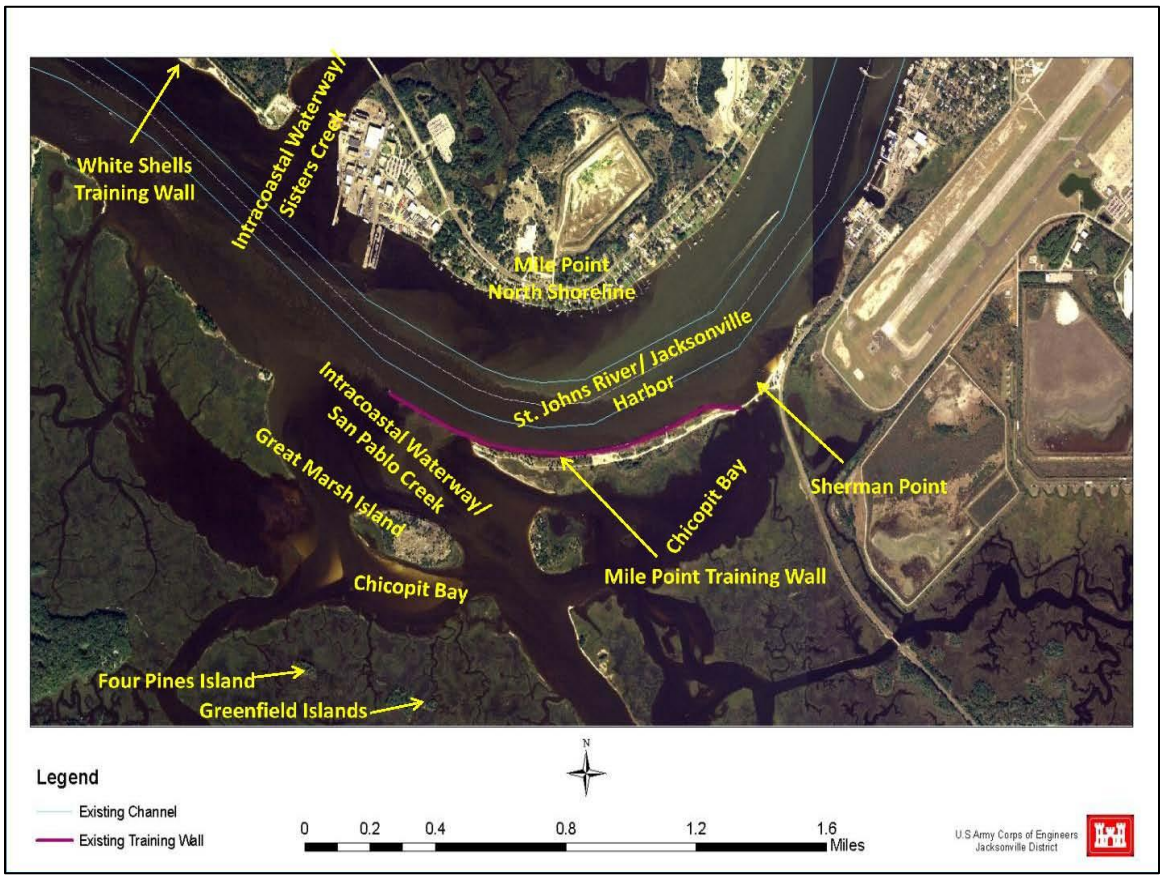
1.3 PURPOSE AND SCOPE

The purpose of this study is to develop and evaluate alternate plans to reduce effects of the crosscurrents on the Mile Point shoreline and recommend alternatives that would allow the St. Johns Bar Pilots to remove the restrictions to navigation for vessels transiting Jacksonville Harbor. The objective of this feasibility report is to investigate and recommend solutions to the water resources problems at Mile Point. The results of this study include documentation of environmental compliance.

1.4 LOCATION OF THE STUDY AREA

Mile Point consists of 5,000 feet of shoreline located along the north shore of the St. Johns River and east of the Intracoastal Waterway (IWW). Great Marsh Island and the Mile Point training wall divide Chicopit Bay from the St. Johns River. Chicopit Bay is located to the south of the Mile Point area (**Figure 5).** Mile Point is in the 4th Congressional District. Congressman Ander Crenshaw supports efforts to determine the cause and prevention of the erosion and navigational restrictions.

FIGURE 5: LOCATION OF JACKSONVILLE MILE POINT



1.5 HISTORY OF THE INVESTIGATION

A Reconnaissance Analysis for the Mile Point Shoreline of Jacksonville Harbor, Duval County, Florida was completed in 2001, under Section 905(b) Water Resources Development Act (WRDA) 1986. The purpose of the analysis was to evaluate the potential for Federal interest in investigations to determine the source of the Mile Point erosion problem and to recommend appropriate mitigation measures for prevention of the erosion as part of the Jacksonville Harbor and Intracoastal Waterway projects. During the course of the analysis, it was noted that the same crosscurrents affecting the erosion of the shoreline also presented problems for deep draft navigation in the Federal channel. The

analysis determined that a Federal interest exists to investigate, study, plan, and implement structural and nonstructural measures for the prevention or mitigation of Mile Point shore damages attributable to the Jacksonville Harbor and Intracoastal Waterway Federal navigation works. Feasibility objectives were outlined to determine the cause of shoreline erosion and to identify measures that reduce and/or relocate the difficult and erosive crosscurrents so that restrictions on deep draft vessel navigation may be removed.

In 2000, new container lines began to call at Talleyrand. This prompted the Jacksonville Port Authority to raise concerns about the restrictions at Mile Point. Letters from Hamburg-Sud (Columbus Line USA, Inc.), the Jacksonville Port Authority, and the St. Johns Bar Pilots dated 2000-2003 can be found in Appendix E.

As a result of the determination of Federal Interest, a feasibility cost sharing agreement was executed March 12, 2003. The study is cost shared at 50/50.

1.6 PRIOR REPORTS AND EXISTING PROJECTS

1.6.1 Prior Reports

In addition to the Reconnaissance Report mentioned above, several other studies were initiated or completed related to the Mile Point area. The Jacksonville District prepared an environmental assessment (EA) for placement of dredged rock at the Mile Point area. The EA titled "Shoreline Protection Structure and Alternative Placement Site Construction" evaluated placing rock from the Jacksonville Harbor navigation project at the Mile Point Training Wall. The finding of no significant impact (FONSI) for that EA was signed on February 20, 2003. A Continuing Authorities Program (CAP) Section 1135 study to examine the potential for environmental improvements to the Chicopit Bay area was initiated but not completed. The Section 1135 study was put on hold pending the results of this Mile Point feasibility study. There are two navigation projects that are adjacent to the Mile Point area including the deep draft ship channel, Jacksonville Harbor Federal navigation project, (**Figure 6**); and the Intracoastal Waterway (IWW). The Intracoastal Waterway extends from Trenton, New Jersey to Miami, Florida, along the east coast of the United States. **Figure 7** illustrates the portion of the IWW from Jacksonville to Miami, Florida.

1.6.2 Existing Projects

1.6.2.1 Jacksonville Harbor Federal Navigation Project (Mile Point Area)

The Chief of Engineers Report dated May 19, 1965 recommended modification of the existing project for Jacksonville Harbor, Florida, “to provide for maintenance of the existing ocean entrance 42 and 40 feet deep, deepening of the interior channel to 38 feet to the Municipal Docks and Terminals, and

widening the channel near mile 5 and mile 7 by 100 feet and 200 feet, respectively." The Water Resources Development Act of 1999 modified some of the project features. Recent project features from WRDA 1999 include a 40-foot project depth from the Entrance Channel to mile 14.7, and a 38-foot project depth for cuts F and G. Channel widths vary from approximately 400 feet to 1,200 feet. Public Law 109-103, Section 129 of the FY 2006 Appropriations Act, dated November 19, 2005 authorized deepening and widening of miles 14.7 to 20 to the new project depth of 40 feet. Funding was provided through the American Recovery and Rehabilitation Act (ARRA) of 2009 and the project was completed in 2010.

The federally authorized Jacksonville Harbor project provides for Federal maintenance of an existing channel depth of 40 feet with bottom widths ranging from 400 to 1,200 feet from the Atlantic Ocean to Mile 20 of the St. Johns River. The authorized widths in the Mile Point area range from 1,025 feet at reach 7 to 625 feet from reaches 8 to 13 and down to 475 feet at reaches 14 to 15. All vessels transiting to the Jacksonville Port Authority (Jaxport) must pass through the Mile Point area to do so. An important feature of the Federal navigation project which separates the St. Johns River near Mile Point from the east side of Chicopit Bay is the Mile Point training wall. The training wall extends about 6,000 feet from Sherman Point past the confluence of Pablo Creek with the St. Johns River **(Figure 5)**.

1.6.2.2 Intracoastal Waterway

The Intracoastal Waterway (IWW) crosses the St. Johns River south of the Mile Point training wall at Pablo Creek and to the north at Sisters Creek. The IWW has an authorized bottom width of 125 feet at a depth of 12 feet both on the north and south side of the river. The first Federal authorization for the Intracoastal Waterway (at Pablo Creek) from Jacksonville to Miami occurred in the River and Harbor Act of January 21, 1927. Using an existing private canal, the USACE took possession of the waterway on December 11, 1929. That first project called for a canal 8 feet deep by 75 feet wide and has subsequently been deepened and widened. Construction began when the United States snagboat D-1 moved from the St. Johns River into Pablo Creek and headed south clearing obstructions. The first Federal authorization for the Atlantic Intracoastal Waterway (AIWW), which includes Sisters Creek, occurred under the acts of March 4, 1913, and provided for a channel 7 feet deep by 100 feet wide (found in document H. Doc. 898/62/2).

1.6.2.3 History of the Mile Point Area

As shown in an 1895 survey, the St. Johns River originally flowed around both sides of Great Marsh Island from about Sherman Point to St. Johns Bluff. At that time near Mile Point, the river was about 4,000 feet wide with a shoal area.

In 1892 a USACE project for improvement of the channel in the St. Johns River from a controlling depth of 12.5 feet to 18 feet received approval from the Secretary of War. The project proposed improvement of shoal areas at Dames Point, Cedar Creek, and Mile Point by means of training dikes and dredging. To expedite those improvements the citizens of Duval County obtained permission from the Secretary of War to accomplish that work at their own expense. As a result of those efforts, a navigable 18-foot channel existed by May 1894.[2]

From 1903 to 1907 the Jacksonville Harbor project was deepened to 24 feet. Mile Point did not seem to change during that period. By 1910 a request to deepen the harbor to 30 feet included a recommendation to continue construction of the Mile Point training wall by augmenting the small part that already existed.

That recommendation noted that the flood tide is deflected off a shell bank at Sherman Point sharply across the point of sands locally known as Mile Point, while the ebb is deflected by the outflow from Sisters Creek against Great Marsh Island. The Mile Point training wall was planned to properly train those currents into one channel and to avoid the troublesome crosscurrents from the several creeks entering the river between Great Marsh Island and Sherman Point. Construction of the Mile Point training wall must have started sometime prior to the 1910 report date since that report mentions an improvement of conditions as a result of initial construction of a small part of the training wall.

A similar situation existed approximately two or three river miles to the west of the Mile Point area along a section of the Federal channel between White Shells and St. Johns Bluff. The same 1910 document mentioned above proposed to shut off conflicting crossing currents by a training wall extending from the mouth of Clapboard Creek to Brunswick Island and further extending along the shoal between Brunswick Island and the head of White Shells training wall for the purpose of training the ebb and flood currents into one channel between St. Johns Bluff and the existing White Shells Training Wall.[3]

An examination of the training wall was performed in 1928.[4] According to that examination, the training wall ranged in height from an original design height of 6 feet above local mean low water (MLW) to areas with a height of only 0.5 feet above MLW. Maintenance work around 1931 rebuilt the training wall to an original design elevation of 6 feet above MLW.[5] Work began under contract on

[2] House of Representatives Ex. Doc. 346, 53rd Congress, 3rd Session, June 3, 1896, Pages 3-4.
[3] House of Representatives Document No. 611, 61st Congress 2nd Session, January 29, 1910, Pages 17-18.
[4] Drawing File No. 1-9100. St. Johns River, Florida, Jacksonville to the Ocean. Examination of Training Walls & Revetments. August 20 to November 24, 1928.
[5] Drawing File No. 1A-8846, St. Johns River, Florida, Jacksonville to the Ocean, Proposed Repairs to Training Walls and Revetments, Mile Point Training Wall. U.S. Engineer Office, Jacksonville, Fla. November 21, 1930. To Accompany Proposal Number 31-434, Dated January 19, 1931.

April 21, 1931 and resulted in the repair of 5,990 linear feet of the training wall. Over 18,000 tons of granite averaging in weight from 1,000 to 1,500 pounds per stone was placed in the Mile Point training wall.[6] The Mile Point training wall underwent maintenance work to the eastern portions of the wall along Sherman Point in 2001. No maintenance work has been performed on the training wall since 2001.

[6] Annual Report of the Chief of Engineers, 1931, Extract. Report Upon the Improvement of Rivers and Harbors in Jacksonville, Fla., District. P. 741.

FIGURE 6: JACKSONVILLE HARBOR FEDERAL PROJECT

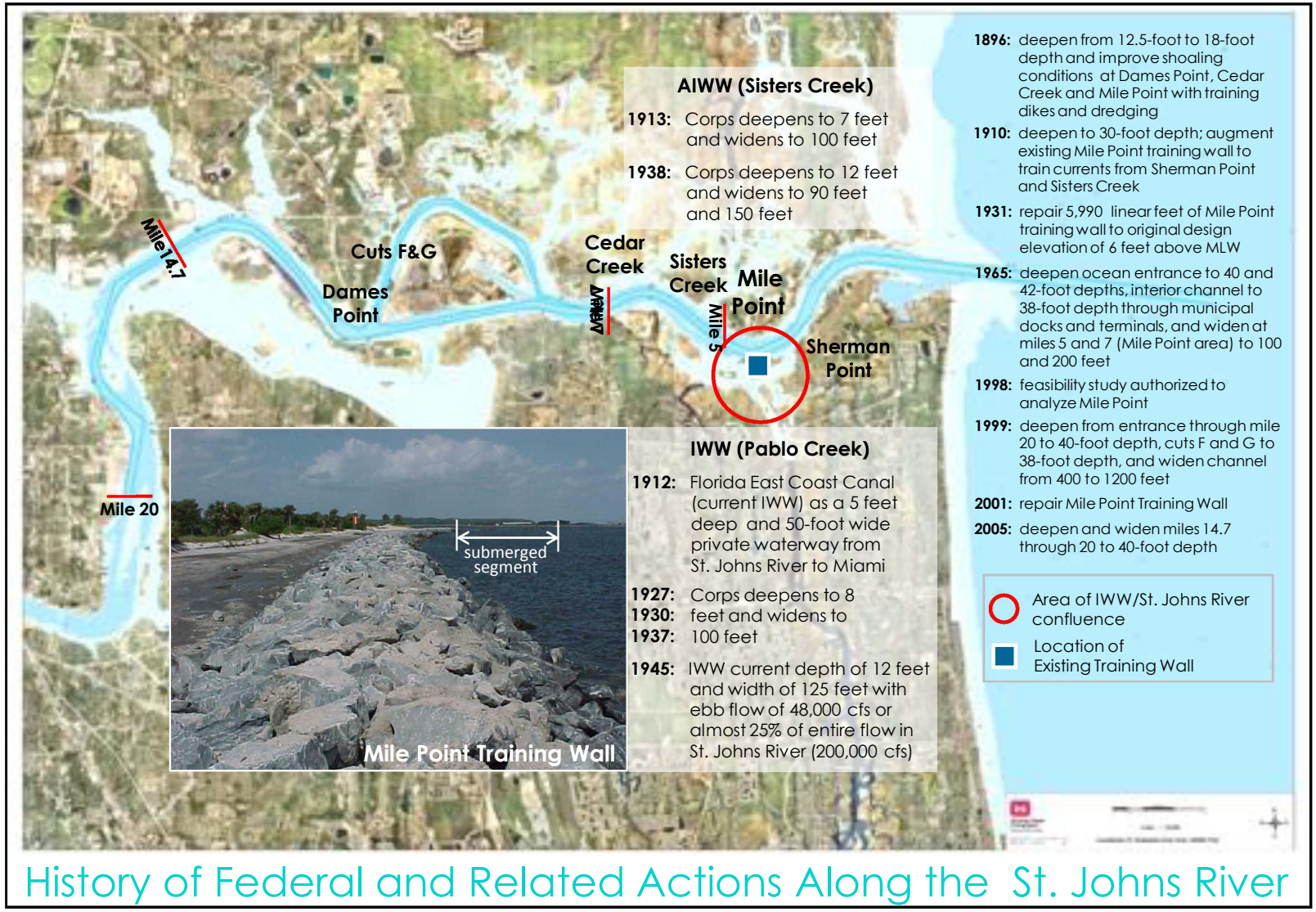
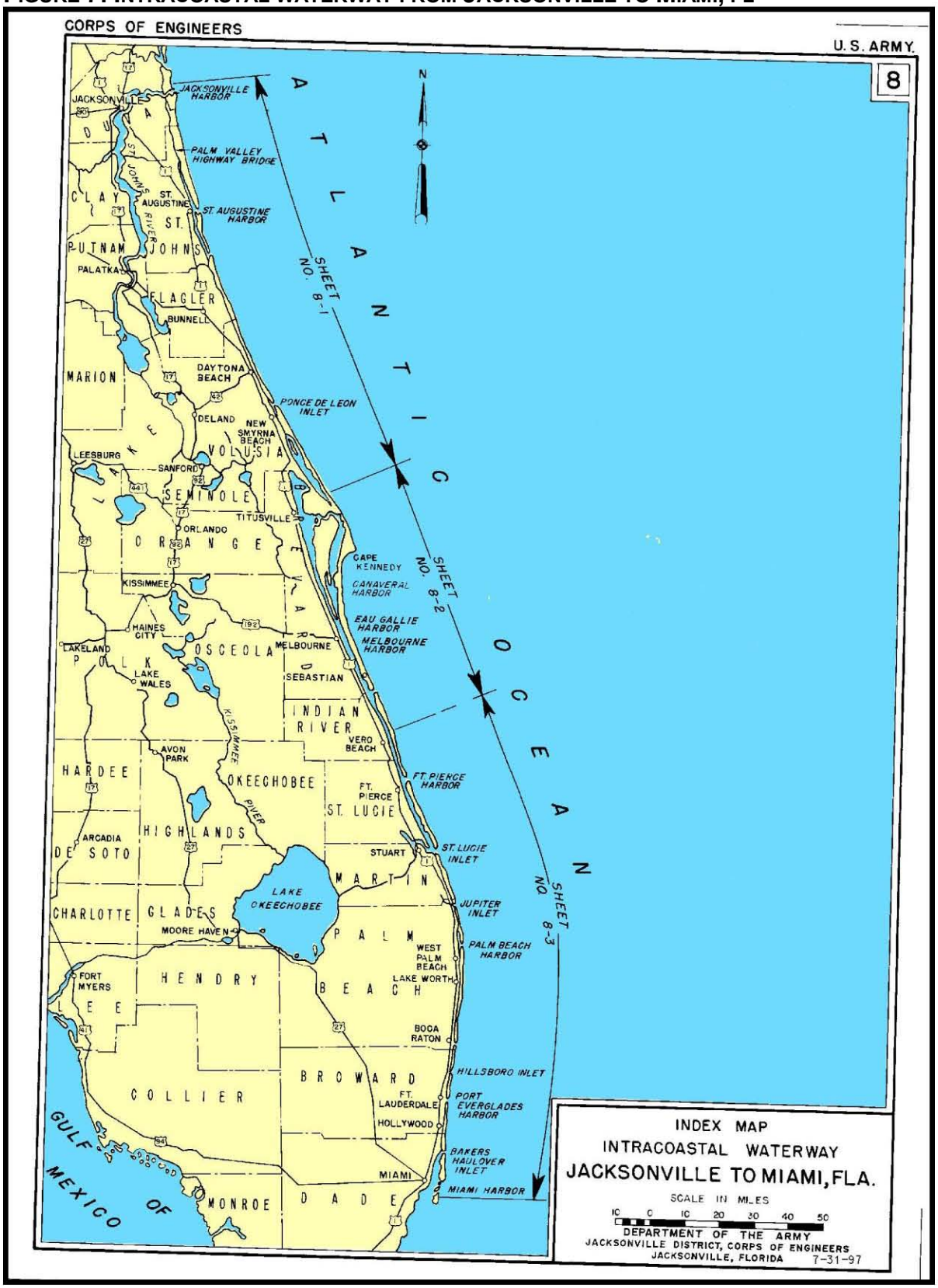


FIGURE 7: INTRACOASTAL WATERWAY FROM JACKSONVILLE TO MIAMI, FL



1.6.3 Other Studies

A Jacksonville Harbor General Reevaluation (GRR-II) study is underway to evaluate deepening and widening Jacksonville Harbor. The Mile Point feasibility study and the GRR-II study relate to one another. Lifting the restrictions at the Mile Point shoreline, as outlined in this report, will have a direct impact on the benefiting vessels for the GRR-II. The recommendations of this report will be included as a part of the without-project condition for the GRR-II.

1.7 PLANNING PROCESS AND REPORT ORGANIZATION

The USACE planning process follows the six-step process defined in the Principles and Guidelines (P&G) for Water and Related Land Resources Implementation Studies. This process, used for all planning studies conducted by the USACE, provides a structured approach to problem solving, and provides a rational framework for sound decision making. The six steps are:

Step 1: Identify problems and opportunities
Step 2: Inventory and forecast conditions
Step 3: Formulate alternative plans
Step 4: Evaluate alternative plans
Step 5: Compare alternative plans
Step 6: Select a plan

This feasibility study started with the issuance of initial Federal feasibility funds, following execution of the feasibility cost sharing agreement (FCSA), and terminates on the date the feasibility report is submitted to the Office of Management and Budget by the Assistant Secretary of the Army for Civil Works (ASA (CW)) for review of consistency with the policies and programs of the President. The feasibility phase may also be terminated if it is determined that there is no clear Federal interest in a project or if no project would meet the current policies or budget priorities. (See paragraph 4-3c(6) in ER 1105-2-100). The products of the feasibility phase include the feasibility report, integrated NEPA documentation, and a Chief of Engineers Report.

The feasibility report should document the planning process and all assumptions and rationale for decision making. The report will present the recommended plan and, if applicable, the degree of, and rationale for, departure from the National Economic Development (NED) plan. The non-federal sponsor cost sharing requirements, including their responsibilities for implementation and operation of the project must be clearly documented. Two project cost estimates shall be displayed in the feasibility report, one based on constant dollars, and one based on projected inflation rates.

Projects which produce NED benefits will result in a “best recommended plan;” resulting in a plan with the highest NED benefits over total project costs.

2.0 EXISTING CONDITIONS*

2.1 GENERAL

Jacksonville Harbor is a part of the St. Johns River. The St. Johns River is the longest river in eastern Florida; it is approximately 310 miles long and flows from the south to the north into the Atlantic Ocean. Deep draft vessels transit Jacksonville Harbor from the Atlantic Ocean to the Main Street Bridge in downtown Jacksonville. Jacksonville Harbor has an authorized depth of 40 feet from mile 0 to mile 20 and an authorized depth of 34 feet to mile 22. Vessels traveling through Jacksonville Harbor pass the Mile Point area to reach commercial terminals located between mainly mile 9 and mile 20.

The Intracoastal Waterway (IWW) crosses the St. Johns River at nearly right angles about 5 miles west of the mouth, at about 30°23.1'N., 81°27.8'W.[7] The IWW crosses the St. Johns River from the north at Sisters Creek and from the south at Pablo Creek. The confluence angle, in which the IWW meets with the St. Johns River, causes strong crosscurrents mainly during the ebb tide. The IWW has a controlling depth of 12 feet in the area of Jacksonville Mile Point. This area is used by barge tows traveling the IWW, requiring navigation through the Mile Point area and the crosscurrents.

Pablo Creek is a navigable waterway that experiences significant flow rates. Flows in excess of 55,000 cubic feet per second during ebb tide have been measured during Acoustic Doppler Current Profile (ADCP) surveys. This flow coming from the south, out of Pablo Creek can exceed 25 percent of the total flow of the St. Johns River at Mile Point. The confluence angle of Sisters Creek and Pablo Creek is more than 130 degrees. As the St. Johns River flows in a southeasterly direction during ebb flow, Pablo Creek flow collides with the river in a northwesterly direction. This combination of high flow and extreme confluence angle causes a deflection of the main channel flows to the northeast (**Figure 1**).

There are no bridges or other air restrictions from the Atlantic Ocean to the Mile Point Shoreline area. There are no utilities that would require relocation in the Mile Point area and there are no permits that have been issued or pending that would interfere with-project modifications in the Jacksonville Mile Point project area.

2.2 PHYSICAL CONDITIONS

The St. Johns River discharges into the Atlantic Ocean at Mayport in Duval County. The total elevation drop from its headwaters to the Atlantic Ocean is less than 30 feet (an average slope of about one inch per mile). Over most of its

[7] United States Coast Pilot 4, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, 2007 (39th) Edition

length, the average depth of the river is relatively shallow. However, the 26-mile stretch of river from the mouth to downtown Jacksonville (the deepest segment) has an average depth of approximately 30 feet. Many small rivers, creeks, and tributaries feed into the St. Johns River, increasing the overall river flow, and affecting the tidal signal, especially during storm events.

The St Johns River runs through the city of Jacksonville, located in northeast Florida. Deep draft vessels transit as far as downtown Jacksonville, or about 24 miles upriver from the confluence with the Atlantic Ocean. Upstream from downtown Jacksonville, commercial traffic is light, and comprised mostly of tug-assisted barges.

Acoustic Doppler Current Profiler (ADCP) surveys show that during flood tide, the majority of the flow in the Mile Point area is fast moving (>5 feet per second) and concentrated toward the southern bank of the river (outer bend) with very slow moving water along the northern bank (inner bend). This is the flow distribution one would expect to see at a river bend; however, during the ebb tide the flow distribution is drastically shifted/deflected to the north. Fast moving water flows can be seen along the northern shoreline, with water moving significantly faster along the northern (inner) bend compared to the southern (outer) bend where the Federal navigation channel is located.

Mile Point is located on the inside of the river bend, where typically sedimentation, not erosion, usually occurs. The unique geometric configuration of the intersection of the IWW and the St. Johns River produces a dramatic shift in the St. Johns River currents. This phenomenon has been verified visibly at the project site, measured with multiple ADCP surveys, reproduced in both two- and three-dimensional modeling, and verified by the St. Johns River Bar Pilots. These dangerous crosscurrents are the reason for the Bar Pilots' navigation restrictions.

In the recent past, homeowners on the north bank of the river at Mile Point have seen severe erosion of their property and are seriously concerned about future property losses. Bow wakes are not found to be a cause of erosion in this area. If bow wakes were the source of the problem, it would be expected that there would be the same level of catastrophic erosion all along the river or at least in multiple other locations, which is not the case. Large vessels move regularly in and out of most portions of the harbor during both ebb and flood tide.

Also of concern in this area is the breakthrough of Great Marsh Island on the southern bank of the St. Johns River at Mile Point, allowing water to flow directly from the St. Johns River into nearby Chicopit Bay. This has caused severe shoaling in parts of Chicopit Bay. At low tide, the water depth in some parts of the bay is less than six inches deep.

2.2.1 Tides

Based on NOAA Tide Gauge Station ID 8720224 (Mayport, St. Johns River) the tide range from mean lower low water (MLLW) to mean higher high water (MHHW) is 4.96 feet. The effect of tides on the river is significant. The exact point where the river becomes non-tidal will constantly change, depending on the strength of the tide signal (e.g., spring or neap tides), and the interaction of the tide with the variable river flow. The total flow in the lower reaches of the river is comprised of about 80%-90% tide-induced flow, with the remaining flow caused by wind, freshwater inflow (from tributaries and rain), and industrial and treatment plant discharges. The river flow generally increases downstream, with the highest flows occurring at the mouth of the river. The total discharge of the river is normally greater than 50,000 cubic feet per second (cfs), and will often exceed 200,000 cfs. River flow is seasonal, generally following the seasonal rain patterns with higher flows occurring in the late summer to early fall, and lower flows occurring in the winter months. The average annual non-tidal discharge at the river mouth is approximately 15,000 cfs.

2.2.2 Currents

Dangerous crosscurrents, in the Mile Point area, are a major concern to deep-draft commercial navigation. Meetings with the St. Johns Bar Pilots Association have highlighted the difficult and intense nature of the crosscurrents at the confluence of the St. Johns River with Sisters Creek to the north and Pablo Creek to the south. The area of the river where the IWW crosses the St. Johns River produces currents that can actually turn an inbound and under powered ship around. In addition, the U.S. Coast Guard (USCG) describes the junction of the IWW with the St. Johns River as one of particular concern, subject to strong and unpredictable crosscurrents at various stages of tide.

To avoid those difficult ebb flow crosscurrents, the St. Johns Bar Pilots and the Captain of the Port have enacted a restriction on vessels transiting the Harbor with a draft greater than 33 feet on the ebb tide (vessels that have called at the port and have proven to have exceptional handling characteristics, transiting to TraPac or Blount Island Terminals, are restricted if transiting with a draft greater than 34 feet) .[8] Inbound vessels, with transit drafts greater than 33 feet are subject to navigation restrictions on the ebb tide; outbound vessels, vessels with a transit draft of 36 feet or more are subject to navigation restrictions on the ebb tide. The sponsor, the Jacksonville Port Authority, has requested the USACE to recommend measures that will allow the St. Johns Bar Pilots and the Captain of the Port to remove those restrictions.

In this study the changes in current velocities of the proposed plans were tested using a two-dimensional hydrodynamic model. An examination of the maximum flood and ebb tide current vectors were used to examine the flow velocity

[8] 2010 Pilot's Book, St. Johns River Navigational Guidelines

magnitudes within the Federal navigation channel to determine the effects of a change in the conditions at Mile Point on the crosscurrents.

2.2.3 Sea Level Rise

Relative sea level (RSL) refers to local elevation of the sea with respect to land, including the lowering or rising of land through geologic processes such as subsidence and glacial rebound. It is anticipated that sea level will rise within the next 100 years. To incorporate the direct and indirect physical effects of projected future sea level change on design, construction, operation, and maintenance of coastal projects, the USACE has provided guidance in Engineering Circular, EC 1165-2-211. This EC provides both a methodology and a procedure for determining a range of sea level change estimates based on global sea level change rates, the local historic sea level change rate, the construction (base) year of the project, and the design life of the project. Three estimates are required by the guidance, a baseline estimate representing the minimum expected sea level change, an intermediate estimate, and a high estimate representing the maximum expected sea level change.

The local rate of vertical land movement is found by subtracting the regional mean sea level (MSL) trend from the local MSL trend. The regional mean sea level trend is assumed equal to the eustatic mean sea level trend of 1.7 mm/year. Therefore, at Mile Point, there is 0.70 mm/year of subsidence. Adjusting equation (2) to include the historic global mean sea-level change rate of +1.7 mm/year results in updated values for the variable b equal to 2.36E-5 for modified National Research Council (NRC) Curve I (intermediate), 6.20E-5 for modified NRC Curve II, and 1.005E-4 for modified NRC Curve III (high).

Equation (3) of EC 1165-2-211 Appendix B calculates eustatic sea level change over the life of the project. E(t) is eustatic sea level change and b is a constant provided in EC 1165-2-211; t1 is the time between project construction date and 1986; and t2 is the time between a future date at which one wants an estimate for sea-level change and 1986 (or t2 = t1 + number of years after construction (Knuuti, 2002)). For example, if a designer wants to know the projected eustatic sea-level change at the end of a project's period of analysis, and the project is to have a fifty year life and is to be constructed in 2009, t1 = 2009 – 1986 = 23 and t2 = 2059 – 1986 = 73.

Modifying equation (3), to include site-specific sea level change data, results in an equation for Relative Sea Level (RSL). This equation is used to estimate baseline, intermediate and high sea level change values over the life of the project. Based on historical sea level measurements taken from NOS gage 8720218 at Mayport, Florida, the historic sea level rise rate (e+M) was determined to be 2.40 +/- .31 mm/year (0.0076 feet/year) http://tidesandcurrents.noaa.gov/sltrends/index.shtml). The project base year was specified as 2009, and the project life was projected to be 50 years. The

average baseline, intermediate, and high sea level change rates were found to be +2.40 mm/year (0.0079 feet/year), +4.67 mm/year (0.015 feet/year), and +12.05 mm/year (0.039 feet/year), respectively.

2.3 ENVIRONMENTAL AND HISTORIC RESOURCES

2.3.1 General Environmental Setting

The study area includes the confluence of the lower St. Johns River and the Intracoastal Waterway (IWW), which is located within the City of Jacksonville, Duval County, Florida. This is a tidally influenced estuarine environment, where fresh water mixes with salt water and salinity can vary considerably. Tides in this area are semi-diurnal, which means two high and low tides per day, and the mean tidal range are approximately 3.9 feet (NOAA 2007). The lower St. Johns is a broad and meandering river, and is part of the Federal system of navigation channels for Jacksonville Harbor. As such, the portion of the river within the study area is dredged at regular intervals to the authorized depth of 40 feet. The IWW is also periodically dredged to the authorized depth of 12 feet, plus 2 feet of allowable overdepth, to a depth of 14 feet.

The northern boundary of the Mile Point study area is situated along the north shoreline of the St. Johns River. As previously described, the point is comprised of residential development and has been vulnerable to erosion for a number of years. The upland portion of this area was created by placing dredged material on top of salt marsh in the early 1900s. Helen Cooper Floyd Park is situated in the Mile Point area along the southern shoreline of the river. The park is part of t Naval Station Mayport, but it is leased to and managed by the City of Jacksonville. The area where the park is located was created in the early 1900's by side casting dredged material to the south side of the Mile Point training wall. Higher elevations of this spoil area supports upland plant species while the lower elevations have evolved into salt marsh. Immediately to the west of Helen Cooper Floyd Park is Great Marsh Island, and as the name suggests, this island is primarily comprised of salt marsh but it has a small amount of disturbed uplands consisting of old dredged material. The island has been subjected to erosion and a substantial portion of the marsh has been lost in recent years. All of the uplands and wetlands within the proposed project footprint are owned by the U.S, Navy. However, the project footprint also lies within the boundaries of the National Park Service, Timucuan Ecological and Historic Preserve. The preserve was designated to protect and interpret the ecological and historic resources of the area. The U.S. Army Corps of Engineers continues to coordinate with the preserve on the Mile Point study as well as other local projects.

In summary, the study area is a mix of river channels which are dredged to accommodate deep draft vessels, but also an estuary with extensive salt marshes and adjacent hardwood hammocks that continues to support a diverse

community of plants and animals. It is important to also note that the St. Johns River has been designated an American Heritage River.2.3.2 Threatened and Endangered Species

Threatened and Endangered species that may occur in the study area, and that may be affected by the proposed work, can be found in **Table 2**.

TABLE 2: STATUS OF LISTED SPECIES THAT MAY OCCUR WITHIN THE STUDY AREA

Species	*State Listing**	*Federal Listing**
West Indian (Florida) Manatee	LE	LE
Piping Plover	LT	LT
Wood Stork	LE	LE
Loggerhead Sea Turtle	LT	LT
Green Sea Turtle	LE	LE
Leatherback Sea Turtle	LE	LE
Kemp's Ridley Sea Turtle	LE	LE
Short-nosed Sturgeon	LE	LE
Smalltooth Sawfish	LE	LE
Northern Right Whale	LE	LE

* LE=Endangered and LT=Threatened

2.3.2.1 West Indian (Florida) Manatee

The West Indian (Florida) manatee (*Trichechus manatus latirostris*) is known to occur in the study area primarily during the spring, summer, and fall months. As water temperatures decline during the winter months, manatees generally leave the St. Johns River, as well as the IWW, and move to warm water refugia such as springs or industrial warm water discharges (O'Shea, T.J., and M.E. Ludlow 1992). Since 1993, researchers at Jacksonville University have been conducting year round bi-weekly aerial and aquatic manatee surveys of the St. Johns River and other water bodies within Duval County. Surveys conducted during 2007 through 2009 recorded approximately 7 manatees within one mile, and several others were recorded between one and two miles of the study area. This data can be viewed at the following website:

http://www.ju.edu/marco/

Demographic analysis reported by Runge et al. (2004 and 2007) indicates that manatee populations are increasing or stable over much of Florida except for the Southwest Region. The analysis suggests that the Atlantic Coast Region is experiencing a population growth rate of 3.7% per year. Other researchers have also indicated that wintering populations of manatees along the Atlantic Coast have been increasing at rates of 4-6% per year since 1994 (Craig and Reynolds 2004). The Florida Fish and Wildlife Conservation Commission (FWC) reported a total of 4,834 manatees during the annual manatee synoptic survey conducted in 2011. A total of 5,076 animals were reported in 2010.

The Mile Point study area lies within designated critical habitat of the manatee. Per CFR 50, parts 1 to 199, the designation encompasses the St. Johns River.

2.3.2.2 Piping Plover

Over-wintering piping plovers (*Charadrius melodus*) may forage on the mud flats and shorelines at, or adjacent to, Helen Cooper Floyd Park. However, the species has not been observed by USACE biologists who have visited the park during the fall and winter months. Piping plovers were observed during these same time periods at Huguenot Memorial Park, which is approximately 3 miles to the northeast and located on the Atlantic coast. This species is primarily associated with barrier beaches during the winter period (Nicholls 1996).

Since its 1986 listing, the Atlantic Coast piping plover population estimate increased 234%, from approximately 790 pairs to an estimated 1,849 pairs in 2009. The portion of the population has almost tripled, from approximately 550 pairs to an estimated 1,597 pairs (USFWS 2011a).

The nearest designated critical habitat for wintering piping plover is unit FL 35, which is located approximately 3 miles from the study area. Unit FL-35 includes Huguenot Memorial Park.

2.3.2.3 Wood Stork

Wood storks (*Mycteria americana*) have not been observed in the study area. Nevertheless, it is very likely that this species does occasionally forage within the tidal channels of Helen Cooper Floyd Park and other nearby shallow water habitats. The study area appears to lie within the 13 mile core foraging area of at least one documented wood stork colony (Pumpkin Hill).

Presently, the wood stork breeding population is believed to be greater than 8,000 nesting pairs (16,000 breeding adults). The southeast United States breeding population of the wood stork declined from an estimated 20,000 pairs in the 1930s to about 10,000 pairs by 1960, and to a low of approximately 5,000 pairs in the late 1970s (USFWS 2005).

Critical habitat has not been designated for the wood stork.

2.3.2.4 Loggerhead Sea turtle

During previous dredging events, the USACE endangered species observers have occasionally seen loggerhead sea turtles (*Caretta caretta*) within the study area. A review of the USACE Sea Turtle Data Base indicates that a total of 3 loggerheads were taken during hopper dredging activities within Jacksonville Harbor between 1994 and 2008, and all occurred below the study area between

St. Johns River mile 4 and the entrance channel. As stated above, the study area primarily lies between St. Johns River miles 4 and 5.

Along northeast Florida beaches, the primary nesting season for loggerheads is mid-May through August. From 2004 through 2008, 346 loggerhead sea turtle nests and 262 false crawls have been documented during surveys by the Florida Fish and Wildlife Conservation Commission (FWC) on northeast Florida beaches. Recent analyses of nesting data from the Index Nesting Beach Survey program in southeast Florida show the population is declining. Similarly, long-term nesting data show loggerhead nesting declines in North Carolina, South Carolina, and Georgia (NMFS 2011a).

Critical habitat has not been designated for this species.

2.3.2.5 Green Sea Turtle

USACE endangered species observers have not recorded green sea turtles (*Chelonia mydas*) within the study area. The USACE Sea Turtle Data Base indicates that one green sea turtle was taken during hopper dredging activities within Jacksonville Harbor between 1994 and 2008, and the take occurred below the study area between St. Johns River mile 4 and the entrance channel. As stated above, the study area primarily lies between St. Johns River miles 4 and 5.

From 2004 through 2008, nine green sea turtle nests and 12 false crawls have been documented during surveys by the FWC on northeast Florida beaches. According to the 5-year review performed by the USFWS and NMFS in 2007, the nesting population of green sea turtles in Florida was increasing.

The study area does not occur within designated critical habitat for this species.

2.3.2.6 Leatherback Sea Turtle

The leatherback sea turtle (*Demochelys coriacea*) has not been seen in the study area by USACE endangered species observers nor has it ever been taken by a USACE dredge operating in Jacksonville Harbor. Leatherbacks are commonly known as pelagic (open ocean) animals, but they also forage in coastal waters (NMFS 2011b).

From 2004 through 2008, three leatherback sea turtle nests and no false crawls have been documented during northeast Florida beach surveys by the FWC. The International Union for the Conservation of Nature (2011) reports that populations of leatherbacks nesting on beaches along the Pacific Ocean, once the stronghold of the species, has declined by more than 80%. However, the small nesting population within Florida is increasing. Nesting populations at all 68 beaches evaluated within the state are increasing from 3.1% to 16.3% per

year, and the number of nests across the state has been increasing by 10.2% per year since 1979 (Stewart et al 2011).

The study area does not occur within designated critical habitat for this species.

2.3.2.7 Kemp's Ridley Sea Turtle

USACE endangered species observers have not recorded the Kemp's ridley sea turtle (*Lepidochelys kempii*) within the project area, and this species has never been taken by a USACE dredge operating in Jacksonville Harbor. However, this sea turtle is known to occur in nearshore waters along the east coast of Florida ((Schmid and Ogren 1992).

Kemp's ridley sea turtles have not been recorded nesting on Florida beaches or along the eastern coast of the United States (USFWS 2011b). Nesting primarily occurs along isolated areas of Mexico with limited nesting along the Texas coast (Lutz et al 1997). This species has declined more than any other sea turtle, but nesting populations appear to be increasing (NMFS 2011c).

Critical habitat has not been designated for the Kemp's ridley sea turtle.

2.3.2.8 Shortnose Sturgeon

The shortnose sturgeon (*Acipenser brevirostrum*) historically occurred in the St. Johns River (Gilbert, C.R. 1992); however, this species has experienced significant declines within its southern geographic range (Rogers and Weber 1994, Kahnle et al. 1998, and Collins et al. 2000). Beginning in the spring of 2001, the Florida Fish and Wildlife Research Institute (FFWRI) and U.S. Fish and Wildlife Service (USFWS) began research on the population status and distribution of the species in the St. Johns River. After approximately 4,500 hours of gill-net sampling from January through August of 2002 and 2003, only one shortnose sturgeon was captured in 2002.

No critical habitat has been designated for this species.

2.3.2.9 Smalltooth Sawfish

The smalltooth sawfish (*Pristis pectinata*) is widely distributed within the coastal waters of the eastern and western Atlantic (Last and Stevens 1994). However, according to C.A. Simpendorfer et al (2008), this species' eastern Atlantic population was dramatically reduced during the 20th century, from widespread and abundant, to very rare with a restricted population range. They reported that the present core range of the eastern Atlantic population extends along the southern coast of Florida from the Ten Thousand Islands to Florida Bay, with moderate occurrence in the Florida Keys and at the mouth of the Caloosahatchee River. They also reported that smalltooth sawfish observations

have not been recorded within the St. Johns River from 1950 to 2008 (C. A. Simpfendorfer et al. 2008). The occurrence of this species within the project area is highly unlikely.

No critical habitat has been designated for the sawfish.

2.3.3 Essential Fish Habitat

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act of 1996, waters and substrate within the study area have been identified as Essential Fish Habitat (EFH) by the South Atlantic Fishery Management Council (1998). EFH is defined as those waters and substrate necessary for fish to spawn, breed, feed, or grow to maturity. Estuarine/inshore EFH within the study area consists of an estuarine water column with an unconsolidated substrate. Salt marsh, which has been designated as a habitat area of particular concern, and a small tidal channel are also present within the proposed project footprint at Helen Cooper Floyd Park. Species managed by the National Marine Fisheries Service that may occur within the study area can be found in **Table 3**, and possible prey species in **Table 4**.

TABLE 3: FEDERALLY MANAGED SPECIES OF FISH THAT MAY OCCUR WITHIN THE STUDY AREA.

Species	Life Stage	Substrate Preference*	
		Unconsolidated Sediment	Salt Mash and Tidal Channel
Brown shrimp (*Farfantepenaeus aztecus)*	A, J, L	A, J, L	J, L
Pink shrimp (*Farfantepenaeus duorarum)*	A, J	A, J	J
White Shrimp (*Litopenaeus setiferus)*	A, J	A, J	J, L
Black seabass (*Centropristis ocyurus)*	A, J	A, J	
Gag (*Mycteroperca microlepis)*	A, J	A, J	
Crevalle jack (*Caranx hippos)*	A, J	A, J	A, J
Spotted seatrout (*Cynoscion nebulosus)*	A, J	A, J	A, J
Weakfish (*Cynoscion regalis)*	A, J	A, J	A, J
Gray snapper (*Lutjanus griseus)*	A, J, L	A, J, L	A, J, L
Atlantic spadefish (*Chaetodipterus faber)*	A, J	A, J	
Sheepshead (*Archosargus probatocephalus)*	A, J, L	A, J	J, L
Red drum (*Sciaenops ocellatus)*	A, J, L	A, J, L	J, L
Black drum (*Pogonias cromis)*	A, J	A, J	

Source: Dennis et al 2001; SAFMC 1998; University of Florida 2008.
***Substrate preference, unconsolidated sediment and salt marsh habitats occur in or near the project area.A=adult; J=juvenile; L=larvae**

TABLE 4: PREY SPECIES THAT MAY OCCUR WITHIN THE STUDY AREA.

Species	Life Stage	Substrate Preference*	
		Unconsolidated Sediment	Salt Marsh & Tidal Channel
Ladyfish (*Elops saurus)*	A	A	
Striped anchovy (*Anchoa hepsetus)*	A, J, L	A, J, L	
Bay anchovy (*Anchoa mitchilli)*	A, J, L	A, J, L	
Scaled sardine (*Harengula jaguana)*	J	J	
Atlantic thread herring (*Opisthonema oglinum)*	A, J, L	A, J, L	
Sheepshead minnow (*Cyprindon variegates)*	A, J, L	A, J, L	A, J, L
Atlantic menhaden (*Brevoortia tyrannus)*	A, J, L	A	J, L
Yellowfin menhaden (*Brevoortia smithi)*	A, J, L	A	J, L
Bay scallop (*Argopecten irradians)*	A, J, L	A, J	L
Atlantic rangia (*Rangia cuneata)*	A, J, L	A, J, L	A, J, L
Quahog (*Mercenaria sp.)*	A, J	A, J	
Grass shrimp (*Palaemonetes pugio)*	A, J		A, J
Striped mullet (*Mugil cephalus)*	A, J	A, J	
Spot (*Leiostomus xanthurus)*	A, J	A	
Atlantic croaker (*Micropogonias undulates)*	A, J	A, J	
Silversides (*Menidia sp.)*	A, J, L	A, J, L	A, J, L
American eel (*Anguilla rostrata)*	A, J, L	J, L	A, J, L
Hardhead catfish (*Arius felis)*	A, J, L	A, J, L	
Gafftopsail catfish (*Bagre marinus)*	A, J, L	A, J, L	
Inshore lizardfish (*Synodus foetens)*	A, J, L		A, J, L
Oyster toadfish (*Opsanus tau)*	J	J	
Atlantic needlefish (*Strongylura marina)*	A, J, L	A, J, L	
Timucu (*Strongylura timucu)*	J	J	
Killifish (*Fundulus sp.)*	A, J, L		A, J, L
Sailfin molly (*Poecilia latipinna)*	A, J, L		A, J, L
Pipefish (*Sygnathus sp.)*	A, J, L		A, J, L
Sea robin (*Prionotus sp.)*	J	J	
Mojarra (*Eucinostomus sp.)*	A, J	A, J	
Pinfish (*Lagodon rhomboides)*	A, J, L	A, J, L	A, J, L
Silver perch (*Bairdiella chrysoura)*	A, J, L	A, J, L	
Kingfish (*Menticirrhus sp.)*	A, J	A, J	
Gobies (*Bathygobius sp., Gobionellus sp.)*	A, J, L	A, J, L	A, J, L

Source: Dennis et al 2001; SAFMC 1998; University of Florida 2008.
*Substrate preference, unconsolidated sediment and salt marsh habitats occur in or near the project area.
A=adult; J=juvenile; L=larvae

2.3.4 Shellfish and Wildlife Resources

In addition to the protected species and EFH resources described above, the study area supports other marine, as well as terrestrial biota. Oysters can be found on the mud flats adjacent to Helen Cooper Floyd Park, and to a lesser extent within the nearby salt marsh and tidal channels. Other macroinvertebrates commonly found in soft-bottom estuarine habitat in northeast Florida include annelids, a variety of mollusks besides oysters, arthropods, sponges and polyps (Hoffman and Olsen 1982).

The terrestrial or upland habitat at Helen Cooper Floyd Park is dominated by sabal palm, various grasses, cacti, and shrubs. Some species of migratory birds, especially common passerines, are likely to nest there. Common species of wading birds and shorebirds have been observed foraging on the nearby mud flats and tidal channels. Small mammals and a few terrestrial species of reptiles are also likely to occur within the upland habitat of the study area.

2.3.5 Cultural Resources

With the long maritime history of the St. Johns River, especially the Mile Point area, there is a high potential for submerged historic properties that may be adversely impacted by the proposed project. Sherman Point just east of the project area was a major shipping and coaling station. Pablo Creek provided access to a number of Spanish and British occupation settlements. The 1959 Nassau Sound to Jacksonville navigation chart shows a shipwreck on the edge of the channel near the western edge of the proposed project area. This shipwreck is not illustrated on later charts; however, a shipwreck is shown near the eastern portion of the project area on 1970s charts. The Mile Point training wall dates to the late 19th century, and the USACE is in the process of evaluating this property. Recent evaluations (1996 and 2003) of similar Jacksonville Harbor training walls have resulted in them being determined not eligible for listing on the National Register of Historic Places.

In 2009 the USACE contracted Panamerican Consultants, Inc to conduct a cultural resource survey for the Jacksonville Harbor GRR, Cultural Resources Remote Sensing Survey of the Jacksonville Harbor Project GRR2 Duval County, Florida. The Mile Point project area was included in this survey. A number of magnetic, side scan and sub-bottom profiler targets were identified in the proposed Mile Point project area. In 2010 the USACE contracted Panamerican to conduct diver identification of the potentially significant targets identified by their survey. This report, Diver Identification and Archaeological Testing: Addendum to Cultural Resources Remote Sensing Survey of the Jacksonville Harbor Project GRR2 Duval County, Florida, resulted in the identification of one potentially significant historic property (SB-10) in the Mile Point project area. This prehistoric site is located approximately three feet below the bottom surface on the eastern side of the proposed restoration fill area at Great Marsh Island.

While no definitive artifacts were recovered, such as pottery or lithics, the materials recovered during the diver identification are indicative of a prehistoric coastal shell midden. This type of site is dominated by shell and animal bone; given the small sample size, the lack of definitive artifacts is not unusual. Radiocarbon dating of the materials resulted in an estimated age of 980 ± 40 years before present (present = 1950), with a calibrated date of 970 to 1110 A.D. While there is sufficient information to identify the presence of a prehistoric site, the level of work is not sufficient for a determination of eligibility for listing on the National Register of Historic Places. In accordance with the National Historic Preservation Act and the implementation regulations for Section 106 of the Act it will be treated as if it were eligible until a determination can be made.

The remote sensing survey resulted in a magnetic target near the location of the shipwreck symbol on the 1959 navigation chart. However, the diver identification investigation indicated that this magnetic anomaly was from a 30-foot long section of wire rope. No evidence of the mapped shipwreck was found.

The existing Mile Point training wall is under evaluation for eligibility in the National Register of Historic Places. The wall is a historic structure and its significance is still under evaluation. If it is determined that the structure is significant and that project implementation will create an adverse effect, the following steps will be undertaken:

- Determine if project alterations are possible that will avoid or minimize the effect. If avoidance is not possible then develop a memorandum of agreement (MOA) to outline mitigation of effects. Implement mitigation of adverse effects.[9]

2.3.6 Water Quality

Waters within the study area have been designated by the state of Florida as Class III - Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife. In addition, the study area is just south of the Nassau River-St. Johns River Marshes Aquatic Preserve.[10]

Two tributaries which flow into the project area at Chicopit Bay, Greenfield Creek and Mt. Pleasant Creek, have been identified by the state as not meeting Class III surface water standards for fecal coliform bacteria. Thus, they have been designated by the state as 303(d) list verified impaired water bodies. As a result, Total Maximum Daily Loading (TMDL) allocations for discharges within the watersheds have been established. This allocation was based upon the assumption that the existing watershed hydrology would be maintained while remediation efforts are conducted within the watershed by state and local agencies. Since flow through Chicopit Bay is currently restricted by shoal

[9] Of note: These mitigation costs are 100% Federal.
[10] A map of the preserve can be viewed at the following link: http://www.dep.state.fl.us/coastal/sites/nassau/map.htm

material, blocking off the current channel through Great Marsh Island would likely substantially limit the flushing capacity of Greenfield Creek and Mt. Pleasant Creek, thus adversely affecting the implementation of the state and local TMDL remediation activities.

2.3.7 Hazardous, Toxic, and Radioactive Waste (HTRW)

A Phase 1 Environmental Site Assessment was conducted in conformance with the scope and limitations of American Society of Testing and Materials (ASTM) Practice E 1527. The review of available HTRW data, historical sediment and water quality data, aerial and water site visits, and the frequency of dredging activity within the project area all indicate that the site is highly likely to be free of hazardous and toxic materials and waste (USACE 2004).

2.3.8 Air Quality

According to the Florida Department of Environmental Protection, Florida is one of only three states east of the Mississippi River to meet all national air quality standards. Local emissions appear to be minimal.

2.3.9 Noise

The ambient (or surrounding) noise level of the Mile Point study area includes human-caused (recreational boat traffic, ship engines, occasional military aircraft, construction activities, etc.) and natural (wind, waves, birds, etc.) sources. All of these sources are intermittent; their strength, as well as frequency, can vary considerably due to the type of activity, distance from receptor, and weather conditions. The U.S. Environmental Protection Agency (EPA) has established that construction noise resulting in an hourly equivalent sound level of 75 dBA at a sensitive receptor (e.g., hospital, residence, church) would represent a significant impact. During operation, heavy equipment and other construction activities generate noise levels ranging typically from 70 to 90 dBA at a distance of 50 feet. That portion of the study area where construction would occur is located within or adjacent to Helen Cooper Floyd Park and Great Marsh Island. These locations are over 2,000 feet from the nearest development, i.e. residential or commercially zoned properties.

In addition to noise in the air, pile driving and other construction and/or upgrade activities can produce underwater noise. For underwater environments, ambient noise includes tides, currents, waves, as well as noise produced by marine mammals and by humans. Human-caused noise can be generated from the operation of vessels or boats, aircraft, dredging equipment, and other activities.

2.3.10 Aesthetics

The study area lies in the near vicinity of commercial port facilities, businesses, and residential neighborhoods. However, this portion of the St. Johns River also has many scenic qualities and perhaps the most remarkable of which are the salt marshes.

2.3.11 Recreation

Recreational boat traffic regularly transits through the study area via the St. Johns River and IWW. Recreational boaters from Mt. Pleasant Creek also use the eroded breakthrough at Great Marsh Island in order to gain access to the river. Fishing is a very popular recreational activity, and many fishermen can typically be observed using Helen Cooper Floyd Park. The park has a public fishing pier, an accessible shoreline, and some people climb onto the Mile Point training wall to fish.

2.4 ECONOMIC CONDITIONS

Jacksonville Harbor allows for transportation of international and domestic cargo to and from the terminals located along the Federal channel. All vessels traveling to the Port of Jacksonville and many of the terminals along the channel must pass through the Mile Point area of Jacksonville Harbor. As is discussed in this report there are strong crosscurrents located at the confluence of the St. Johns River and the IWW; due to these crosscurrents the St. Johns Bar Pilot Association (Pilots) restricts some vessels to ebb tide movements inbound and outbound to and from the upstream river terminals. The Pilots' St. Johns River Navigational Guidelines (2011) stipulate ebb tide restrictions for inbound and outbound vessel movements are attributable to the without-project Mile Point conditions as follows: [11]

Inbound Vessels

> Vessels with draft over 33 feet (fresh water) but no more than 36 feet (fresh water) shall start in no sooner than 15 minutes before start of flood current on the bar. Vessels with greater than 36 feet of draft (fresh water) shall start in no sooner than 30 minutes after start of flood current on the bar. Stop taking in vessels with draft over 33 feet (fresh water) one hour before start of ebb current. [12] Vessels that have called at the port and have proven to have exceptional handling characteristics, transiting to TraPac or Blount Island Terminals, with a fresh water draft of 34 feet or less, may start in anytime and any stage of the tide.

[11] St. Johns Bar Pilot Association, pages 8 and 9 (2010).

[12] Other outbound sailing draft restrictions are assumed to be raised to Blount Island standards (36 feet) effective with the completion of the 40-foot channel as authorized beyond Dames Point to Talleyrand Terminals.

Outbound Vessels

> Vessels leaving Blount Island with a draft over 36 feet (at their berth) sailing time shall be no sooner than the start of flood current (emphasis supplied). Cut off time is the beginning of ebb current.

Effectively, vessels entering the St. Johns River are restricted whenever their sailing drafts exceed 33 feet (fresh water), and vessels departing the St. Johns River are restricted whenever their sailing drafts exceed 36 feet (fresh water). The Mile Point ebb tide restrictions effectively function as a tidal delay for vessels with sailing drafts within the authorized channel depth less normal underkeel clearance.[13]

Detailed vessel call lists, projections, and vessel delays by type are available in Appendix B (Economics Appendix). The majority of vessels that were affected by the tidal delay were inbound vessels, with only a slim amount of outbound vessels transiting over 36 feet. For the entire Jacksonville Harbor, Mile Point tide delayed inbound calls are nearly 20 percent of all calls with only two to three percent of outbound vessels

Bulk, tanker, container, and general cargo vessels are the majority of constrained vessels due to the Mile Point restrictions. The major commodity groups by tonnage for Jacksonville Harbor are petroleum and related products, crude materials, coal, manufactured equipment, machinery and products, and primary manufactured goods. These commodities transit primarily on Container, Liquid Bulk and Dry Bulk vessels. The Jacksonville Port Authority (JPA) has been moving to aggressively exploit its undeveloped terminal sites for both bulk and containerized cargo. Prior to the development of the Mitsui terminal, Jacksonville was primarily a regional container port for Puerto Rico and the Caribbean, with some limited service to South America.

JPA has also attracted new bulk commodity shippers such as CEMEX/Rinker that will bring upwards of 2.0 million tons of aggregate into the port at a site nearing completion adjacent to the Martin Marietta site. Also, Vulcan Materials will likely secure a similar site in proximity to the existing berth that will serve Martin Marietta and CEMEX/Rinker. Interviews with these aggregate firms suggest that the local market is limited to within about 100 miles of the port and will experience modest growth reflecting changes in population.

Population growth rates were used as the basis for increasing the cargo volumes handled through Jacksonville Harbor except for liquid bulk cargo for which no

[13] The authorized project depth for the channel at Mile Point is minus 40 feet. With a two-foot underkeel clearance, allowance vessels should be able to enter and exit the St. Johns River up to 38 foot drafts without any tidal delay. Effectively, Mile Point inbound restriction of 33 feet adds five feet of tidal delay (38-33 = 5) for inbound vessels and two feet of tidal delay for outbound vessels (38 – 36 = 2).

growth was assumed because of the preponderance of automotive fuel imports which are not expected to grow.

Jacksonville Harbor has long served as a regional port for Puerto Rico, other Caribbean trades, and South America for containers and general cargo and for a local distribution of imported bulk cargo. Container tonnage has been dominated by Puerto Rico. Jacksonville is the principal domestic port for this trade, dominating with several services characterized by both self-propelled vessels and barges. Container trades to world areas other than Puerto Rico, the Caribbean, and South America have been relatively undeveloped until recently (Asia). The port also handles refined petroleum imports for the local region (north Florida and south Georgia) as well as dry bulk (coal, cement, and aggregates). Finally, the port is a regional distribution point for automobile imports into the southeast U.S.

Jacksonville clearly dominates the Caribbean (Puerto Rico) trade, with about a 95 percent share (top commodities) compared to Savannah and Charleston. Otherwise, Jacksonville has a much smaller market share in other major regional markets that it serves such as East Coast South America (ECSA) at about 34 percent (imports and exports)and West Coast South America (WCSA) at about 14 percent (imports and exports). Outside of the regional markets, Jacksonville has a very small share of the global markets. Recently, Jacksonville has entered the Asia market and re-entered the European market with direct services, both arising from relatively new container services that initiated services to the port at the TraPac Dames Point terminal in 2009.

The vessel fleets outlined in the Economic Appendix B were projected based on expected growth in commodities and trades. Jacksonville Harbor is expecting significant growth in the number and sizes of container vessels expected to call as a result of the completion of the TraPac container terminal and the subsequent development of the planned Hanjin container terminal. TraPac is currently served by major eastwest global container services using Panamax and Post-Panamax container ships that are also calling other East Coast U.S. ports, including Savannah Harbor. After expansion of the Panama Canal, Far East services are expected to always be Mile Point sailing draft restricted for inbound and outbound movements. The shifts in the container fleet at Jacksonville Harbor have a major impact on delays associated with Mile Point. Container vessels are also the most expensive to operate on a time basis compared to bulk, tanker, and general cargo vessels. See Section 4.2 of the Economics Appendix for detailed projections.

The economic consequences of the no action scenario are the continued incidence of the additional resource costs of commodity transport associated with vessel tide delays. Vessels anchored off the coast as a result of tide delay waste fuel and labor, as well as both private and public sector capital resources. The private capital wasted is the vessel, which could be otherwise used for its

intended function (commodity transport). The public sector capital resource wasted is a 40 feet deep navigation channel restricted to operating as a 33 feet deep channel for significant periods of time. Given the tendency of the world fleet to operate at increasingly deeper sailing drafts, this problem is likely to be exacerbated over time. As older vessels reach the end of their service life, they are likely to be replaced with newer vessels that tend to operate at deeper sailing drafts. The alleviation of these inefficiencies is the navigation benefit associated with the recommended channel improvements.

2.4.1 MOL and Hanjin Alliances and Global Presence

The new TraPac Container Terminal (built in 2009), has two 1,200-foot berths that line a 158-acre facility used by Mitsui O.S.K. Lines (MOL) and its terminal operating partner, TraPac, to load and unload container ships sailing to and from ports in Asia. Jaxport (Jacksonville Port Authority) is leasing this space to Tokyo-based MOL. The TraPac Container Terminal is located between two existing Jaxport facilities: the Jaxport cruise terminal just off of Heckscher Drive and Jaxport's existing bulk cargo terminals at the southern end of the Dames Point peninsula. Jaxport and the Florida Department of Transportation (FDOT) have completed road improvements at State Road 9-A/Heckscher Drive and Heckscher Drive/New Berlin Road to better accommodate vehicular and truck movement through the area.

MOL's liner route network coverage is global, and there are plans for future global expansion. In 1995, MOL's leadership helped create a world strategic alliance with other carriers. To better serve trans-Pacific, trans-Atlantic, and Asia-Europe routes, MOL, APL of Singapore, and Hyundai Merchant Marine of South Korea formed the New World Alliance (NWA), which plays a key role in cargo trade on these international routes. The NWA growth is particularly strong in Asia, which has seen tremendous economic expansion in recent years, and in South America and Africa, markets where MOL traditionally has held an advantage. The Alliance also serves the Middle East, Russia, and Australia. MOL operates liner routes with a fleet of over 100 containerships. These vessels range in size up to 8,000 TEUs. MOL continues to launch new vessels to boost efficiency and competitiveness. MOL has expanded its container inventory in step with the growth of its containership fleet to include maintenance of reefer containers to meet growth.

MOL has 8 owned-and-operated container terminals worldwide (Tokyo, Yokohama, Osaka, Kobe (Japan), Laem Chabang (Thailand), Los Angeles, Oakland, Jacksonville (USA)). To meet expanding needs, new terminals are now being built at Cai Mep Port in Vietnam, and in Maasvlakte 2 Zone in the Port of Rotterdam, the Netherlands. MOL terminals have state-of-the-art systems and equipment.

MOL also serves the global auto industry with a large, flexible fleet. MOL launched Japan's first ship designed to transport cars. Since then, MOL service has expanded from handling Japanese exports to serving global auto production centers including Japan/South Korea, North America, Europe, and Southeast Asia. Today's car carriers are designed to ship all types of motor vehicles, from automobiles to construction machinery. Since the cargo can move under its own power, these roll on/roll off carriers need no specialized loading equipment other than rampways used to drive the vehicles on and off the ships. The largest car carrier in service today can accommodate 5,300 vehicles on 13 cargo decks. The Blount Island terminal at Jaxport is 754 acres, Jaxport's largest marine facility terminal, and is one of the largest vehicle import/export centers in the United States. The terminal also handles Ro/Ro, heavy lift, breakbulk and liquid bulk cargoes.

As of the first quarter of 2011, MOL featured a total of 88 service lanes, 7 lanes for Asia to Africa and the Middle East, 6 lanes for Asia to Europe, 2 lanes for Asia to the Mediterranean, 16 lanes for Asia to North America, 5 lanes for Asia to Oceania, 10 lanes for Asia to South America and Latin America, 4 lanes for Europe to Africa, 1 lane for Europe to North America, 23 lanes for Intra-Asia services, 5 lanes for Latin America services, 7 lanes for North America to Latin/South America, 1 lane for North America to South Africa, and 1 lane for South America to Africa service.

Out of the 16 Asia to North America lanes, 5 service lanes call the east coast of the U.S. (routes CNY, NYX, SVE, NUE and SZX, of which the first three call Jacksonville). The CNY port rotation has a Panama Canal transit and calls the following U.S. ports: Miami, Jacksonville, Savannah, Charleston, Norfolk, and New York (different calls under eastbound and westbound rotations). The NYX rotation calls New York, Norfolk, Savannah, Jacksonville, and Miami. The SVE rotation is a Suez transit westbound calling New York (after Halifax), Norfolk, Jacksonville, followed by Savannah (and returns westbound around the cape of Africa to Singapore). The NUE rotation is a Panama transit calling New York, Norfolk, and Charleston. The SZX rotation is a Suez Canal transit calling New York, Charleston, Savannah, and Norfolk. The other 11 service lanes are from Asia to the west coast of the U.S. (i.e., Los Angeles/Oakland, Pacific Southwest, Pacific Northwest, and west coast Canada).

The Europe to North America trade route (APX) has the following U.S. port calls, eastbound: New York, Norfolk, Charleston, Savannah, Jacksonville, Miami, followed by a Panama Canal transit to Los Angeles and Oakland. The North America to South Africa trade route (via APX) has New York, Charleston, Savannah, Jacksonville, and Miami as port of loadings with intermediate ports in rotation to Europe. For the North America Latin/South America trade route, Jacksonville is a port of call to MOL for 4 out of the 7 trade routes (ACW, CNY, ECX, and NYX).

In December 2008, Jaxport executives and representatives of the Hanjin Shipping Company of Seoul, Korea signed a 30-year lease agreement calling for construction of a 90-acre container facility at the Dames Point Marine Terminal. The lease contains an option for further expansion (with an option for a 10-year extension). The $300 million Hanjin Container Terminal at Dames Point is expected to open for business in 2016 and will be a key hub operation for Hanjin's east coast port activity.

The construction of Hanjin terminal operations will be located on Jaxport's Dames Point Marine Terminal adjacent to the TraPac container terminal (next to the MOL facility). The Hanjin shipping alliance and the developed container terminal facility with Jaxport will have the following to offer:

- As part of the CKYH Alliance, Hanjin is allied with China-based China Ocean Shipping Co. (COSCO), Japan-based Kawasaki Kisen Kaisha Ltd. ("K" Line) and Taiwan-based Yang Ming Line. The CKYH Alliance has enabled Hanjin Shipping to broaden its service coverage, offering Express Services, and sharing space with the allies to lower costs.
- The Hanjin fleet includes some 200 containerships and bulk and liquefied natural gas carriers.
- Jaxport will design, permit and finance the Hanjin terminal project and perform and complete the construction.
- The terminal will include two berths able to accommodate post-Panamax vessels.
- Terminal capacity is designed for annual handling of more than 800,000 twenty-foot-equivalent container units, or TEUs.
- A dual operating system will utilize rubber-tired gantries and rail-mounted gantry cranes.
- A computerized operating system will facilitate free flow of information between the terminal, customers and government agencies.

As South Korea's largest container carrier, Hanjin moves more than 100 million tons of cargo annually and operates in more than 50 countries, which also makes the company the sixth largest container carriers in the world (as of 2010). In the U.S., Hanjin subsidiary Total Terminal International presently runs dedicated terminal operations in Seattle, Long Beach and Oakland. The Hanjin Container Terminal will be the company's first dedicated U.S. operation outside the west coast, a strategic move meant to capitalize on the expansion of the Panama Canal and the anticipated increase in container traffic along the east coast.
In 2010, Hanjin shipping featured a total of 57 service lanes, 19 lanes for Trans-Pacific service, 3 lanes for Trans-Atlantic, 14 Asia- Europe service, 14 Intra-Asia and Australia service, 5 Latin America services and 2 Africa service. Hanjin Shipping's 200 vessels visit ports of call all over the world. Most of the company's revenue comes from its container shipping operations, which include service on Trans-Pacific, Europe and Atlantic, and Intra-Asia and Australia routes. Along with containerships, Hanjin Shipping's fleet includes bulk carriers, both for dry

cargo such as coal, grain, and iron ore, and for liquid cargo such as crude oil and petroleum products, and LNG (liquefied natural gas) carriers. The company also provides logistics and terminal management services.

The three Hanjin Trans-Atlantic services are as follows: (1) India-Mediterranean-USA Service (IMU) calling the following U.S. ports: New York, Norfolk, and Savannah; (2) MED-Canada Service (MC1) calling only Montreal in North America; (3) North Trans- Atlantic Express Service (NTA) calling New York, Norfolk, and Charleston.

3.0 FUTURE WITHOUT-PROJECT CONDITIONS

Under the without-project future conditions there would be no Federal action to address the navigation restrictions and the erosion problems at the Mile Point shoreline. Projections were made to include the period of analysis starting 2015 and ending 2065. Under this condition both the navigational restrictions that are enacted due to the crosscurrents at Mile Point and the erosion problems caused by these crosscurrents would continue to be in effect. As is described under section 2.4 Economic Conditions; the navigational restrictions primarily affect Bulkers, Tankers, Container Vessels, and General Cargo vessels. Jacksonville Harbor is experiencing growth for both Container and Bulk Vessels. Container service for the new Mitsui terminal is now in operation. The development of the Mitsui terminal is expected to bring major east-west global services to Jacksonville Harbor.

Under the future without-project condition, Bulk vessels and Container vessels are projected to grow particularly with the addition of new terminals as described in the previous section. Tanker vessels are expected to stay steady and not grow due to uncertain market conditions. General Cargo vessels are expected to experience minimal growth with market conditions. Under the without-project condition vessel traffic is expected to increase and overall transportation costs are expected to increase due to vessel delays.

Homeowners on the north bank of the river at Mile Point have experienced catastrophic shoreline erosion to their property and have serious concerns about future property losses; this is detailed in the next section of this report under Problems and Opportunities. The expected future condition (without-project) for the Mile Point shoreline consists of continued progressive erosion of the shoreline progressing from the west to east.

In addition to shoreline erosion on the north shore of Mile Point; there has been a breakthrough at Great Marsh Island on the southern bank of the St. Johns River that has caused severe shoaling of Chicopit Bay. Under the without-project, the shoaling of Chicopit Bay would continue. The shoaling of Chicopit Bay has been ongoing and resulted in the Great Marsh Island breakthrough. Prior to the breakthrough at the confluence of Mt. Pleasant Creek with Chicopit Bay and the IWW, there were depths of 7 to 10 feet in Chicopit Bay; however after the breakthrough, the area has mainly shoaled in. See **Figures 8, 9, and 10** in Section 4 for aerial pictures of this area and the breakthrough development over time. The recently formed channel through the eroded portion of Great Marsh Island now flushes the bay. The salt marsh at Great Marsh Island is expected to continue eroding under the without-project condition. Other environmental conditions are expected to remain unchanged.

Prior to the breakthrough of Great Marsh Island and the continued erosion, salt marsh was present. The marsh at this location has been eroding over the years, and recent site inspections have indicated that it is still actively eroding.[14] For a representative future without-project condition see the Hydrology and Hydraulics section, Engineering Appendix A that details the effects of the Mile Point issues on the surrounding areas. Sea level rise is expected to exacerbate the loss of salt marsh under both the with-project and without-project conditions.

A single prehistoric site has been identified within Great Marsh Island. There is insufficient information for an evaluation of eligibility for listing on the National Register of Historic Places. Until such evaluation is made, Historic Preservation guidelines require that the site be treated as if it was listed. The existing conditions have resulted in substantial erosion and loss of Great Marsh Island, exposing the prehistoric site. This erosion is expected to continue with an eventual loss of the archeological site.

Additional future without-project conditions include the addition of a new container service Hanjin. This service is in addition to the new Mitsui O.S.K. Lines, Ltd (MOL) container service. Hanjin will bring container vessels that typically have a design draft greater than 33 feet and, as such, could be subject to the navigational restrictions at Mile Point. In addition, the Panama Canal expansion, facilitating the use of larger vessels, is expected to be operational in 2014. The existing Panama Canal dimensions can accommodate a maximum vessel draft of 39.5 feet (tropical fresh water), maximum vessel beam of 106 feet, and maximum vessel length of 965 feet. The expanded canal is designed to accommodate a maximum vessel draft of 50 feet (tropical fresh water), a maximum vessel beam of 160 feet, and a maximum vessel length of 1,200 feet. Vessels that may be affected by the Panama Canal expansion that could transit Jacksonville Harbor with additional deepening include post-Panamax Containerships. Post-Panamax container vessels that transit on Asia trade routes currently call on the west coast of the United States with land bridge service (rail and truck) to the rest of the United States. With the Panama Canal expansion, these vessels will be able to transit to the east coast United States ports. Affected vessels include the Maersk S-Class which has vessel dimensions of a maximum draft of 48 feet, beam of 141 feet, and length of 1,139 feet. This class of vessel is more than three times the length of an American football field.

[14] Appendix D: Mitigation Plan and Incremental Analysis, Attachment 5: Historical Maps and Aerial Photos, Attachment 3: Photos 3 and 4.

4.0 PROBLEMS AND OPPORTUNITIES

The existing conditions at Jacksonville Mile Point require vessels to be restricted on the ebb tide due to difficult crosscurrents at the confluence of IWW and the St. Johns River. According to the St. Johns Bar Pilots, the area of the river where the IWW crosses the St. Johns River produces crosscurrents that can actually turn an inbound, under powered ship around. The U.S. Coast Pilot[15] describes that area as one of particular concern, describing the junction of the IWW with the St. Johns River as subject to strong and unpredictable crosscurrents at various stages of tide.

The crosscurrents at Mile Point are also of concern for erosion on the Mile Point shoreline. In the recent past, homeowners on the north bank of the river at Mile Point have seen severe erosion of their property and are seriously concerned about future property losses. The homeowners speculate that the cause of the erosion is due to hydrodynamic effects of dredging done by the U.S. Army Corps of Engineers, installation of the Atlantic Marine dry dock, and deterioration of the Mile Point training wall.

4.1 PUBLIC AND AGENCY CONCERNS

During a April 15, 1997 risk analysis meeting for Jacksonville Harbor at the Jacksonville Office of the U.S. Coast Guard (USCG), most harbor pilots, commercial towing company representatives, and tug/barge operators identified the Intracoastal Waterway (IWW)/St. Johns River confluence as the harbor location with the greatest risk.

On September 4, 1997, and October 6, 1997, meetings with towing company and bar pilot personnel confirmed two different opinions relating to the repair of the Mile Point training wall. Most operators of tugs towing the large roll-on/roll-off triple deck barges wanted a shorter period of time to deal with the crosscurrents. The bar pilot representative indicated that a longer period of time with a reduced crosscurrent strength might be preferred for the commercial ships.

Currently, submerged sections of the Mile Point training wall present a challenge to recreational boaters not familiar with the area. One towing company representative noted that boaters sometimes run aground on unseen submerged sections of the training wall. In his discussion of the historical deepening of Jacksonville Harbor from a depth of 18 feet to 24 feet during the construction years of 1905 through 1909 in *Sun, Sand and Water*, Dr. Buker notes the impact that construction of the jetties and deepening had on the shorelines of the St.

[15] The United States Coast Pilot 4, published by the National Ocean Service (NOS) and National Oceanic and Atmospheric Administration (NOAA), Atlantic Coast: Cape Henry to Key West, 2008 (40th Edition), p. 390. http://www.nauticalcharts.noaa.gov/nsd/coastpilot/files/cp4/CP4-40ed-reduced.pdf

Johns River: “The effect the jetties had upstream soon demanded notice. The current flow had increased due to the bar project and the river dredging. The riverbanks in some places became undercut and vast amounts of earth fell into the riverbed. St. Johns Bluff and Dames Point were especially hard hit. St. Johns Bluff was set back several hundred feet within a period of 10 years. This latest problem called for building retaining walls and throwing up riprap (a sustaining wall of stones put together without any formal order, as in deep water or on embankments to prevent erosion) at various places along the river bank. Chaining the St. Johns bar spread construction upriver.”[16]

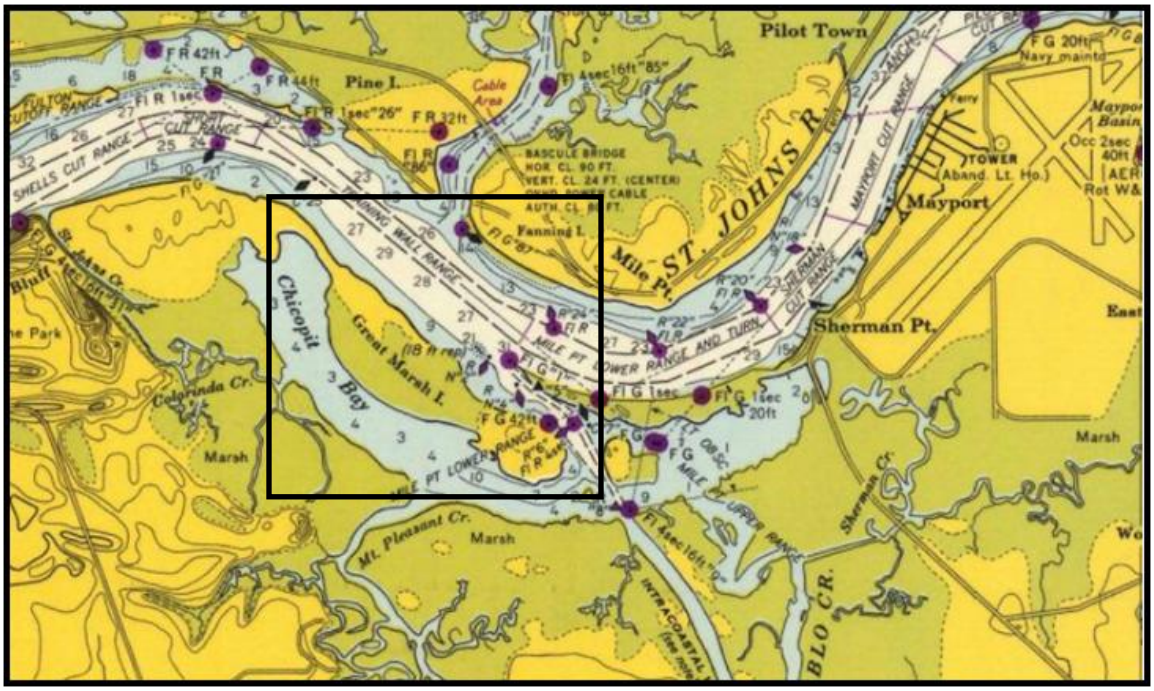
The undercutting of the Mile Point shoreline apparently started in the late 1960s or early 1970s according to the enclosed Heckscher Drive Community Club (HDCC) position paper.[17] Long time HDCC residents state that, in the 1960s, one could ride a bicycle on a beach along the Mile Point shoreline from the Mayport Ferry slip to the Intracoastal Waterway. Prior to the 1960s early photographs and surveys dated 1933 through about 1953 indicate the Mile Point north shoreline consisted of a marsh area covered by gradually increasing areas of dredged material.

The U.S. Army Corps of Engineers (USACE), Jacksonville District met with environmental resource agencies and adjacent landowners on August 26, 2008 to discuss the Jacksonville Mile Point study and the numerical hydrodynamic modeling results. The purpose of the hydrodynamic modeling is to provide recommendations for reducing or relocating the difficult crosscurrents during the ebb flow at Mile Point. The results of the modeling were favorable for one of the alternatives; relocate the Mile Point training wall. During the meeting, the following concerns were expressed: how changes to the local sedimentation or shoaling rates would prevent future erosion; if the predicted velocity rates indicate an effect on future erosion; and if the work would affect salt marsh associated with Four Pines Island and Greenfield Islands **(Figure 5)**. There was a concern by the representatives at the meeting that the proposed project would affect the flows from Chicopit Bay. National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) stated that they would support a Flow Improvement Channel (FIC) in Chicopit Bay. They also stated that they would support the concept of expanding the Great Marsh Island Restoration Area to the south. During the meeting, the Mayport Naval Station agreed to follow-up on the required real estate license at the appropriate time. The port also expressed their support of the proposed work. **Figures 8, 9 and 10,** show the development of the breakthrough of Great Marsh Island over time. As can be seen in the 1957 aerial where Great Marsh Island is shown prior to the breakthrough, there were depths of 7 and 10 feet in Chicopit Bay. After the breakthrough in 2004 **(Figure 10)**, areas of Chicopit Bay started to shoal in.

[16] George E. Buker, PhD, Sun, Sand, and Water, A History of the Jacksonville District U.S. Army Corps of Engineers 1821-1975k, U.S. Army Corps of Engineers, 82-83.
[17] HDCC Position Paper located in Appendix E (Pertinent Correspondence). The letter is dated January 11, 1998.

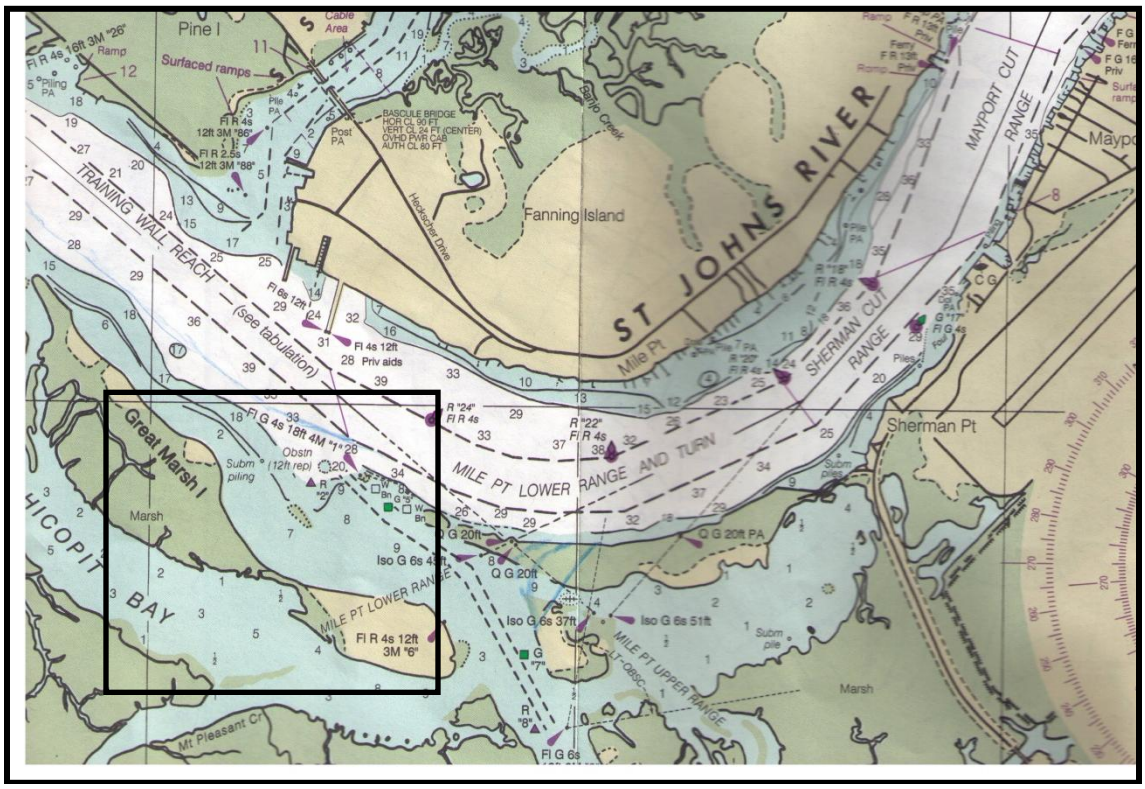
A public workshop was held on August 15, 2011 to provide agencies and the general public additional opportunity to discuss the draft Integrated Feasibility Report and Environmental Assessment. The Florida Department of Environmental Protection (DEP) reviewed the report, and has stated that a FIC must be maintained. Also, construction sequencing of a western training wall, restoration site, and FIC must be addressed to prevent flushing impairment within Chicopit Bay. If these issues are not addressed, then the DEP may not have reasonable assurance to provide State Water Quality Certification for the project. Residents living along Greenfield and Mt. Pleasant Creeks have also stated that construction of a western training wall, restoration site, and FIC should be properly sequenced so that they have continued access to the IWW and St. Johns River. The residents have also requested that future maintenance dredging of an FIC be included within the project authorization (please refer to Section 7.24.4 for more information on this issue).

FIGURE 8: NAV CHARTS 577 FEBRUARY 1957



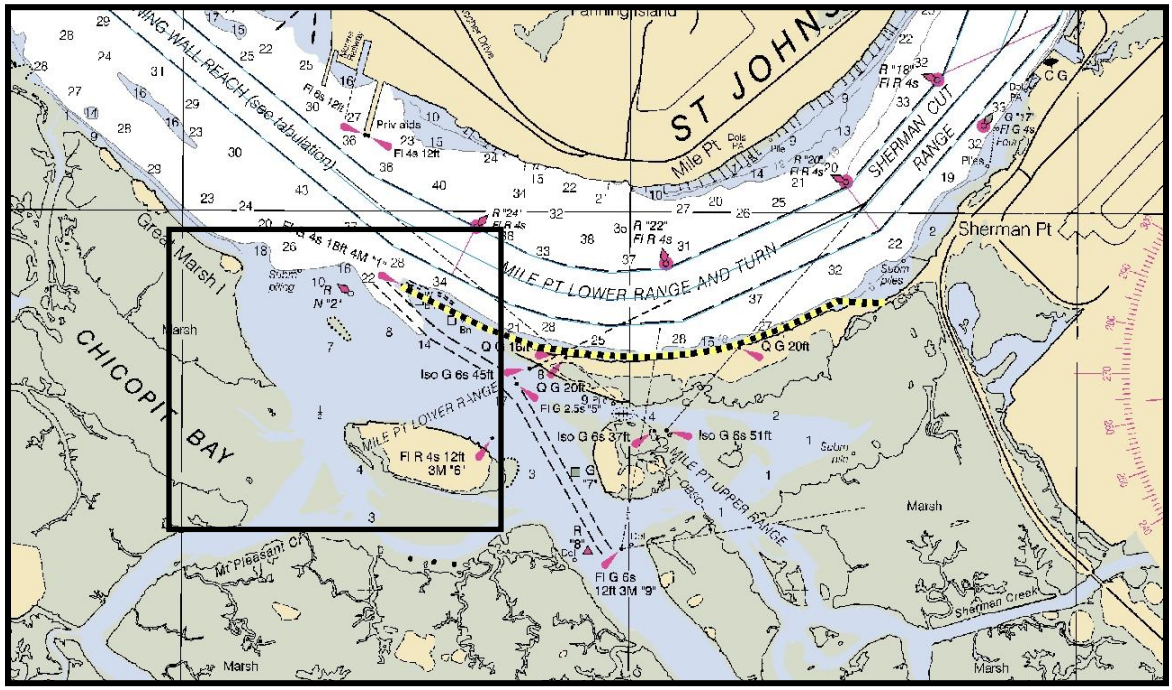
Great Marsh Island prior to the breakthrough.

FIGURE 9: NAV CHART 11491 MARCH 2001



Erosion of Great Marsh Island before breakthrough.

FIGURE 10: NAV CHART 11491 DEC 2004



Full breakthrough at Great Marsh Island.

4.2 COAST GUARD CASUALTY DATA

United States Coast Guard (USCG) casualty data dating from 1982 to 2004 contained over 500 casualties in and around the St. Johns River. The USCG Casualty data consists of reported collisions, allisions (a collision between a moving vessel and a stationary object), groundings, events of pollution, loss of vessel control, damage to environment, capsizing, equipment failure, and flooding. The majority of the casualty data points are located in the northern portion of the river, beginning at the Matthews Bridge (downtown Jacksonville) and increasing northward to the mouth of the river (**Figure 11**). The earliest data points collected have a tendency to deviate from the river and tributary boundaries due to the smaller accuracy of GPS recording at that time. In the vicinity of the Mile Point project area, collisions, allisions, groundings, one pollution event, loss of vessel control, and one damage to the environment event were all reported (**Figure 12**). None of the data points shown include the type of vessels affected by the navigation issues. These findings highlight the concern and safety risk posed by the present hydrodynamics of Mile Point and demonstrates that the St. Johns Bar Pilots restrictions are effective at reducing risk.

It is difficult to maintain control of an under-powered vessel in river reaches and channel cuts subject to strong currents. Vessels with mechanical failure are included in this category. A vessel with inadequate power that is moving at 2 knots against a 3 knot current can go backwards while facing in the direction intended by the crew in control.

A risk assessment dated February 3, 2004 was completed by the USCG[18] relating to a permit request by Atlantic Marine, Inc. (AMI). The assessment evaluated impacts to navigation in the main Federal channel in the St. Johns River and the IWW. The assessment stated:

> "The west drydock and pier extension as described to the workgroup involved extending the length of the existing pier by 160 feet and mooring a floating drydock to the eastern side of the pier. The river pilots opposed this part of the project because of the effect it would have on navigating large deep draft ships up bound or down bound in the river. The pilots said that the 160-foot pier extension and likelihood that berthed ships will overhang the pier and drydock, created an unacceptable navigation hazard."

While the proposed pier extension did not extend into the channel or setback limits, the pilots asserted that “during certain times, the current into the St. Johns River from Sisters Creek (north IWW) was especially strong, and allowing for an extra margin of safety in distance between the channel and end of the pier was necessary to prevent the possibility of an allision with the pier."

[18] Risk Analysis Coast Guard Pages from Document SAJ-1994-9814340580

The decision resulted in the St. Johns Bar Pilots agreeing with the USCG and AMI to reduce the length of the 160-foot pier extension by 80 feet. The revised design at 80 feet was acceptable based on the crosscurrent conditions and the distance from the channel. The risk assessment evaluated the affects of erosion caused by the proposed pier extension on the shoreline in the vicinity of the project. The results of the modeling showed under a "worst-case" scenario, the result would only be a "negligible change in flow velocities." The risk assessment affirms that strong currents in the vicinity of the IWW and the St. Johns River create additional safety concerns, affecting both navigation and berthing facilities along that area.

FIGURE 11: USCG CASUALTY DATA – JACKSONVILLE HARBOR

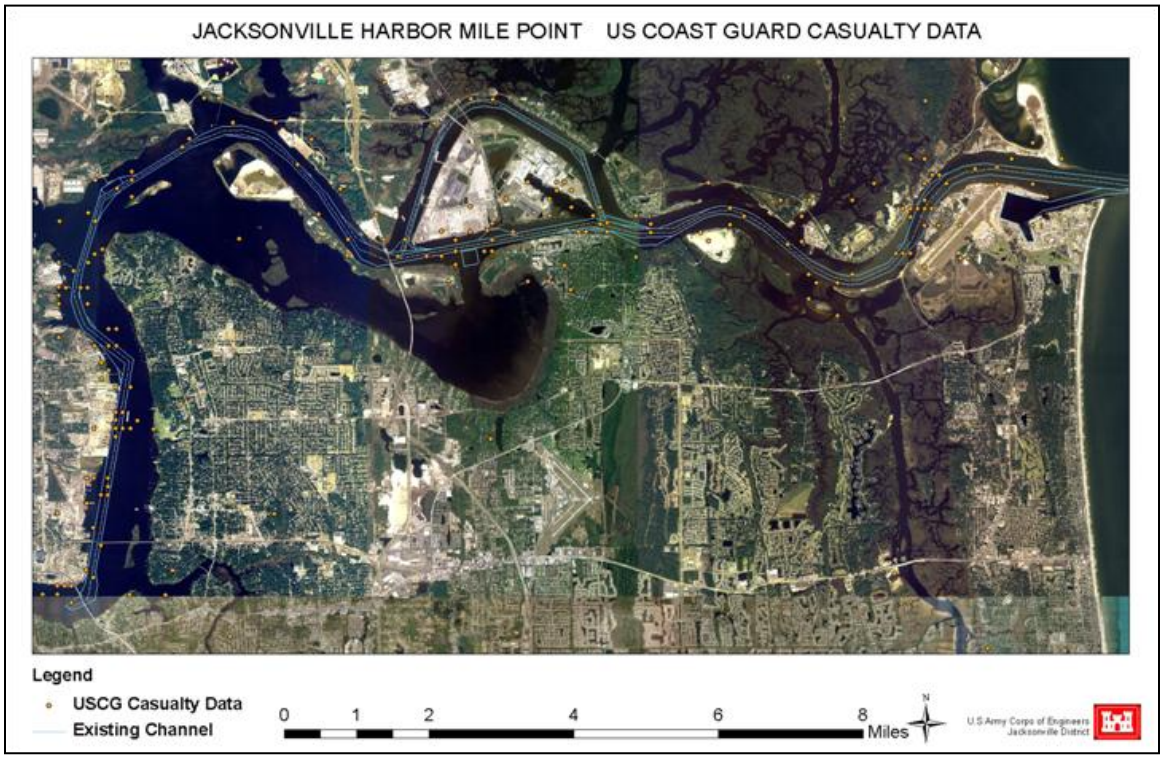
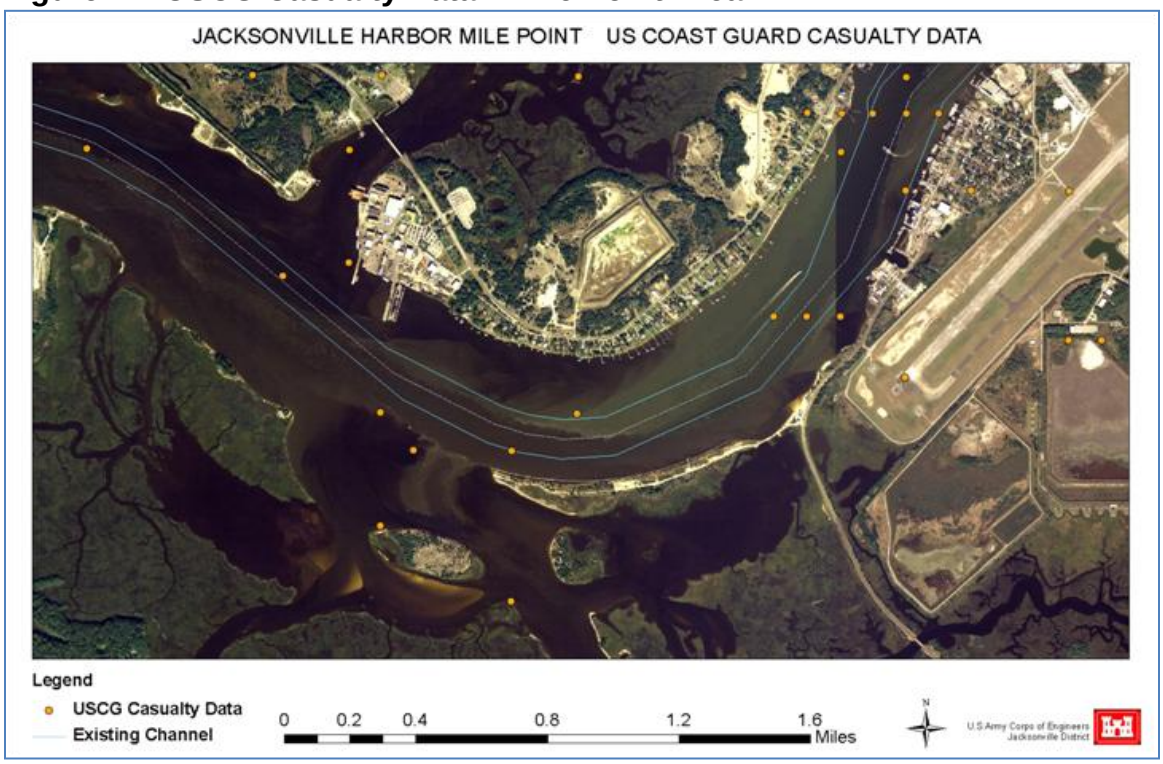


Figure 12: USCG Casualty Data – Mile Point Area



4.3 PLANNING OBJECTIVES

4.3.1 Federal objectives

The Federal objective of water and related land resources planning is to contribute to National Economic Development (NED) consistent with protecting the nation's environment, in accordance with national environmental statutes, applicable executive orders, and other Federal planning requirements.

1) The objective of this feasibility study is to provide solutions to the previously defined problems in accordance with the Federal objective, objectives of the non-federal sponsor and other interested parties. Planning objectives are statements that describe the desired results of the planning process. Their goal is to solve the problems and take advantage of the opportunities that are identified for the study. Study planning objectives must:

- Be clearly defined
- Provide information on the effect desired
- State what will be accomplished
- State the location of where the action will take place
- State when the action would take place

2) Four accounts are established in the Principles and Guidelines (P&G) to facilitate the evaluation and display of effects of the plans. The accounts are:

- National economic development account: changes in the economic value of the national output of goods and services
- Environmental quality account: non-monetary effects on ecological, cultural, and aesthetic resources including positive and adverse effects of ecosystem restoration plans
- Regional economic development account: changes in the distribution of regional economic activity (eg. income and employment)
- Other social effects account: plan effects on social aspects such as community impacts, health and safety, displacement, energy conservation, and others

4.3.1.1 Study Objectives

The objective of the Mile Point Feasibility Study is to reduce the effects of the crosscurrents at the confluence of the St. Johns River with the IWW resulting in:

1) Eliminating the navigation restrictions on the ebb tide due to the crosscurrents at Mile Point; and
2) Reducing the effects of the crosscurrents on the Mile Point north shoreline

4.4 PLANNING CONSTRAINTS

Constraints are restrictions that limit the planning process. Plan formulation involves meeting the study objectives while not violating the constraints. Specific study constraints include:

1) Atlantic Dry Dock Corporation received a permit in 2006 to add two new dry docks, one 625 feet long, and the other 853 feet long that will extend from the north shoreline to about 300 feet from the edge of the Federal channel at the intersection of the Intracoastal Waterway and the St. Johns River. Widening in this area would require purchase of a business property.

2) As previously stated, the uplands and wetlands within the project footprint are owned by the U.S. Navy. However, the project footprint also lies within the boundaries of the National Park Service, Timucuan Ecological and Historic Preserve. The preserve contains a mosaic of salt marsh, oyster beds, and other high value environmental habitats. The project would seek avoidance of impacts to the extent practicable. The U.S. Army Corps of Engineers continues to coordinate with the preserve on the Mile Point study as well as other local projects.

3) The City of Jacksonville constructed a public fishing pier from the Mile Point training wall into the St. Johns River and developed the Little Jetties Park on dredged material placed behind the Mile Point training wall. The project will seek to minimize disruption to this pier during project construction.

4) The public has built homes and docks on dredged material along the north shoreline of Mile Point. Project construction will seek to avoid impacting homeowners' access to their property.

5) Atlantic Dry Dock, per permit SAJ-1994-981-JJS, has a minimum setback criterion of 300-foot from the near bottom edge of the Federal channel. This setback restricts widening on the north side of the Mile Point area. The setback criterion is a result of the U.S. Coast Guard Navigation Risk Assessment.[19]

4.5 RELATED ENVIRONMENTAL DOCUMENTS

The proposed action is included in sections of this integrated feasibility report and environmental assessment in order to satisfy the requirements of the National Environmental Policy Act (NEPA). Other NEPA documents prepared by the USACE related to the planned action include the Environmental Impact Statement (EIS) on the Jacksonville Harbor Navigation Channel Deepening (1998); a Jacksonville Harbor Navigation Study, General Re-Evaluation Report and Environmental Assessment (2002); and the Environmental Assessment (2003) entitled Shore Protection Structure and Alternative Placement Site Construction, Mile Point, Jacksonville Harbor, Duval County, Florida. The Jacksonville District is currently preparing the integrated General Re-Evaluation Report and Supplemental Draft Environmental Impact Statement on further deepening of Jacksonville Harbor.

4.6 DECISIONS TO BE MADE

This integrated feasibility report and environmental assessment will provide recommendations for reducing erosion along the Mile Point shoreline and improving navigation at the confluence of the St. Johns River with the Intracoastal Waterway. Various alternatives were evaluated and specific protective measures are suggested to minimize, avoid, or mitigate for adverse effects to local resources.

4.7 AGENCY GOAL OR OBJECTIVE

Planning objectives of the feasibility study involve the use of available information and hydrodynamic modeling to evaluate navigation improvements at the confluence of the Intracoastal Waterway with the St. Johns River over the 50-year period of analysis from 2015-2065. Specific planning objectives for the feasibility phase of the Mile Point navigation study include:

[19] Atlantic Dry Dock Inc., Permit SAJ-1994-981

1) Determine navigation improvements that may reduce or eliminate erosion of the Mile Point shoreline.

2) Reduce and/or relocate the difficult and erosive Intracoastal Waterway crosscurrents so that the St. Johns Bar Pilots and the Captain of the Port (USCG) agree to remove restrictions on deep draft navigation traffic.

3) Identify the plan for Mile Point which most efficiently and safely maximizes net benefits for Jacksonville Harbor existing and future ship traffic while protecting, conserving and/or restoring natural and recreational resources.

4.8 SCOPING AND ISSUES

Timing of the interim measures, such as placement of dredged material from the current Jacksonville Harbor deepening project along the Mile Point shoreline to slow the erosion process while more detailed studies continue, will require timely coordination of the current permitting process. Safety concerns relating to prevention of the next potential catastrophic slope failure (future without-project condition), may require emergency dredging to place material along the Mile Point shoreline. Potential competition for the beach quality dredge material between various interests will require coordination to assure each group that only a portion of the available material is required for placement along the Mile Point shoreline.

4.8.1 Relevant Issues

The following issues were identified as relevant to the current investigations and appropriate for further evaluation: the consideration of threatened and endangered species including the Florida manatee, piping plover, wood stork, sea turtles, shortnose sturgeon, and smalltooth sawfish; Essential Fish Habitat (including salt marsh); other fish and wildlife resources; cultural resources; water quality; air quality; hazardous, toxic, and radioactive waste; aesthetics; recreation; noise; socio-economics (including navigation).

4.8.2 Impact Measurement

See the detailed impact assessments in the integrated environmental assessment regarding specific alternatives section.

4.8.3 Issues Eliminated from Further Analysis

Impacts to housing and population dynamics were eliminated from further analysis. The proposed action of this project is expected to have little or no impact on these issues.

4.9 PERMITS, LICENSES, AND ENTITLEMENTS

4.9.1 Water Quality Certification

This project would be performed in compliance with State of Florida water quality standards. The Florida State Clearinghouse stated by letter dated September 9, 2011 that based on the information contained in the draft Integrated Feasibility Study and Environmental Assessment, the project appears to be consistent with the Florida Coastal Management Program (see Appendix E: Pertinent Correspondence). A final consistency determination would be performed concurrently with the issuance of the state water quality certification (FDEP Environmental Resource Permit).

4.9.2 Endangered Species Act- Section 7 Coordination

In accordance with Section 7 of the Endangered Species Act, the USACE has completed informal consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (refer to Section 7.2 for additional information on effects determinations).

5.0 FORMULATION AND EVALUATION OF ALTERNATIVE PLANS*

Preliminary plans were formulated by combining management measures. Each plan was formulated in consideration of the following 4 criteria described in the Principles and Guidelines (P&G):

- Completeness: Extent to which the plan provides and accounts for all necessary investments or actions to ensure realization of the planning objectives
- Effectiveness: Extent to which the plan contributes to achieving the planning objectives
- Efficiency: Extent to which the plan is the most cost-effective means of addressing the specified problems and realizing the specified opportunities, consistent with protecting the nation's environment
- Acceptability: Workability and viability of the alternative plan with respect to acceptance by Federal and non-federal entities and the public, and compatibility with existing laws, regulations, and public policies

5.1 PLAN FORMULATION RATIONALE

Step 3 of the Planning Process as described in ER 1105-2-100 is "Formulation of Alternative Plans."

1. Alternative plans are formulated to identify ways of achieving planning objectives within the project constraints, in order to solve the problems and realize the opportunities listed in Step 1 of the Planning Process which is to "Specify Problems and Opportunities."
2. Identify structural and non-structural management measures. Combine management measures to form alternative plans.
3. Planners will keep focus on complete plan(s) while doing individual tasks, to ensure their plans address the problems of the planning area.
4. Section 904 of the WRDA (Water Resources Development Act) of 1986 requires the U.S. Army Corps of Engineers to address the following in the formulation and evaluation of alternative plans:
    a. Enhancing national economic development (NED)-including benefits to particular regions that are not transfers from other regions.
    b. Protecting and restoring the quality of the total environment
    c. The well-being of the people of the United States
    d. Preservation of cultural as well as historical values
5. Non-structural measures must be considered in the plan formulation process as means to address problems and opportunities.
6. Costs of mitigation, if any, will be included in the final cost-benefit analysis.

In accordance with this policy, alternative plans were formulated for the Jacksonville Mile Point study and evaluated on the basis of their potential to minimize the impacts of the flows out of the IWW during ebb tide, to both navigation and erosion on the Mile Point shoreline.

5.2 MANAGEMENT MEASURES

1) A management measure is a feature or activity that can be implemented at a specific geographic site (**Figure 13**) to address one or more planning objectives. Management measures are used to create plans and can be categorized as non-structural or structural. The following measures were identified to reduce the effects of the crosscurrents on the Mile Point shoreline and restrictions to navigation for vessels transiting Jacksonville Harbor.

2) The following non-structural management measures were identified to reduce the effects of the crosscurrents on navigation through the Mile Point area:

a) Additional Tugs: Vessels to use more tugs to transit through the Mile Point area
b) Light Loading: Light load larger vessels since vessels are restricted by transit draft

3) The following structural management measures were identified to meet the objectives (as defined in Section 4.3) of reducing the effects of the crosscurrents on the erosion of the Mile Point shoreline.

a) Structural Erosion Protection: Build a bulkhead, groins, or beach fill along the Mile Point shoreline on the north side of the channel

4) The following structural management measures were identified to meet the objectives to eliminate the navigation restrictions on the ebb tide due to the crosscurrents at Mile Point and to reduce the effects of the crosscurrents on the Mile Point shoreline.

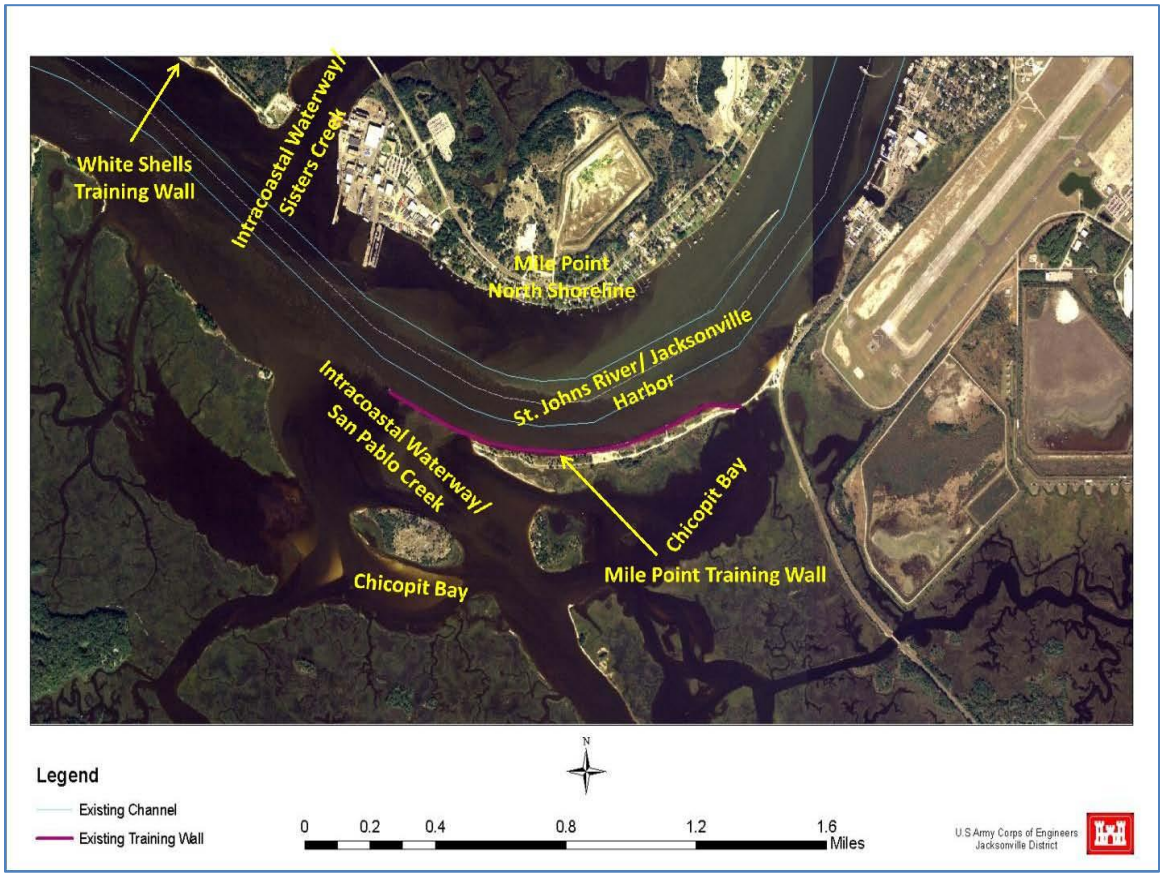
a) San Pablo Creek IWW Submerged Weir: Construct a weir across the Pablo Creek section of the IWW (and the east and west ends of Chicopit Bay if modeling indicates flows diverted in those directions).
b) Rebuild Mile Point Training Wall: Rebuild the Mile Point training wall to its original design length and height of 5,990 feet and 6 feet above MLW.
c) 150-Foot Training Wall Reach Channel Widening: Widen the south side of Training Wall Reach Channel by 150 feet.
d) Eastern Chicopit Bay Diversion: Partially remove Jetty/Eastern Portion of the Mile Point training wall (and park) by opening the east end of Chicopit Bay (100 feet to 500 feet) and cutting a 5500-foot bypass channel.
e) Relocate (Reconfigure) the Mile Point Training Wall: Relocate about one-half of the Mile Point training wall to the southwest, to widen the

confluence of Pablo Creek (IWW) with the St. Johns River.

f) Rebuild White Shells Training Wall: Rebuild the White Shells training wall to its original design length and height of approximately +1.0 MLW through station 67+20 (6,720 feet) .[20]

g) Short Cut Widener between South Buoys G25-G27: Widen the east end of the Short Cut Turn - about 150 feet to the south between buoys G25-G27.

FIGURE 13: JACKSONVILLE MILE POINT GEOGRAPHICAL AREA



5.3 ISSUES AND BASIS FOR CHOICE

Management measures were evaluated to determine the degree in which they reduce the impacts of the crosscurrents out of the IWW during the ebb tide. Measures were evaluated on their ability to effectively meet the 4 criteria in the P&G.

Changes in the current velocities were tested for each of the alternatives using a two-dimensional hydrodynamic model. The modeling performed was to provide

[20] 1955 survey for rehabilitation of the training wall.

recommendations for reducing or relocating the difficult crosscurrents during the ebb flow at the confluence of the St. Johns River with the IWW. The detailed results of the hydrodynamic modeling can be found in Attachment A of the Engineering Appendix, Hydrodynamic Model Report.

5.4 PRELIMINARY ARRAY OF ALTERNATIVES

Alternative plans are made up of structural and/or non-structural measures that function together to address one or more of the study objectives. Alternative plans to prevent the erosion of the Mile Point shoreline and reduce the ebb tide navigation restrictions included a combination of measures suggested by the Heckscher Drive Community Club (HDCC) homeowners, the study team, and the St. Johns Bar Pilots.

Alternatives were formed to address the ebb tide navigation restrictions as well as the erosion problems at Mile Point. The following are the list of preliminary alternatives that were evaluated in detail.

(1) No action (required by NEPA).

(2) Construction of a stone revetment or sheet pile bulkhead along a shoreline length of about 3,300 feet for shoreline protection of Mile Point.

(3) Construction of a Groin Field consisting of groins extending from the Mile Point north shoreline toward the Federal channel. This would include 6 groins about 150 feet long and 15 feet wide at the top placed about 420 feet apart with an elevation above high water at all times.

(4) Submerged breakwater built away (out in the river) and parallel to the Mile Point north shoreline. This would include a breakwater with a top elevation of about 8 feet below the water surface at mean low water and a total length about 3,300 feet.

(5) Rebuilding of Mile Point (Little Jetties) training wall to its original design length (without-project condition) and monitor pre- and post-construction conditions with bank-to-bank hydrographic and Acoustic Doppler Current Profiler (ADCP) surveys. Provide effective monitoring over a 10-year period.

(6) Rebuilding of White Shells Training Wall opposite Buck Island along the north shoreline (without-project condition) and monitor pre- and post-construction conditions with bank-to-bank hydrographic and ADCP surveys. Provide effective monitoring over a 10-year period.

(7) Construction of a weir across the Intracoastal Waterway (similar to the elevation -12.0' MSL weir shown in the Jacksonville Harbor Mill Cove, Florida, D.O. File No. 1-34,662) from the Mile Point training wall to Great Marsh Island.

(8) Opening of the landward end of the Mile Point training wall (previous hydrodynamic model testing involved two different opening widths, one included an opening 6 feet deep by 150 feet wide and the other consisted of an opening 6 feet deep by 350 feet wide) to restore flow back through Chicopit Bay.

(9) Use of the Mile Point shoreline (total length about 5,000 feet), up to ordinary mean high water, as a disposal area for beach quality dredged material from existing Jacksonville Harbor Federal channel cuts 3 - 7.

This list of preliminary alternatives was expanded and combined to develop the matrix in **Table 5**. The alternatives were formed to address the problems and provide benefits that are listed below.

> Problems Addressed: The primary problems the alternatives aim to address are erosion of the Mile Point shoreline and unsafe inbound transit through Mile Point during the ebb tide.
>
> Benefit Description: Each alternative aims to reduce erosion along the Mile Point shoreline and eliminate the delay associated with the Bar Pilots' entry restriction.

Alternatives were grouped into 5 categories as follows:

- Alternative Plan 1: These alternatives were identified to reduce the effects of the crosscurrents at the confluence of the St. Johns River and IWW, and the erosion of the Mile Point shoreline.
- Alternative Plan 2: This alternative was identified to eliminate or alleviate the navigation restrictions on the ebb tide due to the crosscurrents at Mile Point.
- Alternative Plan 3: These alternatives were identified to eliminate or alleviate the navigation restrictions on the ebb tide due to the crosscurrents at Mile Point and reduce the effects of the crosscurrents on the erosion of the Mile Point shoreline.
- Alternative Plan 4: This alternative was identified to eliminate or alleviate the navigation restrictions on the ebb tide due to the crosscurrents at Mile Point and also to provide an opportunity to reduce the need for one-way traffic in this area.
- Alternative Plan 5: These alternatives were identified to eliminate or alleviate the navigation restrictions on the ebb tide due to the crosscurrents at Mile Point and reduce the effects of the crosscurrents on the erosion of the Mile Point shoreline. These alternatives were also evaluated on the opportunity to reduce the need for one-way traffic in this area.

TABLE 5: JACKSONVILLE HARBOR (MILE POINT) – STRUCTURAL ALTERNATIVE PLANS

Jacksonville Harbor (Mile Point) - Alternative Plans			
Alternative Plan	**Objective Addressed**	**Designation**	**Management Measure(s)**
Alternative Plan 1	Reduce Effects of the Crosscurrents at Mile Point on the Ebb Tide on the Erosion of the Mile Point Shoreline	1A	North Shoreline Groin Field
		1B	San Pablo Creek IWW Submerged Weir
		1C	Rebuild Mile Point Training Wall (Little Jetties)
		1D	Rebuilding White Shells Training wall
		1E	North Shoreline stone revetment or sheet pile bulkhead
		1F	Removal of waterward portion of Training Wall
Alternative Plan 2	Reduce Effects of the Crosscurrents on the Ebb Tide at Mile Point in order to Eliminate the Pilots' Navigation Restrictions	2	150-Foot Training Wall Reach Widening
Alternative Plan 3	Reduce Effects of the Crosscurrents on the Ebb Tide at Mile Point in order to Eliminate the Pilots' Navigation Restrictions and Reduce the Effects of the Crosscurrents on the Erosion of the Mile Point Shoreline	3A	Eastern Chicopit Bay Diversion
		3B	Relocate Mile Point Training Wall
		3C	North Shoreline Groin Field AND 150 Foot Training Wall Reach Widening
		3D	San Pablo Creek IWW Submerged Weir AND 150-Foot Training Wall Reach Widening
		3E	Rebuild Mile Point Training Wall (Little Jetties) AND 150-Foot Training Wall Reach Widening
		3F	Rebuild Mile Point Training Wall (Little Jetties) AND Rebuild White Shells Training Wall
Alternative Plan 4	Reduce Effects of the Crosscurrents on the Ebb Tide at Mile Point in order to Eliminate the Pilots' Navigation Restrictions	4	150-Foot Training Wall Reach Widening AND Short Cut Turn Widener
Alternative Plan 5	Reduce Effects of the Crosscurrents on the Ebb Tide at Mile Point in order to Eliminate the Pilots' Navigation Restrictions and Reduce the Effects of the Crosscurrents on the Erosion of the Mile Point Shoreline	5A	North Shoreline Groin Field AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener
		5B	San Pablo Creek IWW Submerged Weir AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener
		5C	Rebuild Mile Point Training Wall (Little Jetties) AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener

The above matrix of alternatives includes the designation of the previously discussed management measures. The alternatives were formed by combining and expanding on the management measures. The non-structural alternatives that were measured include additional tug assists and using the tide to transit the harbor for deeper draft vessels. The no action alternative was also considered.

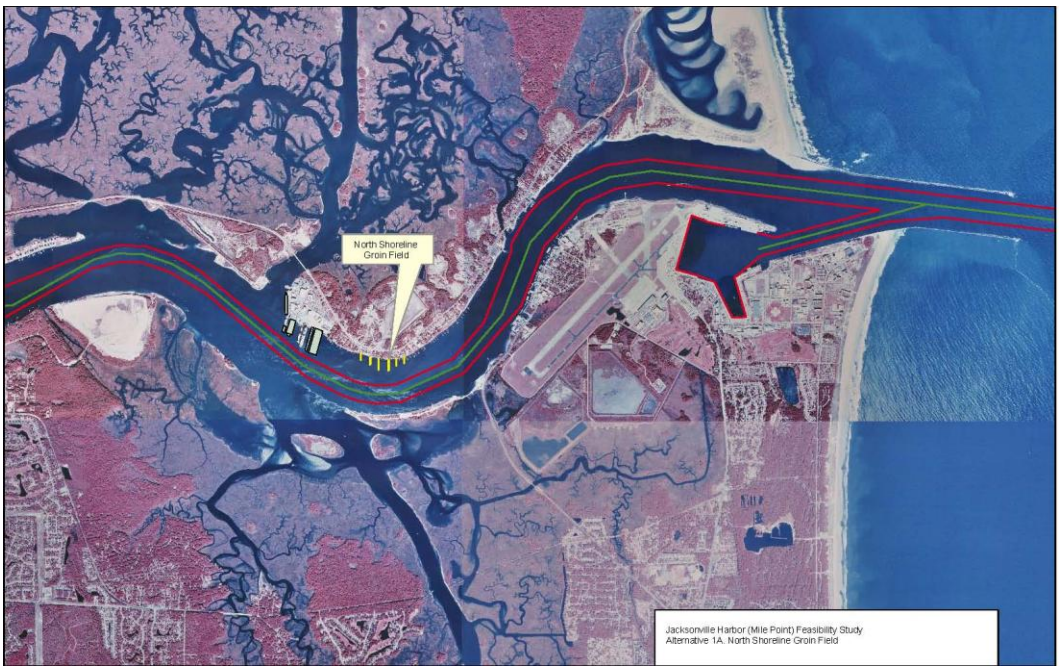
5.4.1 Hydrodynamic Modeling of Alternatives

Hydrodynamic modeling allowed for preliminary testing of several of the above alternatives. An available hydrodynamic model set up originally for the previous Jacksonville Harbor Feasibility Study provided insight into the potential for several of the alternatives to deflect the erosive flows away from the Mile Point shoreline. Alternatives were evaluated on their ability to significantly reduce the

crosscurrents in the navigation channel. There is a direct correlation between the crosscurrents out of the IWW and the navigation restrictions enacted. Alternatives that provided a significant reduction in crosscurrents were carried forward and those that did not provide a significant reduction were eliminated. The models that were used are the approved USACE models RMA2 and RMA10. Visits by USACE, Jacksonville District representatives from the environmental studies and water quality sections to the study area enabled an evaluation of environmental impacts and benefits for the alternatives under consideration. Results of the environmental evaluations can be seen in Sections 5.5 and 7.0.

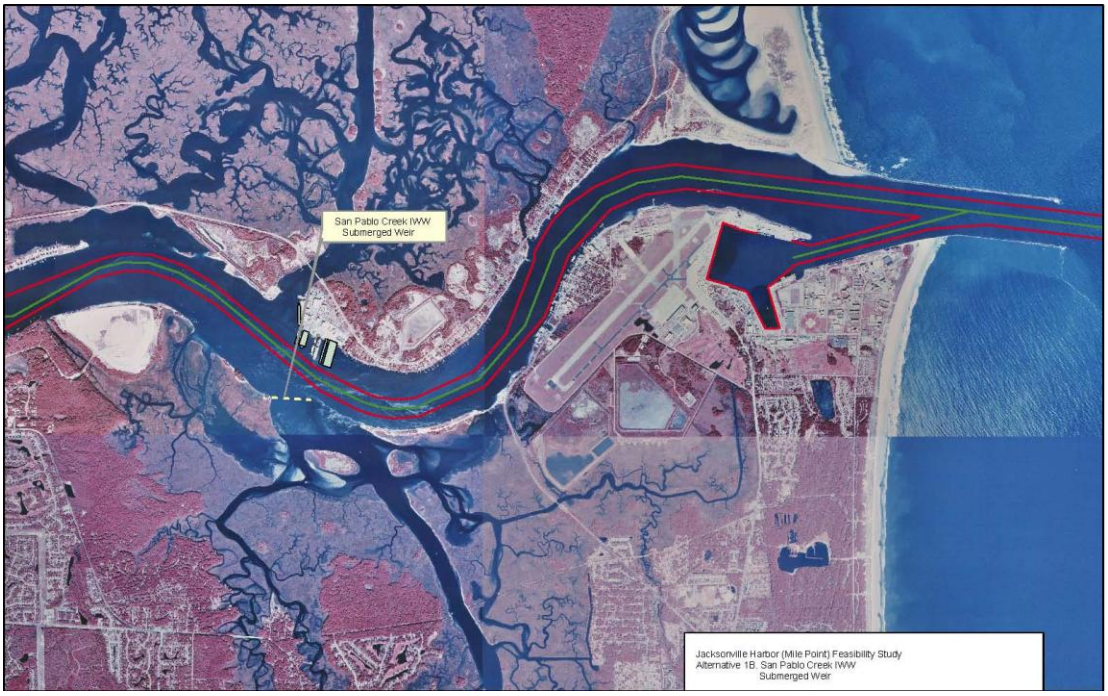
(1) Alternative 1A. A groin field consisting of groins extending from Mile Point north shoreline towards the Federal channel. Six groins about 150 feet long and 15 feet wide at the top, spaced about 420 feet apart were introduced in the hydrodynamic model. The groin field was effective at reducing the currents adjacent to the north Mile Point shoreline, but showed no significant reduction of crosscurrents within the navigation channel; therefore, it would not allow for the navigation restrictions to be lifted.

FIGURE 14: NORTH SHORELINE GROIN FIELD



(2) Alternative 1B. A submerged weir with a crest elevation of 14.0 feet, MLLW to be located to connect the tip of the Mile Point training wall with Great Marsh Island was evaluated to reduce the crosscurrents from the outflow of Pablo Creek during the ebb tide. Modeling showed no significant effects on crosscurrents within the navigation channel. The proposed elevation was the highest possible without impairing navigation, but still not high enough to limit the tidal flow, and therefore this alternative would not allow navigation restrictions to be lifted nor help with the erosion problems at Mile Point.

FIGURE 15: SAN PABLO CREEK IWW SUBMERGED WEIR



(3) Alternative 1C. Rebuilding the existing Mile Point Training Wall was evaluated. The existing training wall has subsided and now has several sections permanently under water. Modeling of rebuilding the training wall to its original size resulted in no significant impacts to the crosscurrents. Flow over the existing Mile Point Training Wall was measured and calculated to be less than five percent of the maximum ebb flow measured out of Pablo Creek.

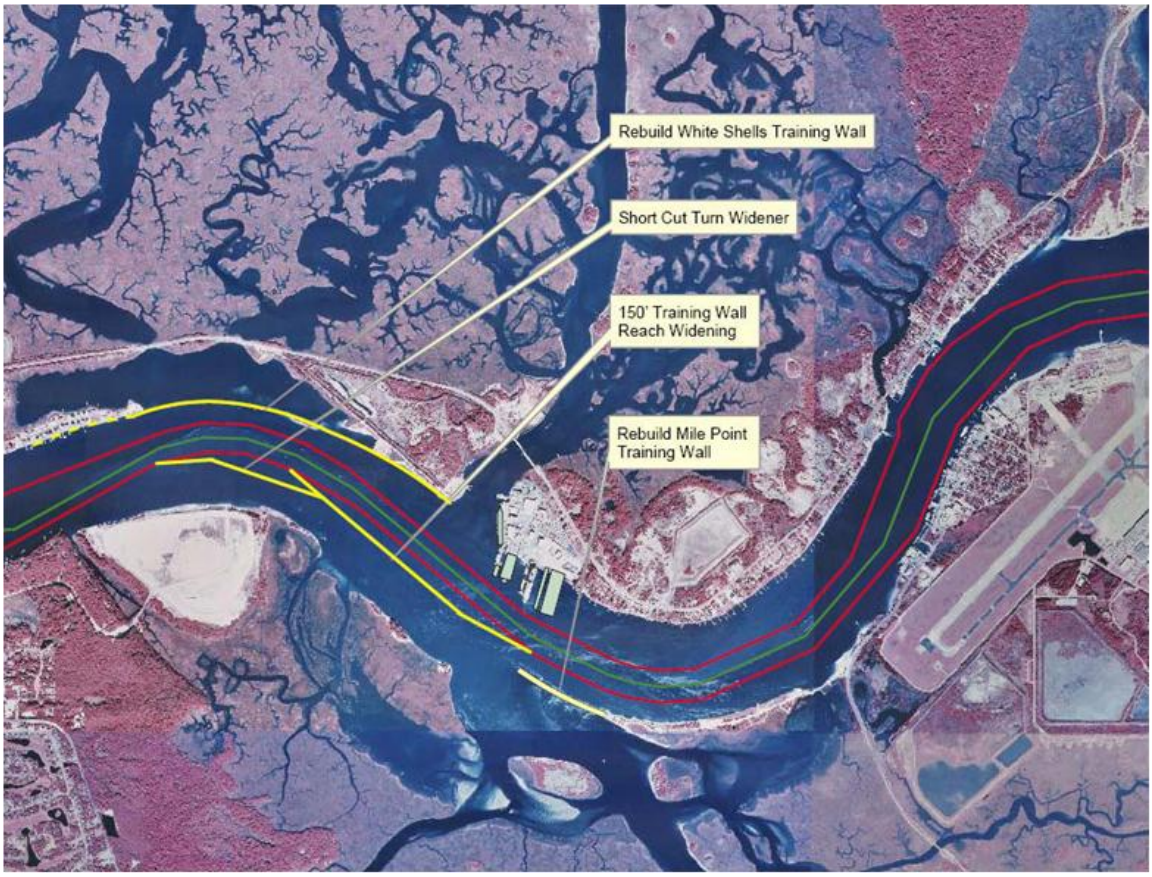
(4) Alternative 1D. Rebuilding the White Shells Training Wall, which is located on the opposite side of Buck Island along the north shoreline, to its original design dimensions was evaluated to measure the affects of the crosscurrents if the White Shells wall was rebuilt. The wall as it exists today is in a deteriorated state and is often partially submerged. The crosscurrents have a direct relation to the navigation restrictions enacted by the St. Johns Bar Pilots. Results of the modeling indicated that no significant changes to the currents within the navigation channel would occur after rebuilding the White Shells Training Wall.

(5) Alternative 1E. Shoreline protection for Mile Point such as a stone revetment or sheet pile bulkhead along a shoreline length of about 3,300 feet requiring protection does not provide for a reduction in crosscurrents that impact navigation. The use of a steel sheet pile wall with inflow windows and augmented with a filter stone is recommended for use in conjunction with the relocation of the Mile Point training wall alternative. Specific design criteria can be found in the Value Engineering (VE) Report in Engineering Appendix A.

(6) Alternative 1F. Removal of the waterward portion of the Mile Point Training Wall, under the Operations and Maintenance (O&M) Program to -6feet MLLW and -12feet MLLW was tested using a three-dimensional, finite-element hydrodynamic model (RMA10). The results of modeling this alternative were that the crosscurrents on the ebb flow were not significantly reduced.

(7) Alternative 2. A 150-foot training wall reach channel widening alternative was evaluated to reduce the intensity of the currents and add more space to be incorporated to the navigation channel. The results of modeling this alternative showed insignificant changes to the magnitude of the currents. A widening alternative was considered further (at the request of the St. Johns Bar Pilots) that would allow the Bar Pilots to lift the navigation restrictions for vessels with a deadweight (DWT) to Horsepower ratio of .75 or more (mainly container vessels). This alternative would not alleviate the erosion problems at Mile Point.

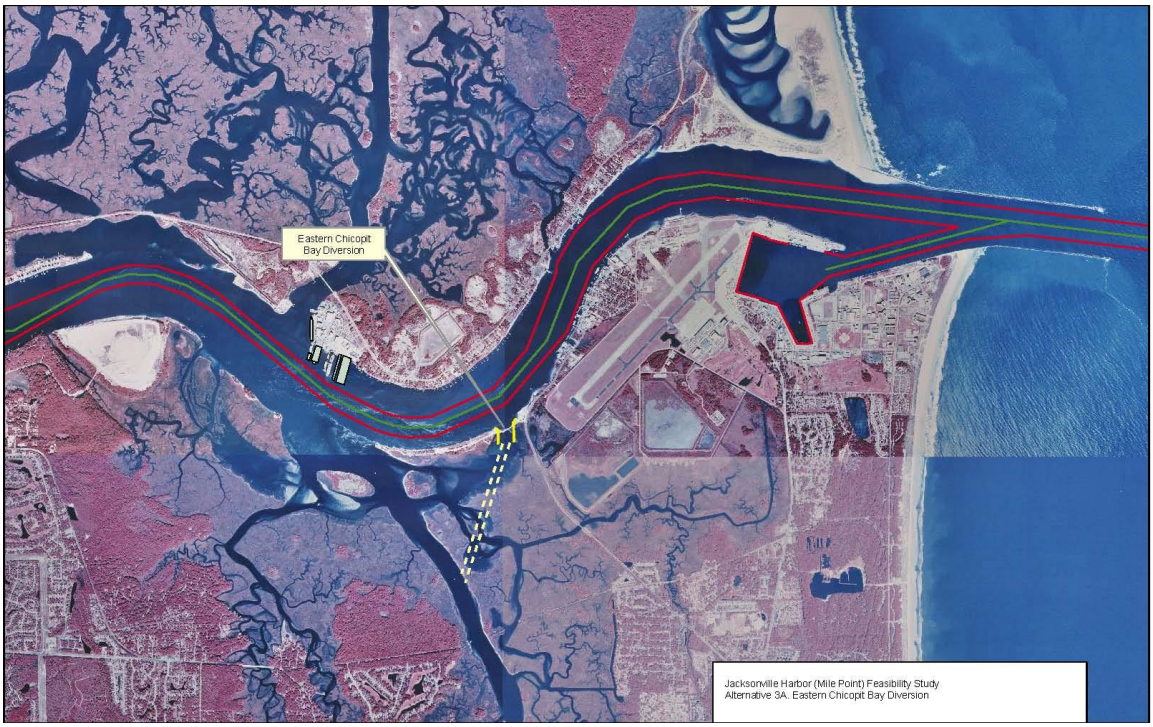
FIGURE 16: REBUILD TRAINING WALLS AND WIDENING ALTERNATIVES



(8) Alternative 3A. An Eastern Chicopit Bay Diversion alternative was proposed to open a canal at the landward end of the Mile Point training wall. The purpose of the diversion is to reduce the magnitude of the existing crosscurrents by reducing the amount of ebb flow at that particular location. The results of modeling this alternative were that the ebb flow currents were reduced by approximately fifty percent, however, the crosscurrents inside the navigation

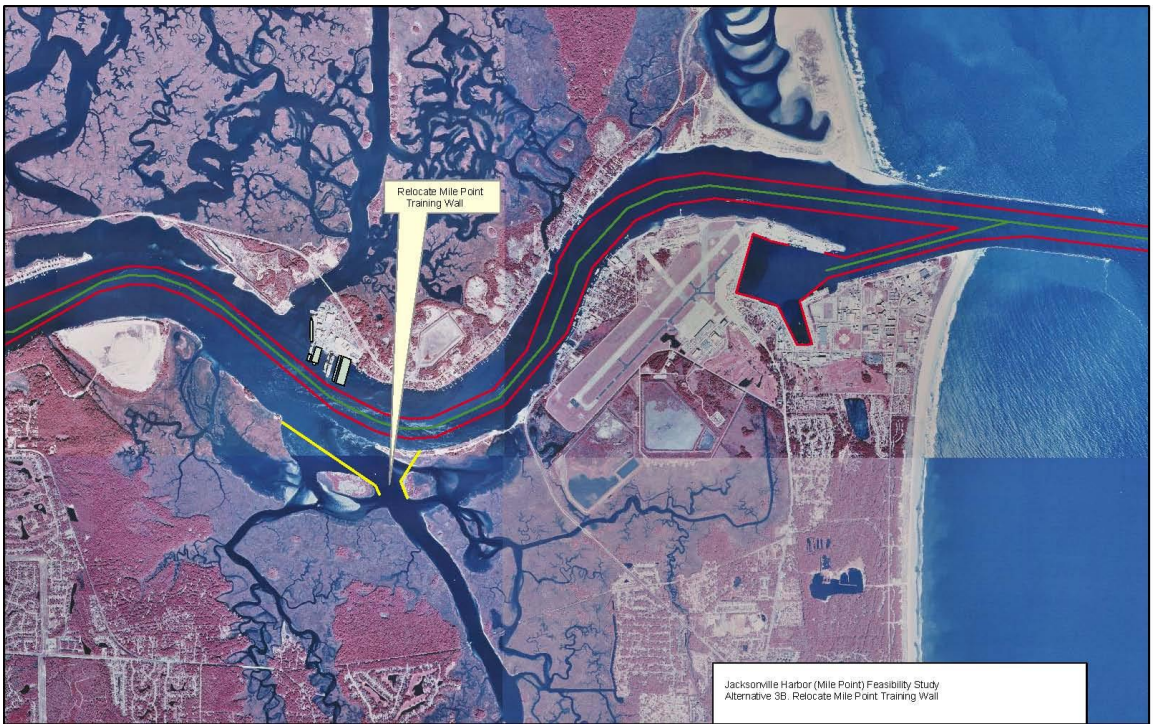
channel were only reduced by twenty-five percent. The angle of the crosscurrents did not change significantly. There are environmental concerns associated with constructing a large diversion canal through the landward end of the training wall related to destabilization of the mosaic of salt marsh, mud flats, and slack water areas present in this location. There is also an additional cost of having to build a bridge to maintain access to the existing park. Due to the adverse effects of this alternative, and that it does not significantly reduce the crosscurrents, this alternative was not carried further.

FIGURE 17: EASTERN CHICOPIT BAY DIVERSION



(9) Alternative 3B. Relocating the Mile Point training wall includes removal of the western 3,110 feet of the existing Mile Point training wall and construction of a new western leg and a relocated eastern leg training wall of approximately 4,250 feet and 2,050 feet, respectively. The purpose of the training wall relocation is to redistribute the ebb flow to intersect the main navigation channel further east where the currents will be parallel to the channel. Modeling of this alternative demonstrated a significant change in the distribution and direction of the currents within the navigation channel. Crosscurrents were completely eliminated inside the navigation channel during maximum ebb. The ebb currents along the new configuration followed a trajectory parallel to the navigation channel. Flood currents did not appear to be negatively impacted by the new training wall configuration.

FIGURE 18: RELOCATE MILE POINT TRAINING WALL



(10) Alternative 4. A short cut turn widener plus a 150-foot training wall reach widening was evaluated. The short cut turn is located just upstream from the training wall reach. This alternative extends the 150-foot widener north into the turn. The results indicated this alternative would not provide for significant changes to the magnitude of the currents at Mile Point.

5.4.2 Alternatives Eliminated from Detailed Evaluation

Alternatives were evaluated using the hydrodynamic model, USACE approved models RMA2 and RMA10, as is described in the above section. This model measured the affects of the alternative plans on the crosscurrents during the ebb and flood tides. Alternatives were eliminated that did not decrease these crosscurrents by the amount needed to reduce the affects of the currents on the adjacent shoreline or vessel traffic. **Table 6** shows the alternatives that were eliminated during the evaluation.

The numerical model RMA2 was chosen for this study for several reasons. First, the finite element method permits the modeler to develop an unstructured mesh to define the channel geometry. The lower St. Johns River has many tributaries and secondary channels that are difficult to discretize in the sense of a structured, index based grid. The finite element method uses freely connected three-sided and four-sided elements that are knitted together by means of an element connection table, thus permitting the modeler more flexibility to resolve important geometric features that may be required to accurately compute the flow

field. Second, a vertically averaged description of the hydrodynamics was sufficient to answer the questions that were posed concerning the relative impacts of the engineering alternatives on cross currents in the navigation channel at Mile Point. Third, RMA2 has been successfully applied to a variety of estuarine and riverine modeling studies conducted by the USACE.

Later a 3-D model was developed to validate the only alternative found to be effective at reducing cross currents, the relocation of the training wall at Mile Point. The 3-D numerical hydrodynamic model used in this project is known as RMA10- WES. The results obtained from the 3-D model confirmed the effectiveness of relocating the training wall at Mile Point. RMA2 and RMA0 are both classified as "Corps of Engineers Preferred." All hydrodynamic modeling was conducted by staff within the Hydrologic Modeling Section, Water Resources Engineering Branch, Engineering Division of the USACE, Jacksonville District.

The non-structural alternatives were also eliminated. The non-structural alternative of light-loading did not allow for the vessels that are currently subject to the navigation restrictions to transit without the restriction or reduce the erosion of the Mile Point shoreline. The no action alternative is not recommended as it does not provide any benefits or address any of the problems discussed in this study.

The St. Johns Bar Pilots determined the use of bow/stern thrusters or available tug assistance for ships restricted by the crosscurrents at Mile Point during the maximum ebb tide flows as not effective or practical due to the vessel transit speed required to overcome the crosscurrents under those conditions. For a container ship to attempt to transit the Mile Point area of Jacksonville Harbor during maximum ebb tide, the container ship must typically transit at speeds of about 7-11 knots which equates to an over-the-ground speed of about 4-7 knots with a 3-4 knot opposing ebb flow. The max ebb tide involves flows from the Intracoastal Waterway (48,000 cubic feet per second) south of the Mile Point Training Wall that flow around the west end of the training wall almost perpendicular across the Federal channel, equivalent to almost 25 percent of the entire flow in the St. Johns River (200,000 cubic feet per second). Tugs in Jacksonville Harbor do not have the capability to move through the water with the container ship under those ebb tide flows while applying sufficient force or push to overcome those types of forces. The non-structural alternative which evaluated adding additional tugs was eliminated based on this assessment.

The O&M Alternative (1F) evaluated removal of the waterward portion of the Mile Point Training Wall. This alternative was eliminated due to results of RMA10 modeling. Modeling showed only a slight benefit in the direction and magnitude of the ebb tide velocity vector, not enough to lift the existing navigation restrictions at Mile Point. The modeling also showed an increase in the areal extent of the crosscurrents which would have potential negative impacts to navigation. Other impacts of this alternative included a potential increase of

current velocities on the north shoreline and Great Marsh Island which allows for potential shoreline erosion. There is an archeological site at Great Marsh Island which would be subject to erosion risk under this alternative.

TABLE 6: ALTERNATIVE PLANS ELIMINATED THROUGHOUT THE STUDY

Jacksonville Harbor (Mile Point) - Alternative Plans Eliminated throughout the Study				
Alternative Plan	**Objective Addressed**	**Designation**	**Management Measure(s)**	**Basis for Elimination**
Alternative Plan 1	Reduce Effects of the Crosscurrents on the Erosion of the Mile Point Shoreline	1A	North Shoreline Groin Field	Reduced crosscurrents at adjacent shoreline but not in the navigation channel.
		1B	San Pablo Creek IWW Submerged Weir	No Sig impacts on crosscurrents in navigation channel.
		1C	Rebuild Mile Point Training Wall (Little Jetties)	No Sig impacts on crosscurrents in navigation channel.[1]
		1D	Rebuilding White Shells Training wall	No Sig impacts on crosscurrents in navigation channel.
		1E	North Shoreline stone revetment or sheet pile bulkhead	No Sig impacts on crosscurrents in navigation channel.
		1F	Removal of waterward portion of Training Wall	Insignificant changes to magnitude and direction of crosscurrents.
Alternative Plan 3	Reduce Effects of the Crosscurrents in order to Eliminate the Pilots' Navigation Restrictions and Erosion of the Mile Point Shoreline	3A	Eastern Chicopit Bay Diversion	Reduced ebb flow by 50% but magnitude of crosscurrents in the channel by less than 25%.[2]
		3C	North Shoreline Groin Field AND 150-Foot Training Wall Reach Widening	Insignificant changes to magnitude and direction of crosscurrents.
		3D	San Pablo Creek IWW Submerged Weir AND 150-Foot Training Wall Reach Widening	Insignificant changes to magnitude and direction of crosscurrents.
		3E	Rebuild Mile Point Training Wall (Little Jetties) AND 150-Foot Training Wall Reach Widening	Insignificant changes to magnitude and direction of crosscurrents.
		3F	Rebuild Mile Point Training Wall (Little Jetties) AND Rebuild White Shells Training Wall	Insignificant changes to magnitude and direction of crosscurrents.
Alternative Plan 4	Reduce Effects of the Crosscurrents in order to Eliminate the Pilots' Navigation Restrictions	4	150-Foot Training Wall Reach Widening AND Short Cut Turn Widener	Insignificant changes to magnitude and direction of crosscurrents.
Alternative Plan 5	Reduce Effects of the Crosscurrents in order to Eliminate the Pilots' Navigation Restrictions and Erosion of the Mile Point Shoreline	5A	North Shoreline Groin Field AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener	Insignificant changes to magnitude and direction of crosscurrents.
		5B	San Pablo Creek IWW Submerged Weir AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener	Insignificant changes to magnitude and direction of crosscurrents.
		5C	Rebuild Mile Point Training Wall (Little Jetties) AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener	Insignificant changes to magnitude and direction of crosscurrents.
1. The ADCP Survey measured a maximum flow of approximately 1,500 cfs over the training wall, less than five percent of the maximum ebb flow measured out of Pablo Creek.				
2. The angle of the crosscurrents did not change significantly. This is an environmentally sensitive area.				

5.4.3 Alternatives Carried Forward

The results of the hydrodynamic modeling of the alternatives showed that only relocation of the Mile Point training wall demonstrated significant change in the distribution and direction of the currents within the navigation channel. Relocation of the Mile Point training wall is the only alternative that met all of the study objectives. It is anticipated that the new realignment of the Mile Point training wall would produce flows coming out of the IWW from the south that are more aligned with the Federal channel. This is expected to provide a drop in water velocity in the areas north of the channel at Mile Point and slow the progression of the erosion that has occurred at the north bank of Mile Point. Ship simulation was run to test the relocation of the Mile Point training wall (Alternative 3B). The results of this simulation were considered favorable by the majority of

the St. Johns Bar Pilots toward reducing or eliminating the restrictions associated with the training wall crosscurrents.[21]

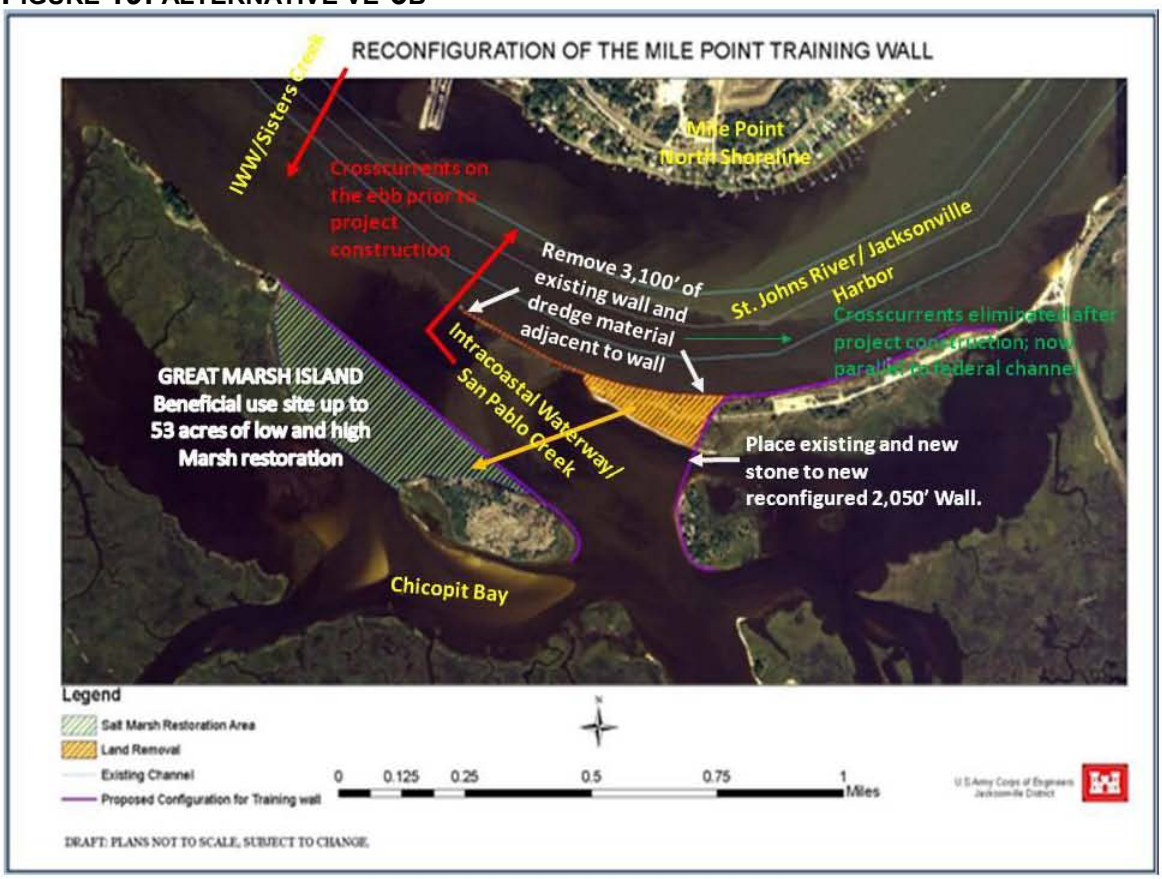
A widening alternative was carried forward for further investigation at the request of the St. Johns Bar Pilots. A second ship simulation was run September 14-17, 2009 to test the widening only alternative, as well as the relocation of the Mile Point training wall alternative. The pilots, as observed by the USACE, Engineer Research and Development Center (ERDC) and Jacksonville District personnel, attempted to use the wideners to make the turn at Mile Point. The pilots, after using the wideners in the simulation, stated that they felt the wideners would not reduce tidal restrictions for Mile Point. Based on the simulator runs, the pilots felt that relocation of the Mile Point training wall could reduce or eliminate tidal restrictions for Mile Point. These alternatives are discussed further below:

1. Alternative VE-3B: The original relocation of the Mile Point Training wall (Alternative 3B) was further refined following an extensive Value Engineering (VE) study (**Figure 19**). This alternative was modified to incorporate the beneficial use of dredged material by creating a salt marsh mitigation area that restores wetlands lost on Great Marsh Island as a result of erosion. The original plan 3B used the Buck Island Disposal area for placement of dredged material; however, the use of Great Marsh Island is a lower cost disposal option due to a shorter transit distance. Relocation of the Mile Point training wall and the Great Marsh Island restoration improves navigation for the maximum ebb, maximum ebb from Pablo Creek, and maximum flood, and facilitates potential reductions in the erosion along the Mile Point shoreline. There are incidental environmental benefits with this alternative. Restoring Great Marsh Island is both the least cost alternative for the disposal of dredged material and also provides additional acres of restoration above the required mitigation to offset the approximate 8.15 acres impacted by the relocation. This alternative met both the objectives of reducing the erosive effects of the crosscurrents on the Mile Point shoreline, and reducing or eliminating the restrictions to navigation. The St. Johns Bar Pilots agreed that this alternative would allow the tidal restriction to be lifted or greatly reduced.[22]

> Note: This alternative is not complete due to potential shoaling problems at Chicopit Bay. Thus it was not carried further in the final comparison of alternatives. By creating a means of disposal by restoring Great Marsh Island, the natural tidal outlet of Chicopit Bay is filled, reducing circulation and increasing shoaling in Chicopit Bay.

[21] The ship simulation report is located in Appendix A (Engineering Appendix) Attachment C.
[22] Letter in Appendix E (Pertinent Correspondence): St. Johns Bar Pilot Association Letter, May 15, 2008.

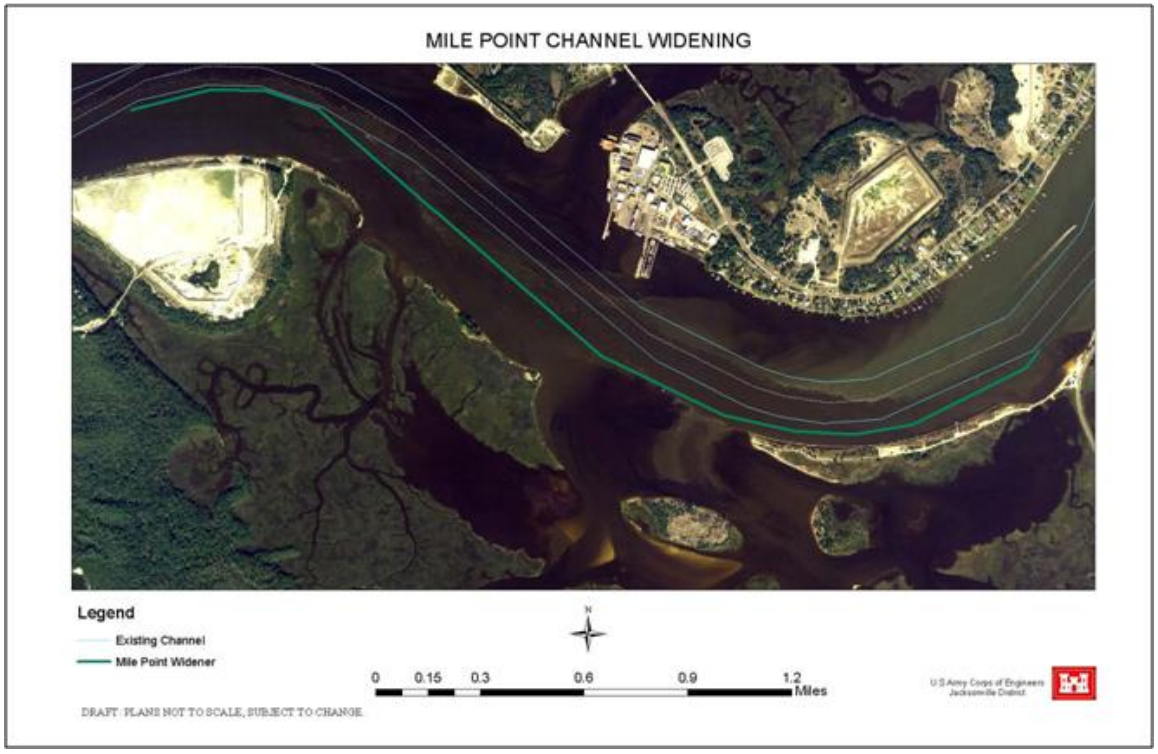
FIGURE 19: ALTERNATIVE VE-3B



2. Widening Alternative 2: A widening alternative that would allow for a reduction in the delay associated with the Bar Pilots restrictions for vessels with a deadweight (DWT) to Horsepower ratio of .75 or greater (**Figure 20**).

This alternative will not reduce the effects of the crosscurrents on the adjacent shoreline and does not offer a reduction in the navigation delay, as was determined by the 2009 ship simulation. Thus, although it was evaluated in the final array of alternatives, it was not carried further in the final comparison of alternatives. The widening alternative would need to be coupled with adding groin fields, which are detailed in the previous section, to protect against erosion on the Mile Point shoreline to the north. This would still not mitigate for shoaling on the southern side of the Mile Point area, in the Chicopit Bay area. Without a reduction in navigation delays, there is little benefit for this alternative and it is eliminated.

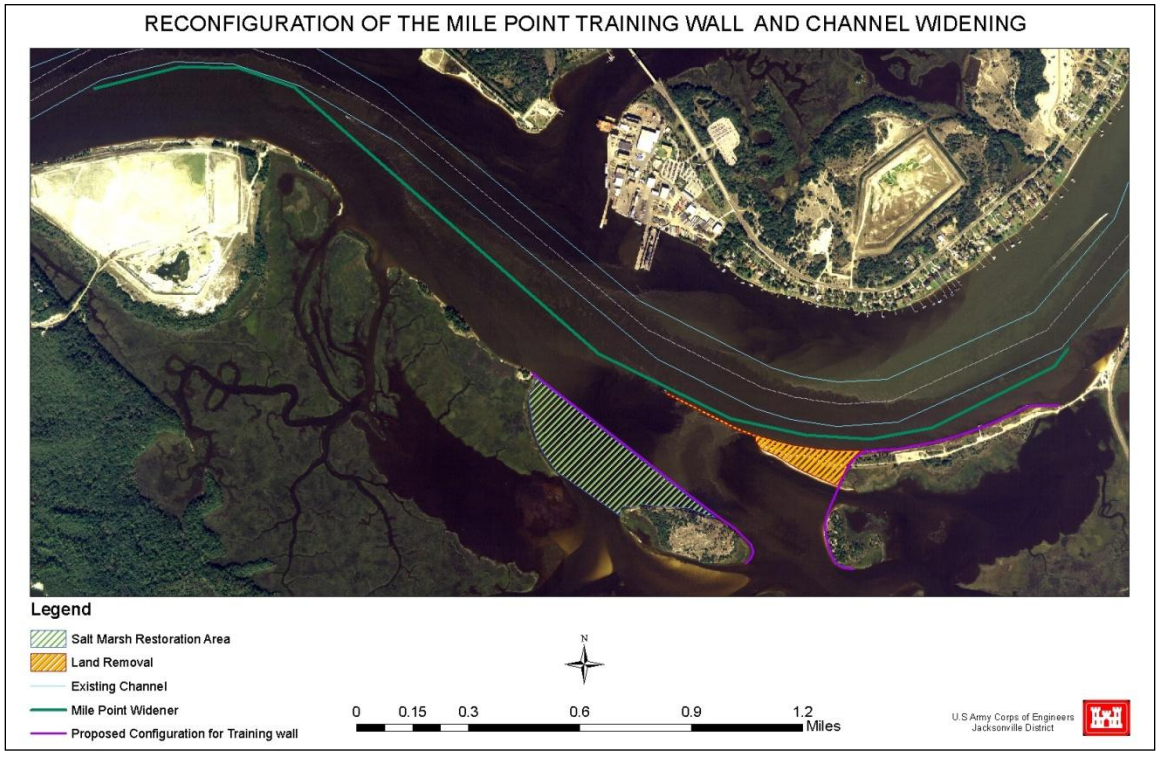
FIGURE 20: WIDENING ALTERNATIVE



3. Alternative VE-3B plus Widening: A combination of the relocation of the Mile Point training wall alternative VE-3B and the widening alternative would improve navigation for vessels transiting under all tidal conditions (**Figure 21**).

This Alternative is not complete due to potential shoaling problems at Chicopit Bay; however, this alternative was modified to include a Flow Improvement Channel (FIC) at Chicopit Bay and was carried to the final comparison of alternatives. The FIC would be constructed to offset the flow reduction caused by the restoration of Great Marsh Island (see section 7.6.2 for more detail).

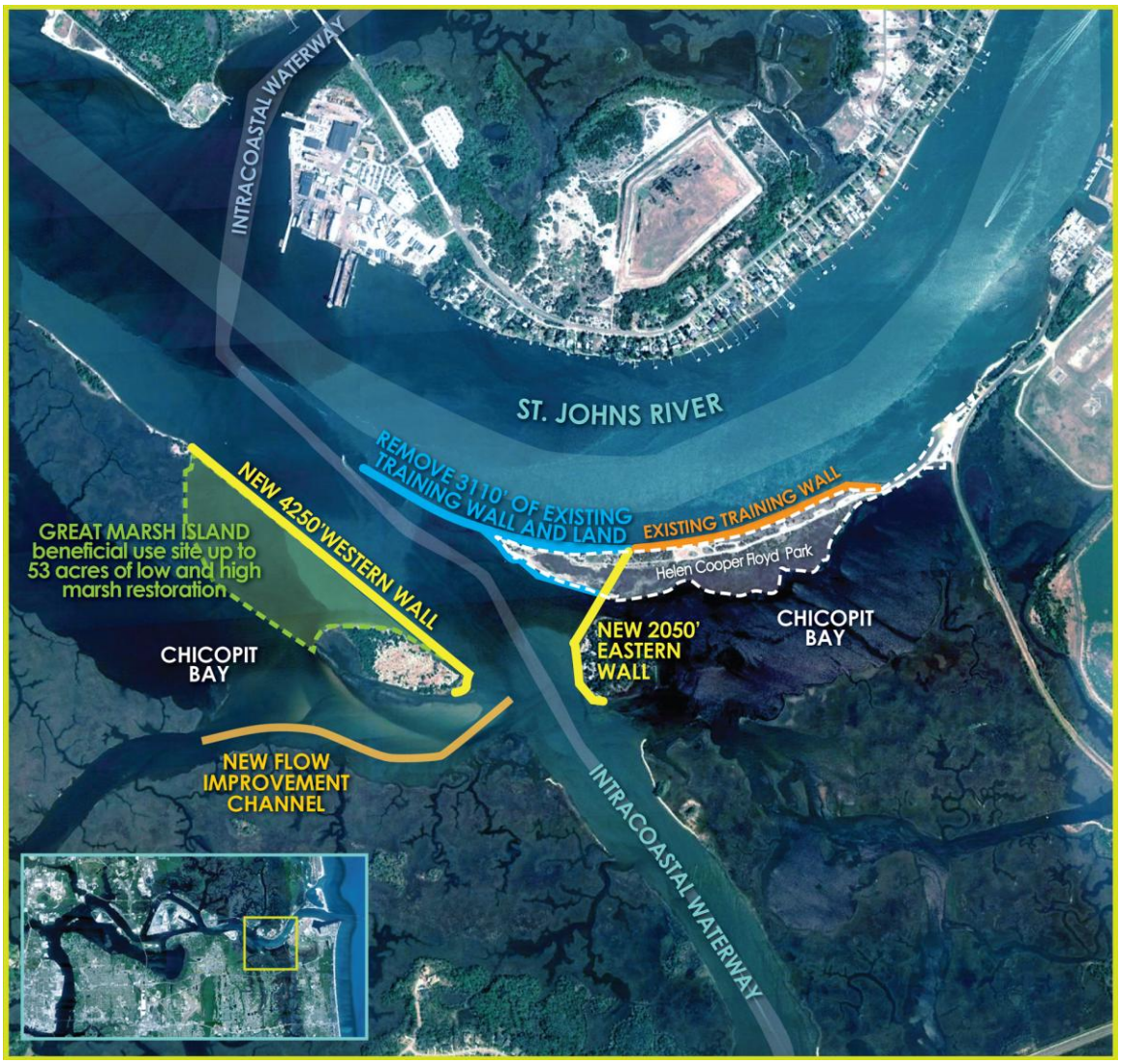
FIGURE 21: ALTERNATIVE VE-3B PLUS WIDENING



4. Alternative VE-3B plus Flow Improvement Channel: Relocation of the Mile Point training wall alternative VE-3B in conjunction with a Flow Improvement Channel (FIC) in Chicopit Bay would help improve navigation in the Jacksonville Harbor by reducing navigation restrictions, in addition to improving the water quality and environmental stability of the project area by increasing flushing capacities and channel flow dynamics (**Figure 22**). It also reduces the impacts of the currents along the Mile Point shoreline.

This alternative would provide for restoration of Great Marsh Island to be used as the least cost disposal for the project. Restoration of this area provides an opportunity to address other impacts caused by the physical decay of the ecosystem such as shoaling in Chicopit Bay. Without the project, Great Marsh Island will continue to erode. The FIC would be constructed to offset any adverse effects that would be caused by closing off the breakthrough of Great Marsh Island. If Great Marsh Island is restored and the FIC is not built, then water quality is expected to continue to degrade within Chicopit Bay and upstream watersheds below the head of tide. This would occur because the restoration would close off the eroded portion of Great Marsh Island which now flushes the bay. The FIC is proposed to improve the flushing of upstream loadings such as sediment, bacteria, and nutrients through the bay, as well as provide deeper water for Essential Fish Habitat. The construction of the FIC would also restore the historic channel through Chicopit Bay which has silted in with eroded material from Great Marsh Island. Dredged material from the FIC would be placed back into the Great Marsh Island restoration area (**Figures 8-10)**.

FIGURE 22: ALTERNATIVE VE-3B PLUS FLOW IMPROVEMENT CHANNEL



5.5 COMPARISON OF FINAL ALTERNATIVES

Table 7 lists the final alternative plans that were evaluated and the associated problems and benefits. The only two alternatives that met the study objectives were the VE-3B plus Flow Improvement Channel alternative (VE-3B +FIC) and the combination of the widening alternative and the VE-3B plus Flow Improvement Channel (VE-3B+FIC+2). The Benefit-Cost Ratios associated with these final two alternatives are illustrated in **Table 9**. **Table 8** lists alternatives considered in the environmental assessment and summarizes the major features and consequences of the No Action Plan; Alternative 3B Reconfigure Mile Point Training Wall (VE-3B above); and the Recommended Plan which is Alternative 3B with the Flow Improvement Channel (VE-3B+FIC). See Section 7.0 Environmental Effects for a more detailed discussion of impacts of alternatives.

TABLE 7: JACKSONVILLE HARBOR MILE POINT ALTERNATIVE PLANS

Jacksonville Harbor Mile Point - Alternative Plans				
Alternative Plan	**Problems Addressed**	**Designation**	**Management Measure(s)**	**Benefit Description**
Relocate Mile Point Training Wall and Great Marsh Island Restoration	Erosion of Mile Point Shoreline; Unsafe inbound transit through Mile Point turn during Ebb Tide; light-loading of Northside light plant tankers	(VE-3B)	Relocate Mile Point Training Wall	Reduce Erosion Along Shoreline; Eliminate Delay Associated with Pilots' Entry Restriction for Most Vessels; Reduce light-loading of Northside Light Plant Tankers
Widening Alternative	Unsafe inbound transit through Mile Point turn during ebb tide; light-loading of northside light plant tankers	2	Training Wall Reach Widening	Reduce Delay Associated with Pilots' Entry Restriction for Most Vessels; Reduce light-loading of Northside Light Plant Tankers
Alternative Plan VE-3B plus Flow Improvement Channel and Widening Alternative	Erosion of Mile Point Shoreline; Unsafe inbound transit through Mile Point turn during Ebb Tide; light-loading of Northside light plant tankers, Shoaling and Flushing Capacity of Greenfield Creek.	VE-3B+F.I.C.+2	Relocation Mile Point Training Wall plus Flow Improvement Channel and Reach Widening	Reduce Erosion Along Shoreline; Eliminate Delay Associated with Pilots' Entry Restriction for Most Vessels; Reduce light-loading of Northside Light Plant Tankers, Increased Flushing Capacity and Beneficial use of Dredged Material.
VE-3B plus Flow Improvement Channel	Erosion of Mile Point Shoreline; Unsafe inbound transit through Mile Point turn during Ebb Tide; light-loading of Northside light plant tankers; Shoaling and Flushing Capacity of Greenfield Creek.	VE-3B+F.I.C.	Relocate Mile Point Training Wall and Flow Improvement Channel	Reduce Erosion Along Shoreline; Eliminate Delay Associated with Pilots' Entry Restriction for Most Vessels; Reduce light-loading of Northside Light Plant Tankers; Increased Flushing Capacity and Beneficial use of Dredged Material.

TABLE 8: SUMMARY OF DIRECT AND INDIRECT IMPACTS

ALTERNATIVE ENVIRONMENTAL FACTOR	No action Status Quo	Alternative 3B Reconfigure Mile Point Training Wall	Recommended Plan- Reconfigure Mile Point Training Wall and Construct Chicopit Bay Flow Improvement Channel
GENERAL ENVIRONMENT	Difficult crosscurrents would persist, and Mile Point may remain vulnerable to erosion. Erosion at Great Marsh Island would continue, and additional salt marsh would be lost. Restoration of the island would not occur.	Training wall footprint would change. Circulation patterns and current velocities would also change, but significant impacts to the estuarine environment are not anticipated. Impacts to salt marsh would be mitigated. Further erosion of Great Marsh Island would be prevented, and lost salt marsh would be restored.	Training wall footprint would change. Current velocities would also change, but significant impacts to the estuarine environment are not anticipated. Impacts to salt marsh would be mitigated. Further erosion of Great Marsh Island would be prevented, and lost salt marsh would be restored. Flow Improvement Channel would increase flushing of silt.
FLORIDA MANATEE	No effect.	May affect, but not likely to adversely affect, with implementation of standard protection measures.	May affect, but not likely to adversely affect, with implementation of standard protection measures.
PIPING PLOVER	No effect.	May affect, but not likely to adversely affect. Species may not occur in project area. Minimal loss of potential habitat.	May affect, but not likely to adversely affect. Species may not occur in project area. Minimal loss of potential habitat.
WOOD STORK	No effect in project footprint. However, restoration of Great Marsh island, potential foraging habitat for the stork, would not occur.	May affect, but not likely to adversely affect. Restoration of Great Marsh island would more than offset loss of foraging habitat.	May affect, but not likely to adversely affect. Restoration of Great Marsh island would more than offset loss of foraging habitat.
SEA TURTLES	No effect.	May affect, but not likely to adversely affect, with use of cutterhead dredge. No nesting habitat in project area.	May affect, but not likely to adversely affect, with use of cutterhead dredge. No nesting habitat in project area.
SHORTNOSE STURGEON	No effect.	May affect, but not likely to adversely affect with use of cutterhead dredge.	May affect, but not likely to adversely affect with use of cutterhead dredge
SMALLTOOTH SAWFISH	No effect.	May affect, but not likely to adversely affect, with use of cutterhead dredge.	May affect, but not likely to adversely affect, with use of cutterhead dredge.
NORTHERN RIGHT WHALE	No effect.	May affect, not likely to adversely affect with protective measures.	May affect, not likely to adversely affect with protective measures.
ESSENTIAL FISH HABITAT (EFH)	No effect in project footprint. However, erosion of Great Marsh Island would continue, and additional salt marsh would be lost. Restoration of Great Marsh island would not occur	Salt marsh impacts (8.15 acres) would be mitigated. Restoration of Great Marsh Island (estimated 53 acres) would more than compensate for impacts. Water column habitat would be temporarily impacted during dredging.	Salt marsh (8.15 acres) impacts would be mitigated. Restoration of Great Marsh Island (estimated 53 acres) would more than compensate for impacts. Flow Improvement Channel would provide deep water habitat in Chicopit Bay, and increase flushing of silt. Water column habitat would be temporarily impacted during dredging.

ALTERNATIVE ENVIRONMENTAL FACTOR	No action Status Quo	Alternative 3B Reconfigure Mile Point Training Wall	Recommended Plan- Reconfigure Mile Point Training Wall and Construct Chicopit Bay Flow Improvement Channel
SHELLFISH AND WILDLIFE RESOURCES	No effect in project footprint. However, erosion of Great Marsh Island would continue, and additional salt marsh would be lost. This would affect shellfish and wildlife resources other than EFH and listed species.	Loss of oyster habitat would be mitigated. Restoration of Great Marsh Island would provide habitat for shellfish and wildlife resources other than EFH and listed species. Open-water and upland habitats would be impacted.	Loss of oyster habitat would be mitigated. Restoration of Great Marsh Island would provide habitat for shellfish and wildlife resources other than EFH and listed species. Flow Improvement Channel would provide deep water habitat in Chicopit Bay, and increase flushing of silt. Open-water habitats and upland habitats would be impacted.
CULTURAL RESOURCES[23]	The existing conditions have resulted in substantial erosion and loss of the Great Marsh Island which has exposed the prehistoric site. This erosion is expected to continue with an eventual loss of the archeological site.	Minimal effect on the archeological site. The effect will be similar to past conditions and will provide protection from ongoing and potential future erosion. As such the effect will not be adverse.	Minimal effect on the archeological site. The effect will be similar to past conditions and will provide protection from ongoing and potential future erosion. As such the effect will not be adverse.
WATER QUALITY	No effect.	Circulation patterns and current velocities would change, but significant water quality impacts are not anticipated. Short-term localized increase in turbidity at dredge site.	Circulation patterns and current velocities would change, but significant water quality impacts are not anticipated. Flow Improvement Channel would help flush silt from Chicopit Bay. Short-term localized increase in turbidity at the dredge site.
AIR QUALITY	No effect.	Minor and short-term impacts caused by dredging equipment.	Minor and short-term impacts caused by dredging equipment.
HTRW	No effect.	There are no known HTRW sites within the project area.	There are no known HTRW sites within the project area.
RECREATION	No effect.	Restoration of Great Marsh Island would close off recreational boat traffic through this area.	Flow Improvement Channel in Chicopit Bay would provide recreational boat access to IWW.
AESTHETICS	No effect.	Minor short-term adverse impact due to construction activities. Mitigation would result in additional salt marsh.	Minor short-term adverse impact due to construction activities. Mitigation would result in additional salt marsh.
NOISE	No effect.	Minor and temporary adverse effect.	Minor and temporary adverse effect.

[23] Based on the results of the underwater cultural resource survey.

ALTERNATIVE ENVIRONMENTAL FACTOR	No action Status Quo	Alternative 3B Reconfigure Mile Point Training Wall	Recommended Plan- Reconfigure Mile Point Training Wall and Construct Chicopit Bay Flow Improvement Channel
SOCIO ECONOMICS	Long-term adverse impact to local, regional and statewide economies.	Long-term benefit to local, regional and statewide economies. Residents along Mile Point should benefit due to reduced erosion.	Long-term benefit to local, regional and statewide economies. Residents along Mile Point should benefit due to reduced erosion.
NAVIGATION	Long-term adverse impact to deep draft vessels.	Long-term benefit to deep draft vessels.	Long-term benefit to deep draft vessels.

5.6 PLAN SELECTION

Alternative VE-3B plus a Flow Improvement Channel is the Recommended Plan. This alternative was evaluated and determined to be economically justified, environmentally acceptable, and complete. In addition, a recommended (approximate) 53 acres of salt marsh restoration and planting is proposed for beneficial use of dredged material and environmental mitigation. The recommended plan has the highest Net average annual equivalent (AAEQ) national economic development (NED) benefits and also provides up to 34 acres of incidental benefits (**Table 9**).

5.6.1 NED Benefits

NED benefits are the time savings to vessels otherwise delayed by Mile Point tidal restrictions for entry and exit from Jacksonville Harbor. The Jacksonville District supplied the Contractor a Mile Point benefit spreadsheet to be used for calculating the without-project delay costs and benefits resulting from with-project reductions of the existing ebb tide constrained sailing drafts.

The spreadsheet calculates the vessel average delay hours as a function of sailing draft and tides, effectively acting as a typical tide delay function, but with lower sailing draft tidal delay thresholds reflecting the Mile Point restrictions (>33 feet sailing draft inbound and >36 feet sailing draft outbound). The Mile Point without-project inbound sailing draft restriction of >33 feet is used as the basis for all delay estimates except for the New World Alliance (NWA) vessels calling TraPac for which a 34 feet inbound delay threshold is used. The Mile Point inbound sailing draft restriction (>33 feet) is applied to a vessel call list contained in the Restriction Without-project worksheet to establish the delay time and associated vessel costs. Modifications to the Mile Point sailing draft restriction as a result of with-project conditions are applied to a vessel call list contained in the Restriction With-project worksheet to establish the changes in delay time and associated vessel costs.

Once the baseline vessel delay costs are calculated for a particular vessel call list (interactions between the Restriction Without-project and Ebb and Tide Delay

Without and between the Restriction With-project and Ebb and Tide Delay With-project), the Growth worksheet will allow the reductions in vessel delay costs associated with the different fleets (bulk, tanker, container, general cargo) to change in response to projected changes in vessel calls. The Growth worksheet allows for changes in the vessel calls for each year of the project life, 2015 to 2065.

The Recommended Plan is also the NED plan or the plan that maximizes Net Benefits and is environmentally acceptable; the Net AAEQ Benefits are $0.7 million. The project is economically justified with a Benefit-to-Cost Ratio (BCR) of 1.4. Navigation benefits were computed using a tide delay spreadsheet to compile the vessel delay hours attributable to Mile Point restrictions.[24]

TABLE 9: JACKSONVILLE HARBOR MILE POINT ALTERNATIVES COSTS AND BENEFITS ($1,000s)[25] (October 2011 price levels and FY2012 discount rate)

Alternative	Benefits	Costs	AAEQ Cost	AAEQ Benefits	AAEQ Net Benefits	BCR
Reconfigure	**$52,400**	**$37,300**	**$1,737**	**$2,440**	**$703**	**1.40**
Reconfigure & Widen	**$52,400**	**$76,300**	**$3,628**	**$2,440**	**-$1,188**	**0.67**

*Costs include interest during construction (IDC).

5.6.1.1 Incidental Benefits

Incidental environmental benefits were computed based upon the combination of feasible dredging and planting alternatives.[26] It is necessary with the Recommended Plan to clear, grub, and dredge the western portion of Helen Cooper Floyd Park (HCFP). This action would impact a total of 8.15 acres of salt marsh. Mitigation would be performed by restoring salt marsh at nearby Great Marsh Island, which has been eroding over the years. As a beneficial use of dredged material, the USACE will attempt to restore the entire eroded breakthrough at the island. This would result in up to 53 acres of total restoration of marsh, and would provide a significantly higher increase of salt marsh functions and values. The approximate 53 acres of total restoration provides for the mitigation and additional acreage as incidental environmental benefits.

5.6.2 Least Cost Disposal Alternative

As is detailed in Appendix A, Attachment E, VE Study FY08, Proposal C-2, and also in Section 6.3.1 of this report, the Recommended Plan includes disposal of

[24] Additional details on the economic model used and the economic assumptions can be found in Appendix B (Economics Appendix).
[25] Reconfigure & Widen (VE-3B+FIC+2) was not economically justified and thus the costs and benefits are planning level costs and benefits.
[26] Additional details on the alternatives evaluated for mitigation can be found in Appendix D (Mitigation Plan).

dredged material at Great Marsh Island as the least cost disposal option, or base plan. The following is a summary of the disposal alternatives evaluated. Costs are not reflective of the final Value Engineering plan costs, which were further refined in a second Value Engineering Study in 2011, as is detailed in **Section 6.3.1**.

Disposal Site	Unit Cost
Buck Island	$55,945,000
Great Marsh Island	$46,889,000
Savings at Great Marsh Island	$9,056,000

Use of Great Marsh Island instead of Buck Island incorporates the beneficial use of dredged material by creating a salt marsh mitigation area that restores wetlands lost on Great Marsh Island. The mitigation site/disposal site at Great Marsh Island is closer than Buck Island, which would result in a substantial cost savings by reducing pumping distance of dredged material and allows for use of a smaller dredge and less pipeline.

6.0 THE RECOMMENDED PLAN

The recommended plan for navigation improvements at Jacksonville Harbor Mile Point has to be responsive to local needs and desires as well as the economic and environmental criteria established by Federal and state law. To do this the plan must be able to handle current and forecasted vessel traffic safely with minimum impact on the environment and without excessive delays and damage. Subsequent paragraphs outline the plan design, construction, operation and maintenance procedures.

The U.S. Army Corps of Engineers (USACE) decision making for the selection of a recommended plan begins at the District level and continues at the Division and Headquarters levels through subsequent reviews and approval. For congressionally authorized projects, the final agency decision maker is the Secretary of the Army through the Assistant Secretary of the Army for Civil Works.

The National Economic Development (NED) Plan is the Recommended Plan, identified as Alternative VE-3B plus FIC, and combines the reconfiguration of the existing training wall, restoration of Great Marsh Island which is the least cost disposal option, and the creation of a Flow Improvement Channel (FIC) in Chicopit Bay. Please see **Section 7.6.2** for additional information on the FIC. The training wall reconfiguration includes removal of the western 3,110 feet of the existing Mile Point training wall and the construction a relocated eastern leg training wall of approximately 2,050 feet. The least cost dredging disposal alternative is to restore the breakthrough at Great Marsh Island by placing dredged material at the Island and constructing a western leg training wall, approximately 4,250 feet (**Figure 22**).

6.1 DESCRIPTION OF THE RECOMMENDED PLAN

6.1.1 Environmental Mitigation

The recommended plan would impact approximately 8.15 acres of salt marsh at Helen Cooper Floyd Park. Mitigation to offset the loss of 8.15 acres of salt marsh through implementation of the Recommended Plan would be performed by restoring approximately 18.84 acres of salt marsh which historically occurred at nearby Great Marsh Island. However, as a beneficial use of dredged material, the USACE will attempt to restore the entire eroded breakthrough at the island, equating to approximately 53 acres of marsh, providing a significantly higher increase of salt marsh acreage. For more information on the proposed mitigation please see Appendix D: Mitigation Plan and Incremental Analysis. The mitigation plan was prepared in accordance with the guidance provided in Water Resources Development Act of 2007 Section 2036 (a). The USACE regards the Flow Improvement Channel (FIC) as mitigation for project-related impacts, specifically the closure of the breakthrough at Great Marsh Island, which would adversely

affect both water quality within Chicopit Bay and local boating access (please refer to Appendix A: Engineering Design for more information). Monitoring and corrective action, if needed, of the FIC will be implemented by the USACE for 5 years. Based on the dredged material management plan for Jacksonville Harbor and historical cycles of dredging, shoaling tends to occur in the main channel within 2 or 3 years of dredging. While the FIC is anticipated to be self-maintaining, the 5-year period of monitoring will allow for surveying across annual weather variations for confirmation.

6.1.2 Ecosystem Restoration Using Dredged Material (EP-116-2-1)

Planning Guidance Notebook ER 1105-2-100 (USACE, April 2000) page E-69 states that it is USACE policy that studies include an assessment of potential beneficial uses of dredged material for environmental purposes including fish and wildlife habitat creation, ecosystem restoration and enhancement, and hurricane and storm damage reduction.

This study contains a complete Mitigation Plan (Appendix D) that evaluates alternatives for beneficial use of dredged material in conjunction with environmental mitigation efforts. Using the USACE Institute for Water Resources (IWR) Planning Suite Software, management measures were combined into alternatives for incremental cost and benefit comparisons. Six alternatives are outlined in **Table 10**.

Using the Uniform Mitigation Assessment Method, the USACE has determined that approximately 18.84 acres of mitigation would be required to offset the loss at Helen Cooper Floyd Park. Optimal restoration includes the required mitigation (approximately 18.84 acres); up to 26.16 acres of additional salt marsh would be restored at Great Marsh Island for a total of approximately 45 acres. Expanded restoration would include both the required and optimal, plus approximately 8 acres of additional marsh would be restored for a total of approximately 53 acres. Material for the additional 8 acres of restoration would come from the dredging of the proposed Flow Improvement Channel (FIC) in Chicopit Bay.

Incremental Analysis identifies Mitigation Alternative 6 as the Best Buy, and is described as restoration of the 45 acres of eroded marsh at Great Marsh Island with an additional 8 acres of marsh restoration for a total of approximately 53 acres. Material for the additional 8 acres of restoration would come from the dredging of the proposed Flow Improvement Channel in Chicopit Bay. The proposed 53 acres would be sprigged with transplanted salt marsh species at 3-foot centers. This alternative generated the largest Habitat Unit gain per incremental cost. Additional information can be found in Appendix D: Mitigation Plan and Incremental Analysis.

TABLE 10: ENVIRONMENTAL MITIGATION ALTERNATIVES*

ALTERNATIVE
Alternative 1 – Required Mitigation plus 18.84 acres of Planting
Alternative 2 – Optimal Restoration plus 18.84 acres of Planting
Alternative 3 – Optimal Restoration plus 45 acres of Planting
Alternative 4 – Expanded Restoration plus 18.84 acres of Planting
Alternative 5 – Expanded Restoration plus 45 acres of Planting
Alternative 6 – Expanded Restoration plus 53 acres of Planting

*The mitigation alternatives are further defined in Appendix D.

6.2 DETAILED COST ESTIMATES (MCACES)

Based on planning level benefits and costs as shown in **Table 9**, Alternative VE-3B plus Flow Improvement Channel (FIC) represents the NED plan.

Once the NED plan was determined, a detailed cost estimate was developed using the Micro Computer Aided Cost Engineering System (MCACES). As outlined in the Engineering Appendix A, Alternative VE-3B with Chicopit Bay Flow Improvement Channel, construction cost (including Pre-Construction Engineering and Design (PED) and aids to navigation) is $36,430,000 with an Interest During Construction (IDC) of approximately $1,622,000. The average annual costs were determined to be $1,737,000. The average annual benefit for alternative VE-3B plus FIC is $2,440,000. Therefore, the benefit-to-cost ratio for alternative VE-3B+FIC is 1.4.

The estimates of first costs for construction of the NED Plan (which includes restoration of Great Marsh Island for beneficial use of dredged material) were prepared using MCACES software and are presented in the Cost Engineering Appendix, which is included as an attachment to the Engineering Appendix A. The estimate includes a narrative, a summary cost, and a detailed cost showing quantity, unit cost, and the amount for contingencies for each cost item. The costs of the non-construction features of the project are also included in the cost estimate. Costs are currently provided assuming beneficial use of disposal material at Great Marsh Island. The costs have been prepared for an effective date of October 2011.

6.2.1 Project Schedule and Interest During PED/Construction

Interest During Construction (IDC) accounts for the opportunity cost of expended funds before the benefits of the project are available and is included among the economic costs that comprise NED project costs. The amount of the pre-base year cost equivalent adjustments depends on the interest rate; the construction schedule, which determines the point in time at which costs occur; and the magnitude of the costs to be adjusted. PED costs are included in the IDC, as well as construction costs. The current construction schedule assumes authorization of the project in a future Water Resources Development Act

(WRDA). Assuming Congress provides funding subsequently to authorization of the project in that future WRDA, the proposed schedule of activities would follow resulting in benefits starting in the base year of the proposed project. The interest during construction (IDC) was computed with the 2012 fiscal year interest rate of 4%. Total construction duration is assumed to be 465 days. The following is the schedule for construction that was used in computing the IDC (**Table 11**).

TABLE 11: SCHEDULE FOR CONSTRUCTION USED FOR COMPUTATION OF IDC

Description	Duration in Months	Cumulative Months
Division Engineer's Public Notice/ Design Agreement (DA) Initiated	0	S
DA Executed / Initiate PED	1	S+1
Continue Draft Plans and Specification	10	S+11
Project Cooperation Agreement (PCA) Initiated (Once Authorized& WQC)	1	S+12
PCA Executed by USACE	5	S+17
Advertise (Contingent upon funding)	1	S+18
Receive Proposals	2	S+20
Award Contract	1	S+21
Construction Start	1	S+22
Complete Construction	16	S+34

6.3 DESIGN AND CONSTRUCTION CONSIDERATIONS

The western most 1,310 feet of the existing training wall will be removed and the entire mouth of San Pablo Creek at its confluence with the St. Johns River will be dredged to -12 feet MLW plus 1 foot of allowable overdepth. Total estimated quantity of material to be excavated is approximately 889,000 cubic yards (cy). All usable stone material recovered from the existing training wall will be stockpiled for use in either the west or east leg of the relocated training wall and all other material excavated will be placed as beneficial use in the Salt Marsh Mitigation Area (Great Marsh Island) and as foundation for the relocated training wall. It is estimated that approximately 14,600 cy of armor stone can be recovered for reuse purposes; however, additional geophysical exploration is needed to more precisely ascertain the exact quantities of stone available for reuse.

The east leg training wall incorporates a larger scour apron (25 feet) than the West leg (10 feet) due to the predicted permanent shift of stronger currents in Pablo Creek towards the east, especially during the ebb tide. Channel migration of the IWW is anticipated and realignment of the channel to deep water may become necessary. The relocated east leg consists of building approximately 2,050 feet of training wall, tying into the existing structure at Helen Cooper Floyd Park; and the west leg consists of building approximately 4,250 feet of training wall along the breakthrough at Great Marsh Island. Estimated quantities associated with the east leg are 26,900 cy of armor stone and 11,900 cy of bedding stone and for the west leg are 5,670 cy of concrete (567 units at

10cy/unit) and 32,000 square yards (sy) of geotextile fabric for bags and tubes to be filled with 40,500 cy of excavated material. Both legs will incorporate the use of a total of approximately 34,900 sy of filter fabric.

See Engineering Appendix A for all design, geotechnical, and hydrologic modeling information; surveys; and plates in greater detail.

6.3.1 Value Engineering

The original Alternative 3B was refined via an extensive value engineering (VE) study. The VE savings for the Mile Point Project Feasibility Study was based on the cost for alternatives to Plan 3B as described in Plan Formulation Section 5.4.3 of this report. The Recommended Plan is the composite design providing all VE items including adjustment to quantities for armor stone, dredged material reductions with new depths (-13 MLW), the 53-acre Great Marsh Island restoration, and reconnection of Chicopit Bay flow improvements.

Preliminary designs included extensive armoring of the channel bottom in the Intracoastal Waterway (IWW). Upon further analysis during the VE study, it was determined that armoring of the entire channel bottom was unnecessary. Although hydrodynamic modeling predicted that higher water velocities along the eastern shoreline of the IWW have the potential to erode and undermine the new training wall, armoring of the entire confluence area would not be necessary or desired. It is more appropriate to concentrate on providing enhanced scour protection directly to the individual structures rather than a broad based scour feature under the entire width of the IWW.

Cost and VE savings are as follows:

1. Develop Improved Training Wall Sections and Delete Scour Stone
    a. SAVINGS: $12,234,000;
    b. ACTION: Accepted in NED/Recommended Plan

2. Develop a Composite Plan for Mile Point Navigation Improvements and Dredge Disposal Supporting Salt Marsh Mitigation and Restoration of Great Marsh Island.
    a. SAVINGS: $9,056,000;
    b. ACTION: Accepted in NED/Recommended Plan

3. VE Savings to Mile Point Improvements Project Feasibility Study:
    a. Estimated Total First Cost Savings: $21,290,000

The alternative was further value engineered in 2011, evaluating alternative materials for the western wall at Great Marsh Island. The results of that study showed that the use of a Concrete Structure Unit (CSU) for the selected commercial training wall structure should prove to be both cost effective and

provide the reliability for an 80 to 100-year training wall. Use of CSU provides better tidal exchange to marsh areas, and adds oyster and fish habitat over the other proposed systems. Structural units can be casted near the project area and barged for placement on the prepared foundation described. The heights of the units to be used on both ends of the wall can also be reduced with a change in existing elevations at both existing land features of Great Marsh Island. This could reduce unit heights of approximately 5 feet over these portions of the training wall. Compared to the stone training wall alternative, approximately $20,120,000 can be reduced from the cost of the wall if the CSU system is used.

4. Additional VE Savings using CSU or selected commercial training wall structure: $20,120,000

6.3.1.1 Stability of the Concrete Structural Units

There are methodologies which give an indication of the stability of similar-shaped units under a variety of input wave conditions. Using guidance from EM 1110-2-1100, the Hudson methodology was used to assess the stability of the Wave Attenuation Device (WAD) units, or more specifically for this project, the CSUs as discussed above. The exact configuration of the WAD units cannot be accommodated in this guidance since these particular armor units did not exist at the time the empirical data was gathered for determining the Kd (Stability Coefficient) values that are incorporated into the Hudson equation. However, the 'Modified Cube' units presented in the guidance are relatively close in terms of shape and in terms of the surface area presented to impacting waves. By inputting the proper design parameters, a calculated minimum weight of 116 pounds per unit would be required to resist the impact of the 3-foot design wave. The proposed WAD units are estimated to weigh 20,000 pounds each (10 tons). This yields a factor of safety of 172 to 1. Therefore, these units would be extremely unlikely to slide or overturn under the influence of design wave conditions.

As a follow-up, prior to source selection, the contractor would be required to submit test data to show the units' performance under real wave-loading conditions. Pending satisfactory performance in such a test, the units could be approved for use on this project. Other stability-related issues relate to the units settling into the bedding layer, and to the scouring of the bedding layer from around the units. In regard to the former concern, the average bearing pressure of each 10-ton WAD unit would be on the order of 440 psi (12-inch wall thickness of WAD unit) or 296 psi (based on 18-inch wall thickness). These bearing pressures are well within the tolerable loading of the bedding layer. The WAD units are cast with stainless steel lifting eyes on the top of each unit so that they can be lifted using appropriate equipment. In the event of settlement of the bedding layer into the underlying sediment or settlement of the unit into the bedding layer, the individual units can be lifted, the foundation reinforced, and the units replaced. Note that no core borings of the underlying sediment along the

training wall alignments have been obtained at this time; this data will be incorporated into final design when the field work is completed.

6.3.2 With-Project Sea Level Rise

It is reasonable to assume that current velocities would increase in the project area under all three sea level rise scenarios. A higher sea level will likely produce a larger tidal prism in the Intracoastal Waterway as well as in the St. Johns River, resulting in a larger volume of water moving through the project area. This would be especially true for the Intracoastal Waterway which has a large areal extent of tidal salt marsh and very wide flood plains, producing a non-linear stage-storage relationship. Also, under the high sea level rise scenario there is a potential for significant loss of salt marsh, further increasing tidal volumes. Under any sea level rise scenario for the future without project condition, it is reasonable to assume that the dangerous cross-currents at Mile Point will be further exacerbated due to an increase in tidal volume flowing in the St Johns River and Intracoastal Waterway and meeting at such an extreme confluence angle because of the existing training wall alignment that currently exists.

Projecting the three rates of change to the year 2065, which corresponds to a 50-year project life, provides us with a predicted low level rise of 0.12 m or approximately 0.39 feet, an intermediate level rise of 0.25 m or approximately 0.81 feet, and a high level rise of 0.66 m or approximately 2.17 feet. In order to assess the impact that either the low level (0.39 feet), the intermediate level (0.81 feet) or the high level (2.17 feet) of predicted sea level rise may have on this project it is first important to understand the function of the affected structure. A training wall by definition is a wall built along the bank of a river or estuary parallel to the direction of flow to direct and confine the flow. With that definition in mind it should be noted that a training wall is not a coastal protection structure and the function and performance of the wall is measured by its ability to “train” river currents; therefore, as long as the water surface level is below the crest of the structure, the structure is performing at 100% design capacity. The structure design crest elevation of +7.5 feet (+2.29 m), MLLW, represents a height of 2.55 feet (0.77 m) above Mean Higher High Water (MHHW) and a height of 0.36 feet (0.11 m) above the highest observed water level (NOAA Tidal Bench Mark Station ID #8720218 at Mayport).

Thus the impact of the low and intermediate level increases of 0.39 feet and 0.81 feet, respectively, would be inconsequential to the performance of the structure and the high level increase of 2.17 feet would only affect the performance of the structure during low probability events that exceeded the MHHW level by more than 0.38 feet. Even during such low probability events, the structure will perform its intended purpose to train the river currents with the exception of that very small portion of the water column above the structure’s crest. In addition, if over time the actual measured changes in relative sea level are closer to the

Scenario III amounts or greater, then the structure's performance can easily be brought back to an optimal level by increasing the crest elevation by up to a foot without major expense although the crest width would have to decrease slightly to do so.

It is anticipated that the potential effects of sea level rise would be much less severe under the with-project condition. While the Mile Point alternative will not affect the volume of water flowing into or out of the Intracoastal Waterway, the reconfigured training wall alignment is able to improve the confluence angle of the Intracoastal Waterway and the St. Johns River. Since the volumes and resulting velocities of tidal water coming out of the Intracoastal Waterway and the St Johns River during ebb tide would likely increase under both the with- and without-project conditions, the with-project condition will continue to produce a resultant current vector that is aligned with the navigational channel and greatly improved over the without-project condition.

If, in the future, current velocities do increase under a sea level rise scenario to the point where the currents result in navigation restrictions, it is possible that the training wall could be further realigned. More of the landward end of the existing Mile Point Training wall could potentially be removed, further improving the confluence angle of the two water bodies and reducing cross-currents which may exist. While the hydrodynamic effects of sea level rise were not explicitly quantified with numerical models or ship simulation due to the extensive level of effort required, the selected alternative will continue to have a beneficial effect on currents in the St Johns River under future sea level rise scenarios. The selected plan was the only alternative capable of addressing and successfully improving the direction of the water flowing out of the Intracoastal Waterway under the existing tidal conditions while retaining adaptive capacity to preserve performance if necessary under future sea level scenarios.

The salt marsh restoration design at Great Marsh Island is based on existing conditions, or current sea level, in order to achieve requisite elevations that would support low and high salt marsh as well as intertidal oyster beds. The restoration of these habitats cannot be performed using projected future sea level as the target species for these habitats would not be able to survive at current water levels. As an adaptive management measure to address future sea level rise, additional dredged material could be used when appropriate to increase the elevation of the Great Marsh Island restoration site and maintain salt marsh and other habitats.

6.3.3 Storm Surge

The following are storm surge levels from the Federal Emergency Management Agency (FEMA) for Atlantic Beach, approximately 2 miles to the east of the Mile Point project site:

Return Interval (years)	Surge Level (feet)
2	2.7
5	5.1
10	6.6
50	9.8
100	11.0

These surge levels do not include the effects of astronomical tides. Therefore, the less-frequent storm surge events may overtop the training wall during periods of peak tide levels. These WAD units are designed to be completely overtopped; however, and as a result, no damage to the structures is expected from such overtopping events. Once submerged, the structures would actually be subjected to less wave impact energy than an emergent structure.

Even under the influence of the design wave, no damage to the WAD structures is expected at these elevated water levels. The design wave height is 3 feet along the western training wall, which is the location of the WAD units. The design waves are generated by ship wakes and as such are completely independent of increased water depth. These WAD units are highly stable under the influence of 3-foot waves, so no adverse effects on the units are anticipated due to wave action at any water level.

The only adverse effect that can be identified due to elevated storm surge levels is that the WAD units would lose some of their effectiveness at dissipating wave energy when overtopped. As seen in the above surge level versus frequency of recurrence table, such overtopping events would occur rarely, and would usually last for short durations (near the time of high tide only).

6.3.4 Tidal Prism

The purpose of this analysis is to determine if the post-construction entrance channel to Chicopit Bay will remain open and stable, and what degree of shoaling (if any) can be expected once the project features have been constructed.

The tidal analysis was performed by delineating the plan view extent of Chicopit Bay and its primary tributaries using georeferenced aerial photographs imported into CADD (MicroStation). The mean tide range was applied throughout this region in order to calculate the tidal prism in Chicopit Bay. Flow velocities were calculated in the vicinity of the mouth of Chicopit Bay, leading to the IWW. Based on the magnitudes of these velocities, conclusions were drawn as to the potential for shoaling or scouring in this region.

Note that at each step in this analysis, conservative (low) assumptions, estimates, and measurements are made. For example, several assumptions are

made that greatly reduce the tidal prism, thereby reducing the calculated volume of flow relative to the actual volume of flow.

The following assumptions were made:

- Some of the marsh area along the perimeter of the bay is overwashed during the upper phase of the tide, but this additional volume of water was excluded from the analysis, reducing the calculated tidal prism.
- Some of the 'open' portion of Chicopit Bay was excluded from the analysis since some of the volume of the bay drains through a series of small, shallow outlets at the north end of the bay. The exact volume of flow that passes though these openings is uncertain but it is felt that assigning most of the volume of the northernmost portion of the bay to these openings will give an extremely conservative estimate of the flow volume through the main (IWW) opening.
- Volume computations of the flow through the two large feeder creeks south of Chicopit Bay and several other smaller feeder creeks were all truncated at the tree-line surrounding the bay, since the limits of the bay area were impossible to define below the tree canopy using aerial photography. This resulted in a (more conservative) reduced bay area for the purposes of tidal prism computations.
- The mean tide range (MHW minus MLW, versus MHHW minus MLLW) was used throughout this analysis, further decreasing the flow volume relative to other tide stages during each lunar cycle. NOAA Tide Gauge Station ID 8720232 (Pablo Creek Entrance, FL) was selected as a reference due to its close proximity to Chicopit Bay and the FIC.

Conservative assumptions were made at each decision-point when assembling data for this analysis. Therefore the results of this analysis may be considered very conservative. The ACES software package uses methodology recommended in EM 1110-2-1100 for calculating the magnitude of tidal currents based on tidal prism. Based on a bay area of 1150 acres, NOAA tide range of 3.84 feet, and average channel opening area of 2700 square feet, peak flow velocities in the vicinity of the FIC are calculated at 3.6 feet per second. This peak velocity appears to be more than adequate to maintain an open channel. Any shoaling in the vicinity of the entrance channel would reduce the channel cross-section, resulting in further increases in flow velocity and increased channel scouring.

6.4 LERRDS CONSIDERATIONS

There are federally-owned lands impacted by the proposed project. Approximately 51.2 acres of land are under the control of the U.S. Navy. The U.S. Army Corps of Engineers will coordinate with the U.S. Navy for a license that will allow removal of the real property (uplands) in the vicinity of Helen Cooper Floyd Park. The non-federal sponsor (Jacksonville Port Authority) owns lands in the vicinity of the proposed project, but those lands will not be impacted

by the proposed project. The Nature Conservancy, Inc. owns lands in the vicinity of the proposed project that may be required for construction of the western leg training wall through perpetual easement. As the area is continuing to erode, surveys and designs will be completed during the PED phase to determine the extent of construction needed to complete the western leg training wall. The Nature Conservancy, Inc. is familiar with the proposed project and has indicated their support for the project.

Other lands required for the construction and operation of the proposed project are located below the ordinary high water line and as such, available to the Federal government via navigational servitude. Approximately 53 acres of land are within the category of navigational servitude.

The U.S. Army Corps of Engineers, as the responsible lead agency for the Jacksonville Harbor Navigation Project will coordinate with the U.S. Navy the license of impacted real property. It is anticipated that the license of real property from the U. S. Navy to the U. S. Army Corps of Engineers will take approximately 30 to 90 days after execution of the Project Partnership Agreement. The Federal real estate acquisition/ incidental costs include the project real estate planning, review, and incidental (license) costs. The non-federal sponsor will receive credit towards its share of real estate incidental project costs incurred for certification. Reference the Real Estate Appendix C for more details.

6.5 OPERATIONS AND MAINTENANCE CONSIDERATIONS

The U.S. Coast Guard (USCG) would be responsible for providing and maintaining navigation aids. The U.S. Coast Guard has been tasked to provide costs associated with changes to aids in navigation, and once those costs have been received they will be added accordingly. A relatively small amount of cost is identified in the MCACES estimate to cover miscellaneous incidental costs for coordination with the USCG during and post construction.

6.5.1 Future Operations and Maintenance

Numerical hydrodynamic modeling of the proposed channel improvements and recommended features for the Mile Point project found in Engineering Appendix A shows changes to current vectors (velocities and direction) under flood and ebb tide. Numerical modeling results indicate that crosscurrents exiting the IWW southern channel under ebb tide will be redirected to more closely parallel the alignment of the Federal navigation channel instead of being focused at the erosion prone areas along the northern shoreline of Mile Point. Examination of the maximum flood and ebb tide current vectors indicate that flow velocities within the Federal navigation channel are very similar between the existing and with-project condition and in isolated areas of the Mile Point turn are about 1 foot/second less under the with-project condition. This comparison suggests that little or no significant net increase in shoaling rates will occur in the Jacksonville

Harbor Federal channel over existing project conditions. A natural shift of the Intracoastal Waterway at the entrance to Pablo Creek will be expected as a result of the realignment of the training wall. Lower water velocities will increase the opportunities for sedimentation on the western side of the entrance while higher velocities along the eastern side have the potential to scour and undermine the location of the new training wall if unprotected against erosion. However, little or no significant net increase in shoaling of the Intracoastal Waterway navigational channel is predicted as a result of the reconfiguration of the Mile Point training wall.

Historically, the training walls along the St. Johns River have performed well and required very little maintenance. The White Shells training wall has received no maintenance since 1931 and is not scheduled for any maintenance in the near term, the St. Johns Bluff Training Wall received no maintenance between 1931 and 1996 (65 years), the Bartram Island training wall received no maintenance between 1931 and 1998 (67 years) and the Mile Point training wall received no maintenance for a period of 70 years between 1931 and 2001. Therefore, with proper design and construction it is anticipated that no maintenance of the relocated training wall legs will be required over the project life of 50 years.

The June 2005 Interim Dredged Material Management Plan with Environmental Report for the Jacksonville Harbor indicates that for this reach of the river (Bar Cuts 3-13) material would be placed on the beach located south of the St. Johns River inlet. In addition, material from Cuts 14-19 would be placed on Buck Island. All dredged material for the Recommended Plan would, however, be placed in the mitigation site for salt marsh restoration at Great Marsh Island, and would not impact the distribution of quantities planned for Buck Island or for the beach. The selected plan will have no effect on future channel dredging maintenance activities shown in **Tables 12 and 13**.

Based on model investigations and current measurements, the resulting bottom current velocities from the relocated training wall legs and excavation and removal of a portion of the existing training wall and entire surrounding area to -13 feet MLW are of such magnitude to expect little deposition to occur in either of the channels. The Chicopit Bay Flow Improvement Channel is also not expected to require maintenance dredging. Prior to the breakthrough of Great Marsh Island, a natural channel existed in the same location as the proposed FIC. The historical maps, **Figures 8-10**, show water depths up to 10 feet due to tidal flushing of Chicopit Bay, as well as freshwater runoff from the neighboring creeks. Once Great Marsh Island is restored, the water from Greenfield and Mount Pleasant Creeks, as well as the large volume of water within Chicopit Bay's tidal prism, will flush in and out through the FIC. It is reasonable to expect the water velocities in the channel to be sufficient to prevent shoaling within the channel.

Numerical hydrodynamic modeling of the proposed channel improvements and recommended features for the Mile Point project shows changes to current vectors (velocities and direction) under flood and ebb tide. Numerical modeling results indicate that the dangerous crosscurrents exiting the IWW southern channel under ebb tide will be redirected to more closely parallel the alignment of the Federal navigation channel instead of being focused toward the erosion prone areas along the northern shoreline of Mile Point, thus reducing the effects of the crosscurrents on the erosion of the Mile Point shoreline.

TABLE 12: SHOALING RATES AND DREDGING QUANTITIES AND FREQUENCIES FOR JACKSONVILLE HARBOR[27]

CHANNEL REACH	ANNUAL SHOALING RATE	DREDGING FREQUENCY	QUANTITY
BARCUT 3 - CUT 13	175,000 CY	3 YEARS	525,000 CY
CUT 14 - CUT 41	80,000 CY	3 YEARS	240,000 CY
CUT 42	330,000 CY	2 YEARS	660,000 CY
CUT 43 - Terminal Channel	142,000 CY*	3 YEARS	426,000 CY
BLOUNT ISLAND - CUTS F&G	100,000 CY**	2 YEARS	200,000 CY
SPONSOR MATERIAL	150,000	1 YEARS	150,000 CY
* Current estimated quantity is 85,000 cy. Additional quantity of 57,000 cy estimated as a result of Phase III construction.			
** Since the cuts were overdredged, the resulting shoaling rate may be greater than indicated or it can be assumed that sloughing of the side slopes after construction was equal to the overdepth impoundment. The adjacent berths have experienced a shoaling rate of about 40,000 cy. annually.			

[27] Reference the June 2005 Interim Dredged Material Management Plan with Environmental Report for the Jacksonville Harbor.

TABLE 13: UPLAND DISPOSAL MAINTENANCE PLANS FOR BUCK ISLAND AND EAST AND WEST BARTRAM ISLAND[28]

YEAR	BEACH	BUCK ISLAND				EAST BARTRAM			WEST BARTRAM			
		Existing Capacity			988,000	Existing Capacity		610,000	Existing Capacity			1,291,000
	Cuts 3-13	Dredge Material	Beneficial Uses Removal [1]	Dike Raising Capacity Increase	Site Capacity	Dredge Material	Dike Raising Capacity Increase	Site Capacity	Dredge Material	Sponsor Material (Cell B)	Dike Raising Capacity Increase[3]	Site Capacity
2005			-291,600		1,279,600			610,000	260,000	150,000	[4] 3,660000	4,541,000
2006		240,000	-291,600		1,331,200			610,000		909,000		3,632,000
2007			-291,600		1,622,800	660,000	[2] 1,698,000	1,648,000	200,000	150,000		3,282,000
2008	525,000		-291,600		1,914,400			1,648,000		150,000		3,132,000
2009		900,000	-291,600		1,306,000			1,648,000	626,000	150,000		2,356,000
2010			-291,600		1,597,600			1,648,000		150,000		2,206,000
2011	525,000	660,000	-291,600		1,229,200	200,000		1,448,000		150,000		2,056,000
2012		240,000	-291,600		1,280,800			1,448,000	426,000	150,000		1,480,000
2013		660,000	-291,600		912,400	200,000		1,248,000		150,000		1,330,000
2014	525,000		-291,600		1,204,000			1,248,000		150,000		1,180,000
2015		900,000	-291,600		595,600	200,000		1,048,000	426,000	150,000		604,000
2016			-291,600		887,200			1,048,000		150,000		454,000
2017	525,000	660,000	-291,600		518,800	200,000		848,000		150,000	[5] 5,500,000	5,804,000
2018		240,000	-291,600		570,400			848,000	426,000	150,000		5,228,000
2019			-291,600		862,000	200,000		648,000	660,000	150,000		4,418,000
2020	525,000		-291,600		1,153,600			648,000		150,000		4,268,000
2021		900,000	-291,600		545,200	200,000		448,000	426,000	150,000		3,692,000
2022			-291,600		836,800			448,000		150,000		3,542,000
2023	525,000	660,000	-291,600		468,400	200,000		248,000		150,000		3,392,000
2024		240,000	-291,600		520,000			248,000	426,000	150,000		2,816,000
2025		660,000	-291,600		151,600	200,000		48,000		150,000		2,666,000
2026	525,000		-291,600		443,200			48,000		150,000		2,516,000

[1] **Material removed from Buck Island facility for local construction projects**

[2] **Estimated cost for raising dikes to EL.45 MSL (from EL.27 MSL) is $4,337,000**

[3] **Includes capacity increases for both Cell A and Cell B**

[4] **Estimated cost for raising dikes to EL.34 MSL (from EL.27 MSL) is $1,740,000**

[5] **Estimated cost for raising dikes to EL.45 MSL (from EL. 34 MSL) is $1,340.000**

[28] Reference the June 2005 Interim Dredged Material Management Plan with Environmental Report for the Jacksonville Harbor.

6.6 SUMMARY OF ACCOUNTS

As stated in Section 5, the Federal process incorporates four accounts to facilitate evaluation and display of effects of alternative plans. The four accounts are national economic development, environmental quality, regional economic development, and other social effects. They are established to facilitate evaluation and display of effects of alternative plans.

The national economic development account is required. Other information that is required by law or that will have a material bearing on the decision-making process should be included in the other accounts, or in some other appropriate format used to organize information on effects. The Federal Objective is to determine the project alternative with maximum net benefits while protecting or minimizing impacts to the environment. The environmental effects of the Recommended Plan were evaluated under the environmental quality account and are detailed in section 7. The economic analysis used NED to measure the benefits of the Recommended Plan; regional shifts in economics are not expected as a part of the Recommended Plan. Other social effects include the effects of the project on the homeowners in the region. The opinions of these homeowners have been noted in the report and are documented in **Section 7**.

The national economic development (NED) account displays changes in the economic value of the national output of goods and services. Under this account, Alternative VE-3B plus Flow Improvement Channel demonstrates the highest net benefits of $703,000 with a BCR of 1.4 (**Table 9**).

6.6.1 Regional Economic Benefits (RED)

The new container terminal, MOL, at Jaxport is expected to provide RED benefits:

- Create more than 1,600 new private sector port jobs in Jacksonville, while supporting operations in trucking, distribution and related services could generate a total of 6,000 direct and indirect local jobs throughout the region. These projections are made by Martin Associates, a Lancaster, Pennsylvania consulting firm widely-recognized as an expert in the evaluation of economic impacts created by maritime activity.
- Create $870 million in new economic benefits annually for the Jacksonville area, including wages paid to private sector port workers; local and state taxes paid by area companies engaged in the service; revenue earned by businesses involved in the operations; and local services and supplies purchased by maritime-related companies relative to Asian trade.
- Could keep some consumer prices low in Jacksonville. This is true because Jacksonville area companies which import from Asia currently

ship these goods through other U.S. ports, some as far away as California, and pay to have those goods trucked to Jacksonville. By importing directly through Jacksonville's port, local companies will save transportation costs and will not have to pass those expenses on to Jacksonville residents.

- Enables Jacksonville businesses to export directly to nations throughout Asia, opening a huge new consumer market for them, and giving them an opportunity to boost sales.
- Make Jacksonville more attractive for a host of businesses to grow operations in Northeast Florida by enabling local companies to export directly to Asian markets, or easily receive goods directly from Asia.
- Creates new opportunities in manufacturing, distribution and warehousing, all linked to trade with these new markets. For example, home improvement and department stores may now look to open distribution centers anywhere in Northeast Florida because this facility will provide them with a direct local link to their Asian suppliers. Similarly, manufacturing plants which rely on parts or materials from Asia may consider Jacksonville more closely for their operations because they now have a direct link to their Asian suppliers.

In December 2008, the Jacksonville Port Authority (JAXPORT) executives and representatives of the Hanjin Shipping Company of Seoul, Korea signed a 30-year lease agreement calling for construction of a 90-acre container facility at the Dames Point Marine Terminal in north Jacksonville. The lease contains an option for further expansion. The $300 million Hanjin Container Terminal at Dames Point is expected to open for business in 2016 and will be a key hub operation for Hanjin's east coast port activity.

The new agreement between the Jacksonville Port Authority and Hanjin is expected to create more than 5,600 new private sector jobs in Jacksonville and support operations in trucking, distribution and related services. The terminal will generate nearly $1 billion in annual economic impact.

6.7 RISK AND UNCERTAINTY

Risk and uncertainty exists in the possibility of the fluctuation of the Federal interest rate, changes in vessel operating costs, or potential mitigation costs. Interest rates and vessel operating costs are discussed further in the Appendix B, the Economics Appendix. Cost contingencies, incremental costs, and estimates for the mitigation plan are discussed in detail in Appendix D, the Mitigation Plan. Monitoring of the Great Marsh Island Restoration Site is included in the Mitigation Plan (Appendix D). Monitoring would be done for no longer than 5 years. Corrective action would be taken, as needed.

6.8 IMPLEMENTATION REQUIREMENTS

To implement a plan at Mile Point, Jacksonville Harbor, certain conditions and requirements are necessary to meet state, local, and Federal standards set by law. A discussion of those responsibilities is in the subsequent paragraphs.

6.8.1 Division of Responsibilities

Under the Water Resources Development Act (WRDA) 1986, as amended by Section 201 of WRDA 1996, Federal participation in navigation projects is limited to sharing costs for design and construction of the general navigation features (GNF) consisting of breakwaters and jetties, entrance and primary access channels, widened channels, turning basins, anchorage areas, locks, and dredged material disposal areas with retaining dikes.

Non-federal interests are responsible for and bear all costs for acquisition of necessary lands, easements, rights-of-way and relocations; terminal facilities; and dredging berthing areas and interior access channels to those berthing areas.

6.8.2 Cost Sharing

1. The Water Resources Development Act of 1986 (Public Law 99-662) as amended, specifies cost apportionment by project purpose for deep draft navigation projects. Federal participation in navigation projects is limited to sharing costs for design and construction of general navigation features (GNF) consisting of breakwaters and jetties, entrance and primary access channels, widened channels, turning basins, anchorage areas, locks, and dredged material disposal areas with retaining dikes. Non-federal interests are responsible for and bear all costs for acquisition of necessary lands, easements, rights-of-way and relocations; terminal facilities; and dredging berthing areas and interior access channels to those berthing areas.

2. Title I Section 101 of WRDA 1986 requires the project sponsor to bear a percentage share of harbor construction for project components that are cost shared (general navigation features, mitigation) that varies according to the range of water depths where work is to be done. That cost share is paid during construction.

3. For a commercial navigation project with-project depths greater than 20 feet but not in excess of 45 feet, the non-federal share for the construction is 25 percent. Lands, easements, rights-of-way, and relocations (LERRs) are 100 percent non-federal costs. Operation and maintenance of the general navigation features with a 100 percent commercial vessel navigation project are a 100 percent Federal responsibility. **Table 14** summarizes the cost sharing percentages. **Table 15** shows the total cost sharing summary of the NED plan.

4. As is shown in **Tables 14 and 15;** ER-1105-2-100 on Page E-62 states under 2(a) Harbors, General Navigation Features. (See Table E-12) Section 101 specifies cost shares for general navigation features that vary according to the channel depth: (20 feet or less, greater than 20 feet but not more than 45 feet, and greater than 45 feet). The percentage applies as well to mitigation and other work cost shared the same as general navigation features. The cost share is paid during construction. Section 101 also requires the project sponsor to pay an additional amount equal to 10 percent of the total construction cost for general navigation features. This may be paid over a period not to exceed thirty years, and LERRs may be credited against it.

TABLE 14: GENERAL COST ALLOCATION

Feature	Federal Cost % [1]	Non-Federal Cost % [1]
General Nav. Features (GNF)	• 90% from 0' to 20' • 75% from 20' to 45' • 50% 46'and deeper	• 10% from 0' to 20' • 25% from 20' to 45' • 50% 46' and deeper
GNF's costs for this project include: mobilization, all dredging costs, and all disposal area construciton costs.		
Navigation Aids	• 100%	• 0%
Operation and Maintenance		
GNF	• 100% except cost share 50% costs for maint. > 45 feet	• 0% except cost share 50% for maint. > 45 feet
Mitigation	• 75%	• 25%
(1) The Non-Federal Sponsor shall pay an additional 10% of the costs of GNF over a period of 30 years, at an interest rate determined pursuant to Section 106 of WRDA 86. The value of LERR shall be credited toward the additional 10% payment.		

TABLE 15: COST SHARING TABLE NED PLAN SUMMARY (OCTOBER 1, 2011 PRICE LEVELS AND FY2012 DISCOUNT RATE)

(October 1, 2011 Price Levels and FY12 discount rate) Cost Summary Relocation (Reconfiguration) + Flow Improvement VE-3B+FIC			
	Total Cost	**Federal Share**	**Non-federal Share**
General Navigation Features	**20-45 ft.**	**75%**	**25%**
Mobilization	**$2,378,000**	**$1,783,000**	**$594,000**
Dredging and Disposal[1]	**$6,687,000**	**$5,015,000**	**$1,672,000**
Turbidity and Endangered Species Monitoring	**$451,000**	**$338,000**	**$113,000**
Bank Stabilization, Dikes & Jetties (Reconfigured Training Wall)	**$19,299,000**	**$14,474,000**	**$4,825,000**
Environmental Mitigation	**$3,088,000**	**$2,316,000**	**$772,000**
Salt Marsh Mitigation	$1,592,000	$1,194,000	$398,000
Oyster Bed Mitigation	$565,000	$424,000	$141,000
Biological Survey	$488,000	$366,000	$122,000
Mitigation Monitoring	$443,000	$332,000	$111,000
Planning, Engineering, and Design	**$2,087,000**	**$1,565,000**	**$522,000**
Construction Management (S&I)	**$1,910,000**	**$1,433,000**	**$478,000**
Subtotal Construction of GNF	**$35,900,000**	**$26,924,000**	**$8,976,000**
Lands and Damages.	**$99,000**	**$74,000**	**$25,000**
Total Project First Costs	**$35,999,000**	**$26,998,000**	**$9,001,000**
Aids to Navigation[2]	**$431,000**	**$431,000**	**$0**
Credit for non-Federal LERR[3]	**-**	**$13,000**	**($13,000)**
10% GNF Non-Federal[4]	**-**	**($3,590,000)**	**$3,590,000**
Total Cost Allocation	**$36,430,000**	**$23,852,000**	**$12,578,000**
AAEQ Benefits			**$2,440,000**
AAEQ Costs			**$1,737,000**
AAEQ Net Benefits			**$703,000**
Benefit-to-Cost Ratio (BCR)			**1.40**

1. Includes Pipeline Dredging Cost.

2. Navigation Aids - 100% Federal

3. Real Estate Costs: Credit is given for the incidental costs borne by the non-Federal sponsor for lands, easments, rights of way and relocations per Section 101 of WRDA 86. The Federal real estate acquisition/ incidental costs include the project real estate planning, review, and incidental (license) costs between the Navy and the USACE.

4. The Non-Federal Sponsor shall pay an additional 10% of the costs of GNF, pursuant to Section 101 of WRDA 86. The value of LERR shall be credited toward the additional 10% payment.

6.8.3 Financial Analysis of Non-federal Sponsor's Capabilities

The Non-federal sponsor, Jacksonville Port Authority, has accepted the financial responsibility as it pertains to the rules as stated above.

6.8.4 View of the Non-federal Sponsor

The Jacksonville Port Authority greatly supports this project both financially through cost sharing and legislatively through the project authorization.

6.9 ENVIRONMENTAL OPERATING PRINCIPLES

The USACE Environmental Operating Principles (EOP's) were considered during each step of the plan formulation process. Scoping letters were sent out in 2004 and 2008 to stakeholders soliciting views and comments regarding environmental and cultural resources, study objectives, and important features within the study area. A Notice of Availability for the Draft Integrated Feasibility Study and Environmental Assessment was mailed to interested parties on July 7, 2011. Copies of the draft report was made available in selected libraries within the study area and placed on the District website, along with other pertinent study documents. A public workshop was held on August 15, 2011. Taking into consideration the views expressed by all the stakeholders, and in conformity with the EOPs, the PDT selected a plan which provides the best balance of environmental sustainability and national economic development benefits. Some of these principles are presented below.

Environmental monitoring over a period of five years will help insure the sustainability of the restoration site. The USACE will be ultimately responsible for ensuring that the final success criteria are met, and will take corrective actions as necessary. If deemed necessary by the USACE, any corrective actions may be monitored for at least five years from the time they were implemented. Monitoring includes stability, hydrology, vegetation, photography, and annual reports of the Great Marsh Island restoration site. The FIC will be monitored for up to 5 years. If corrective action is needed to maintain the channel's depth, it will be implemented.

6.10 USACE CAMPAIGN PLAN

USACE Vision – A great engineering force of highly disciplined people working with our partners through disciplined thought and action to deliver innovative and sustainable solutions to the Nation's engineering challenges.

USACE Mission – Provide public engineering services in peace and war to strengthen our Nation's security, energize the economy, and reduce risks from disasters.

Commander's Intent – The USACE will be one disciplined team, in thought, word, and action. We will meet our commitments, with and through our partners, by saying what we will do and doing what we will say. The USACE will, through execution of this Campaign Plan, become a GREAT organization as evidenced by the following in all mission areas: delivering superior performance; setting the

standard for the profession; making a positive impact on the Nation and other nations; and being built to last by having a strong “bench” of educated, trained, competent, experienced, and certified professionals.

The recommended plan for this project is consistent with these themes. The project team took the latest policy and planning guidance and worked with professionals familiar with the local system to design a project that will work in tandem with adjacent projects to help provide safe, effective, and efficient navigation. Extensive reviews were performed to ensure quality and consistency. The team worked with stakeholders on the state and Federal level as well as local stakeholders.

7.0 ENVIRONMENTAL CONSEQUENCES*

7.1 General Environmental Effects

7.1.1 No Action Alternative

Difficult crosscurrents would persist at the confluence of the St. Johns River and IWW, and the Mile Point shoreline may continue to be vulnerable to erosion. Erosion would also continue at nearby Great Marsh Island, and additional salt marsh would be lost. Salt marsh restoration at the island would not occur.

7.1.2 Recommended Plan

The Mile Point training wall would be reconfigured, and this work would affect circulation patterns and current velocities within the study area which should provide navigation benefits and reduce erosion along Mile Point (refer to Appendix A: Engineering Design and Cost Estimates for more information). However, significant adverse impacts to the estuarine environment caused by these changes are not anticipated. Further erosion of Great Marsh Island would be prevented by construction of the West leg of the training wall just north of the island. Impacts to salt marsh within the project footprint would be mitigated by restoring salt marsh at Great Marsh Island. The proposed Chicopit Bay Flow Improvement Channel would increase flushing potential of silt and other waterborne constituents from the bay and provide deeper water habitat.

7.2 Threatened and Endangered Species

7.2.1 No Action Alternative

There would be no effect to threatened and endangered species if the no action alternative were selected. However, erosion would continue at nearby Great Marsh Island, and additional salt marsh would be lost which is most likely used by the wood stork. Salt marsh and tidal channel restoration at the island would also not occur if the no action alternative were selected.

7.2.2 Recommended Plan

In compliance with Section 7 of the Endangered Species Act, coordination on the Recommended Plan with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) has been completed. The USFWS by letter dated September 14, 2011 concurred with the USACE determination that the proposed work may affect, but is not likely to adversely affect, the West Indian (Florida) manatee and its designated Critical Habitat, piping plover, and wood stork. The NMFS by letter dated July 13, 2011 also concurred with the USACE determination that the project may affect, but is not likely to adversely affect sea turtles, short-nosed sturgeon, and the smalltooth sawfish.

7.2.2.1 Florida Manatee

In accordance with the USFWS consultation letter, standard protective measures would be taken during all in-water work to insure the safety of manatees. To make the contractor and his personnel aware of the potential presence of this species in the project area, their endangered status, and the need for precautionary measures, the contract specifications would include the following standard manatee protection clauses:

- The contractor would instruct all personnel associated with construction activities about the potential presence of manatees in the area and the need to avoid collisions with them.

- If siltation barriers are used, they shall be made of material in which manatees cannot become entangled, are properly secured, and are regularly monitored to avoid manatee entrapment. Barriers must not block manatee entry to or exit from essential habitat.

- If a manatee were sighted within 100 yards of the project area, all appropriate precautions would be implemented by the contractor to ensure protection of the manatee. These precautions would include the operation of all moving equipment no closer than 50 feet of a manatee. If a manatee were closer than 50 feet to moving equipment or the project area, the equipment would be shut down and all construction activities would cease to ensure protection of the manatee. Construction activities would not resume until the manatee has departed the project area.

- All vessels associated with the project would operate at 'no wake' speeds at all times while in shallow waters or channels where the draft of the boat provides less than three feet clearance from the bottom. Boats used to transport personnel would be shallow draft vessels, preferably of the light-displacement category, where navigational safety permits. Vessels transporting personnel between the landing and any workboat would follow routes of deep water to the greatest possible extent. Shore crews would use upland road access if available.

- Mooring bumpers would be placed on all large vessels wherever and whenever there is a potential for manatees to be crushed between two moored vessels. The bumpers would provide a minimum stand-off distance of four feet.

- All personnel would be advised that there are civil and criminal penalties for harming, harassing, or killing manatees, which are protected under the Endangered Species Act and the Marine Mammal Protection Act.

In addition to the standard protective measures, and in accordance with the USFWS consultation letter, the following measures would also be implemented:

- All in-water work associated with the removal and/or replacement of boulders or other structures (i.e. concrete structure units, geo-tubes, water dams, etc.) shall be restricted to daylight hours only. Daylight hours shall be defined as that period between one-half hour after sunrise to one-half hour before sunset.

- A dedicated manatee observer shall be present for all in-water work associated with the removal and/or replacement of boulders or other structures (i.e. concrete structure units, geo-tubes, water dams, etc.). The observer shall be equipped with polarized sunglasses and binoculars.

- In the event that a mechanical dredge is used, then an additional one to two dedicated observers shall be assigned to this work.

- All observers shall be experienced in manatee observation as described in the manatee observer guidelines developed by the Florida Fish and Wildlife Conservation Commission. The observer's qualifications shall be sent to the USFWS for review and concurrence prior to the commencement of the in-water work.

- The size of openings within concrete structure units, if used, shall be no more than 8 inches in diameter, and/or the grating of openings larger than 8 inches.

- The Great Salt Marsh Island restoration enclosure, which includes the training wall and southern boundary structures, shall be constructed to elevations that would preclude manatees from swimming over the top of the training wall/boundary structures into the enclosure during monthly flood tides.

- An inspection of the enclosure shall be conducted just prior to final closure from the bay and/or river to insure no manatees are present within the enclosure. In the event of manatee presence within the enclosure, the animal(s) must be allowed to leave it of its (their) own volition, prior to proceeding with final construction.

- An additional inspection of the enclosure shall be conducted following its closing to insure no manatees are trapped within it. In the event that one or more animals are observed within the enclosure, all work related to the enclosure must cease immediately. The contractor shall immediately notify the USACE, and the USACE shall then immediately notify the US Fish and Wildlife Service (USFWS) and the Florida Fish and Wildlife Conservation Commission (FWC).

- In the event take of a manatee occurs as a result of the project, the USACE shall immediately discontinue work and contact the USFWS and FWC.

7.2.2.2 Piping Plover

The proposed project would not impact the mud flats located to the south-southeast of Helen Cooper Floyd Park, which are possibly used by wintering piping plovers, but the work would eliminate approximately 2,800 feet of shoreline at the park. The plover may occasionally forage along the park's shoreline, but it has not been observed on multiple site visits during the fall and winter months.

7.2.2.3 Wood Stork

Reconfiguration of the Mile Point training wall would impact 8.15 acres of salt marsh and 0.30 acres of tidal channel. It is very likely that the wood stork occasionally forages within these habitats. The proposed restoration of up to 53 acres of salt marsh and 1.6 acres of tidal channels at nearby Great Marsh Island would more than offset these losses. The USACE shall continue to coordinate with the USFWS to insure that the final plan for salt marsh and tidal channel restoration adequately compensates for the expected impacts to suitable wood stork foraging habitat.

7.2.2.4 Sea Turtles, Shortnose Sturgeon, and Smalltooth Sawfish

Since a cutter suction pipeline dredge or a backhoe are anticipated to be used for this project, adverse impacts or "takings" of sea turtles, shortnose sturgeon, and smalltooth sawfish within the proposed work area would not be anticipated. These types of equipment do not pose a risk to these species like hopper dredges do. Dredged material would not be placed on any beaches where sea turtles nest. All of the dredged material generated by this project would be placed within the salt marsh restoration area at Great Marsh Island. In accordance with the NMFS consultation letter, the following Sea Turtle and Smalltooth Sawfish Construction Conditions would be implemented:

- The contractor shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

- The contractor shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

- Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment.

- All vessels associated with the construction project shall operate at “no wake/idle” speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

- If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle, smalltooth sawfish, or shortnose sturgeon. Operation of any mechanical construction equipment shall cease immediately if a sea turtle, smalltooth sawfish, or shortnose sturgeon is seen within a 50-foot radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

- Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

7.3 Essential Fish Habitat (EFH)

7.3.1 No action Alternative

There would be no effect to EFH within the project footprint if the no action alternative were selected. However, erosion at Great Marsh Island would continue, and additional salt marsh would be lost. Restoration of salt marsh at Great Marsh Island would not occur.

7.3.2 Recommended Plan

Reconfiguration of the training wall is the only evaluated alternative that redirects currents in a way that provides the desired navigation and Mile Point shoreline protection benefits. Impacts to Essential Fish Habitat within the proposed reconfiguration footprint would be unavoidable. However, the USACE has determined that the work would not have a substantial adverse impact on EFH or federally managed fisheries along the eastern coast of Florida. This determination was based on the fact that project related impacts to salt marsh would be fully mitigated. The proposed restoration of Great Marsh Island should provide a significant net increase in salt marsh functions and values. Impacts to the water column would occur during dredging operations, but these effects should be temporary. Coordination with the National Marine Fisheries Service is on-going. Please refer to Appendix D: Mitigation Plan and Incremental Analysis and Appendix A: Engineering Design and Cost Estimates for more information on the planned restoration work.

7.3.2.1 Salt Marsh Impacts

The proposed reconfiguration of the training wall would impact 8.15 acres of low and high salt marsh at Helen Cooper Floyd Park, which has been identified as a habitat of particular concern per EFH criteria. More specifically, the project would impact a fringe salt marsh (2.05 acres) which has developed between the training wall and the north shore of the park as well as a substantially larger area of higher quality marsh (6.10 acres) along the south shore of the park. The low marsh is generally dominated by salt marsh cord grass (*Spartina alterniflora*) transitioning in slightly elevated areas to high marsh species such as sea oxeye (*Borrichia spp.*) and salt grass (*Distichlis spicata*). A tidal channel also occurs within the marsh along the southern shore of the park and within the project footprint. Using the Uniform Mitigation Assessment Method, the USACE has determined that approximately 18.84 acres of mitigation would be required to offset this loss. The mitigation would be performed by restoring salt marsh which historically occurred at nearby Great Marsh Island. However, as a beneficial use of dredged material, the USACE proposes to restore the entire eroded breakthrough at the island, which is an estimated approximate 53 acres of salt marsh. This would provide 34.16 acres of restored salt marsh in addition to the required 18.84 acres of mitigation. The proposed west leg of the training wall should help prevent future erosion of salt marsh at the island.

7.3.2.2 Water Circulation Impacts

Restoration of Great Marsh Island would close the existing northern connection between Chicopit Bay and the St. Johns River. This connection was created by the erosion and loss of salt marsh in the 1990s. Shoaling within the bay has also decreased the amount of flow or flushing effect coming from the east, or from the bay's historic connection with the IWW. Therefore, as mitigation for this impact, the USACE proposes to construct a Flow Improvement Channel within Chicopit Bay, which should improve the flushing of silt and other waterborne constituents through the bay as well as provide deeper water Essential Fish Habitat. The channel would be constructed from the IWW, through the shoal within the bay, and ending at the mouth of Mt. Pleasant Creek. The Flow Improvement Channel would be constructed to a depth of -6 feet MLW plus 1-foot of allowable overdepth to account for the inaccuracies of dredging. The channel will be 80 feet in width and approximately 3,620 feet in length. According to NOAA navigation charts (1993), Chicopit Bay had depths as great as 9 feet, but depths in this area have greatly decreased over subsequent years due to shoaling. Dredged material from the Flow Improvement Channel would be used to restore salt marsh at Great Marsh Island. It is believed that much of the bay's shoal material originated from the island.

7.3.2.3 Water Column and Substrate Impacts

Dredging of the project footprint would impact an estimated 109 acres of estuarine water column with an unconsolidated bottom. Turbidity would affect the vision of marine life within the sediment plume as well as those marine organisms with gills, but these effects would be temporary as they would be limited to the actual dredging and placement operations. Benthic organisms would also be impacted. However, long-term suppression of benthos is not anticipated because the project footprint would not be maintenance dredged on a regular basis.

7.4 Shellfish and Wildlife Resources

7.4.1 No action Alternative

There would be no effect to shellfish and other wildlife resources within the proposed project footprint if the no action alternative were selected. However, erosion would continue at nearby Great Marsh Island, and additional salt marsh would be lost. Salt marsh restoration at the island would not occur. This would affect shellfish and wildlife resources other than EFH and federally protected species.

7.4.2 Recommended Plan

7.4.2.1 Shellfish and Marine Wildlife Resources

Site inspections at low tide indicate that oyster habitat does occur within the project footprint. Oysters appear to be primarily restricted to the inter-tidal edge of the existing training wall (0.56 acres) and the tidal channel found within the salt marsh along the south shoreline of Helen Cooper Floyd Park (0.30 acres), total of 0.86 acres. However, the highest oyster densities have been observed just east of the project footprint, on the mudflats, and this area should not be impacted by the proposed work. Loss of oyster habitat shall be offset by creating intertidal habitat along the west leg of the new training wall (0.76 acres) and reconfiguration of the east leg training wall (0.37 acres), total of 1.13 acres. The loss would also be offset by the construction of tidal channels within the restoration area at Great Marsh Island (in excess of 1.6 acres). Oyster shell would be placed intermittently along the bottom of constructed tidal channels in order to provide hard substrate for oyster colonization. After consulting with the Florida Division of Aquaculture, the USACE believes that colonization should be fairly rapid and seeding the area with live oysters would not be necessary. Other species, including a variety of mollusks besides oysters, arthropods, sponges, polyps, and wading birds should benefit from the restoration of Great Marsh Island. Please refer to Appendix D: Mitigation Plan and Incremental Analysis and

Appendix A: Engineering Design and Cost Estimates for more information on the proposed restoration work.

7.4.2.2 Terrestrial (Upland) Wildlife Resources

The proposed work would result in the loss of an estimated four acres of upland habitat within the western portion of Helen Cooper Floyd Park. As previously stated, the entire park area was created by side-casting dredged material from the Federal channel along the southern side of the training wall during the early 1900s. The uplands are dominated by sabal palm, various grasses, cacti, and shrubs. Some species of migratory birds, especially common passerines, are likely to nest here; therefore, this area would be monitored for nesting species from April 1 through August 30 in order to avoid the taking of migratory birds, per the Migratory Bird Treaty Act. Small mammals and a few terrestrial species of reptiles are also likely to occur within the upland habitat of the study area. The vast majority of uplands within the park would not be affected by the project. The proposed work would also impact approximately 0.25 acres of low dunes or coastal strand habitat, which is vegetated by sea oats, railroad vine, and other native plant species. In accordance with the U.S. Fish and Wildlife Service request, the USACE shall create a minimum of 0.25 acres of coastal strand habitat at the Great Marsh Island Restoration Site

7.5 Cultural Resources

7.5.1 No action Alternative

The existing conditions have resulted in substantial erosion and loss of the Great Marsh Island which has exposed the prehistoric site. This erosion is expected to continue with an eventual loss of the archeological site.

7.5.2 Recommended Plan

This alternative will have minimal effect on the archeological site. The effect will be similar to past conditions and will provide protection from ongoing and potential future erosion. As such the effect will not be adverse.

7.6 Water Quality

7.6.1 No action Alternative

There would be no effect to water quality if the proposed work was not performed.

7.6.2 Recommended Plan

Reconfiguration of the training wall would affect water circulation patterns and current velocities, but significant impacts to water quality caused by these changes are not anticipated. To offset any adverse effects that would be caused by closing off the breakthrough of Great Marsh Island, a Flow Improvement Channel (FIC) would be constructed within the historical flow way in the southeast portion of Chicopit Bay. This feature would allow flushing of sediment and other waterborne constituents into the adjacent Intracoastal Waterway. If Great Marsh Island is restored and the FIC is not built, then water quality is expected to degrade within Chicopit Bay (approximately 164 acres) due to non-point source pollution loadings from the upstream watershed not being flushed out of the hydrological system. Water quality within Mt. Pleasant Creek (approximately 3.4 stream miles) and Greenfield Creek (approximately 3 stream miles), which flow into Chicopit Bay, may also be adversely affected.

The primary anticipated change in water quality during construction would be a temporary increase in turbidity during construction. According to the State of Florida's water quality standards, turbidity levels during dredging or placement of dredged material are not to exceed 29 nephelometric turbidity units (NTUs) above background levels at the edge of normally a 150-meter mixing zone. In order to comply with this standard, turbidity will be monitored according to state protocols during the proposed dredge work. If at any time the turbidity standard were exceeded, those activities causing the violation would cease. The project footprint lies to the south of the Nassau River St. Johns River Marshes Aquatic Preserve. However, water quality impacts within the preserve are not anticipated.

Restoration of this area provides an opportunity to address other impacts caused by the physical decay of the ecosystem such as shoaling in Chicopit Bay. Without the project, Great Marsh Island will continue to erode. The channel would allow for improved water quality and environmental stability of the project area by potentially improving the flushing of sediment and other waterborne constituents through the bay as well as provide deeper water for Essential Fish Habitat. The construction of the FIC would restore the historic channel through Chicopit Bay which has silted in with eroded material from Great Marsh Island. The FIC consists of dredging a channel 80 feet wide and 6 feet deep for a length of approximately 3,620 feet through Western Chicopit Bay. Dredged material from the FIC would be placed back into the Great Marsh Island restoration area. The Recommended Plan provides NED benefits from alleviating the navigation restrictions, incidental environmental benefits from restoring Great Marsh Island, and incidental erosion benefits from reducing the effects of the crosscurrents on the adjacent shoreline.

7.7 Air Quality

7.7.1 No action Alternative

There would be no effect to air quality if the proposed work was not performed.

7.7.2 Recommended Plan

No air quality permits would be required for this project. Exhaust emissions from labor transport and dredge equipment would likely be well under the de minimus levels for criteria air pollutants. The proposed action may result in small, localized, temporary increases in concentrations of NO2, SO2, CO, VOC, and PM. Since the project is located in an attainment area, there is no requirement to prepare a conformity determination. The total increases are relatively minor in context of the existing point and nonpoint and mobile source emissions in Duval County. Emissions from the proposed action would not adversely impact air quality given the relatively low level of emissions and the likelihood for prevailing offshore winds. With the proposed action, the criteria pollutant levels would be well within the national ambient air quality standards. The contract specifications would require the contractor to minimize pollution of air resources such as controlling particulates, i.e. dust, or excess machinery emissions. This project shall be coordinated with the U.S. Environmental Protection Agency and the Florida Department of Environmental Protection.

7.8 Hazardous, Toxic, and Radioactive Waste (HTRW)

7.8.1 No action Alternative

There are no known sources of HTRW within the study area.

7.8.2 Recommended Plan

There are no known sources of HTRW within the study area. However, appropriate assessment and coordination would be performed in the unlikely event that HTRW is discovered during the construction of the project.

7.9 Recreation

7.9.1 No action Alternative

There would be no effect to recreation if the no action alternative were selected.

7.9.2 Recommended Plan

Recreational boat traffic from Mt. Pleasant Creek has historically accessed the IWW and the St. Johns River by proceeding east through Chicopit Bay. The

erosion of Great Marsh Island in the 1990's opened a new channel which currently allows recreational boats from the creek to access the river by going north. At the same time the island was eroding, Chicopit Bay was shoaling which has made it very difficult for small boats to go east and access the IWW and the river like they used to. The restoration of Great Marsh Island would close the new channel. However, the proposed Chicopit Bay Flow Improvement Channel would help reestablish the historical depths of the bay and should make it possible for recreational boats from Mt. Pleasant Creek to access the IWW as well as the river.

7.10 Aesthetics

7.10.1 No action Alternative

There would be no effect to aesthetics if the no action alternative were selected.

7.10.2 Recommended Plan

Construction activities within the project area would temporarily impact the aesthetics of the area. The proposed restoration would result in additional salt marsh.

7.11 Noise

7.11.1 No action Alternative

There would be no effect to noise levels if the no action alternative were selected.

7.11.2 Recommended Plan

Construction activity would result in a minor short term increase over the existing background level. As previously stated, the U.S. Environmental Protection Agency (EPA) has established that construction noise resulting in an hourly equivalent sound level of 75 dBA at a sensitive receptor (e.g., hospital, residence, church) would represent a significant impact. During operation, heavy equipment and other construction activities generate noise levels ranging typically from 70 to 90 dBA at a distance of 50 ft. That portion of the study area where construction would occur is located within or adjacent to Helen Cooper Floyd Park and Great Marsh Island. These locations are over 2,000 feet from the nearest development, i.e. residential or commercially zoned properties. Based on this, significant impacts to sensitive receptor sites are not anticipated, and it is likely that noise emanating from construction activities would not be noticeable in residential or commercially zoned properties.

7.12 Socio-economics

7.12.1 No action Alternative

There would be a long-term adverse impact to the Port of Jacksonville and commercial shipping interests, as well as the local, regional and statewide economies, if the proposed work was not performed.

7.12.2 Recommended Plan

The Port of Jacksonville and commercial shipping interests would benefit if the proposed work was performed. It is important to note that this project would also benefit many businesses, both locally and around the state, that depend on the Port for the transport of commodities. Residents along the Mile Point shoreline should also benefit due to reduced erosion.

7.13 Navigation

7.13.1 No action Alternative

There would be a long-term adverse impact to navigation if the no action alternative were selected. The difficult crosscurrents at the confluence of the IWW and the St. Johns River would remain. The current restriction on deep draft vessels, drafting 33 feet or more, navigating through the Mile Point area during flood tide only would not be removed.

7.13.2 Recommended Plan

There would be a long-term benefit to navigation if the proposed work were performed. The difficult crosscurrents at the confluence of the IWW and the St. Johns River would be redirected. The current restriction on deep draft vessels, drafting 33 feet or more, navigating through the Mile Point area during flood tide only could be removed.

7.14 Cumulative Impacts

Cumulative impact is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). **Table 16** summarizes the impact of such cumulative actions by identifying the past, present, and reasonably foreseeable future condition of the various resources which are directly or indirectly impacted by the proposed action and its alternatives. The table also illustrates the with-project and without-project condition (the difference being the incremental impact of the project).

The timeline for this cumulative impacts analysis is from the 1890's, which is immediately prior to construction of the Mile Point Training Wall, to the present. The analysis is spatially restricted to the lower St. Johns River and the adjacent shoreline, with emphasis on the study area.

TABLE 16: SUMMARY OF CUMULATIVE IMPACTS

	Past	Present	Future without-project	Future with-project
General Environment	Numerous physical changes including shoreline development and channel modifications. Extensive loss or degradation of aquatic and upland habitats.	High percentage of shoreline built-out, but infra-structure changing. Channel modifications include deepening. Significant adjacent habitat now preserved, but still threatened.	Shoreline infra-structure changes would continue as well as channel modifications such as deepening. Restoration of Great Marsh Island would not occur.	Cumulative adverse impacts to the general environment caused by the proposed work in combination with other actions may occur, but protective regulations should reduce impacts. Restoration of Great Marsh Island would have a positive impact.
Threatened and Endangered Species	Extensive loss or degradation of habitat. Mortalities increase with increasing recreational boat traffic and construction activities.	Significant adjacent habitat now preserved, but still threatened. Protective regulations have been instituted and have decreased mortalities and helped to conserve existing habitat.	Cumulative adverse impacts caused by increases in recreational boat and ship traffic, changes in shoreline infra-structure, and other actions may occur. However, protective regulations should reduce the risk of these actions having a significant adverse effect. Restoration of Great Marsh Island would not occur.	The proposed work in combination with other actions may adversely impact protected species. However, protective regulations should reduce the risk of these actions having a significant adverse effect. Restoration of Great Marsh Island would have a positive impact.
Essential Fish Habitat (EFH)	Extensive loss of salt marsh and other wetlands due to shoreline development. Water column adversely affected by changes in water quality.	Loss of wetland functions have declined due to mitigation requirements. Significant salt marsh and other wetlands now preserved, but still threatened. Current water quality regulations have improved water column habitat.	Cumulative adverse impacts caused by water pollution occurring throughout the watershed and physical changes may occur. Protective regulations should reduce impacts. Restoration of Great Marsh Island would not occur.	The proposed work in combination with other actions may adversely impact EFH. However, protective regulations should reduce the risk of these actions having a significant adverse effect. Restoration of Great Marsh Island and construction of the Chicopit Bay Flow Improvement Channel would provide substantial EFH benefits.

Table 16 continued

	Past	Present	Future without-project	Future with-project
Shellfish and Wildlife Resources	Extensive loss or degradation of habitat.	Significant adjacent habitat now preserved, but still threatened. Protective regulations help to conserve these resources.	Cumulative adverse impacts caused by water pollution and other types of habitat degradation may occur. However, protective regulations should reduce impacts. Restoration of Great Marsh Island would not occur.	The proposed work in combination with other actions may adversely impact shellfish and other wildlife resources. However, protective regulations should reduce the risk of these actions having a significant adverse effect. Restoration of Great Marsh Island and construction of the Chicopit Bay Flow Improvement Channel would provide substantial benefits.
Cultural Resources	A prehistoric site has been identified, but past and present effects have not been evaluated	A prehistoric site has been identified, but past and present effects have not been evaluated	Continued erosion at Great Marsh Island would have an adverse effect.	No adverse effect.
Water Quality	Historically, point and non-point sources of water pollution have adversely impacted water quality.	Federal laws and state statutes have significantly improved water quality.	Cumulative adverse impacts caused by runoff and other discharges may occur, but protective regulations should continue to reduce impacts.	The proposed work in combination with other actions may adversely affect water quality, but protective regulations should continue to reduce impacts.
Air Quality	Location, weather patterns, and a lack of heavy industry have contributed to generally good air quality.	Florida is in attainment with all air quality standards.	Local cumulative emissions are not expected to significantly change.	The proposed work in combination with other actions is not expected to significantly change local emissions.
Hazardous, Toxic, and Radioactive Waste (HTRW)	HTRW may be associated with some industrial sites.	HTRW sites have mostly been identified and have been remediated or are being studied for possible future remediation.	Remediation of HTRW sites are expected to continue.	The proposed work in combination with other activities is not expected to contribute to additional HTRW or interfere with remediation efforts.

Table 16 continued

	Past	Present	Future without-project	Future with-project
Recreation	Recreational use and associated impacts have increased over time.	High recreational use including boating, fishing, and use of adjacent public lands.	High recreational use is expected to continue.	The proposed work in combination with other actions should not adversely impact recreation. The Chicopit Bay Flow Improvement Channel would be a benefit to recreational boaters.
Aesthetics	Development of shoreline affected local aesthetics.	Shoreline is mostly built out, but infra-structure is changing. Significant areas of salt marsh, tidal creeks, and coastal hammock have been preserved.	Significant cumulative impacts to local aesthetics are not anticipated.	The proposed work in combination with other actions should not significantly impact local aesthetics.
Noise	Development has minimally increased ambient noise levels.	Current noise levels generally appear to be minimal, with the exception of some local construction and military aircraft.	Significant increases to noise levels are not anticipated.	The proposed work in combination with other actions should not significantly increase noise levels.
Socio Economics	Development of the Port and adjacent areas created a positive economic stimulus.	Port continues to provide a significant economic stimulus.	Port would continue to provide a significant economic stimulus. However, navigation restriction would continue at Mile Point.	The proposed work in combination with other planned projects should provide significant benefits to the Port and surrounding community.
Navigation	Construction of federal navigation channels provided access for deep draft vessels to Port of Jacksonville.	Deepening of federal channels and maintenance dredging continues to provide safe navigation for deep draft vessels.	Deepening and maintenance dredging projects would continue.	The proposed work in combination with other planned actions should provide significant navigation benefits.

7.14.1 General Environment

The lower St. Johns River (LSJR) flows through the City of Jacksonville and provides deep draft vessels access to the Port of Jacksonville. Population growth and commercial development along this portion of the river has resulted in the extensive loss of wetland systems and upland habitats (Dennis et al 2001, FDEP 2002, UNF and JU 2008). It is difficult to quantify the wetland impacts due to a lack of conclusive records (UNF and JU 2008). However, a review of

historical aerials and maps suggests that wetland losses were indeed considerable. Still, the Federal, state, and local governments have been successful in purchasing significant tracts of remaining wetlands and uplands. The most notable perhaps is the Timucuan Ecological and Historic Preserve which is managed by the National Park Service, and contains approximately 46,000 acres.

Except for protected areas, the LSJR shoreline has been mostly built out within the city limits of Jacksonville. Changes in infrastructure such as conversion of older housing to more upscale communities and construction of more modern port facilities are ongoing. These changes as well as deepening of the Federal system of navigation channels within the port may have the most significant future cumulative impacts on the general environment within this portion of the LSJR. Conversely, deepening may result in a decrease in total vessel call traffic compared to without-project conditions. More specifically, deepening will likely lead to some reduction in dry bulk cargo vessel calls. The case for container ships is more conjectural based on vessel deployment itineraries and other ports called. The proposed restoration of Great Marsh Island would provide substantial wetland benefits. Protective Federal laws, such as the Clean Water Act of 1972, as well as state statutes shall regulate any future construction activities and should help protect remaining resources.

7.14.2 Threatened and Endangered Species

Loss and degradation of habitat along the LSJR and other regions of the state is generally considered to be one of the most important factors affecting threatened and endangered species (O'Shea and Ludlow 1992, Gilbert 1992, UNF and JU 2008). Deaths and injuries of manatees resulting from boat strikes have also been significant (JU 2007). However, according to a study by the University of North Florida and Jacksonville University (2008), a comparison of two time periods (1980-93) and (1994-07) indicated a four percent decrease of manatee mortalities from collisions with watercraft in the LSJR. Future increases in recreational boat traffic may reverse this trend.

According to data collected by the USACE, sea turtle mortalities caused by hopper dredges, which are frequently used within the LSJR, were once much higher than they currently are. The development of a sea turtle deflector which is mounted on the drag arm of the hopper dredge, operational windows which prohibit the use of a hopper dredge during times of the year when sea turtles are present in greater numbers, and take limits established by the NOAA Fisheries Service have all combined to reduce sea turtle mortalities within the LSJR.

Protective Federal laws, such as the Endangered Species Act and Marine Mammal Protection Act, state legislation, and partnerships to better refine existing protective measures should help conserve these species. Restoration

efforts, such as the proposed restoration of Great Marsh Island, and preservation of remaining habitat would also benefit protected species.

7.14.3 Essential Fish Habitat (EFH)

According to Dennis et al (2001), the estuarine environment of the LSJR supports the “last great salt marsh area along the eastern United States coast.” It is well documented that salt marsh, and other types of wetlands, are vital to fish populations because they provide shelter, food, spawning and nursery areas, as well as water filtration (Mathews and Minello 1994; USGS 1996, Graff and Middleton 2001). In recognition of its value to federally managed fisheries, NOAA has also designated salt marsh as a “habitat of particular concern”. However, over the years, urban development within the City of Jacksonville has resulted in the extensive loss or degradation of salt marsh along the LSJR (Dennis et al 2001; UNF and JU 2008). The regulation of wetlands, like salt marsh, and requisite mitigation for impacts, has resulted in fewer lost wetland functions and values.

In addition to salt marsh impacts, the water column of the river has also been adversely affected by agricultural and urban runoff, as well as point sources discharges (UNF and JU 2008). These negative trends began to slow with the enactment of Federal legislation, such as the U.S. Clean Water Act of 1972, and state statutes which established water quality criteria and provided for the regulation of wetlands with the objective of no net loss of wetland functions. One of the most successful environmental protection programs which have improved water quality is the National Pollutant Discharge Elimination System, which regulates point source dischargers like sewage treatment plants. Recent establishment of Total Maximum Daily Loads (TMDL) of pollutants should further improve water column and substrate habitats.

Deepening and maintenance dredging of the Port of Jacksonville, as well as the proposed training wall reconfiguration, in combination with runoff and point source discharges can have a cumulative adverse impact on EFH. However, the efforts to regulate water quality described above and preservation of wetlands, such as the establishment of the Timucuan Ecological and Historical Preserve, and restoration of impacted wetlands have combined to improve EFH.
A review of fisheries studies conducted within the LSJR indicates that it is not possible to determine accurate long-term trends in federally managed fisheries or prey species based on the data collected. The University of North Florida and Jacksonville University (2008) found that many of the species reported in the LSJR by researchers in the 1960s are still present today. However, the studies used different sampling methodologies so it is unclear whether numbers of individual species have changed over this time period. In more recent years, recreational landings and research sampling indicates that stocks for red drum and spotted seatrout appear to be stable in northeast Florida, including the LSJR (FWC 2007; UNF and JU 2008).

Existing protective laws, including fishing regulations, as well as refinement and implementation of water quality initiatives like the TMDL program, and continued regulation, preservation and restoration of wetlands should result in a continued positive trend for EFH and federally managed fisheries.

7.14.4 Shellfish and Wildlife Resources

The loss of wetlands and upland habitats and changes in water quality has cumulatively impacted shellfish and other wildlife resources throughout the LSJR. However, the efforts to regulate, restore, and preserve wetlands as well as water quality initiatives should also benefit these resources.

7.14.5 Water Quality

Like many major water bodies flowing through agricultural and urbanized areas, the water quality of the LSJR has been adversely affected by a combination of point and non-point source discharges. The enactment of the U.S. Clean Water Act as well as state statutes has established criteria which have resulted in improved water quality.

Many State and local entities continue to address unresolved water related issues within the LSJR basin. At the forefront of this effort, Jacksonville University and the University of North Florida annually produce the State of the River Report which provides a comprehensive summary of water quality issues affecting the LSJR. In 2008, the universities identified dissolved oxygen, nutrients, turbidity, algal blooms, and bacteria as water quality indicators that are continuing to be tracked. They report that dissolved oxygen levels in shallow water areas and tributaries of the LSJR are low in summer, and are likely to continue to be low until nutrients, sediment and industrial inputs are substantially reduced. Other water quality improvement efforts include the Lower St. Johns River Basin Surface Water and Improvement Management (SWIM) Program administered by the St. Johns River Water Management District and the City of Jacksonville River Accord program.

Continued wastewater treatment improvements, and implementation of best management practices (BMPS) to control runoff from cities, agricultural areas, and homeowners should reduce nutrient loading, bacteria levels and algal blooms. The previously mentioned TMDL program should result in substantial reductions of nutrient levels, and could include specific recommended BMPs like zero or low phosphorus fertilizers for urban lawns within the watershed. The universities further report that turbidity, within the main stem of the LSJR, is currently satisfactory and the trend is one of overall improvement. Cumulatively, construction work like the proposed reconfiguration of the training wall and other dredging projects will produce minor incidental turbidity, but the work shall be

performed in compliance with state water quality criteria and is not expected to alter the current positive trend.

7.14.6 Air Quality

Emissions from past dredging and other sources along the LSJR have not had a significant cumulative effect on air quality, and this trend is expected to continue. Industries like paper mills and power plants do occur within the LSJR basin, but emissions from these facilities are regularly monitored and regulated in order to meet requisite standards. The state of Florida remains in attainment with air quality criteria.

7.14.7 Hazardous, Toxic, and Radioactive Waste (HTRW)

Existing legislation requires strict handling and disposal of HTRW. That being said, most HTRW sites within the LSJR basin are the result of past activities. The proposed project and future construction activities are not expected to have a cumulative impact on existing HTRW sites.

7.14.8 Recreation

Development has had a substantial cumulative impact on outdoor recreational opportunities in many parts of the LSJR basin. However, government entities continue to plan for recreation, as is evidenced by the creation of new parks, bike and footpaths, boat ramps and beach access routes. Improvements in water quality also results in more desirable fishing and other water related recreation. Dredging and other types of construction projects can temporarily impact recreation. Measures shall be taken to insure that projects, like the restoration of Great Marsh Island, in combination with other actions will not result in significant cumulative impacts to recreational boaters or other outdoor activities.

7.14.9 Aesthetics

Population growth and associated development along the LSJR have had a substantial cumulative impact on the aesthetics of this region. New projects, like additional training walls can add to this impact. Nevertheless, large natural areas like the Timucuan Ecological and Historic Preserve have been preserved and provide some regional balance to the innumerable development projects. The proposed restoration of Great Marsh Island should also have a positive impact on local aesthetics, and may offset the construction of the new training walls associated with the project.

7.14.10 Noise

With the exception of certain construction activities, which are temporary, ambient noise levels throughout the LSJR appear to be minimal. This situation is not expected to significantly change with anticipated future activities.

7.14.11 Socio economics

The proposed reconfiguration of the training wall should lift current navigation restrictions and at the same time reduce erosive forces on the Mile Point shoreline. This work in combination with other planned projects designed to improve the Port of Jacksonville should provide significant socio economic benefits to the Port and surrounding community.

7.14.12 Navigation

The proposed work would not only lift current navigation restrictions, but should also reduce navigational hazards by redirecting the difficult crosscurrents. In combination with other planned actions, the reconfiguration of the training wall should provide significant navigation benefits.

7.15 Irreversible and Irretrievable Commitment of Resources

7.15.1 Irreversible

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. The proposed reconfiguration of the Mile Point Training Wall would result in the loss of 8.15 acres of salt marsh at Helen Cooper Floyd Park, which would be more than offset by the planned restoration of up to 53 acres of salt marsh at Great Marsh Island. The work would also result in the loss of approximately four acres of uplands at the park that are comprised of old dredged material.

7.15.2 Irretrievable

An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. The proposed work would temporarily impact benthos and other biota in the project area. The restoration of Great Marsh Island would close off the current recreational boat channel through this area. This area was formerly salt marsh, but has eroded and become open water. This action may temporarily disrupt recreational boating until the planned Flow Improvement Channel is completed through Chicopit Bay.

7.16 Unavoidable Adverse Environmental Effect

The proposed work would adversely affect EFH, benthic organisms and some upland species. Impacts to EFH and benthic organisms would be offset by the proposed restoration of Great Marsh Island. Protective measures shall be implemented to protect threatened and endangered species during construction activities. Dredging and placement activities would result in turbidity, and these activities shall be monitored per the terms and conditions of the water quality certification.

7.17 Local Short-term Uses and Maintenance/Enhancement of Long-term Productivity

The proposed work is expected to take up to 16 months, and completion of the proposed restoration of Great Marsh Island may take longer. The restored marsh may take up to 4 growing seasons to develop functions comparable to the impacted marsh, but should provide more long-term productivity than the lost marsh. Long-term impacts to benthos within the project footprint are not anticipated as this area would not be maintenance dredged on an annual basis. Most fish species and other motile organisms like crabs should be able to avoid the dredging equipment. Since the project area is limited in size, the long-term productivity of fish and other motile species should not be significantly affected.

7.18 Indirect Effects

Reconfiguration of the Mile Point Training Wall would benefit the Port of Jacksonville, the shipping industry, local and statewide economies. This may encourage expansion of the port, deepening the project channel, and contribute to increased large ship traffic.

7.19 Compatibility with Federal, State, and Local Objectives

This project has wide support and is compatible with Federal, state, and local objectives.

7.20 Uncertain, Unique, or Unknown Risks

There are no uncertain, unique or unknown risks associated with the proposed work.

7.21 Precedent and Principle for Future Actions

As this project involves training wall work similar to previous projects, there would be no precedent and or principle for future actions established.

7.22 Environmental Commitments

The USACE and its contractors commit to avoiding, minimizing or mitigating for adverse effects during construction activities by including the following commitments in the contract specifications:

1. All conditions contained within the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) consultation letters would be implemented (refer to Section 7.2.2).

2. The loss of 8.15 acres of salt marsh at Helen Cooper Floyd Park would be mitigated. In fact, the USACE proposes to restore up to 53 acres of salt marsh, oyster habitat, tidal channels, and coastal strand habitat at Great Marsh Island which would more than offset this loss (see Appendices A and D for more detail).

2. A Flow Improvement Channel (FIC) shall be constructed in Chicopit Bay, which will improve flushing of silt and other waterborne constituents, create deeper water EFH, and provide a small vessel navigation channel (see Appendices A and D for more detail).

3. Protective measures for threatened and endangered species shall be implemented during construction activities as described in Section 7.2.

4. The District's migratory bird protection policy shall be implemented.

5. The work shall be performed in compliance with state water quality statutes.

6. The project footprint shall be surveyed for cultural resources, and, if required, protective measures shall be implemented.

7. Air emissions such as vehicular exhaust and dust shall be controlled.

8. The contracting officer would notify the contractor in writing of any observed noncompliance with Federal, state, or local laws or regulations, permits and other elements of the contractor's Environmental Protection Plan. The contractor would, after receipt of such notice, inform the contracting officer of proposed corrective action and take such action as may be approved. If the contractor fails to comply promptly, the contracting officer would issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions would be granted or costs or damages allowed to the contractor for any such suspension.

9. The contractor would train his personnel in all phases of environmental protection. The training would include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities to insure adequate and continuous

environmental pollution control. Quality control and supervisory personnel would be thoroughly trained in the proper use of monitoring devices and abatement equipment, and would be thoroughly knowledgeable of federal, state, and local laws, regulations, and permits as listed in the Environmental Protection Plan submitted by the contractor.

10. The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract would be protected during the entire period of this contract. The contractor would confine his activities to areas defined by the drawings and specifications.

11. As stated in the standard contract specifications, a spill prevention plan would also be required.

7.23 Compliance with Environmental Requirements

7.23.1 National Environmental Policy Act of 1969

Environmental information on the project has been compiled and an Environmental Assessment has been prepared. The project is in compliance with the National Environmental Policy Act.

7.23.2 Endangered Species Act of 1973

In accordance with Section 7 of the Endangered Species Act, the USACE has completed informal consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service. The USFWS by letter dated 14 September 2011 concurred with the USACE determination that the proposed work may affect, but is not likely to adversely affect the West Indian (Florida) manatee and its designated Critical Habitat, piping plover, and wood stork. The NMFS by letter dated 13 July 2011 also concurred with the USACE determination that the project may affect, but is not likely to adversely affect sea turtles, short-nosed sturgeon, and the smalltooth sawfish. This project is in full compliance with the act.

7.23.3 Fish and Wildlife Coordination Act (FWCA) of 1958

This project has been coordinated with the U.S. Fish and Wildlife Service (USFWS). A Memorandum for Record, dated 6 September 2011, was jointly prepared by the USFWS and the USACE which states that both agencies agree to utilize the NEPA review and ESA consultation processes to complete coordination responsibilities under the FWCA. This project is in full compliance with the act.

7.23.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (INTER ALIA)

Archival research, and consultation with the Florida State Historic Preservation Officer (SHPO), has been completed in accordance with the National Historic Preservation Act, as amended (PD 89-665); the Archeological and Historic Preservation Act, as amended (PD 93-291); and Executive Order 11593. The project is in compliance with each of these Federal laws.

7.23.5 Clean Water Act of 1972

The project will be in compliance with this act. A Section 401 water quality certification will be obtained from the Florida Department of Environmental Protection. All state water quality standards would be met. A Section 404(b) (1) evaluation is included in this report as Appendix F. A public notice has been issued in a manner which satisfies the requirements of Section 404 of the Clean Water Act.

7.23.6 Clean Air Act of 1972

Vehicular emission and airborne dust particulates resulting from construction activities will be controlled. This project has been coordinated with U.S. Environmental Protection Agency (EPA) and will be in compliance with Section 309 of the act. Correspondence from EPA will be placed in Appendix E and discussion of any issues therein can be found in the Public and Agency Involvement section of this statement.

7.23.7 Coastal Zone Management Act of 1972

A federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as Appendix G. The Florida State Clearinghouse stated by letter dated September 9, 2011 that based on the information contained in the draft Integrated Feasibility Study and Environmental Assessment the project appears to be consistent with the Florida Coastal Management Program (see Appendix E: Pertinent Correspondence). A final consistency determination would be performed concurrently with the issuance of the state water quality certification (permit).

7.23.8 Farmland Protection Policy Act of 1981

No prime or unique farmland would be impacted by implementation of this project. This act is not applicable.

7.23.9 Wild and Scenic River Act of 1968

No designated Wild and Scenic river reaches would be affected by project related activities. This act is not applicable.

7.23.10 Marine Mammal Protection Act of 1972

Protective measures for marine mammals such as manatees will be implemented. This project has been coordinated with the USFWS and NMFS. The work is in compliance with the act.

7.23.11 Estuary Protection Act of 1968

No designated estuary would be affected by project activities. This act is not applicable.

7.23.12 Federal Water Project Recreation Act

The principles of the Federal Water Project Recreation Act, (Public Law 89-72) as amended, have been fulfilled by complying with the recreation cost sharing criteria as outlined in Section 2 (a), paragraph (2) of the act.

7.23.13 Fishery Conservation and Management Act of 1976

The project is being coordinated with the NMFS and will be in compliance with the act.

7.23.14 Submerged Lands Act of 1953

The project would occur on submerged lands of the State of Florida. The project will be coordinated with the state and will be in compliance with the act.

7.23.15 Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990

There are no designated coastal barrier resources that would be affected by this project. These acts are not applicable.

7.23.16 Rivers and Harbors Act of 1899

The proposed work would not obstruct navigable waters of the United States. The proposed action will be subject to the public notice, possible public hearing, and other evaluations normally conducted for activities subject to the act. The project is in full compliance.

7.23.17 Anadromous Fish Conservation Act

Anadromous fish species would not be affected. The project is being coordinated with the National Marine Fisheries Service and will be in compliance with the act.

7.23.18 Migratory Bird Treaty Act and Migratory Bird Conservation Act

Measures will be taken to protect migratory birds, i.e. avoiding nesting sites. The project is in compliance with these acts.

7.23.19 Marine Protection, Research and Sanctuaries Act

The term "dumping" as defined in the Act (3[33 U.S.C. 1402](f)) does not apply to the disposal of material for wetland restoration. Therefore, the Marine Protection, Research and Sanctuaries Act does not apply to this project. The disposal activities addressed in this environmental assessment has been evaluated under Section 404 of the Clean Water Act.

7.23. 20 Magnuson-Stevens Fishery Conservation and Management Act

The USACE has determined that the project would impact 8.15 acres of salt marsh, a habitat of particular concern per Essential Fish Habitat criteria. These impacts would be fully mitigated by restoring salt marsh at Great Marsh Island. In fact, the Corps proposes to restore up to 53 acres of salt marsh which would more than offset this loss. The work would also adversely affect water column habitat, but this should be temporary as the impacts would be limited to construction activities. The proposed work is being coordinated with the NMFS. The project will be in full compliance with the act.

7.23.21 E.O. 11990, Protection of Wetlands

The project would impact 8.15 acres of salt marsh, but this impact would be mitigated. In fact, the Corps proposes to restore up to 53 acres of salt marsh which would more than offset this loss. This project is in compliance with the goals of this Executive Order.

7.23.22 E.O. 11988, Flood Plain Management

This project would have no adverse impacts to flood plain management.

7.23.23 E.O. 12898, Environmental Justice

In accordance with this E.O., the USACE has determined that no group of people would bear a disproportionate share of the environmental consequences resulting from the proposed work. As described in the report, construction activities would occur within navigation channels as well as Helen Cooper Floyd Park and Great Marsh Island which are uninhabited, and are primarily publicly owned properties. The proposed work would result in net navigation and environmental benefits. Stakeholders were sought out that may be affected by the project, and they have participated in decisions about proposed project

activities that may affect their environment and/or health. All stakeholder concerns were considered in the selection of the recommended plan. The Integrated Feasibility Report and Environmental Assessment has been coordinated with the U.S. Environmental Protection Agency, which chairs the Interagency Working Group on environmental justice. Their comments have been addressed in Section 7.24.4.1. The project is in compliance with this Executive Order.

7.23.24 E.O. 13089, Coral Reef Protection

This project would not impact those species, habitats, and other natural resources associated with coral reefs.

7.23.25 E.O. 13112, Invasive Species

This project would not introduce any invasive species.

7.24 Public Involvement*

7.24.1 Scoping and Draft Environmental Assessment (EA)

A scoping letter, dated August 4, 2004 was sent to stakeholders soliciting views and comments regarding environmental and cultural resources, study objectives, and important features within the study area. Funding for this project was discontinued but was reallocated in 2007, at which time scoping was resumed. The USACE, Jacksonville District met with all landowners within or immediately adjacent to the footprint of the proposed work in January of 2008. These meetings were held in order to discuss the project, and were attended by staff from the Mayport Naval Station, The Nature Conservancy (TNC), and the Timucuan Ecological and Historic Preserve. A second scoping letter was issued to all stakeholders on March 31, 2008. A Notice of Availability for the draft Integrated Feasibility Study and Environmental Assessment was mailed to interested parties on July 7, 2011. Copies of the draft report were made available in selected libraries within the study area and placed on the District website, along with other pertinent study documents. A public workshop was held on August 15, 2011 in order to provide all stakeholders the opportunity to discuss the draft report. The public and agency comment period on the draft report was initiated on July 7, 2011 and was extended to September 9, 2011.

7.24.2 Agency Coordination

The scoping letters listed in Section 7.24.1 were sent to all appropriate agencies. Federal and state agencies attended the Jacksonville Harbor (Mile Point) Feasibility Scoping Meeting held on July 30, 2004. Informal coordination between the USACE and the USFWS, NMFS, Timucuan Ecological and Historic Preserve, Florida Department of Environmental Protection (DEP), as well as TNC

was conducted during 2008. As requested, site visits were also made in 2008 with the USACE, USFWS, NMFS, and TNC attending. A meeting to discuss the numerical hydrodynamic modeling results for the proposed work was held on August 26, 2008 and was attended by the USFWS, NMFS, TNC, and the Mayport Naval Station. An Alternative Formulation Briefing was conducted on May 25, 2011 and was attended by federal and state agencies. An on-site meeting was held on August 19, 2011 in order to discuss the proposed mitigation and was attended by the DEP, USFWS, and the FWC. Pursuant to Section 7 of the Endangered Species Act, coordination with USFWS and the NMFS has been completed. The USACE, Jacksonville District and the USFWS jointly prepared a Memorandum for Record which stated that both agencies agree to utilize the National Environmental Policy Act review and Endangered Species Act consultation processes to complete coordination responsibilities under the Fish and Wildlife Coordination Act. Coordination with the Florida State Historic Preservation Officer has been completed. Coordination with the NMFS on Essential Fish Habitat and the DEP on state water quality certification is on-going. Agency coordination letters can be found in Appendix E.

7.24.3 List of Recipients

Copies of the draft Integrated Feasibility Report and Environmental Assessment shall be made available to appropriate stakeholders upon request. A list of stakeholders receiving notification can be found within Appendix E.

7.24.4 Comments Received and Responses

Comments received include public comments which are all non state and agency comments including but not limited to resident comments.

7.24.4.1 The scoping letter dated March 31, 2008 and meetings with the agencies generated the following comments. Responses were generated immediately following and later revised to reflect the recommended plan:

Public Comment: When will we know that the “Relocate Mile Point Training Wall” action is the chosen plan?

Response: Completion of the benefit-cost analysis will provide a selected plan. As part of the benefit-cost analysis our economist continues to interview commercial shipping interests to update the benefit analysis while our design engineers evaluate potential measures to reduce construction costs. After our Division and Headquarters offices complete a policy review and approve the draft report for release to the public, you will have an opportunity to review the selected plan. We will notify you when we have received approval to release the draft report to the public.

Public Comment: What is the timeframe for completion of this project?

Response: Due to the extra time required to evaluate additional sources of benefits and cost reduction measures, we anticipate completion of the draft report this summer, but review and approval for release to the public will extend into the fall of 2011. Assuming we have an economically justified project that is environmentally acceptable, avoids or minimizes impacts to the environment, the estimated project completion would occur in 2014 pending a Water Resources Development Act (WRDA) in 2012 followed by Federal appropriation of funds.

Public Comment: Will there be dredging of Chicopit Bay included in this resolution? There is significant silt that has almost closed this entrance currently and if the Great Marsh Island breakthrough was closed it would pretty much make Mt. Pleasant and Greenfield creeks landlocked.

Response: The USACE, Jacksonville District is proposing to construct a Flow Improvement Channel from the IWW, through Chicopit Bay, and ending at the mouth of Mt. Pleasant Creek. Additional details on the channel can be found in Appendices A and D.

Public Comment: Will there be dredging of Mt. Pleasant and Greenfield Creeks included in this resolution? They have been significantly hampered by the change in current flow caused by the current Little Jetties. I have seen them become shallower and shallower on a yearly basis.

Response: As previously stated, the USACE, Jacksonville District is proposing to construct a Flow Improvement Channel from the IWW, through Chicopit Bay, and ending at the mouth of Mt. Pleasant Creek. Additional details on the channel can be found in Appendices A and D.

Public Comment: What future maintenance will be included in this resolution to be sure that there are not future problems in Chicopit Bay and our creeks?

Response: Monitoring and corrective action, if needed, of the Flow Improvement Channel will be implemented by the USACE for no more than 5 years.

Public Comment: As you know many land owners including myself use these tidal creeks to navigate and any lowering of the tidal flow could impact property values as well as wildlife and fisheries. Please let me know what impact these proposed changes may cause? If the tide water levels rise a little that's ok. However, if the tidal waters lessen and make the tidal waters unnavigable this would be unacceptable.

Response: The proposed alternative, which includes relocation of the training wall along Helen Cooper Floyd Park will not lower the tidal water levels of any creeks. The tidal fluctuations in a large river like the St. Johns, this close to the ocean, are too great to be altered by this kind of project. The relocation of the

training wall would, however, result in the loss of salt marsh at Helen Cooper Floyd Park. To mitigate for this impact, as mentioned earlier, we propose to restore salt marsh at Great Marsh Island that would equal or exceed mitigation requirements for the project. Dredged material under this alternative would be placed in the eroded area at the island in order to achieve the desired elevation for the salt marsh to re-establish itself. Placement of dredged material at this location should also help re-direct the flow of Mt. Pleasant Creek towards the Intracoastal Waterway, which is the direction the creek used to flow.

Public Comment: Selection of the "no action alternative" would stimulate the community as the affected class to proceed with a class action suit based on wrongful neglect, diminished property values, and compensatory damages.

Response: Our Planning Guidance regulations require us to consider a no action alternative as part of the plan formulation process, but we also have to consider a National Economic Development Plan which maximizes net economic benefits (commercial ship transportation savings related to the Federal channel) while minimizing or avoiding impacts to the environment. The "no action alternative" usually does not satisfy the planning objectives of the study and rarely results in a selected plan.

City of Jacksonville Comment: Would the relocation of the training wall affect the concrete pier at Helen Cooper Floyd Park?

Response: The pier would not be affected as the proposed work would occur to the west of this location.

City of Jacksonville Comment: Please extend the training wall to the east more.

Response: It is not within the scope of the project.

Timucuan Ecological and Historic Preserve Comment: Examination of aerial photographs from 1943 show the eastern end of Great Marsh Island covered in sand, assumed to be dredge spoil. Do any records or charts of the area exist prior to the placement of dredge spoil? Knowledge of the size and shape of Great Marsh Island would be necessary to understand the circulation of water in Chicopit Bay prior to the alterations that have been made in association with the creation of the Intracoastal Waterway and the training walls on the St. Johns River.

Response: We have found several charts of Chicopit Bay and Great Marsh Island which predate the 1943 aerial. Historically, it appears that Mt. Pleasant Creek flowed in an easterly direction through the bay, and south of the island, towards the Intracoastal Waterway or Pablo Creek. According to NOAA navigation charts (1993), the bay was also much deeper than it is today. A portion of the shoal material which has accumulated in Chicopit Bay most likely

originated from the on-going erosion of Great Marsh Island. The planned west leg of the Mile Point Training Wall would wrap around the north side of the island and should prevent additional erosion from occurring. We also propose to restore up to 53 acres of salt marsh at Great Marsh Island. However, this would close the existing northern connection between Chicopit Bay and the St. Johns River. This connection was created by the erosion and loss of salt marsh in the 1990s. Shoaling within the bay has also decreased the amount of flow or flushing effect coming from the east, or from the bay's historic connection with the waterway or Pablo Creek. Therefore, we propose to construct a Flow Improvement Channel within Chicopit Bay, which should improve the flushing of the bay as well as provide deeper water Essential Fish Habitat.

Timucuan Ecological and Historic Preserve Comment: It appears there are several proposals for the placement of new training walls adjacent to Great Marsh Island. During the harbor deepening scoping meeting on February 7, 2008, a proposed training wall running from Great Marsh Island to Buck Island was shown. However, in the March 31, 2008 letter requesting comments, the length of the proposed training wall is shown much shorter. No information was presented as to the heights or additional walls or dikes that will be needed to retain the proposed fill to be placed. More information as to exact length, height, type of material, and plans to prevent the movement of fill is needed. Where will the fill needed to create the wetlands originate?

Response: Please refer to Appendix A of this report for more information on the dimensions of the proposed training wall. The proposed restoration of Great Marsh Island would utilize dredged material from the reconfiguration of the Mile Point Training Wall, i.e. the western portion of Helen Cooper Floyd Park and the Intracoastal Waterway, and from the Flow Improvement Channel.

Timucuan Ecological and Historic Preserve Comment: More detailed hydrological modeling is needed to determine the water flow into and out of Chicopit Bay. Historic aerial photographs and local lore suggests that in past decades Chicopit Bay was significantly deeper than today. The tidal marshes in and around Chicopit Bay have both ecological and recreational significance to Timucuan Preserve and the Theodore Roosevelt Area, which has extensive hiking trails and a bird observation tower.

Response: As previously stated, we propose to construct a Flow Improvement Channel within Chicopit Bay which should help restore the historical direction of flow through the bay. A tidal prism analysis of Chicopit Bay has been completed, please refer to **Section 6.3.4** of the report.

Timucuan Ecological and Historic Preserve Comment: Additional hydrological modeling is needed to determine the potential for increased erosion to the eastern end of Great Marsh Island or the salt marshes around Greenfield Islands should the proposed training walls be constructed.

Response: It is unclear what exactly constitutes the "Greenfield Islands salt marsh areas"; however, the marshes that border Chicopit Bay should not be adversely affected by the proposed work as the work seeks to restore the condition that existed approximately 10 years ago prior to the Great Marsh Island breakthrough. The hydrology of the marshes in the project area is tidally dominated and would continue to remain so with or without the project. The footprint of the proposed Flow Improvement Channel (FIC) seeks to follow the historic hydraulic connection through Chicopit Bay, from the Intracoastal Waterway to the mouth of Mt. Pleasant Creek, and replace the tidal flow that will be lost when the Great Marsh Island breakthrough is closed. Based on a tidal analysis, peak flow velocities within the FIC are predicted to be 3.6 feet per second and the presence of the FIC acts to provide a pathway for the tidal flow. While it is reasonable to expect the FIC to shift and change configuration somewhat over time while reaching relative equilibrium, there is no anticipation that the velocities outside of the FIC would be erosive to the surrounding marshes. In fact, without the initial construction of the FIC in the proposed location, a natural flow way would develop to accommodate the tidal prism and such a channel may form more closely to the marsh shoreline with greater potential for erosion. Eventually, the peak velocities in a naturally formed flow way would be the same as for the FIC.

The Nature Conservancy (TNC) Comment: The proposed project will remove 8.15 acres of salt marsh from Helen Cooper Floyd Park, is the proposed marsh creation the only mitigation for the removal of salt marsh?

Response: Using the Uniform Mitigation Assessment Method, we determined that 18.84 acres of mitigation would be required to offset the loss of 8.15 acres of salt marsh at Helen Cooper Floyd Park. However, as a beneficial use of dredged material, we propose to restore up to 53 acres of salt marsh at Great Marsh Island. The restoration would include tidal channels, placement of oyster shell to encourage oyster colonization, and a mix of high and low marsh. Please refer to Appendices D and A for more information.

TNC Comment: During the meeting in January, there were two proposed scenarios for marsh creation. The first scenario is the creation of 18.84 acres and the second scenario proposes to create 41.4 acres. Where will the fill to create marsh beyond the 8.15 acres of removed salt marsh come from? How would the flows and flushing be affected in Chicopit Bay between the two scenarios? Would oyster reefs in the area be impacted?

Response: As previously stated, we propose to restore up to 53 acres of salt marsh at Great Marsh Island. The restoration would use dredged material from the reconfiguration of the training wall, i.e. Helen Cooper Floyd Park and the Intracoastal Waterway. The restoration of Great Marsh Island would close off the eroded break through or channel that now exists in that location. This channel

was created due to the erosion of salt marsh. Also, much of this eroded material has most likely contributed to the shoaling of Chicopit Bay. Therefore, we also propose to construct a Flow Improvement Channel (FIC) within the bay. Dredged material from the FIC would be used to help restore Great Marsh Island. Site inspections of the proposed project footprint indicate that there is some oyster habitat in this area. However, the oyster reefs with the highest density in the vicinity of the project occur on the inter-tidal mud flats adjacent to Helen Cooper Floyd Park which are outside the project footprint and would not be affected by the work. We do plan to include tidal channels and place oyster shell within one of these channels as part of the proposed restoration of Great Marsh Island. Please refer to Appendices D and A for more information.

TNC Comment: Marsh creation would include plantings. What is the plan for monitoring success of the sand placement into productive salt marsh?

Response: The restoration of Great Marsh Island would be monitored for five years. Additional information on the monitoring plan can be found in Appendix D.

TNC Comment: As of the date of our meeting the length and height of the training wall was unknown. As adjacent land owners we are concerned about the length of the training wall. Will the training wall be extended beyond the property line and what effects will it have on the erosion of our property?

Response: Please refer to Appendix A for more information on the dimensions of the proposed training wall. The west leg of the training wall would extend out to the eastern side of the TNC property (please see drawings in Appendix A). The TNC salt marsh at Great Marsh Island appears to be actively eroding. The proposed west leg of the training wall should prevent further wave erosion.

TNC Comment: We are interested in the sediment movement along the training wall. Will the position of the training wall change the flows in Chicopit Bay and cause sedimentation? What is the potential for increased erosion on the southern end of Great Marsh Island?

Response: As previously stated, the proposed west leg of the training wall and the restoration of Great Marsh Island would close the eroded breakthrough. This should cause flow from Mt. Pleasant Creek to proceed in an easterly direction through the bay, and this appears to be the historical flow direction. Also as previously stated, we propose to construct a Flow Improvement Channel within the bay which should help re-establish the historical flow path.

TNC Comment: Does the marsh creation and associated fill serve a design purpose for the training wall?

Response: The restoration of Great Marsh Island would serve as mitigation for the loss of salt marsh at Helen Cooper Floyd Park, and it also provides an

opportunity to use dredged material from the project in a beneficial way and restore the entire island.

TNC Comment: This proposed project is part of the Jacksonville Harbor project. How do the different scenarios in the Mile Point project fit into the whole harbor project?

Response: The proposed reconfiguration of the Mile Point Training Wall should lift the current navigation restriction for this area. Per the restriction, vessels that draft more than 33 feet currently transit through the Mile Point turn during flood tide only. This work should allow these vessels to transit this area during flood or ebb tides.

Florida Division of Historical Resources Comment: An archaeological survey of the project area should be conducted.

Response: A survey of the project area has been completed. Please see Section 2.3.5 of the report.

Florida State Clearinghouse Comment: The U.S. Army Corps of Engineers is advised to coordinate with the DEP Bureau of Beaches and Coastal Systems and Florida Fish and Wildlife Conservation Commission.

Response: We have initiated coordination with the state per the scoping letters, and further coordination shall be conducted.

7.24.4.2 Comments from stakeholders on the draft Integrated Feasibility Report and Environmental Assessment (IFR/EA), as well as comments obtained during or after the public workshop, are summarized below (see Appendix H, to view comments):

Public Comment: What assurances can you give us your new flow improvement channel will remain deep enough for the property owners on Mt. Pleasant Creek and Chicopit Bay to get into the Intracoastal Waterway? What plans are there for future dredging of the flow improvement channel if it starts shoaling?

Response: The Chicopit Bay Flow Improvement Channel (FIC) is not expected to require maintenance dredging. Prior to the breakthrough of Great Marsh Island, a natural channel existed in the same location as the proposed Flow Improvement Channel. The historical maps show a stable channel flushing Chicopit Bay, as well as freshwater runoff from the neighboring creeks. Once Great Marsh Island is restored, the water from Greenfield and Mt. Pleasant Creeks, as well as the large volume of water within Chicopit Bay’s tidal prism, will flush in and out through the FIC. It is reasonable to expect the water velocities in the channel to be sufficient to prevent shoaling within the channel. Monitoring and corrective action, if needed, of the FIC will be implemented by the USACE for 5 years.

Public Comment: What is being done to maintain access to the Intracoastal Waterway and St. Johns River from Mt. Pleasant Creek and Greenfield Creek during construction?

Response: Access will be maintained to the greatest extent practicable through design considerations and construction sequencing.

Public Comment: The new Western Wall should have a break in it that allows for continued navigational access into Chicopit Bay.

Response: Great Marsh Island will be restored to a continuous Island as it was prior to approximately 10 years ago. A Flow Improvement Channel in Chicopit Bay will be constructed based on the historic flows prior to the breakthrough.

Public Comment: It is imperative that the flow improvement channel be monitored and maintained, as required, not only to flush out Chicopit Bay, but also to flush out Mt. Pleasant and Greenfield Creeks. Otherwise, this project will have a significant ecological impact on a large portion of the Timucuan Preserve.

Response: The Flow Improvement Channel shall be monitored and maintained per pending agreements with regulatory agencies.

Public Comment: The flow improvement channel will be dredged to 6 feet. Is that 6 feet mlw?

Response: 6 feet Mean Lower Low Water (MLLW)

Public Comment: According to your current charts, the new plan shows less water movement or current in Chicopit Bay. This would cause more silting than present. Can the flow improvement channel be forked behind the newly created marsh so one channel would continue toward the northwest to connect to the other 2 creeks near Buck Island that will increase more water flow?

Response: The area to the northwest is not within the project footprint, as the project will restore the area to a condition similar to what it was prior to the breakthrough of Great Marsh Island approximately 10 years ago.

Public Comment: What is the definition of high marsh? How high will the created marsh be in the Chicopit Bay area NW of Great Marsh Island?

Response: High salt marsh is found on slightly higher ground than low salt marsh; therefore, high and low salt marshes have different levels and durations of inundation, and they have different plant communities. In the Integrated Feasibility Report and Environmental Assessment, the USACE used +3 feet above mean lower low water (mllw) for high marsh and +2 feet above mllw for

low salt marsh. These elevations were based on existing information from previous surveys. Prior to performing any construction, the USACE will resurvey adjacent high and low salt marshes in order to more precisely determine the target elevations required for high and low salt marshes within the proposed restoration site.

Public Comment: Has the Army Corps ever made a determination on whether Mt. Pleasant and Greenfield Creeks are navigable per CFR 33 Part 329?

Response: Per CFR 33, Part 329.4, both creeks appear to meet the definition of navigable waterways of the United States as stated below.

329.4 General definition.
Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events which impede or destroy navigable capacity.

Public Comment: Why is Great Marsh Island being used as a disposal site for dredge spoils?

Response: A total of 8.15 acres of salt marsh would be impacted by the proposed work, and the USACE has determined that 18.84 acres of mitigation would be required to offset this loss. The mitigation would be performed by placing dredged material within the eroded breakthrough at Great Marsh Island, and restoring salt marsh which historically occurred at this location. However, as a beneficial use of dredged material, the USACE proposes to restore the entire breakthrough at the island, which could be up to 53 acres. This would provide up to 34.16 acres of restored salt marsh, oyster beds, and tidal creeks in addition to the 18.84 acres of required mitigation. Restoration of Great Marsh Island is also the least cost alternative for dredged material placement.

Public Comment: Why is no retaining wall proposed for the south side of Great Marsh Island?

Response: The USACE proposes to place a geotube on the south side of Great Marsh Island. During initial dredged material placement at the island it will be necessary to contain the material to allow for settlement and dewatering of the dredge slurry. Containment would be accomplished on the north side by the new west leg of the training wall, and a combination of geotubes or water dams on the east, west and south sides. In addition, the new west leg of the training wall will wrap around the southeast end of Great Marsh Island.

Public Comment: Do Phase I (relocating jetties) and Phase II (restoring Great Marsh Island) have the same funding and priority? Is it possible Phase I would be done without Phase II?

Response: Per the Engineering and Mitigation Plan Appendices of the IFR/EA, Phase I would include relocation of the jetties as well as placement of dredged material at the Great Marsh Island restoration site. Phase II would include final grading of the material to elevations that would support salt marsh, planting, etc. The amount of final grading and planting would be dependent on how the material has settled and how much natural recruitment of marsh vegetation has occurred since the completion of Phase I. Both Phases I and II have the same priority. Phase II would be required per the U.S. Clean Water Act in order to fulfill the USACE mitigation requirements.

Public Comment: As a member of the community, I urge the U.S. Army Corps of Engineers to proceed with the solution to the navigational hazard at Mile Point and submit the recommendation to Congress in the Chief of Engineer's report in February 2012.

Response: This report shall be sent to the Secretary of the Army for further review, and if presented to the U.S. Congress, the U.S. Congress shall decide whether this project is to be funded for construction.

U.S. Environmental Protection Agency (EPA) Comment: Official correspondence with the U.S. Coast Guard (USCG) about risk analysis should be included with the Final Integrated Feasibility Report and Environmental Assessment (IFR/EA).

Response: The risk assessment dated February 3, 2004 was completed by the USCG relating to a permit request by Atlantic Marine, Inc. (AMI); the assessment evaluated impacts to navigation in the main Federal channel in the St. Johns River and the IWW. The Risk Assessment can be found in the following document SAJ-1994-9814340580; the Jacksonville District Regulatory Division retains these documents.

EPA Comment: Specific and detailed information should be provided (or referenced) that addresses any changes in local sedimentation or shoaling rates that may be caused by the proposed work. In addition to shoreline erosion on the north shore of Mile Point, a breakthrough has occurred at Great Marsh Island on the southern bank of the St. Johns River, and this has led to severe shoaling in Chicopit Bay. The Corps should conclusively address the potential for increased shoaling in Chicopit Bay and flow alterations.

Response: The shoaling of Chicopit Bay has apparently resulted from the breakthrough that has occurred and the subsequent erosion of Great Marsh Island and the deposition of such into the Bay. This source of sedimentation will no longer be present upon completion of the West leg Training Wall component.

Based on model investigations and current measurements, the resulting bottom current velocities from the relocated training wall legs and excavation and removal of a portion of the existing training wall and entire surrounding area to -13 feet MLW are of such magnitude to expect little deposition to occur in either of the channels. The Chicopit Bay Flow Improvement Channel (FIC) is also not expected to require maintenance dredging. Prior to the breakthrough of Great Marsh Island, a natural channel existed in approximately the same location as the proposed FIC. The historical maps (**Figures 8-10**) show water depths up to 10 feet due to tidal flushing of Chicopit Bay as well as freshwater runoff from the neighboring creeks. Once Great Marsh Island is restored, the water from Greenfield and Mount Pleasant Creeks, as well as the large volume of water within Chicopit Bay's tidal prism will flush in and out through the Flow Improvement Channel. It is reasonable to expect the water velocities in the channel to be sufficient to prevent shoaling within the channel.

EPA Comment: Conclusive information about the eligibility for listing of the Great Marsh Island prehistoric site should be included in the Final IFR/EA.

Response: The Great Marsh Island prehistoric site has been determined to be eligible for listing on the National Register of Historic Places in accordance with guidelines for implementing Section 106 of the National Historic Preservation Act (36 CFR, Part 800). Consultation with the Florida State Historic Preservation Officer and Federally recognized tribes have determined that the preferred alternative would have no adverse effect on this prehistoric site.

EPA Comment: The Corps should conclusively address the north bank homeowners' concerns about increased future erosion of their property and subsequent property losses. These homeowners on the north bank of the river at Mile Point have experienced significant shoreline erosion to their property and have legitimate and serious concerns about future property losses; therefore, final recommendations for solving these erosion problems should be included in the Final IFR/EA in the Problems and Opportunities section.

Response: Compared to the existing without-project condition, the future with-project condition reduces the magnitude of the ebb flow currents along the north shoreline. A reduction of water flow immediately adjacent to a shoreline should ordinarily reduce erosional conditions. However, exactly how the current reduction will relate to the rate of future erosion at the Mile Point north shoreline is not certain because there are other dynamic factors present such as flood tide, wave attack, storm activity (direct or in the St. Johns River watershed), and underlying geology that can affect erosion.

EPA Comment: The Final IFR/EA should also include the computer model predicted velocities along Mile Point and demonstrate that they are within acceptable limits.

Response: Maximum velocities along the northern shoreline vary with location, and are approximately 3 to 3.25 feet per second for both with and without-project conditions. From the model results, the velocities are reduced for the majority of the northern shoreline.

EPA Comment: The Corps should also show the proposed work will not adversely affect the salt marshes in the Greenfield and Four Pines Islands areas.

Response: It is unclear what exactly constitutes the "Greenfield and Four Pines Islands salt marsh areas;" however, the marshes that border Chicopit Bay should not be adversely affected by the proposed work as the work seeks to restore the condition that existed approximately 10 years ago prior to the Great Marsh Island (GMI) breakthrough. The hydrology of the marshes in the project area is tidally dominated and would continue to remain so with or without the project. The footprint of the proposed Flow Improvement Channel (FIC) seeks to follow the historic hydraulic connection through Chicopit Bay, from the Intracoastal Waterway to the mouth of Mt. Pleasant Creek, and replace the tidal flow that will be lost when the GMI breakthrough is closed. Based on a tidal analysis, peak flow velocities within the FIC are predicted to be 3.6 feet per second and the presence of the FIC acts to provide a pathway for the tidal flow. While it is reasonable to expect the FIC to shift and change configuration somewhat over time while reaching relative equilibrium, there is no anticipation that the velocities outside of the FIC would be erosive to the surrounding marshes. In fact, without the initial construction of the FIC in the proposed location, a natural flow way would develop to accommodate the tidal prism and such a channel may form more closely to the marsh shoreline with greater potential for erosion. Eventually, the peak velocities in a naturally formed flow way would be the same as for the FIC.

EPA Comment: Pursuant to Section 7 of the Endangered Species Act, coordination with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) reportedly has been initiated. The Corps and the USFWS have entered into an agreement on the review of the draft Fish and Wildlife Coordination Act Report for this project. The Final IFR should include copies of all official correspondence with NMFS and USFWS, as well as the Jacksonville Port Authority.

Response: All official correspondence with the NMFS and USFWS shall be included in the final IFR.

EPA Comment: A report on future real estate negotiations (that occurred after the Draft IFR/EA was issued) regarding the expansion of the Great Marsh Island Restoration Area should be included, as well as an update on the efforts of the Mayport Naval Station and the Nature Conservancy of their real estate agreements.

Response: Once the PPA is signed, land can be specifically requested. Approximately 51.2 acres of land are under the control of the U.S. Navy. The U.S. Army Corps of Engineers will coordinate with the U.S. Navy for a license that will allow removal of the real property (uplands). Additionally, the Federal government has navigational servitude over submerged lands impacted by the proposed project. The Nature Conservancy, Inc. owns lands in the vicinity of the proposed project that will not be negatively impacted. The USACE has and continues to coordinate with The Nature Conservancy, Inc. on the proposed work.

Lands required for the construction and operation of the proposed project are located below the ordinary high water line and as such, available to the Federal government via navigational servitude. Approximately 53 acres of land are within the category of navigational servitude. No additional land interests are required. The U.S. Army Corps of Engineers, as the responsible lead agency for the Jacksonville Harbor Navigation Project will coordinate with the U.S. Navy the license of impacted real property.

EPA Comment: A report of issues raised at future public meetings should also be included in the Final IFR/EA.

Response: All comments and concerns raised at public meetings, and responses to those comments and concerns, are included in the final IFR/EA.

EPA Comment: The status of the existing Mile Point training wall's eligibility for the National Register of Historic Places should be documented in the Final IFR/EA.

Response: In accordance with implementing regulations of Section 106 of the National Historic Preservation Act (36 CFR, Part 800), the final determinations of eligibility and effect are required prior to project implementation. The National Environmental Policy Act (NEPA) requires informed decisions. The National Historic Preservation Act specifically states adverse effects to historic properties does not necessarily trigger significance under NEPA. The decision maker has sufficient information about the historic property to make an informed decision. If the training wall is determined to be National Register eligible, then appropriate mitigation measures would be taken in accordance with Section 106 of the National Historic Preservation Act prior to construction.

FDEP Comment: The Florida Department of Environmental Protection (DEP) staff notes that the project will require an Environmental Resource Permit (ERP) under Part IV of Chapter 373, *Florida Statutes*, from the Northeast District Office in Jacksonville. The proposed project impacts to jurisdictional wetlands and/or surface waters, and any proposed mitigation activities offsetting those impacts,

will be assessed in accordance with Chapter 62-345, *Florida Administrative Code*.

Response: Noted.

FDEP Comment: DEP's Hydrographic Engineer has reviewed the Draft IFR/EA and concurs with the modeling study results for the Recommended Plan. Crosscurrents and eddies are key hydrodynamic factors affecting river shoreline stability, particularly in the river winding area. The study results showed that the Recommended Plan would reduce shoreline erosion and navigational impediments in the river to improve navigation in Jacksonville Harbor.

Response: Noted.

FDEP Comment: The report indicated that post-construction, the peak flow velocities in the vicinity of the FIC (*i.e.,* near the mouth of the Chicopit Bay, leading to the Intracoastal Waterway) would be 3.6 feet per second. What are the peak flow velocities at the same location if the FIC is not constructed?

Response: As previously stated, based on a tidal analysis, peak flow velocities within the Flow Improvement Channel (FIC) are predicted to be 3.6 feet per second and the presence of the FIC acts to provide a pathway for the tidal flow. While it is reasonable to expect the FIC to shift and change configuration somewhat over time while reaching relative equilibrium, there is no anticipation that the velocities outside of the FIC would be erosive to the surrounding marshes. In fact, without the initial construction of the FIC in the proposed location, a natural flow way would develop to accommodate the tidal prism and such a channel may form more closely to the marsh shoreline with greater potential for erosion. Eventually, the peak velocities in a naturally formed flow way would be the same as for the FIC.

FDEP Comment: Since related local water velocity will diminish after the initial dredging, the FIC may become a sediment/sand trap as tidal and riverine currents move sediments into the channel. Reportedly, port representatives stated in a public meeting that they have no plans to maintenance-dredge the FIC after its excavation. What are the Corps' plans for future maintenance-dredging of the FIC to keep it open?

Response: Monitoring and corrective action, if needed, of the Flow Improvement Channel (FIC) will be implemented by the USACE for 5 years.

FDEP Comment: Currently, flows from Mt. Pleasant Creek enter the St. Johns River through the area that will become the material placement/mitigation restoration site (*i.e.,* between the eastern and western portions of Great Marsh Island). Upon construction of the new western training wall and the placement of the dredged material, this northward flow of the creek will be eliminated. Will the

FIC improvements fully compensate for the loss of this flow vector? Again, what plans are available to maintain the FIC and sustain access to Mt. Pleasant Creek?

Response: Monitoring and corrective action, if needed, of the FIC will be implemented by the USACE for 5 years. However, the Chicopit Bay Flow Improvement Channel (FIC) is not expected to require maintenance dredging, prior to the breakthrough of Great Marsh Island, a natural channel existed in the same location as the proposed FIC. Historical maps show a stable channel flushing Chicopit Bay, as well as freshwater runoff from the neighboring creeks. Once Great Marsh Island is restored, the water from Greenfield and Mount Pleasant Creeks, as well as the large volume of water within Chicopit Bay's tidal prism, will flush in and out through the Flow Improvement Channel. It is reasonable to expect the water velocities in the channel to be sufficient to prevent shoaling within the channel.

FDEP Comment: If the western training wall is constructed prior to creation of the FIC, sediments from the upstream drainage basin will accumulate in West Chicopit Bay and flushing is at risk of deteriorating. The same risk would occur if the FIC is not maintained, as stated above. Until a sustainable maintenance commitment is identified and construction sequencing of the western wall, restoration site and FIC are addressed to prevent flushing impairment, the DEP may not have the reasonable assurance necessary to provide State Water Quality Certification for the project as presented in the Draft IFR/EA.

Response: Monitoring and corrective action, if needed, of the Flow Improvement Channel (FIC) will be implemented by the USACE for 5 years.

FDEP Comment: The reconfigured eastern training wall will block an existing channel between Helen Cooper Floyd Park and a salt marsh island directly south of the park that leads to the eastern portion of Chicopit Bay. Another channel exists south of the salt marsh island between San Pablo Creek and eastern Chicopit Bay, but its bathymetry appears shallower than the planned FIC. Will the new eastern training wall significantly impact the channel hydrology to East Chicopit Bay? How will the change in flow velocities affect wetland habitat along the shoreline of the salt marsh island?

Response: The new eastern leg training wall will block flow through the identified channel; however, a hydraulic connection will remain such that there is no impact to water levels. Based on the model, the flows through the channel are currently in the range of about 0.5 feet per second and the majority of flow to Eastern Chicopit bay enters through the southern channel. There exists a potential that with the blocking of this connection, the water flows behind the new training wall decrease such that material deposition occurs. If this occurs there could be a formation of salt marsh in an area that is now open water.

FWC Comment: The FWC advises that in-water work could adversely affect the Florida manatee and marine turtles. Since no information was provided detailing the timing or duration of the proposed construction and dredging activities, FWC cannot recommend specific avoidance and minimization measures for the manatee, other than the 2011 Standard Manatee and Marine Turtle Construction Conditions for in-water work. As more details become available, further consultation with FWC staff will be necessary to determine the site-specific conservation measures for this project. Staff requests that additional information be included in the Final IFR/EA to facilitate FWC's review and future state permitting of the proposal: complete detailed Great Marsh Island restoration plans and habitat surveys identifying and quantifying the affected marine habitats.

Response: Information regarding timing and duration of the proposed work were provided in the 404 (b)(1) evaluation (Appendix F). Information regarding restoration of Great Marsh Island were provided in the Engineering and Mitigation Appendices (Appendices A and D).

FWC Comment: There are currently multiple information gaps related to potential habitat impacts and habitat restoration aspects of the proposed project. If the Corps of Engineers includes the information requested below in the final EA, it would facilitate our review of the project and accelerate the future permitting process. In addition, this information will provide the FWC's marine habitat staff with information that will assist them in providing technical recommendations towards successful habitat minimization and mitigation. Therefore, we recommend that the following information be included in the final EA:

1. Complete detailed restoration plans so state agencies can assess the habitat restoration/mitigation aspects of this project, including:

a) Potential effects that the newly proposed channel may have on the southeast portion of Great Marsh Island;

Response: The Flow Improvement Channel (FIC) is proposed to be located approximately 500 feet south of the southeast portion of Great Marsh Island (GMI) and will not be deep enough or close enough to the shoreline of GMI to be impactive. At the location where the FIC is closest to the southeast corner of GMI, the newly constructed west leg training wall will wrap around the shoreline and provide erosion protection.

b) The total amount of fill required to create the Great Marsh Island restoration site and identify the individual sources of fill and the amount of fill that will be used from each site;

Response: Please refer to Table A-2 in the Engineering Appendix for estimated construction quantities. It is currently estimated that approximately 889,000 cubic yards of material will be excavated or dredged from the vicinity of the existing training wall to be removed and approximately 72,000 cubic yards of material will be dredged from the FIC. All excavated/dredged material will be placed in the GMI marsh restoration area and the total amount of marsh created will be split between high marsh and low marsh in a ratio yet to be determined.

c) Proposed construction elevations for Great Marsh Island and the expected subsidence elevations; and

Response: A discussion of construction elevations for Great Marsh Island is provided in the Mitigation Plan (Appendix D).

d) Origin of nursery stock that will be used for planting the restoration sites and the species that will be used.

Response: The origin of nursery stock has not been determined at this time. The USACE shall coordinate with the Florida Fish and Wildlife Conservation Commission on this issue.

2. The results of habitat surveys identifying and quantifying the existing marine habitats that would be impacted by the proposed project, other than the 8.15 acres of salt marsh at Helen Cooper Floyd Park.

Response: Information on habitats affected by the proposed work is provided in Section 7 of the report as well as the Mitigation Appendix D.

3. Identify the material that would be used to construct the new training wall as well as the construction designs for the structures. If possible, include a discussion on the potential types of construction methodology.

Response: Please refer to part D of the Engineering Appendix that describes construction materials and methodology, in addition please refer to the 2008 and 2011 Value Engineering attachments. The current design reflects the level of detail required for a Feasibility Study and will be refined and detailed during the Preconstruction, Engineering and Design (PED) phase upon project approval.

SJRWMD Comment: District staff have been communicating directly with the U.S. Army Corps of Engineers about this project (e.g., relative to concerns about hydrologic effects, such as the potential for erosion to affect the shoreline and emergent vegetation within Chicopit Bay) and will continue this coordination. The Recommended Plan includes adding a Chicopit Bay flow improvement channel, which involves dredging. USACE should work closely with the marine mammal experts at the University of North Florida to develop and use best management practices that will protect the resident dolphin population from dredging-related

impacts. Background information/note: Last year, the St. Johns River experienced a well documented marine mammal mortality event. In addition, there was an unusually high death rate among young dolphins occurred coincident with the deepening of the St. Johns River Channel. Although it is not certain, it has been suggested that the placement of the dredge spoil pipes along the channel of the river in a location where the river's dolphin population is active, and at a time when young dolphins are still reliant upon their mothers, may have impaired the ability of mothers and their young to communicate.

Response: The proposed work has been coordinated with the National Marine Fisheries Service (NMFS), and shall be in compliance with the Marine Mammal Protection Act.

FLORIDA DEPARTMENT OF STATE Comment: No Comment/Consistent.

Response: Noted.

FLORIDA DEPARTMENT OF TRANSPORTATION Comment: The FDOT Seaport Office and District Two have no comments.

Response: Noted.

NORTHEAST FLORIDA REGIONAL PLANNING COUNCIL Comment; No comments.

Response: Noted.

Duval County Comment: No comments from the Duval County Planning and Development.

Response: Noted.

7.25 References

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8.0 RECOMMENDATIONS

I concur with the findings presented in this report. The recommended plan developed is technically sound, economically justified, and socially and environmentally acceptable.

The work proposed is not within existing authority. I recommend that the plan selected herein for the relocation of the Mile Point training wall, which combines the reconfiguration of the existing training wall, restoration of Great Marsh Island as the least cost disposal option, and the creation of a Flow Improvement Channel in Chicopit Bay be authorized by Congress for implementation. Mitigation is required for approximately 8.15 acres impacted by the training wall relocation. Aids to navigation will be provided at 100% Federal cost. For the purpose of calculating the Section 902 limit, the total estimated project first cost of the project is $35,999,000 including an estimated Federal share of $26,998,000 and an estimated non-Federal share of $9,001,000.

The recommended plan conforms to the essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and complies with other Administration and legislative policies and guidelines on project development. If the project were to receive funds for Federal implementation, it would be implemented subject to the cost sharing, financing, and other applicable requirements of Federal law and policy for navigation projects including WRDA 1986, as amended; and would be implemented with such modifications, as the Chief of Engineers deems advisable within his discretionary authority. Aids to navigation are to be funded by the U.S. Coast Guard. Federal implementation is contingent upon the non-federal sponsor agreeing to comply with applicable Federal laws and policies. Prior to implementation, the non-federal sponsor shall agree to:

a. Provide 10 percent of the total cost of construction of the general navigation features (GNFs) attributable to dredging to a depth not in excess of 20 feet; plus 25 percent of the total cost of construction of the GNFs attributable to dredging to a depth in excess of 20 feet but not in excess of 45 feet; plus 50 percent of the total cost of construction of the GNFs attributable to dredging to a depth in excess of 45 feet as further specified below:

(1) Provide the non-federal share of design costs allocated by the Government to commercial navigation in accordance with the terms of a design agreement entered into prior to commencement of design work for the project.

(2) Provide, during construction, any additional funds necessary to make its total contribution for commercial navigation equal to 10 percent of the total cost of construction of the GNFs attributable to dredging to a depth not in excess of 20 feet; plus 25 percent of the total cost of construction of the GNFs

attributable to dredging to a depth in excess of 20 feet but not in excess of 45 feet; plus 50 percent of the total cost of construction of the GNFs attributable to dredging to a depth in excess of 45 feet.

b. Provide all LERRs, including those necessary for the borrowing of material and the disposal of dredged or excavated material, and perform or assure the performance of all relocations, including utility relocations, all as determined by the Federal government to be necessary for the construction or operation and maintenance of the GNFs.

c. Pay with interest, over a period not to exceed 30 years following completion of the period of construction of the GNFs, an additional amount equal to 10 percent of the total cost of construction of the GNFs less the amount of credit afforded by the Government for the value of the LERR is provided by the sponsor for the GNFs. If the amount of credit afforded by the Government for the value of LERR, and relocations, including utility relocations, provided by the sponsor equals or exceeds 10 percent of the total cost of construction of the GNFs, the sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of LERR and relocations, including utility relocations, in excess of 10 percent of the total cost of construction of the GNFs.

d. Provide, operate, and maintain, at no cost to the Government, the local service facilities 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;

e. Provide 50 percent of the excess cost of operation and maintenance of the project over that cost which the Federal government determines would be incurred for operation and maintenance if the project had a depth of 45 feet.

f. Accomplish all removals determined necessary by the Federal Government other than those removals specifically assigned to the Federal Government;

g. Give the Federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the Sponsor owns or controls for access to the project for the purpose of completing, inspecting, operating and maintaining the GNFs.

h. Hold and save the United States free from all damages arising from the construction or operation and maintenance of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors.

i. 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 cost of the project, 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.

j. 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 LERRD that the Federal government determines to be necessary for the construction or operation and maintenance of the GNFs. However, for lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigations unless the Federal government provides the sponsor with prior specific written direction, in which case the sponsor shall perform such investigations in accordance with such written direction.

k. Assume complete financial responsibility, as between the Federal government and the sponsor, for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under LERRD that the Federal government determines to be necessary for the construction or operation and maintenance of the project;

l. Agree, as between the Federal Government and the non-Federal sponsor, that the non-Federal sponsor shall be considered the operator of the local service facilities for the purpose of CERCLA liability.

m. To the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA.

n. 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 sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element.

o. 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.

p. 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));

q. Provide the non-federal share of that portion of the costs of mitigation and data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized to be appropriated for the project.

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

The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the State of Florida, the Jacksonville Port Authority (the non-federal sponsor), interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

Alfred A. Pantano, Jr.
Colonel, U. S. Army
District Commander
03/28/12