JUNE 2013

Environmental Assessment

MAINTENANCE DREDGING OF PONCE DE LEON INLET WITH BEACH AND NEARSHORE PLACEMENT

VOLUSIA COUNTY, FLORIDA

U.S. Army Corps
of Engineers
JACKSONVILLE DISTRICT

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

REPLY TO
ATTENTION OF

26 JUN 2013

ENVIRONMENTAL ASSESSMENT

MAINTENANCE DREDGING OF PONCE DE LEON INLET WITH BEACH AND NEARSHORE PLACEMENT

VOLUSIA COUNTY, FLORIDA

FINDING OF NO SIGNIFICANT IMPACT

I have reviewed the Environmental Assessment (EA) for the proposed dredging of the federally authorized navigation project of Ponce de Leon Inlet by the US Army Corps of Engineers South Atlantic Division on 27 October 1965. Dredged material from the Inlet channel cuts would be placed either on the beach or in the nearshore placement areas. This Finding incorporates by reference all discussions and conclusions contained in the EA 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 emergency maintenance action had no significant impact on the quality of the human environment. Reasons for this conclusion are in summary:

a. The proposed action would be conducted in accordance with the Endangered Species Act, and specifically in compliance with the South Atlantic Regional Biological Opinion (SARBO) issued by the National Marine Fisheries Service (NMFS) and the Statewide Programmatic Biological Opinion (SPBO) and project specific Piping Plover Biological Opinion (BO) issued by the U.S. Fish and Wildlife Service (USFWS). The proposed action would not jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat.

b. Historic properties have been recorded by the Florida Master Site File within the proposed south beach placement project area. To avoid adverse impacts of construction to recorded historic properties, the U.S. Army Corps of Engineers (Corps) will establish a minimum of a 100-foot buffer around the recorded sites in conjunction with monitoring by a qualified archeological monitor during construction in the immediate vicinity of the recorded sites. As stated in Section 2.3 of the attached EA, additional cultural resource investigations will be required prior to dredging of the cuts and wideners and use of the north and south nearshore placement areas. If historic properties are identified, they will be protected with a minimum of a 100-foot buffer and no anchoring, spudding, or direct outfall will be permitted.

c. State water quality standards were met. A FDEP Joint Coastal Permit (JCP) was issued on 3 August 2012.

d. The Corps has determined that the emergency maintenance project is consistent with the Coastal Zone Management Act (CZMA). The final concurrence from the State of Florida was issued on 15 May 2013 is in accordance with 15 CFR 930 Subpart C which states that the project is consistent with the Florida Coastal Zone Management Program with conditional concurrence. The two conditions specified for the project are:

- The Ponce de Leon Inlet maintenance dredging and sand bypassing plan detailed in the draft EA must be revised so that dredged material is placed only to the south of the inlet.

- The northern beach and nearshore placement areas can be approved if and only if a new regional sediment budget analysis is conducted and demonstrates that the placement of sand to the north of the jetty is needed to balance the sediment load.

To maintain concurrence with the consistency determination, the Corps will conduct maintenance dredging with placement to occur in the southern beach and/or nearshore areas. Should conditions render placement necessary in the northern beach and/or nearshore areas, a regional sediment budget analysis will be performed as stated in the second condition.

e. Measures will be in place during construction to eliminate, reduce, or avoid adverse impacts below the threshold of significance to fish and wildlife resources including the following:

1. Maintenance dredging would occur within the footprint of the previously maintained Federal channel as would beach and nearshore placement occur within the template of previously permitted and authorized placement areas;

2. All water based activities would follow standard manatee, sea turtle and smalltooth sawfish protection measures and the conditions of the NMFS SARBO;

3. Dredged material placement would comply with the Operations and Maintenance dredging conditions of the USFWS SPBO and programmatic piping plover BO, and

4. The Jacksonville District's Migratory Bird Protection Plan would be followed during the nesting season.

f. Public benefits will be provided with unobstructed channel navigation and beach recreation.

In consideration of the information summarized, I find that the Federal Navigation Project, maintenance dredging of the Ponce de Leon Inlet with beach and nearshore placement of dredged material, will not significantly affect the human environment and does not require an Environmental Impact Statement.

This document will be available to the public on the U.S. Army Corps of Engineers Jacksonville District website at:

http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#Volusia

Alan M. Dodd
Colonel, U.S. Army
District Commander

25 Jun 2013
Date

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DRAFT ENVIRONMENTAL ASSESSMENT

MAINTENANCE DREDGING
PONCE DE LEON INLET
WITH BEACH AND NEARSHORE PLACEMENT
VOLUSIA COUNTY, FLORIDA

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1 PROJECT PURPOSE AND NEED

1.1 INTRODUCTION

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is proposing to conduct periodic maintenance dredging of the federally authorized Ponce de Leon Inlet channel (hereafter referred to as the Inlet), including the entrance, throat, and inner channels leading to the Atlantic Intracoastal Waterway (IWW) in Volusia County, FL. This includes Cuts 1A to 3A, 1S to 3S, and 3N to 13N, along with wideners where the channel converges with the IWW (see **Figure 1**, Project Map). The Inlet entrance channel across the ocean bar will be maintained to a depth of -15.0 feet mean lower low water (MLLW), the Inlet throat to a depth of -12.0 feet MLLW, the southward channel to the IWW to a depth of -12.0 feet MLLW, northward channel Cut-3N, Cut-4N and Cut-5N to a depth of -12.0 feet MLLW, and remaining north channel connector to the IWW to a depth of -7.0 feet MLLW. For each cut, an allowable 2-foot overdepth is authorized. Dredged material would be placed either on the beach north of the north jetty between Florida Department of Environmental Protection (FDEP) monuments R-140 to R-148, or on the beach south of the south jetty between R-158 and R-177. Placement could also occur at the nearshore area located 1 mile south of the south jetty some 1500 feet offshore, at depths between contours -8.0 feet and -18.0 feet MLLW, or at the north nearshore placement area, located north of the north jetty adjacent to the shoreline from R-140 to R-148 also at depths of -8.0 to 18.0 feet MLLW. The dredged material consists of fine grained sand with percent fines ranging from less than 1% to less than 20% passing through the #200 sieve.

Figure 1. Project Location Map.

1.1.1 PROJECT AUTHORIZATION

The Ponce de Leon Inlet was authorized as a Federal navigation project under the Rivers and Harbors Act adopted on October 27, 1965, House Document 74, 89th Congress, 1st session. This provided for a channel of -12-foot minimum depth at MLLW stabilized by rock jetties. Work was completed in July 1972, and maintenance of the Inlet has occurred regularly since initial construction. The most recent maintenance effort occurred in the summer of 2012. The Ponce de Leon Inlet dredging is authorized to a maximum depth of -17.0 feet MLLW within the entrance channel; -14.0 feet MLLW within the inlet throat, southward channel to the IWW, and North channel Cut-3N, Cut-4N, and Cut-5N; and to -9.0 feet MLLW within the remaining north channel connecting to the IWW.

1.2 PROJECT LOCATION

1.2.1 MAINTENANCE DREDGE AREA

The project is to maintenance dredge the Inlet entrance channel, inlet throat, and inner channels leading to the Intracoastal Waterway (IWW). Approximately 200,000 cubic yards of shoal material are expected to be removed every 2 to 4 years to maintain authorized depths. The entrance channel across the ocean bar will be maintained to a depth of -15.0 feet MLLW, the inlet throat to a depth of -12.0 feet MLLW, the southward channel to the IWW to a depth of -7.0 feet MLLW, channel Cut-3N, Cut-4N and Cut-5N to a depth of -12.0 feet MLLW, and remaining north channel to the IWW to a depth of -7.0 feet MLLW. For each cut, an allowable overdepth of 2 feet is authorized (see **Figure 1**).

1.2.2 BEACH PLACEMENT AREA

For beach quality material, deposition of dredged material may occur within the beach placement area located south of the south jetty between R-158 through R-177, or within the north beach placement area located up to 7,500 feet north of the north jetty from R 140 to R 148.

1.2.3 NEARSHORE PLACEMENT AREA

For non-beach quality material, dredged material may be placed in one of two nearshore placement areas. One nearshore placement area begins 1 mile south of the south jetty adjacent to the south beach placement area, from FDEP monument R-158 through R-177, between contours -8.0 feet and -18.0 feet (MLLW), and extends approximately 1 mile south (1 mile long x 800-ft wide). The other nearshore placement area is located north of the north jetty between R-140 and R-148, between contours -8.0 feet and -18.0 feet MLLW, extending 1 mile in length to 800-foot in width; see **Figure 1**. Material in these two nearshore placement areas are to be placed below MHW with a varying berm width. Nearshore placement will occur when an insufficient quantity of material exists to justify the cost of beach placement, when the dredged material contains more than 10% fines, or if the necessary real estate easements for beach placement cannot be acquired.

1.3 PROJECT NEED OR OPPORTUNITY

The relatively high rate of shoal buildup within the Inlet Federal channel necessitates frequent maintenance dredging. Last dredged in August, 2012, the most recent examination survey documented a total in situ shoal volume of approximately 52,000 cubic yards within the authorized channel. Prior to this dredging event, minimum depths recorded from the project channel were less than -9.0 feet, causing navigation hazard for commercial and recreational vessels. Vessels are currently being forced outside the authorized channels in search of deeper water, waiting for high tides, or plowing through the channels with boat propellers. Removal of the shoal material would maintain the navigable capacity of the project channel. In addition, placement of dredged material on the beach or in the nearshore environment could partially attenuate erosional effects on this FDEP-designated critically eroded beach.

The Ponce de Leon Inlet channel is utilized most frequently by commercial sport fishing, sight-seeing excursions, and private recreational boaters including non-motorized recreational kayaks and canoes. The channel also provides access to the United States Coast Guard (USCS) for their mission operations.

ERDC, the research arm of the USACE, conducts the Radar Inlet Observing System (RIOS) program, which was designed to monitor shoals and currents around inlets. The system relies on reflection by X-band radar, and studies the reaction of rough waters, or breaking waves, to provide data on shoal morphology and wave orbital velocities. The program is able to monitor the morphodynamic evolution of a newly dredged channel in an inlet. The use of this technology at the Ponce de Leon Inlet will provide evidence of a nodal point, or the point at which a sediment-laden current direction diverges to deposit the material in opposing locations along the coastline. On-going study of recent maintenance activities are expected to reveal areas of beneficial material buildup on the shoreline from natural processes.

1.5 DECISION TO BE MADE

This Environmental Assessment (EA) will evaluate whether to conduct periodic maintenance dredging of Ponce de Leon Inlet, Volusia County, FL, and if so, recommend alternatives to accomplish that goal.

1.6 PROJECT HISTORY AND RELATED DOCUMENTS

1.6.1 PROJECT HISTORY

Ponce de Leon Inlet

The Federal Inlet channel has a shared dredging history (as illustrated in **Table 1**, pages 5- 6) due to its direct connection with the IWW. Rapid shoal build-up of the channels, particularly adjacent to the Ponce Inlet community, has required frequent attention. Routine maintenance has been conducted on both of these waterways through numerous events starting in 1973 until the most recent event of 2012. Dredged material has historically been placed either on the north or

south beach; in the swash zone adjacent to the north beach; or in nearshore adjacent to New Smyrna Beach.

Table 1. Ponce de Leon Inlet Federal Channel Maintenance History

Year of activity	Description of Action
1973	- Maintenance Dredging North Inner Channel - Award Date of 6/22/1973 - Contract No. 73-83 - Contractor: Trans-State Dredging Company - Amount: $346,110.00 - Dredge Quantity: Data Not Available
1974	- Maintenance Dredging of Entrance Channel & South Shoal, with breach closure & North Beach Placement. - Award Date of 3/27/1974 - Contract No. 74-37 - Contractor: Parkhill-Goodlock Co Inc. - Amount: $697,750.00 - Dredge Quantity: Data Not Available
1984	- Maintenance Dredging, South Inner Channel, 12 foot project - Award Date of 5/08/1984 - Contract No. 84-22 - Contractor: C-Way Construction Co. - Amount: $58,880.00 - Dredge Quantity: Data Not Available
1988	- Maintenance Dredging, 12-ft Channel Project - Award Date of 1/25/1989 - Contract No. 89-C-08 - Contractor: Prosperity Dredging Company, Inc. - Amount: $3,834,000.00 - Dredge Quantity: Data Not Available
1999	- Extension of the North Jetty - 800 feet extension westward - 1,540 feet of rock revetment placed westward into Lighthouse Point Park
2005	- 125009 Ponce De Leon Inlet - Award Date of 6/02/2005 - Contract No. W912EP-05-C-0027 - Contractor: Govcon, Inc. - Amount: $1,079,749.40 - Dredge Quantity: 115,339 CY.
2009	-125009 Ponce De Leon Inlet - Award Date of 07/15/2009 - Contract No. W912EP-09-C-0040 - Contractor: Govcon, Inc. - Amount: $1,506,263.40 - Dredge Quantity: 184,000 CY.
2011	- 125009 Ponce De Leon Inlet

	- Maintenance activity conducted by USACE CURRITUCK -Dredge Quantity: 30,125 CY
2012	- 125009 Ponce De Leon Inlet - Maintenance activity conducted by USACE CURRITUCK - Contract No. N/A - Contractor: N/A - Amount: N/A -Dredge Quantity: 52,000 CY

1.6.2 RELATED ENVIRONMENTAL DOCUMENTS

Numerous maintenance dredging projects have occurred within and adjacent to the Inlet. Most of the work was completed to the Federal Inlet channel, or in association with various IWW channel cuts, with placement at a Dredged Material Management Area (DMMA) within the immediate area of Ponce Inlet, or other nearshore, beach and upland locations. The discussion below includes both Ponce de Leon Inlet and associated IWW maintenance dredging projects. These descriptions included information such as Public Notices (PN) and Environmental Assessments (EA) found within the USACE records. Projects related to the IWW will include dredging of cuts that start with "V-" followed by a number (i.e. V-24), whereas projects specific to the Federal channel of the Ponce de Leon Inlet will be described as "entrance", "north" and/or "south" channels, or connection to the IWW. Later documents included numerical order of Inlet channels followed by a north or south designation (i.e. 3N, 1S, etc).

- 7 October 1992—Construction Operations Navigation (CO-ON) Statement of Findings (SOF) requested State of Florida Water Quality Certificate (WQC) #05-16-18-55-640957439 (IWW J-M), issued 09 September 1986, expired 09 September 1996. Proposed FY93 maintenance dredging of IWW Cuts V-23 to V-27. Disposal option was specific to Ponce de Leon Inlet. WQC #640516879, issued 22 June 1984, expired on 22 June 1994 referenced modification of beach placement for berm expansion on north beach, for beneficial use of sand.

- 18 March 1994—CO-ON SOF referenced Ponce de Leon Inlet hydrographic survey of January 1992 requested WQC Permit appropriation. Scope of Work included entrance channel through the Inlet, south to the Halifax River connecting to the IWW. Placement of dredged material was at the impoundment adjacent to the north jetty and on the channel side of the north jetty to prevent undermining. All material was beach quality for shoreline placement.

- 23 March 1994— CO-ON SOF requests maintenance dredging for Ponce de Leon Inlet projected for FY95; Scope of Work included dredging shoaled areas in the entrance and inner channels along with core borings in shoaled areas.

- 10 October 1995— CO-ON SOF addressed maintenance of the north jetty and scour apron installed in 1978 along the southside of the jetty in an area of potential breach.

Survey of July 1994 found the channel had migrated up against the north jetty, with depths >20 feet.

- August 1998—Environmental Assessment (EA) completed, with corresponding Finding of No Significant Impact (FONSI) signed 13 April 1999. Project description from the EA:

  > "The maintenance dredging includes the Inlet and portion of the north and south channels. The dredged material would be transported outside of the Inlet south of the south jetty, where the material would be deposited and transported to shore by wave action. The project would generate approximately 500,000 cubic yards of dredged material per event, with frequency estimated every four years. The two dredging areas included the southern end of the Halifax River channel starting near Live Oak Point and ending at the landward side of the Inlet; along with the northern extent of the Indian River from the Inlet south approximately 1.4 mile to the junction with the IWW. Finally, the dredging would include the entrance channel from the junction of the aforementioned dredge areas to a distance of approximately 0.7 mile offshore. The nearshore placement area, 1 mile long by 800 feet wide, is located approximately 1 mile south of the south jetty, positioned approximately 1500 feet east of land in -12.0 to -18.0 feet of water at MLW. An alternative placement consisted of pumping the material to the beach located north of the north jetty for beneficial renourishment. The beach placement area is described as "north of the north jetty extending from 2000 feet south and west of the north jetty, to a point 6000 feet north of the north jetty; the placement area being 300 feet wide with a 10-foot height at MLW" (USACE EA, 1998).

- August, 2004—An EA and FONSI, signed 10 December 2004, addressed maintenance dredging of IWW Cuts V-22 to V-40 and two new settling basins at V-23 and V-26, along with maintenance dredging of an existing basin feature at V-24. A total volume of 1.1 million cubic yards was authorized for removal with placement in the designated nearshore south of the Inlet, the DMMA 434/434C, and beneficial use along the shoreline south of the south jetty. This EA does not include the Ponce de Leon Inlet channels, or placement of dredged material north of the north jetty either on the beach or nearshore.

- 22 November 2006—PN-CO-IWW-281 included a project description for routine maintenance of the IWW navigational channel including dredging of Cuts V-22 to V-36 with upland (DMMA 434/434C) and beach placement of dredged material. The work was to be conducted in late 2006 and early 2007. The EA for the IWW maintenance dredging project was based on the EA/FONSI described below.

- February 2007—Revised EA, with FONSI signed 10 April 2007. Project description included maintenance dredging of the IWW in the vicinity of the Ponce de Leon Inlet at Cuts V-22 through the northern portion of V-36, two new settling basins at Cuts V-23 and V-26, and a third existing settling basin at V-24. Up to 672,000 cubic yards of material would be removed, with 108,000 cubic yards to be placed on the beach south of

the Inlet from FDEP monument R-158 to R-175, and an estimated 264,000 cubic yards to be placed in the DMMA 434/434C south.

1.7 PERMITS REQUIRED AND ENVIRONMENTAL COMPLIANCE

A chronology of the State permit history for the Ponce de Leon Inlet and associated IWW projects is presented below.

Ponce de Leon Inlet Operation and Maintenance Related Permits

- 22 November 1999—FDEP Permit #0129417-001-JC, issued for Ponce de Leon Inlet, expired 22 November 2009. The permit also included the Coastal Zone Management Act (CZMA) consistency certification with state water quality standards pursuant to Section 401 of the Clean Water Act, 33 U.S.C. 1341. The permit authorized dredging in the entrance and inlet channels leading to the IWW, and IWW Cut V-23 at the channel intersection. Up to 200,000 cubic yard of dredge material was expected for removal every four years with placement on the south beach between R-159 and R-161 and in the beach placement area located up to 6000 feet north of the north jetty for beach quality material. Nearshore placement would occur only in an emergency situation when an insufficient quantity of material exists to justify the cost of beach placement or when the dredged material contains more than 10% fine grained material.

- 14 July 2009—Modification of this permit was issued under FDEP Permit # 01294170-002 JN for a time extension of the original permit's expiration date. The modified permit extended the expiration date to 22 November 2011 in order to conduct urgent maintenance in the Inlet by the special purpose dredge USACE CURRITUCK; this work occurred from 26 July to 9 August 2011. According to Notice of Completion of 12 August 2011 from the USACE (SAJ-OD-NB) to FDEP Beach and Coastal Systems Office, a total volume of 30,000 cubic yards of dredged material was removed from Inlet cuts 3N, 4N, 5N, and southward Cut 1S. Placement of the material occurred north of the north jetty in the approved template between +10.0 feet to -10.0 feet MLLW contours. No endangered species and/or marine activity were encountered, and no turbidity exceedance measurements were recorded that could impact water quality. Copies of the FDEP Permit #0129417-001-JC (1999), FDEP Permit #0129417-002-PN (2009), and Notice (2011) are included in Appendix C.

- 3 August 2012— The current FDEP Permit modification, FDEP File no. 0308009-001 JC, was issued to USACE, with expiration date of 3 August 2022. The purpose of the permit modification is for maintenance dredging of the Ponce de Leon Inlet entrance channel, inlet throat and north and south channels leading to the IWW (a.k.a. Halifax River) for an estimated volume of 200,000 cubic yards of material, with events projected every four years. Placement would occur in the nearshore area one mile south of the south jetty, or on beaches both north and south of the Inlet. A permit modification may be sought to further explore placement options for all proposed beach and nearshore sites.

Intracoastal Waterway Related FDEP Permits

- 26 August 1993—State permit modification was issued to Permit #05-16-18-55-640957439, regarding maintenance of the IWW. The modifications included adding Cuts V-23 to V-29 with disposal of material on the north side of Ponce de Leon Inlet in site MSA (DMMA) 434. The permit modification excluded IWW Cuts V-23 and V-27 through V-29. Previous beach placement areas were authorized under Permit #6040516879. The permit modification added authorization of one new beach placement area for a one-time use: material from V-24 to V-29 to be placed as beach disposal.

- 1 July 2005—FDEP Permit Modification #0177220-004 JC, pertained to the DMMA 434/434C off-loading of dredged material for the proposed construction of a dune system within the permitted beach placement area of FDEP monument R-161 to R-175. FDEP Permit Modification #0177220-008 JC extended the dune template southward to R-189. The two modification requests were subsequently combined into one permit, FDEP Permit Modification #0177220-007 JC. A variance was issued by the FDEP on 5 August 2005 under Permit Modification #0177220-008 EV that extended the expiration date to 3 October 2008. No other modifications to project specifications or conditions were authorized.

- 27 July 2009—FDEP Permit Modification #0183817-006-BN and Permit # 0183817-001 JC were issued for IWW maintenance dredging to extend the original permit expiration date from 18 January 2010 to 18 January 2015. Briefly, FDEP Permit #0183817-001 JC was issued 18 January 2005 for the removal of 400,000 to 800,000 cubic yards every two to three years. Proposed channels for maintenance dredging included IWW Cuts V-22 north of Ponce de Leon Inlet to V-40 south of Mosquito Lagoon Aquatic Preserve, three wideners in Cuts V-23, V-24, and V-26 settling basins. Placement of dredged material included the upland disposal site adjacent to V-26, as authorized by the St. Johns River Water Management Permit 4-127-65055-1, or in the nearshore under FDEP Permit 0177220-001 JC.

1.8 SCOPING AND ISSUES

1.8.1 ISSUES EVALUATED IN DETAIL

The following issues were identified to be relevant to the proposed action and appropriate for detailed evaluation:

a. Water Quality
b. Sediment Compatibility
c. Fish and Wildlife, including Endangered Species and Critical Habitat
d. Essential Fish Habitat (EFH)
e. Cultural Resources
f. Aesthetics
g. Navigation
h. Economics
i. Recreation
j. Noise

2 ALTERNATIVES

The alternatives section is perhaps the most important component of this EA. It describes the no-action alternative, the proposed action, and other reasonable alternatives that were evaluated. The beneficial and adverse environmental effects of the alternatives are presented in comparative form, providing a clear basis for choice to the decision maker and the public. A preferred alternative was selected based on the information and analysis presented in the section on the Environment Effects, (see Section 4, page 43).

2.1 DESCRIPTION OF ALTERNATIVES.

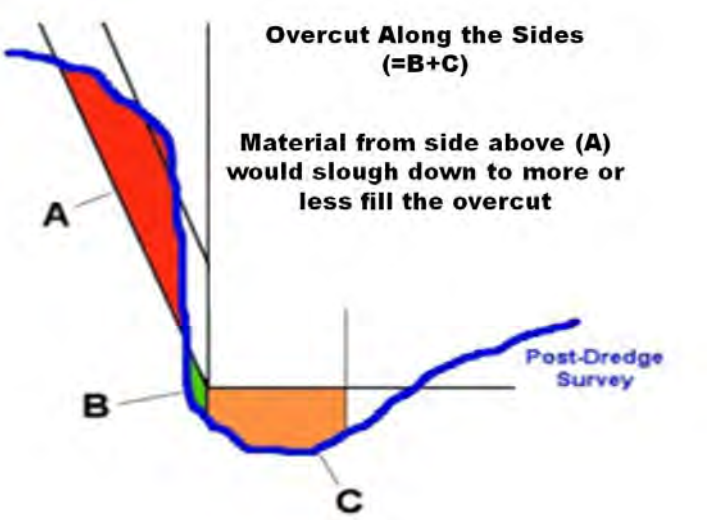
2.1.1 NO ACTION ALTERNATIVE

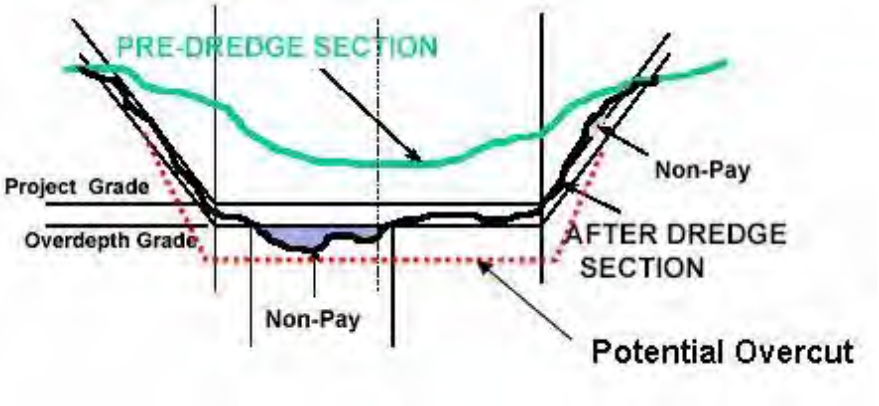
The project channels would not be maintenance dredged. This would result in increased shoal buildup and unsafe navigation conditions for vessels. In addition, the down-drift, critically eroded beaches would not receive the benefit of Inlet-bypassed sediments.

2.1.2 MAINTENANCE DREDGING ALTERNATIVE

The proposed periodic maintenance dredging of the project channel would occur as planned (refer to Section 1.1 for more detail). The Corps does not normally specify the type of dredging equipment to be used. This is generally left to the dredging industry to offer the most appropriate and competitive equipment available at the time. Nevertheless, certain types of dredging equipment are normally considered more appropriate depending on the type of material, the depth of the channel, the depth of access to the disposal or placement site, the amount of material, the distance to the disposal or placement site, or the wave-energy environment, etc. A more detailed description of types of dredging equipment and their characteristics can be found in Engineer Manual, EM 1110-2-5025, *Engineering and Design - Dredging and Dredged Material Disposal*. This Engineer Manual is available on the internet at http://www.usace.army.mil/publications/eng-manuals/em1110-2-5025/toc.htm.

The plans and specifications normally require dredging beyond the project depth or width. The purpose of the "required" additional dredging is to account for shoaling between dredging cycles (reduce the frequency of dredging required to maintain the project depth for navigation). In addition, the dredging contractor is allowed to go beyond the required depth. This "allowable" specification accounts for the inherent variability and inaccuracy of the dredging equipment (normally ±2 feet).





Overdepth = required + allowable

In addition, the dredge operator may practice over-cutting. An "over-cut" along the sides of the channel may be employed in anticipation of movement of material down the sides of the channel. Over-cut throughout the channel bottom may be the result of furrowing or pitting by the dredging equipment (the suction dredge's cutterhead, the hopper dredge's drag arms, or the clam-shell dredge's bucket). As a result, some mixing and churning of material below the channel bottom may occur (especially with a large cutterhead). Generally, the larger the equipment, the greater the potential for over-cut and mixing of material below the "allowable" channel bottom. Some of this material may become mixed-in with the dredged material. If the characteristics of the material in the overcut and mixing profile differ from that above it, the character of the dredged material may be altered. The quantity and/or quality of material for disposal or placement may be substantially changed depending on the extent of over-depth and over-cut.

Frequent maintenance dredging operations in the project channel have taken place since they were originally constructed to the authorized project depths. The most recent maintenance event in 2012 removed approximately 52,000 cubic yards of material from the project channel and placed this material in the south nearshore placement area. Dredging of the project channels has been typically performed with a hydraulic cutterhead pipeline dredge although a clamshell or small hopper dredge could also perform the work.

Since dredging equipment does not typically result in a perfectly smooth and even channel bottom (see discussion above); a drag bar, chain, or other item may be dragged along the channel bottom to smooth down high spots and fill in low spots. This finishing technique also reduces the need for additional dredging to remove any high spots that may have been missed by the dredging equipment. It may be more cost effective to use a drag bar or other leveling device.

2.1.3 DREDGED MATERIAL PLACEMENT OPTIONS

2.1.3.1 BEACH PLACEMENT

Beach placement — placing dredged material compatible with the native beach sands on the beach — is an approach to dredged material management that the State of Florida encourages. In fact, the FDEP Bureau of Beaches and Coastal Systems (BBCS) Strategic Beach Management Plan for the Central Atlantic Coast Region (FDEP BBCS website, 2012) recommends the continued placement of beach quality dredged material from the maintenance of the project channel on the shoreline along Volusia County, including Ponce Inlet (hereafter referred to as north beach placement) and New Smyrna Beach (hereafter referred to as south beach placement) (FDEP May, 2008). The Corps also includes this approach as an essential part of dredged material management for channel reaches which, based on historic data, are likely to contain beach quality sediments. These conditions are most typically encountered immediately adjacent to tidal inlets where waterway shoals are formed primarily by sand driven through the inlet by waves and tides. The material historically dredged here has been beach quality in compliance with the Florida State "Sand Rule" (62B-41.005(15), Florida Administrative Code (F.A.C.) and the south placement areas are designated by FDEP as critically eroded (FDEP May, 2012). Thus dredged material from the project channels has been routinely placed on the beach south and north of the inlet. The north beach placement area is not currently considered critically eroded by FDEP. Access to the beach placement areas will occur by pipeline slurry with discharge and distribution by heavy equipment.

The two beach placement areas are described as follows:

- North beach placement: Shoreline at 300-ft wide berm from +10 feet to -10 feet MLLW up to 7,500 feet north of the north jetty from FDEP monuments R-140 through R-148.

- South beach placement: Shoreline starting approximately 7430 feet south of the south jetty between FDEP monuments R-158 through R-177.

2.1.3.2 NEARSHORE PLACEMENT

Material that does not qualify for beach placement would be placed adjacent to the beach area in one of two proposed nearshore placement areas via either pipeline or bottom-dumping from a hopper dredge. The two placement areas are described as follows and are depicted on **Figure 1**:

- North nearshore placement area: Located immediately north of the north jetty between FDEP monuments R-140 and R-148, between contours -8.0 feet and -18.0 feet MLLW. The dimensions are roughly 1 mile long by 800 feet wide.

- South nearshore placement area: Located one mile south of the south jetty ending at R-161; the dimensions are 1 mile long by 800 feet wide, between contours -8.0 feet to -18.0 feet at MLLW.

Pursuant to the Florida State "Sand Rule" (Chapter 62B-41.0072J), sandy sediment derived from the maintenance of coastal navigation channels shall be deemed suitable for beach placement with up to 10 percent fine material passing the #230 sieve. If this material contains between 10 percent and 20 percent fine material passing the #230 sieve by weight, and it meets all other sediment and water quality standards, it shall be considered suitable for placement in the nearshore portion of the beach. Therefore, this placement alternative would be used if the dredged material were deemed incompatible for beach placement but in compliance with the sand rule for nearshore placement. The nearshore placement option would also be used if one of the Corps special purpose dredges (CURRITUCK or MURDEN) performs the dredging because these vessels have only bottom-dump capability.

2.2 HISTORY OF ALTERNATIVE FORMULATION

Maintenance dredging of the Federal navigation channel within the Inlet has been required frequently between 1973 to the most recent event of 2012. Beneficial use of the beach quality dredged material has been the preferred and most cost effective dredged material placement alternative. Previous events have also used the nearshore placement area that is present some 1500-feet offshore of the south beach placement area. Given the available dredged material placement options and the Federal mandate to maintain free and unobstructed access to the nation's navigational waters, as well as the high cost of ocean dredged material disposal sites (ODMDS), other dredging and placement alternatives were not considered practicable.

2.3 ALTERNATIVES COMPARISON

The effects of alternatives considered for this project are compared and summarized in **Table 2**. This comparison lists the major features and consequences of the emergency action and alternatives. See Environmental Effects Section 4.0, starting on page 43, for a more detailed discussion of the potential impacts of each alternative.

Table 2. Alternative Comparison Chart.

ENVIRONMENTAL FACTOR	ALTERNATIVE 1: NO ACTION STATUS QUO	ALTERNATIVE 2: DREDGING WITH BEACH PLACEMENT (BOTH NORTH AND SOUTH)	ALTERNATIVE 3: DREDGING WITH NEARSHORE PLACEMENT (BOTH NORTH AND SOUTH)
WATER QUALITY	No Impact	Short-term localized increase in turbidity at the dredge site and in surf zone along the beach placement area. Turbidity impacts are expected to be minimal since the source of material would contain less than 10% fines.	Short-term localized increase in turbidity at the dredge site and in surf zone along the nearshore placement area. Turbidity impacts are expected to be minimal since the source of material contains less than 20% fines.
WEST INDIAN MANATEE	Manatees could become injured through collision or trapped by vessels passing overhead from inadequate clearance between the channel bottom and vessel.	Dredging and beach placement not likely to adversely affect manatees with implementation of standard protection conditions. Increased boat traffic from restored navigability but reduced travel time and distance in shallow inland waters.	Dredging and nearshore placement is unlikely to adversely affect manatees with implementation of standard protection conditions. Increased boat traffic from restored navigability but reduced travel time and distance in shallow inland waters.
SEA TURTLES	No dredging means no O&M material to place on the critically eroded nesting beach.	Short-term impacts to sea turtle nesting during beach placement through relocation of nests from the project area; Gain of sea turtle nesting habitat from beach placement on critically eroded beach.	Short-term impacts to nesting sea turtles during nearshore placement; Benefit to sea turtle nesting habitat from shoreward migration of the dredged material.
NORTH ATLANTIC RIGHT WHALE	No effect.	No adverse effects are anticipated for in-water work during dredging and beach placement.	No adverse effects are anticipated for in-water work during dredging and beach placement.
ESSENTIAL FISH HABITAT	Continued accretion in channel and water column displaces EFH.	No substantial adverse impacts to sandy channel bottom, water column, or ocean high salinity surf zone habitat anticipated during dredging and beach placement.	No substantial adverse impacts to sandy channel bottom, water column and ocean high salinity surf zone habitat with unconsolidated substrate during dredging and nearshore placement.
PIPING PLOVER	Monitoring of intertidal and beach areas within project area has shown no long-term net loss of habitat from dredging activities. No dredging of channel should have negligible effect.	No net loss of critical habitat is anticipated due to dredging based on continued maintenance of the channel within the critical habitat unit FL-34; beach placement should augment critical habitat through littoral drift (see section 4.7.2.3). Monitoring of intertidal zone adjacent to the channel found that dredging has not impaired use of shoreline (disappearing islands).	Alteration, but no net loss, of critical habitat is anticipated due to dredging based on long-term shoreline monitoring; nearshore placement should augment critical habitat through littoral drift.
MIGRATORY BIRDS	Monitoring of intertidal and beach areas within project area has shown no long-term net loss of habitat from dredging activities. No dredging of channel should have negligible effect. (see section 4.6).	If dredging and beach placement occur during the nesting season (approximately April 1 – August 31) a migratory bird protection plan would be implemented to insure protection of nests.	If dredging occurs during the nesting season (approximately April 1 – August 31) a migratory bird protection plan would be implemented to insure protection of nests.

ENVIRONMENTAL FACTOR	ALTERNATIVE 1: NO ACTION STATUS QUO	ALTERNATIVE 2: DREDGING WITH BEACH PLACEMENT (BOTH NORTH AND SOUTH)	ALTERNATIVE 3: DREDGING WITH NEARSHORE PLACEMENT (BOTH NORTH AND SOUTH)
VEGETATION	No effect.	Potential temporary impact during dredging from material placement could occur to existing beach vegetation. Vegetation is expected to naturally recruit at affected area within the growing season post event.	Nearshore placement would have no impact to beach vegetation.
HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)	No effect.	No effect anticipated; channel has been dredged frequently since 1973 and material placed on the beach with no impact to or from HTRW.	No effect anticipated; channel has been dredged frequently since 1973 and material placed on the beach with no impact to or from HTRW.
NAVIGATION	Continued shoaling in the Federal channel would have a significant adverse impact on navigational safety. Efficiency of USCG emergency rescue operations could be affected by obstruction in navigable channel.	Dredge barge and pipelines could temporarily alter navigation patterns during construction; However, authorized channel depths would be restored which is a lasting beneficial impact. North beach placement could increase long term maintenance costs due to more frequent events resulting from longshore drift into the Inlet.	Dredge barge and pipelines could temporarily alter navigation patterns during construction; However, authorized channel depths would be restored which is a lasting beneficial impact. North nearshore placement could increase long term maintenance costs due to material drifting back in the Inlet channel.
ECONOMICS	Continued shoaling in the channel would have a significant adverse impact on recreational and commercial vessel traffic which would have a substantial impact on the local economy.	Restored authorized channel depths would benefit the local economy; beach placement could also benefit the local economy through increased beach tourism revenues. North beach placement could increase long term maintenance costs due to more frequent events resulting from longshore drift into the Inlet.	Restored authorized channel depths would benefit the local economy; nearshore placement could also benefit the local economy through increased beach tourism revenues as the material is transported through littoral drift to augment the dry beach. North nearshore placement could increase maintenance dredging event frequency of events resulting from longshore drift into the Inlet.
CULTURAL RESOURCES	No effect.	Potential to adversely affect historic properties.	Potential to adversely affect historic properties.
RECREATION	Continued shoaling in the channel would have a significant adverse impact on recreational activities.	Temporary disturbance due to project dredge and beach placement activities; However, authorized channel depths would be restored and recreational beach increased through placement which are lasting beneficial impacts.	Temporary disturbance due to project dredge and nearshore placement activities; However, authorized channel depths would be restored and critically eroded recreational beach augmented through nearshore placement which are lasting beneficial impacts.
AESTHETICS	Shoal buildup in channel and eroded beach may negatively impact local aesthetic resources.	Dredging equipment would have a temporary impact on local aesthetics. However, restored navigation channel and beach should be beneficial to local aesthetics.	Dredging equipment would have a temporary impact on local aesthetics. However, restored navigation channel and nearshore berm could be beneficial to the local aesthetic resources.

ENVIRONMENTAL FACTOR	ALTERNATIVE 1: NO ACTION STATUS QUO	ALTERNATIVE 2: DREDGING WITH BEACH PLACEMENT (BOTH NORTH AND SOUTH)	ALTERNATIVE 3: DREDGING WITH NEARSHORE PLACEMENT (BOTH NORTH AND SOUTH)
NOISE	Grounded vessels and the rescue equipment required to free them could generate increased local noise levels as the channel shoal buildup accumulates and becomes impassable.	Dredging and placement equipment operations would temporarily increase the local noise levels; However, levels should return to normal at conclusion of project construction.	Dredging and placement equipment operations would temporarily increase the local noise levels. However, levels should return to normal at conclusion of project construction.

2.4 PREFERRED ALTERNATIVE

The preferred alternative is to perform the proposed maintenance dredging of the project channel with beach and nearshore placement of dredged material. Beach placement is the preferred alternative due to the need for beach quality material to nourish critically eroded nearby beaches. Nearshore placement is the preferred alternative for disposal of lesser quality (fines >10% of total sediment) dredged material, or when dredging equipment methodology requires >10 feet of open water for discharge of dredged material.

A Federal Coastal Zone Management Act (CZMA) consistency determination (CD), included in the FDEP correspondence dated 15 May 2013 (Appendix E), is in accordance with 15 CFR 930 Subpart C. The CD states that the project is consistent with the Florida Coastal Zone Management Program with conditional concurrence. The two conditions specified for the project are:

- The Ponce de Leon Inlet maintenance dredging and sand bypassing plan detailed in the draft EA must be revised so that dredged material is placed only to the south of the inlet.

- The northern beach and nearshore placement areas can be approved if and only if a new regional sediment budget analysis is conducted and demonstrates that the placement of sand to the north of the jetty is needed to balance the sediment load.

To maintain concurrence with the CD, the Corps will conduct maintenance dredging with placement to occur in the southern beach and/or nearshore areas. Should conditions render placement necessary in the northern beach and/or nearshore areas, a regional sediment budget analysis will be performed as stated in the second condition.

3 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This section describes the existing environmental resources of the areas that would be affected if either of the alternatives is implemented. It describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those resources that could be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "No Action" alternative, forms the baseline conditions for determining the environmental impacts of the Preferred Alternative.

3.2 GENERAL ENVIRONMENTAL SETTING

Prior to 1968, the Ponce de Leon Inlet (formerly known as the Mosquito Inlet in Colonial time) had functioned as a natural passage through barrier islands that separated the Atlantic Ocean

from the Halifax and Indian Rivers. Build up of ebb shoal created obstacles to safe navigation which led to the construction of two rubble-mound jetties along with channel dredging. This work occurred from 1968 to 1972 (ERDC/CL CHETN-IV-54, 2002).

The Ponce de Leon Inlet Federal navigation channel included within the project area is immediately adjacent to Lighthouse Point Park, a public facility located north of the Inlet, and New Smyrna Beach State Park, located south of the Inlet. Due to recent storm activity, accreted material has created shoal obstruction within the authorized Federal channel, see **Figure 2**. The entrance channel begins some 0.7 mile waterward from the shoreline in the Atlantic Ocean. It is flanked on both sides by jetties. The north jetty extends approximately 4000 feet to its terminus. The south jetty is significantly shorter; less than 1000 feet of rubble is exposed from its start on the shoreline to its terminus. The throat of the channel splits at the intersection with the Halifax River; one channel is located to the north along the backside of Ponce Inlet, and the other channel is located south along the backside of New Smyrna Beach. Both of these channels connect to the Atlantic IWW.

The shoreline consists of a gradually sloping beach that extends from an upland dune to the intertidal swash zone. Areas of shoal build-up, often referred to as "disappearing islands" are exposed at low tide and are dynamic in their creation and migration by wave action or storm influence. Exposed fine sand and silt of the shoal extend into the designated Federal channel at MLLW, but "disappear" at high tide. This area supports moderate to high potential piping plover suitable habitat; see Section 3.3.8.3 for further discussion.

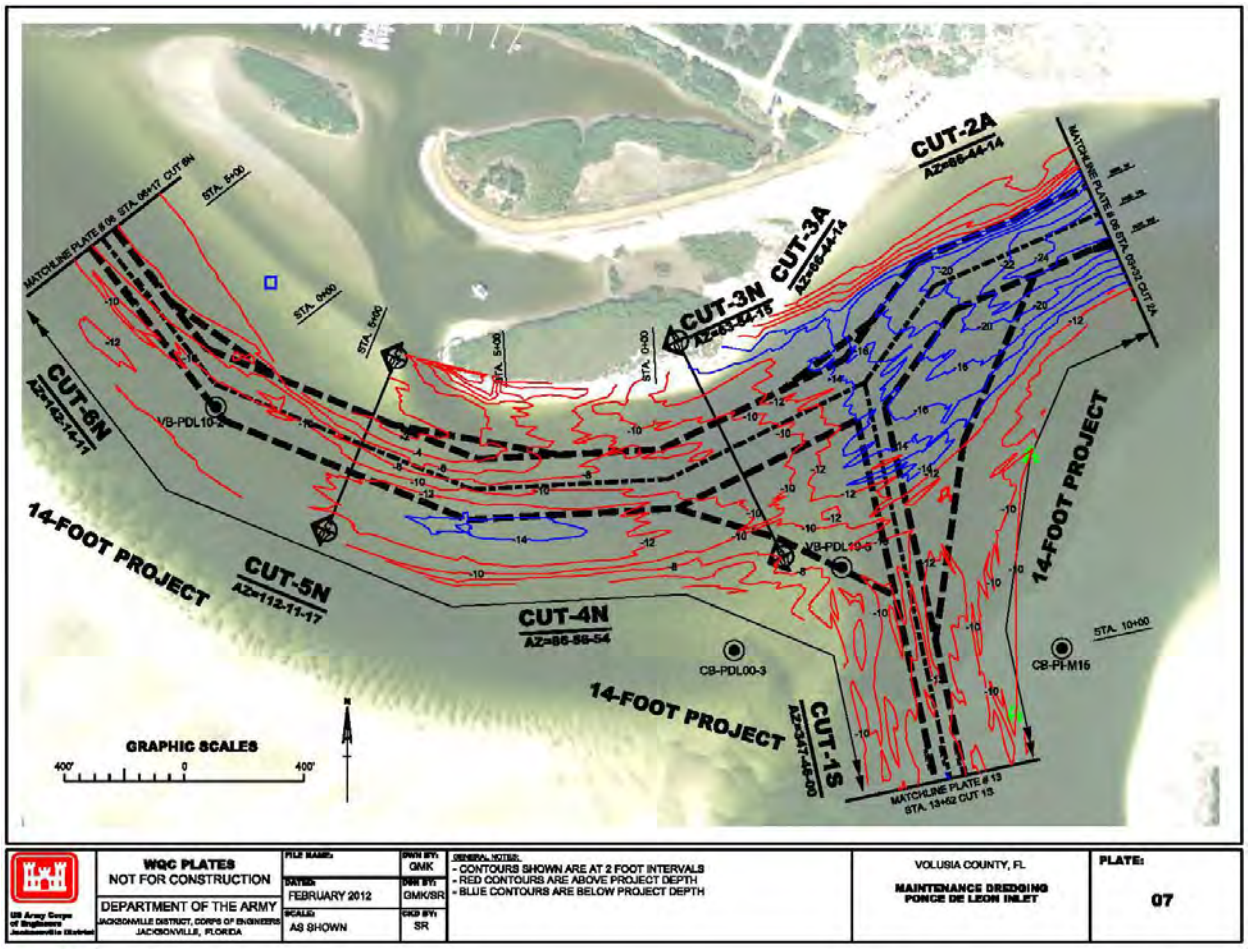


Figure 2. The "throat" of the Ponce de Leon Inlet (Cuts 3N to 5N and 1S) is problematic as shoal obstruction develops rapidly, requiring frequent dredging to sustain navigability. (Note the shoal buildup north and south of the channel creating "disappearing islands").

3.3 ENVIRONMENTAL FACTORS THAT WOULD BE AFFECTED

3.3.1 PHYSICAL

The Halifax River originates at Tomoka Bay, at the confluence of the Tomoka River, Bulow Creek and Halifax Creek. The river's drainage basin, or catchment, includes most of eastern Volusia County, which includes flow from both the Tomoka River and Halifax Creek. The total area covers 390 square miles. Water flows south for a distance of 25 miles and merges with the Spruce Creek and the Mosquito Lagoon before connecting to the Atlantic Ocean through the Ponce de Leon Inlet (Wikipedia, 2012).

3.3.2 WATER QUALITY

The Ponce de Leon Inlet channel is located within an area bounded by barrier islands to the east and mainland to the west. The entrance channel extends 700 feet eastward of the barrier island. No portion of the Inlet is within a designated Florida Outstanding Waters or Aquatic Preserve. The Federal Clean Waters Act requires that the surface water of each state be classified in

accordance with designated uses. The project site is located within a Class III surface water quality (Chapter 62-302, F.A.C.), which is designated for general use of recreation including swimming. Both the Inlet and Halifax River are considered to be Impaired Waters pursuant to Chapter 62-303(d), F.A.C. due to higher than acceptable levels of mercury in fish tissue. The Halifax River is also listed on the 62-303(d) due to elevated nutrients, coliform bacteria, copper, lead and iron (Haydt and Frazel, 2003).

Surface water quality data has been evaluated by the St. Johns River Water Management District (SJRWMD) since the mid 1990's as part of the Water Quality Index program. The sample point closest to the Inlet (No. 27010037) is located on the Halifax River (a.k.a. IWW) 100 feet north of the Beach Memorial Bridge located in Daytona Beach, FL. The outlet for the Halifax River is the Inlet, some 5 miles south of the sample point. Waters within the Halifax River exhibit estuarine properties, such as a near-neutral pH and good buffering capability. Total suspended solids, phosphorus, and chlorophyll concentrations are higher than typically found in other estuaries. In contrast, total organic carbon and total nitrogen concentrations are lower than typically found (SRJWMD, 2012). At the Halifax River sample point location from 2007 to 2011, field measured dissolved oxygen (DO) ranged between 4.6 mg/L and 10.9 mg/L, with a median value of 6.58 mg/L (SJRWMD, 2012 http://floridaswater.com/watershed/factPages/27010037.html).

Turbidity is defined as the cloudiness of haziness of a fluid caused by individual particles (suspended solids) that are generally invisible to the naked eye, and includes both organic and inorganic material. Turbidity measurement in collected samples determines the amount of suspended particulate matter present within the water column to which the extent of light passing through it is reduced. Increased turbidity in estuaries can be a result of suspended bottom sediments from wind and wave action, storm water runoff from the watershed, erosion and other factors. Excessive turbidity in estuaries has a variety of physical and biological detrimental effects, including stressed fish spawning and survivability (Bash and Berman, 2001). Florida Surface Water Quality Standards state that turbidity shall never exceed 29 NTU above natural background conditions. Turbidity values within the Halifax River near the Inlet are considered generally average (median value of 8.83 NTU). From 2007 to 2011, turbidity values ranged from 3.4 (February, 2007) to the highest reading of 29.3 (June, 2011). The second highest turbidity value of 27.8 NTU was recorded on 15 June, 2011 (SJRWMD, 2012).

Excessive turbidity is also measured by the amount of total suspended solids (TSS) in the water column. The presence of increased suspended matter reduces water clarity, thus resulting in degraded overall surface water quality. From 2007 to 2011, TSS values from samples collected at the Halifax River sample point measured lowest at 7.5 mg/L on 5 February 2011, to its highest of 94.0 mg/L on 15 June, 2011 (SJRWMD, 2012).

3.3.3 SEDIMENT ANALYSIS

Geotechnical data was collected in May, 2010 from core sampling within Inlet Cuts 1S, 6N and 7N, **Figure 3**. Grain size analyses were performed on the individual samples from the channel. This geotechnical data was used in conjunction with thirteen historical borings as well as background knowledge of the project to characterize the material within the areas to be dredged

or used as placement options. The composite samples have a mean grain size of 2.13 phi or 0.23 mm, and a stand deviation of 1.36 phi. The percentage of fines passing through the #230 sieve is 1.26%, and the average visual shell content is 28.19%. The Munsell™ colors of the samples are described as 10YR 6.1, 10YR 7.1, and 10YR 8/1.

Additionally, beach samples were collected at locations from FDEP monuments R-140 through R-147 and R-158 through R-161 in November 2010, and from R-162 through R-177 in May 2011. Grain size analyses were performed on the individual samples. A representative composite sample was created using the sample results. The composite sample classifies the sediments as poorly-graded, fine-grained quartz sand with trace to little fine grained sand-sized shell fragments. The samples have a composite mean grain size of 2.51 phi or 0.16 mm and a standard deviation of 1.21 phi. The percentage of fines passing the #230 sieve is 0.60%, and the average visual shell content is 2.8%. The Munsell™ colors of the samples are described as 2.5Y 6/1, 2.5Y 6/2, 2.5Y 7/1 and 2.5Y 8/1.

The channel in the vicinity of Inlet has been dredged to the maximum authorized depth with allowable over-depth multiple times over the life of the project, most recently in 2012. Therefore, all shoal materials are newly deposited in the channel through normal coastal inlet processes. The shoal sediments in the vicinity of Inlet and the planned beach placement areas both consist of predominately of poorly-graded, fine-grained quartz sands possessing similar characteristics, including Munsell™ colors. Using the CEM 2002 method for finding the overfill ratio results in $R_A = 1.00411$, the results of the compatibility analysis show that the sediments of all areas are very similar and compatible, according to the requirements of the FDEP "Sand Rule" guidelines (Chapter 62B-41.0072J).

Figure 3. Recent (2010) sub-surface investigation core sample locations for Inlet Cuts 1S, 6N, and 7N

3.3.4 CULTURAL RESOURCES

The earliest widely accepted date of occupation by aboriginal inhabitants of Florida dates from around 12,000 years ago. This earliest cultural period, called the Paleo-Indian period, lasted until about 10,000 YBP (years before present). Sea level was lower and the continental shelves were

exposed - an area almost twice the width of the current size of the state. Few Paleo-Indian archeological sites are recorded in northeastern Florida.

During the Archaic period (ca. 10,000 YBP - ca. 2500 YBP), a wider range of resources was exploited and may have led to a more sedentary existence. Sea level rose to its present position. Known sites in Volusia County mostly date to the Late Archaic time period and are located along inland waterways and marshes.

The dominant cultural tradition within Volusia County, known as St. Johns, developed from the Archaic period in north Florida around 2500 YBP. The various stages of St. Johns I and II (2500 YBP to A.D. 1565) are based on the evolution of pottery types and design and increasing sedentism, ceremonialism and mound building. St. Johns site types recorded by the Florida Master Site File (FMSF) include freshwater and marine shell middens and earthen mounds, many of which are recorded in Volusia County. One of these, the Turtle Mound, was thought to be the Timucuan village of Surruque mentioned in early seventeenth century documents.

Early exploration by the Spanish in 1513 claimed "La Florida" for Spain. Indeed, Ponce de Leon is thought to have first landed just north of Cape Canaveral at 28.5 degrees north latitude. This began the first Spanish colonial period (A.D. 1513 - 1763) and the Timucua were the dominant tribal group in northeastern Florida. Their population was eventually decimated by European-introduced diseases, warfare, enslavement, and migration out of Florida.

Spain maintained control of northeastern Florida until 1763 when the British took it over. During this time, royal land grants were given to colonists for the production of rice and indigo. Of the land grants in northeastern Florida, Andrew Turnbull began a new colony located in Volusia County in 1767. He named it New Smyrna. Spain regained power in 1784 and finally Florida became a state in 1821.

The FMSF has recorded four sites within the project areas and five within the immediate vicinity. Ones of particular notes include the Third Avenue Beach Ramp Wreck, recorded on the beach south of the inlet. This wreck dates from the British period (1763-1783) and is possibly William Bartram's wrecked vessel from 1774. Also south of the jetty in the nearshore, a shipwreck site has been identified in the general vicinity but its exact location is unknown. In the inlet itself, a dugout canoe of prehistoric or historic origin was discovered and presently resides at the New Smyrna Beach Museum.

The presence of wildlife in the area is limited due to loss of habitat from human interaction and lack of natural vegetative cover. Vegetation along the shoreline of the federal channel and placement sites contain various small but distinct plant communities such as tidal swamp, coastal grassland, beach dune, and coastal berm (FNAI, 2010).

3.3.5 NATIVE AMERICANS

There are no tribal or historic properties eligible for inclusion currently listed on the National Register of Historic Places within the project area.

3.3.6 BIOLOGICAL RESOURCES

3.3.6.1 Vegetation

Vegetation above the immediate beach within the dune consists of typical upland species such as seagrape (*Coccoloba uvifera*), sea oats (*Uniola panicualta)*, saltgrass (*Distichlis spicata)*, bushy seaside ox-eye *(Borrichia frutescens),* and railroad vine, (*Ipomoea pes-careae)*. Shrubs located at the upper elevation along the dune top include saltbush (*Bachharis halimifolia)* and saw palmetto (*Serenoa repens).* Exposed beach extends from the edge of the dune into the swash zone at the shoreline. Few species have naturally recruited to form a primary succession plant community along the beach, consist predominantly of sea oats, railroad vine, and seashore paspalum grass (*Paspalum vaginatum)* see **Figure 4**.

Figure 4. Shoreline vegetation along the Ponce de Leon Inlet Channel.

3.3.7 WILDLIFE RESOURCES

Migrant species from surrounding areas such as raccoon (*Procyon lotor)*, eastern gray squirrel (*Sciurus carolinensis),* and other small mammals may appear in the project area or general vicinity. Dolphins (*Tursiops truncates)*, porpoise and manatees may inhabit the nearby waters. Birdlife is abundant and it is estimated that about 30 species of waterfowl consisting of brown

pelicans, (*Pelecanus occidentalis)*, double-crested cormorants (*Phalacrocorax auritus)*, and white ibis (*Eudocimus albus)*, as well as various egrets, herons, gulls, and terns may occur in the project area region, especially around the inlet. Songbirds frequenting the area include various kingfishers, swallows, crows, wrens, warblers, and sparrows. Many sport and commercial species of fish are also common to the region. Additionally, healthy gopher tortoise (*Gopherus polyphemus)* and southeastern beach mouse (*Peromyscus polionotus niveiventris)* colonies are located within Volusia County's Smyrna Dunes Park, adjacent to the project area.

3.3.7.1 Marine Mammals

Ponce de Leon Inlet, including the project area, is within the range of the Florida sub-species of the West Indian manatee (*Trichechus manatus latirostris*) and up to 28 cetacean species, with bottlenose dolphin (*Tursiops truncates)* being most common. The project is not located in an Important Manatee Area (IMA) as designated by the USFWS, nor in an area designated as critical habitat for the manatee. However, a Florida Fish and Wildlife Conservation Commission (FWC) designated Manatee Protection Area encompasses portions of the project area within Ponce Inlet; see **Figure 5** and accompanying discussion of manatee in the Threatened and Endangered Species Section 3.3.8.1, page 29.

As previously stated, the most common cetacean is the bottlenose dolphin. Bottlenose dolphins have robust bodies that typically reach 6 to 12 feet as adults. They feed on fish such as mullet and sheepshead, along with marine invertebrates. The live up to 50+ years, and have weights between 140 kilograms and 650 kilograms. Bottlenose dolphins frequent both inshore and offshore marine waters along temperate and tropical coasts. Inshore dolphins live in small social groups, or pods, of up to 10 individuals, and are frequently sighted along the Atlantic coast and the Ponce de Leon Inlet. They are highly intelligent and have complex socialization and communication skills. Dolphins along the coast of Florida are protected by Federal law against harassment under the Marine Mammal Protection Act of 1972 (MMPA). (FWC, NMFS, website factsheets).

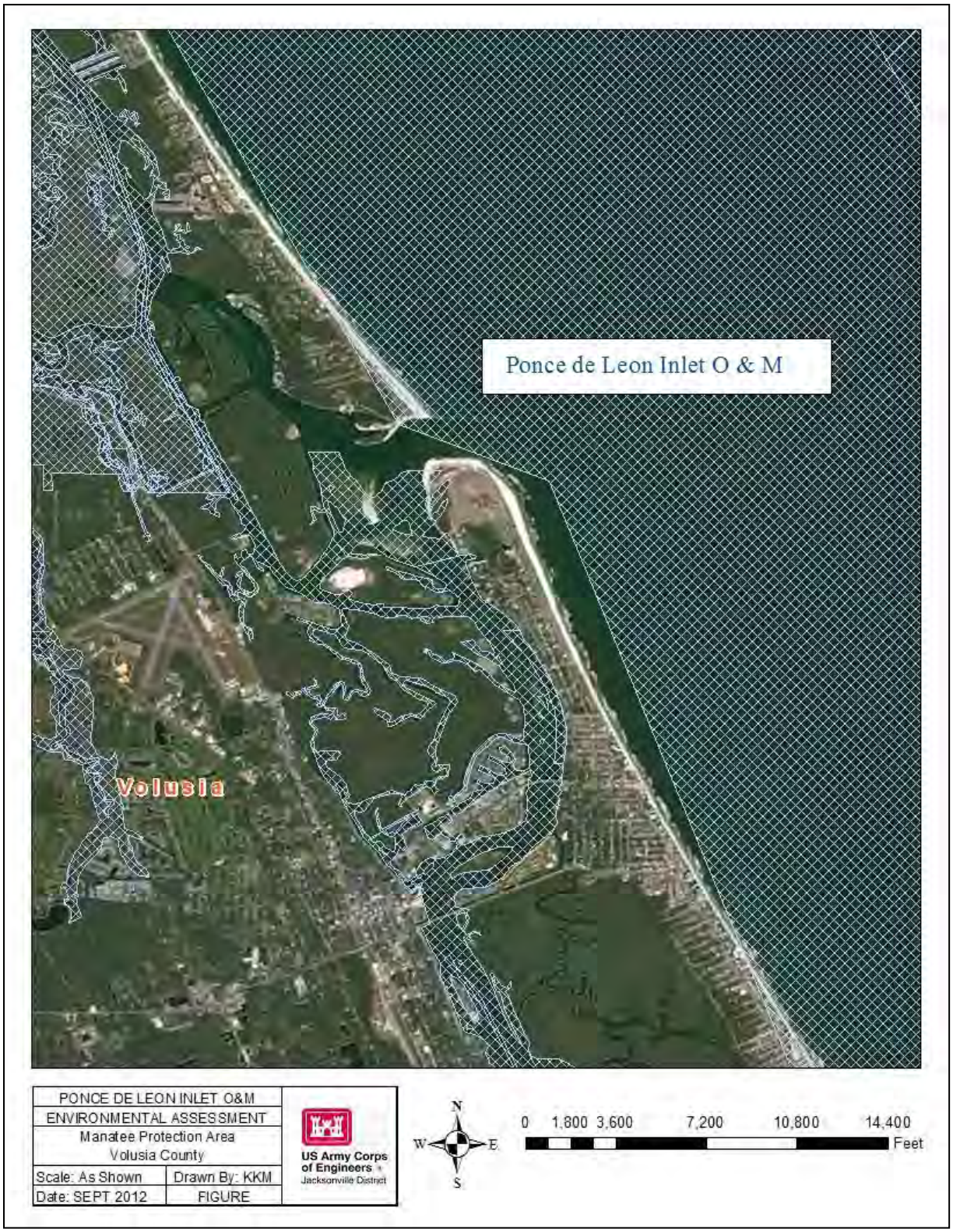


Figure 5. Manatee Protection Zone, shown in cross-hatch, includes the entrance and southern cuts of Ponce de Leon Inlet Federal Channel with connection to the IWW (Halifax River)

3.3.7.2 Migratory Birds

Various shorebirds occur in the project area. Numerous species of wading and shorebirds are associated with marine habitats in the Ponce Inlet, including the New Smyrna Beach area. Laughing gulls, royal terns, sanderlings, ruddy turnstones, and sandwich terns account for over 90% or all individuals observed within the area (Ecological Associates, Inc, 2010). Due to human disturbance, such as uncontrolled pets, all-terrain vehicles (ATV) and other recreational usage on the beach, sightings of piping plover and snowy plover have diminished more recently. Areas where shorebirds most frequently occur include the intertidal area of the swash zone along fresh wrack line.

Additionally, Smyrna Dunes Park is also a USFWS-designated critical habitat area (Unit FL-34) for piping plover, a federally protected species under the Endangered Species Act (ESA); see **Figure 6**, Section 3.3.8.3, page 32. Rookery habitat for wading birds and the federally threatened wood stork are not present at Ponce Inlet.

The following avian species are suspected to utilize, or known to occur in the project area:

Black Skimmer (*Rynchops niger*)
Brown Pelican (*Pelecanus occidentalis*)
Double-crested Cormorant (*Phalacrocorax auritus*)
Great Blue Heron (*Ardea herodias*)
Great Egret (*Casmerodius albus*)
Reddish Egret (*Egretta rufescens)*
Laughing Gull (*Larus atricilla*)
Greater Black-backed Gull *(Larus marinus)*
Herring Gull (*Larus argentatus)*
Ring-billed Gill (*Larus delewarensis)*
Osprey (*Pandion haliaetus*)
*Piping Plover (*Charadrius melodus*)
Royal Tern (*Sterna maxima*)
Forster's Tern (*Sterna fosteri)*
Caspian Tern (*Sterna caspia)*
Sandwich Tern (*Sterna sandricensis*)
Snowy Egret (*Egretta thula*)
White Ibis (*Eudocimus albus*)
Greater Yellowlegs (*Tringa melanoleuca)*
Willet (*Catoptrophorus semipalmatus*)
Snowy Plover (*Charadrius alexandrines)*
Marbled Godwit (*Limosa fedoa)*
Wilson's Plover (*Charadrius wilsonia)*
Black-bellied Plover (*Pluvialis squatarola)*
Semipalmated Plover (*Charadrius semipalmatus)*
Short-billed Dowitcher (*Limnodromus griseus)*
Dunlin (*Calidris alpina)*
Sanderling (*Calidris alba)*
Least Sandpiper (*Calidris minutilla)*
Western Sandpiper (*Calidris mauri)*
Red Knot (*Calidris canuta)*
Ruddy Turnstone (*Arenaria interpres)*
*Wood stork (*Mycteria americana)*

* Denotes federally protected species under the ESA

The Inlet project area is included in a shorebird survey study area which has been conducted annually from 2004 to 2010 by Ecological Associates, Inc. In addition to survey that was specific to piping plover (see Section 3.3.8.3), the monitoring project also included shorebirds that occur within the same location. The results of the most recent survey from 2009 to 2010 concluded that approximately 12,000 birds representing 51 separate species were sighted in the study area. The largest number of sightings and species diversity occurred on the Rockhouse Creek shoals, anecdotally referred to as a "disappearing island". These findings attest to the

importance of this shoal area as a bird resting and foraging area. Other areas of significant sightings include the Atlantic coastal area and south side tip of the Inlet along the shoreline at Smyrna Dunes Park. No exposed shoaled areas occur within the Federal authorized and maintained channel, and therefore are not impacted by frequent dredging events. However, the accretion process often results in submerged shoals within the Federal channel adjacent to the exposed accumulated material, and these submerged shoals are the focus of attention during maintenance dredging events; see **Figure 2**, page 20.

3.3.8 THREATENED AND ENDANGERED SPECIES

Federally listed species under the Endangered Species Act of 1973 (ESA) that may occur in the area are discussed in the following sections**.** The State listed species of special concern include the osprey, least tern, and great white heron.

3.3.8.1 Manatee

The West Indian manatee has been listed as a protected mammal in Florida since 1893. The manatee is also federally protected under the MMPA as a depleted species. The manatee was listed as an endangered species throughout its range in 1967 (32 FR 4061) and received federal protection with the passage of the ESA in 1973. Although critical habitat was designated in 1976 for the Florida subspecies (*Trichechus manatus latirostris*) (50 CFR 19.95(a)), there is no federally designated critical habitat in the project's impact area. Florida provided further protection in 1978 by passing the Florida Marine Sanctuary Act designating the state as a manatee sanctuary and requiring signage and speed zones in Florida's waterways.

Manatees reside and feed mainly in the estuarine areas and around inlets, and are only occasionally observed in the open ocean. Ponce de Leon Inlet and the IWW provide a transitional travel corridor for manatees traveling to foraging habitat of seagrass colonies established in Indian River lagoon south of the project area.

In addition, the Inlet south channel Cuts 1S, 2S, and 3S are included within the protection zone as depicted in **Figure 5**, page 26. Although no portion of the project is within a designated Important Manatee Area (IMA), it lies directly north of the IMA boundary within Mosquito Lagoon (FWC website, 2012).

3.3.8.2 Sea Turtles

Four species of sea turtles that are federally listed endangered or threatened under ESA utilize habitat within the project area as well as the adjacent nearshore and beach. These include the loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), and Kemp' Ridley sea turtle *(Lepidochelys kempii)* (FWC/FWRI website). The loggerhead sea turtle is listed as a federally threatened species, while the green sea turtle is listed as threatened, with the exception of breeding populations in Florida where they are listed as endangered. Both the Kemps ridley and leatherback sea turtles are listed as endangered under the ESA (USFWS website factsheets). The nesting season for all species of sea turtles, as defined by the FWC, is between May 1 and November 1 in Volusia County (FWC website, 2012).

Data from the Fish and Wildlife Research Institute (FWRI), the research arm of the FWC, determined that loggerhead, leatherback, and green sea turtles have historically nested from approximately 2.8 miles south of the Flagler/Volusia County line south to Ponce Inlet, some 23.5 miles, and then south of the Inlet along New Smyrna Beach another 11 miles (FWRI, 2008). This area is adjacent to the Federal channel and the dredged material beach placement sites. Sea turtle nesting and crawl data from 2007 to 2011 indicate that the majority of sea turtles that utilize this beach for nesting are mostly loggerhead, followed by green sea turtles, while very few leatherback sea turtles have been shown to occur (FWRI, 2012). Sea turtle nesting data acquired for Volusia County is presented **Table 3**, below. Averaged over the five year period (2007 to 2011), loggerhead sea turtles on Volusia County beach to the Inlet had a density of 11 nests per mile, whereas from the Inlet south along New Smyrna Beach, the density was 11.2 nests per mile. For green sea turtle, the density drops dramatically: for the same stretch of beach north of the Inlet, the density was 0.5 nest per mile, or 1 nest per 2 miles, and south of the Inlet along New Smyrna Beach, the density was 1 nest per mile. Leatherback nests were found the least, having an average of 0.1 nests per mile, or 1 nest per 10 miles along the beach north of the Inlet, and 0.3 per mile, or 1 nest every 3 miles south of the Inlet. One known Kemp's ridley sea turtle nest was found on the beach north of the Inlet in July, 2010. It should also be noted that of the 5 years studied, the least number of sea turtle nests were found for loggerhead and green sea turtle species in 2009. Furthermore, during 2008, no leatherback sea turtles were found on any beach in the County.

Table 3. Sea Turtle Nest and Crawl data on Volusia County Beaches from 2007 to 2011.

FWC Fish and Wildlife Research Institute
Statewide Nesting Beach Survey Program
Data Source: FWC/FWRI Statewide Nesting Beach Survey Program Database as of 8 February 2012

					LOGGERHEAD				GREEN TURTLE				LEATHERBACK				KEMP'S RIDLEY			
YEAR	COUNTY	BEACH	SUVEY START DATE	SURVEY END DATE	NEST	FALSE CRAWL	FIRST NEST DATE	LAST NEST DATE	NEST	FALSE CRAWL	FIRST NEST DATE	LAST NEST DATE	NEST	FALSE CRAWL	FIRST NEST DATE	LAST NEST DATE	NEST	FALSE CRAWL	FIRST NEST DATE	LAST NEST DATE
2007	Volusia	New Smyrna Beach	5/1/07	9/30/07	249	336	5/16/07	9/6/07	27	29	6/19/07	9/23/07	2	1	5/5/07	6/18/07	0	0		
2008	Volusia	New Smyrna Beach	5/1/08	9/30/08	336	353	5/10/08	9/6/08	14	12	6/27/08	10/1/08	0	0			0	0		
2009	Volusia	New Smyrna Beach	5/1/09	9/30/09	162	173	5/1/09	9/10/09	0	4			3	2	5/17/09	6/23/09	0	0		
2010	Volusia	New Smyrna Beach	5/1/10	9/30/10	286	333	5/12/10	9/20/10	12	12	7/22/10	9/22/10	3	0	5/23/10	6/23/10	0	0		
2011	Volusia	New Smyrna Beach	5/1/11	9/30/11	230	289	5/12/11	9/11/11	3	4	6/12/11	7/24/11	4	0	4/23/11	6/23/11	0	0		
2007	Volusia	Volusia Co Beaches	5/1/07	9/30/07	264	195	5/5/07	8/14/07	18	17	6/26/07	9/11/07	2	0	5/5/07	7/10/07	0	0		
2008	Volusia	Volusia Co Beaches	5/1/08	9/30/08	282	233	5/17/08	8/28/08	18	6	7/12/08	10/3/08	0	0			0	0		
2009	Volusia	Volusia Co Beaches	5/1/09	9/30/09	163	123	5/18/09	9/3/09	7	6	7/6/09	9/9/09	3	0	5/17/09	7/14/09	0	0		
2010	Volusia	Volusia Co Beaches	5/1/10	9/30/10	306	161	5/11/10	9/8/10	3	0	8/3/10	8/15/10	2	0	6/18/10	7/4/10	1	0	7/7/10	7/7/10
2011	Volusia	Volusia Co Beaches	5/1/11	9/1/11	265	131	4/23/11	8/24/11	13	5	7/4/11	9/13/11	8	0	4/18/11	7/7/11	0	0		

CURRENT BOUNDARY DESCRIPTIONS		LENGTH (KM)
New Smyrna Beach	Ponce de Leon Inlet to N Boundary of Canaveral NS (28.93852, -80.83031)	17.5
Volusia Co Beaches	4 km S of Flagler/Volusia Co Line, S Bdry of Peninsula SP (29.38750, -81.08417) to Ponce de Leon Inlet	40.2

3.3.8.3 Piping Plover

The Ponce de Leon Inlet project area is within USFWS-designated piping plover critical habitat Unit FL-34 (FR Vol 66, no. 132 36106, July 10, 2001 Rules and Regulations). A description of Unit FL-34 including New Smyrna Beach in Volusia County is as follows:

> The majority of the unit is within Smyrna Dunes Park and Lighthouse Point Park. This unit includes shoreline extending from the jetty north of Ponce de Leon Inlet west to the Halifax River and Inlet junction. It includes shoreline south of Ponce de Lon Inlet from the Inlet and Halifax River junction, extending east and south along the Atlantic Ocean shoreline 1.2 km (0.70 mi). It includes land from MLLW to where densely vegetated (including grass or lawns) or developed structures, not used by the piping plover, begin and where the constituent elements no longer occur.

A map showing the extent of the Unit FL-34 is presented in **Figure 6**. Areas of shoal build-up, or "disappearing islands", partially fall within this designated critical habitat. One such shoal, the Rockhouse Creek shoal, is located on the west side of the channel between it and the IWW, but is not entirely within the USFWS-designated critical habitat Unit FL-34. Also, exposed shoaled areas are not within the actual federally authorized and maintained channel, and therefore are not impacted by frequent dredging events. However, the nearshore sediment transport process often results in submerged shoals within the Federal channel adjacent to the exposed accreted material, which are the focus of attention during maintenance dredging events; see **Figure 2**.

Figure 6. USFWS Designated Critical Habitat for Wintering Population of Piping Plover Unit FL-34.

Piping plover have been observed in the Ponce Inlet area of Volusia County during survey events conducted by Ecological Associates, Inc., from 2004 to 2010 within the critical habitat Unit FL-34, as described, and the area west of the Federal channel, referred to as the Rockhouse Creek shoal, a potential "disappearing island". Analysis of data from the reports shows a trend of heavier usage by piping plover along the Atlantic Beach area within Unit FL-34, and a lesser number of sightings in the Inlet channel. However, sightings of piping plover occurring outside of critical habitat Unit FL-34 were recorded at the Rockhouse Creek shoal. Survey data from both sites are summarized in **Table 4**, page 35. The sightings frequently occur along the intertidal swash zone where piping plover forage at low tide. Most often, the birds forage singularly but can be found in groups that average between 5 to 9 individuals. A monthly summary of maximum and mean sightings within Unit FL-34, excluding Rockhouse Creek, from 2004 to 2010 is presented in **Figure 7.**

A copy of the most recent piping plover survey report, entitled *Piping Plover and Shorebird Monitoring Within Unit FL-34 and Rockhouse Creek Shoals, 2009-2010*, is included in Appendix F. Earlier reports of the surveys from 2004 to 2009 are available upon request.

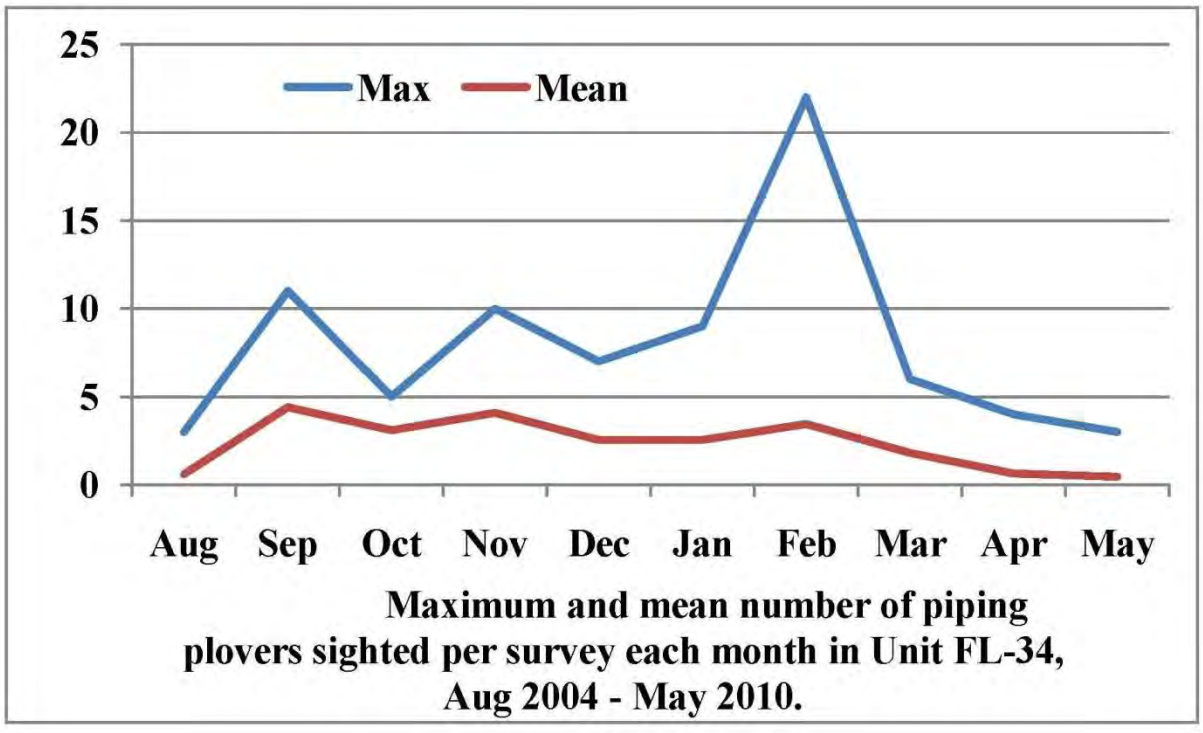


Figure 7. Summary piping plover sightings within Critical Habitat Unit FL-34
Source: Ecological Associates, Inc 2009 – 2010 Report

Table 4. Summary of Piping Plover Surveys at Ponce de Leon Inlet from 2004 to 2010

Survey Year	Location	Total* Sightings	Comments	No. of Banded
2004 - 2005	Unit FL -34	47	Most seen at sightings: 12 individuals.	0
	Rocky Cr Shoal	55	Average sightings per survey event: 14 individuals	3
2005 - 2006	Unit FL -34	62	Most seen at sightings: 10 individuals.	0
	Rocky Cr Shoal	44	Largest group sighted: 9 individuals	several
2006 - 2007	Unit FL -34	41	November was month with highest number of sightings	0
	Rocky Cr Shoal	47	Average individuals sighted per survey: 12	9
2007 - 2008	Unit FL -34	27	Most individuals observed in March; most sighted: group of 8 individuals	2
	Rocky Cr Shoal	38	Average sightings per survey: 10. Largest group sighted: 6 individuals	6
2008 - 2009	Unit FL -34	61	Most individuals observed after Sept. 14. Most observed at one sighting: 22	8
	Rocky Cr Shoal	35	Average sightings per survey: 9. Largest group sighted: 5 individuals	2
2009 - 2010	Unit FL -34	18	First sighting occurred in August, 2009; last sighting in December, 2009. Most sighted: 6	3
	Rocky Cr Shoal	72	Average sightings per survey: 11. Largest group sighted: 20 individuals	10

Source: Ecological Associates, Inc 2009 – 2010 Monitoring Report

* Total surveys for Rockhouse Creek shoals included 4 events per season. 2004 survey event started in October.

The USFWS has identified critical habitat units for the wintering population of piping plover through a description of known physical and biological features referred to as Primary Constituent Elements (PCE's), which are essential to piping plover conservation during the winter migration season. All areas proposed as critical habitat for the wintering population of the piping plover are occupied, and/or are within the species' historic geographical range containing sufficient PCE's to support at least one life history function, i.e. foraging and/or roosting (USFWS 5-yr Recovery Plan).

The PCE's of wintering piping plover habitat include sand and/or mud flats with no or very sparse emergent vegetation. In some cases, these flats may be covered or partially covered by a mat of blue-green algae. Adjacent non-vegetated sand, mud, or algal flats above high tide are also essential, especially for roosting piping plovers. Such sites may have debris, detritus (decaying organic matter), or micro-topographic relief (less than 50 cm above the substrate surface) offering refuge from high winds and cold weather. Essential components of the beach/dune ecosystem include:

- surf-cast algae for foraging of prey, sparsely vegetated backreach (beach area above mean high tide seaward of the dune line, or where no dunes exist, seaward of a delineating feature such as a vegetation line, structure, or road) for roosting and refuge during storms;

- spits (a small point of land, preferably consisting of sand, running into water) for feeding and roosting;

- salterns (bare sand flats in the center of the mangrove ecosystems typically found above mean high water and are only irregularly flushed with sea water) for feeding and roosting; and

- washover areas (broad, nonvegetated™ zones with little or no topographic relief that are formed and maintained by the action of hurricanes, storm surge, or other extreme wave action) for feeding and roosting.

Several of these components (sparse vegetation having little or no topographic relief) are mimicked in artificial habitat types used less commonly by piping plovers, but nonetheless, are considered critical habitat (e.g. dredge spoil sites). Not all life history functions require all the PCE's; therefore, not all proposed critical habitat will contain all the PCE's. All proposed critical habitat areas have been determined (by the USFWS) to contain sufficient PCE's to provide for **one or more** of the life history functions of the wintering population of the piping plover (USFWS 5-yr Recovery Plan).

In some cases, the PCE's exist as a result of ongoing Federal actions, such as channel maintenance and dredged material placement. As a result, ongoing Federal actions at the time of designation will be included in the baseline in any consultation subsequent to this designation.

Discussion of the direct effects to piping plover and its critical habitat from maintenance dredging are presented in Section 4.7.2.3, page 47.

3.3.8.4 Southeastern Beach Mouse

Southeastern beach mouse *(Peromyscus polionotus)* is listed under the ESA as threatened and occurs in isolated populations found in eastern counties of Florida, including Volusia County. Southeastern beach mice occupy both primary and secondary frontal or scrub dunes year round. Their main source of food consists of sea oats, along with grains and seeds of various graminoids (grasses, sedges and rushes) or forbs (broadleaf herbaceous plants). They also forage on small invertebrates such as arthropods. The scrub dunes serve as refugia for beach mice during and after tropical storm events, where re-colonization of the frontal dunes takes place (FWS, 2008). Volusia County is the northern-most extent of the southeastern beach mouse range, whereas Broward County is the southern-most extent for the species in Florida.

Locally, the southeastern beach mouse is known to have a small population located at the tip of Smyrna Dunes Park, in a suitable habitat of upland coastal dune. The Smyrna Dunes Park supports a viable population with an effective breeding size of at least 500 individuals as evidenced by research at the site (FWS, 2008).

A localized survey consisting of a live-trapping effort was conducted by the University of Central Florida that included Smyrna Dunes Park in the study area. The study's timeframe consisted of May 2006; October 2006; April 2007; and May 2008 (J. Stout, 2009). The FDEP permitted traps were located on the top of the primary dune where vegetation exists and were allowed to remain open from late afternoon until being checked early morning of the following day. Data was collected for captured mice, which included piercing with ear tags and tail snips for genetic analysis; the captured mice were then released after data collection (J. Stout, 2009). Results of the May 2006 survey found that of the 300 traps set over three days, 46 captures of 29 individuals were recorded. Fourteen (14) males were captured along with 15 females; 26 were adults and 3 were sub-adults. The October, 2006 survey occurred over two nights. A total of 200 traps were set but no captures were recorded. The April, 2007 survey occurred over two nights. Of the 222 traps set, 66 individual mice were captured. Of these, 39 were males, and 27 were females, with 15 adults. The final trapping cycle was conducted from May 12 to 14, for a total of 372 traps set during the 3-night period that captured 12 individuals. Of these, 10 were adults; 6 were males; five were female; and one was of unknown sex (J. Stout, 2009). It should also be noted that of all the sites included in the study, the most traps and captures occurred at Smyrna Dunes Park.

3.3.8.5 Gopher Tortoise

Gopher tortoise (*Gopherus polyphemus)* are considered a candidate species for proposed listing on the ESA in eastern sections of the United States which includes the population in Florida. If this species achieves listing on ESA, it could be designated as either endangered or threatened, depending upon the level of imperilment the species is facing. Populations west of Mobile, AL are currently listed under the ESA as threatened (USFWS, website provided in References of Section 8).

The upland scrub and grassland natural community of Smyrna Dunes Park provides a quality habitat for gopher tortoise (USACE Biologists field observations). A thriving colony of these animals is openly located within the perimeter of the park in this quality habitat. However, no maintenance activities are proposed within this habitat.

3.3.8.6 Smalltooth Sawfish

The smalltooth sawfish (*Pristis pectinata*) is currently listed as endangered under the ESA by NMFS (50 CFR 224). In 2003, it was the first marine fish species in U.S. waters added to the ESA listing (Ocean Conservancy 2009). Although smalltooth sawfish once ranged throughout U.S. coastal waters along the southeastern Atlantic and northern Gulf of Mexico, its known primary range is now reduced to the coastal waters near Everglades National Park and the Charlotte Harbor Estuary in extreme southern Florida. Sightings are very rare. Although the Indian River Lagoon system and lower reaches of the St. Johns River were historically identified as areas of abundance, by 1981, research concluded that the smalltooth sawfish had been

virtually extripated from this system (Snelson and Williams, 1981). Only one recent encounter from the St. Johns River (2009) has been recorded in the National Sawfish Encounter Database (NSED) (Burgess et al, 2011).

Similar to sharks and rays, smalltooth sawfish belong to a group of fish known as elasmobranches. Their skeletons are composed of cartilage, and are considered modified rays having a body shape and gill slits also found on sharks (NMFS 2009). They are long-lived and slow to mature (up to 10 years). Adults can grow to be quite large; the longest recorded length is 24.7 feet, although the average length is around 18 feet (FLMNH website 2012). Females bear live young after about one year of gestation, and the litters reportedly range from 15 to 20 pups which are born during the warmer summer months in shallow, protected waters (FLMNH 2012). Their diet consists of macroinvertebrates, crustaceans, and fishes such as herrings and mullets. The saw is used to disturb surficial sediments in search of benthic invertebrates or to impale prey fishes on the rostral teeth (FLMNH 2012).

Scientists with the University of Florida have concluded that the sawfish population has declined by as much as 99% over the past 30 years and is in danger of extinction (Ocean Conservancy fact sheet 2009). The primary contributor for the decline of the smalltooth sawfish population is bycatch from commercial and recreational fisheries. Other threats include entanglement in fishing lines, degraded water quality, reduction of critical habitat, disturbance by divers, and removal of their "saws" (NMFS 2010).

Smalltooth sawfish typically inhabit shallow waters (depths up to 20 feet) near the mouths of rivers in estuarine lagoons over sandy or muddy substrates; likewise, they may also be found in deeper waters (greater than 50 feet) along continental shelf (Carlson et al, 2006). Shallow coastal waters, such as bays and estuaries having depths less than 4 feet, provide an important nursery area for juvenile smalltooth sawfish (Carlson et al, 2006). The only breeding areas still known to exist are located in southwest Florida in Charlotte Harbor and Ten Thousand Islands (Burgess et al, 2011).

No critical habitat for smalltooth sawfish lies within or adjacent to the project area. The closest NMFS-designated critical habitat for smalltooth sawfish is around 8 miles south in the Indian River Lagoon where the species was once abundant but populations have since receded. Key habitat features, especially for juvenile individuals, consist of shallow, warm water with proximity to mangroves and estuarine conditions; consequently, none of these features occur in the Ponce Inlet area.

Currently, the South Atlantic Regional Biological Opinion (SARBO, 1997) does not authorize any take of the federally listed smalltooth sawfish.

3.3.9 SEAGRASS

No seagrass beds are known to occur within the Ponce Inlet area or within the project limits. The closest known seagrass beds are located several miles south of the project area in the Indian River Lagoon, according to the FDEP mapped data (FDEP, website provided in References of Section 8).

3.3.10 ESSENTIAL FISH HABITAT DESCRIPTION (EFH).

Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (16 U.S.C. 1801-1882) requires identification of habitats needed to support sustainable fisheries and comprehensive fishery management plans with habitat inclusions. The Act also requires preparation of an Essential Fish Habitat (EFH) assessment and coordination with NMFS when adverse impacts to EFH are likely to occur.

EFH is defined in the MSFCMA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." For interpreting the definition of EFH, "waters" include aquatic areas and their associated physical, chemical, and biological properties used by fish, and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hardbottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

The South Atlantic Fisheries Management Council (SAFMC, 1998) has designated intratidal flats and water column zones within the project area as EFH in compliance with the MSFCMA. A summary of that assessment is included here. Managed species that commonly inhabit the project area are shown in **Table 5**.

Table 5. Managed species commonly occurring in the project area**.**

Common Name	**Scientific Name**
Bluntnose stingray	*Dastatis sayi*
Cownose ray	*Rhinoptera bonasus*
American eel	*Angulla rostrata*
Conger eel	*Conger oceanicus*
Speckled worm eel	*Myrophis punctatus*
Atlantic menhaden	*Brevoortia tyrannus*
Striped anchovy	*Anchoa hepsetus*
Bay anchovy	*Anchoa mitchilli*
Inshore lizardfish	*Aynodus foetens*
Spotted hake	*Urophycis regius*
Rough silverside	*Membras martinica*
Atlantic silverside	*Medidia medidia*
Black seabass	*Centropristis striata*
Sand perch	*Diplectrum formosum*
Gag grouper	*Mycteroperca microlepsis*

Gray snapper	*Lujanus griseus*
Spotfin mojarra	*Eucinostomus argenteus*
Silver jenny	*Eucinostomus gula*
Pigfish	*Orthopristis chrysoptera*
Sheepshead	*Archosargus probatocephalus*
Pinfish	*Lagadon rhombodies*
Silver perch	*Bairdiella chrysura*
Spotted seatrout	*Cynocion nebulosus*
Weakfish	*Cynocion regalis*
Spot	*Leiostomus xanthurus*
Southern kingfish	*Menticirrhus saxatilus*
Atlantic croaker	*Micropogonias undulatus*
Red drum	*Sciaenops ocellatus*
Striped mullet	*Mugil cephalus*
White mullet	*Mugil curema*
Northern searobin	*Prionotus carolinus*
Bay whiff	*Citharichthys spilopterus*
Fringed flounder	*Etropus crossotus*
Gulf flounder	*Paralichthys albigutta*
Summer flounder	*Paralichthys dentatus*
Southern flounder	*Paralichthys lethostigma*
Windowpane	*Scopthalmus aquosus*
Hogchoker	*Trinetes maculates*
Blackcreek tonguefish	*Symphurus plagiusa*
Blue crab	*Callinectes sapidus*
Brown shrimp	*Penaeus aztecus*
Pink shrimp	*Penaeus duorarum*
White shrimp	*Penaeus setiferus*
Welk	*Busyconn* spp
Eastern oyster	*Crassostera virginica*
Hard clam	*Mercenaria mercenaria*

Source: South Atlantic Fisheries Management Council 1998

The fish community of eastern coastal Florida is one of the most diverse in the western Atlantic Ocean region. This high diversity is the consequence of biogeographical (geographical distribution of organisms) and environmental factors operating on various spatial and temporal scales (Gilmore, 2001). Tidal flats are dynamic features of coastal landscapes whose distribution and character may change with shifting patterns of sediment erosion and deposition. Factors that affect the regional character of tidal flats include tidal range, prevailing weather patterns, coastal geography and geology. Human activities that change flow patterns or sediment supply such as dam and jetty construction, dredging and filling can also significantly alter regional characteristics (SAFMC, 1998). In areas with a small tide, wind and waves are generally the most important factors in the formation of tidal flats with the exception of locations near tidal inlets and river mouths, similar to the Ponce de Leon Inlet.

Tidal flats contain critical structural components of coastal systems that serve as benthic nursery areas, refuges and feeding grounds, thus providing essential fish habitat for numerous species. Benthic community of tidal flats include diatoms, cyanbacteria, euglenophytes and unicellular algae, which can equal or exceed phytoplankton primary production in the water column, and can represent a significant portion of overall estuarine primary productivity (SAFMC, 1998). Benthic fauna that live in and/or on the sediment include ciliates, rotifers, nematodes, copepods, annalids, amphipods, bivalves, and gastropods. These species are preyed upon by mobile predators moving onto the flats with the flood tide. The regular ebb and flow of the tide is an important aspect to the functioning of these systems by providing a corresponding rhythm that exists in the animals and microalgae adapted to the intertidal zone (SAFMC, 1998).

The estuarine water column comprises four salinity catagories: Oligohaline (<8 ppt), mesohaline (8-18 ppt), and polyhaline waters (13-30 ppt) with some euhaline water (>30 ppt) around inlets. A high salinity rate (>35 ppt) is expected at the Inlet due to tide and wind transported seawater mixing with freshwater supplied by the Indian and Halifax Rivers. Particulate materials settle from these mixing waters and accumulate as bottom sediments. Coarser-grained sediments, saline waters, and migrating organisms are introduced from the ocean, while finer-grained sediments, nutrients, organic matter, and fresh water are input from rivers and tidal creeks. The sea water component stabilizes the system by supplying abundant inorganic chemicals and relatively conservative temperatures. Closer to the sea, rapid changes in variables, such as temperature, are moderate compared to shallow upstream waters. Without periodic additions of sea water, seasonal thermal extremes would reduce the biological capacity of the water column as well as reduce the recruitment of fauna from the ocean (SAFMC, 1998). The water column is composed of horizontal and vertical components. Horizontal gradients of nutrients that decrease seaward affect the distribution of phytoplankton and organisms utilizing this primary area of productivity. Vertically, the water column may be stratified by the degree of salinity (freshwater overlaying heavier saltwater), decreased oxygen content (lower values at the bottom from high biological oxygen demand due to inadequate vertical mixing) and introduction of contaminants (nutrients, pesticides, industrial waters, and pathogens) (SAFMC, 1998).

The estuarine habitat not only provides food, structure, and refuge from predators to fishery organisms, but also regulates the amount to freshwater, nutrient and sediment inputs into the

estuary, thus functioning as an essential fish habitat. In addition, the marsh plays a vital role in the health and water quality of the estuary by providing stability to the shoreline and storing floodwaters during coastal storms. Estuaries provide habitat for several decapods species and is an important nursery habitat for larval and juvenile stages of decapods blue crab, white shrimp, and grass shrimp. Fiddler crabs burrow preferentially in sediments with intermediate densities of marsh vegetation root mats. Marsh grasses, where present in association with the Inlet, contribute to the production of fisheries by providing refuge and foraging areas. Red drum and shrimp are considered most dependent on salt marsh habitat.

Ocean surf zones are high salinity environments that support coastal pelagic species. Along the coastal area of Ponce Inlet and New Smyrna Beach, the substrate consists of unconsolidated bottom. Species expected to occur in this habitat are included on **Table 5,** pages 39 - 40.

3.3.11 NOISE

Noise in the area of the Ponce de Leon Inlet is typically limited to that of vessels utilizing the navigational channel in transit between the Atlantic Ocean and the IWW. Commercial and recreational vessels as well as personal watercraft contribute moderately to the amount of noise in the area.

3.3.12 SAFETY

The Federal channel was designed and authorized for a specific depth and width. Over time, shoal buildup regularly occurs which reduces the navigable capacity of the channel. If it is not adequately maintained, the use of the channel becomes a safety hazard for vessels. The United States Coast Guard (USCG) is authorized to prohibit the use of channels that pose a safety hazard for vessels.

3.3.13 RECREATION

The Ponce Inlet and New Smyrna Beach communities are heavily populated areas along Florida's Atlantic Coast. The beach is a popular recreation site as this region experiences a large volume of tourists, particularly during the winter months. These communities provide recreational opportunities that include boating, canoeing, kayaking, fishing, swimming, and educating citizens on the environment.

3.3.14 NAVIGATION

In the 1960's initial dredging of a channel for the use of commercial shipping was authorized by Congress for a 12+2-foot channel to access the IWW from the Atlantic Ocean for commercial and personal recreation vessels, as well as rescue operations of the USCG. The Ponce de Leon Inlet has become an important navigation channel for recreational boating, commercial shrimp harvesting and sport-fishing, excursion boats and general tourism.

3.3.15 ECONOMIC

The Ponce de Leon Inlet navigation channel is routinely used by the USCG, various excursion boats, local commercial fishing vessel fleets, and numerous recreational watercrafts to gain access to the Atlantic Ocean from the IWW. This channel provides long-term economic stimulus to the economy of communities associated with Ponce Inlet and New Smyrna Beach

metropolitan areas from the generation of revenues from the sale of goods and services to the public.

Major land uses in the project area include residential, commercial, and public parks. Numerous marinas occupy the landscape of the waterway along the shoreline of the Federal project area. As well, build up of suitable beach material from beach or nearshore placement ensures continued economic growth for commercial businesses along Ponce Inlet and New Smyrna Beach through recreational tourism. Continued channel maintenance benefits the local economy by accommodating increased vessel traffic along the waterway which contributes additional commerce to local communities.

4 ENVIRONMENTAL EFFECTS

4.1 INTRODUCTION

This section is the scientific and analytic basis for the comparisons of the alternatives. See table 1 in Section 2.0 (Alternatives) for a summary of impacts. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects.

4.2 WATER QUALITY

4.2.1 NO ACTION ALTERNATIVE [STATUS QUO]

Boats moored in or traveling through the project area could disturb the sediments that have accumulated in the channel with anchors or propellers, potentially causing a chronic increase in local turbidity levels.

4.2.2 MAINTENANCE DREDGING

The primary anticipated change in water quality at the dredging site would be a temporary increase in turbidity. According to the State of Florida's Class III 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 dredging work. If at any time the turbidity standard were exceeded, those activities causing the violation would temporarily cease.

4.2.3 MATERIAL PLACEMENT OPTIONS

As with the dredging activity, the primary change in water quality during placement of dredged material within the nearshore and beach would be a temporary increase in turbidity. These activities would be monitored similar to the dredging activity.

4.3 HISTORIC PROPERTIES

4.3.1 NO ACTION ALTERNATIVE [STATUS QUO]

The no-action alternative would not have any effect on historic properties eligible for inclusion on the National Register of Historic Places.

4.3.2 MAINTENANCE DREDGING

There is potential for submerged historic properties to be located in the maintenance dredge area. A dugout canoe of prehistoric or historic origin (VO7584) was previously discovered in the inlet and some recorded archaeological sites along the waterway have been identified from dredge spoil (VO7516, VO7517). Given the history of area, there is a potential for submerged historic properties to be adversely impacted by the proposed maintenance dredging.

4.3.3 MATERIAL PLACEMENT OPTIONS

Beach Placement Area

Two historic properties located along the beach placement area south of the jetty are recorded in the Florida Master Site File (FMSF). Both sites (VO7306, VO4386) may have been destroyed by previous hurricanes and subsequent beach maintenance and construction. These site locations will be monitored during beach placement activities to avoid potential impacts in the event there are portions of these sites that remain unidentified.

Nearshore Placement Area

There is potential for submerged historic properties to be located in the nearshore placement area. A shipwreck site (VO7484) has been identified in the general vicinity but its exact location is unknown. Given the maritime history of this vicinity along the Atlantic Coast, there is potential to adversely impact submerged historic properties.

A submerged cultural resources survey is being conducted within the Ponce Inlet maintenance dredging and beach placement project areas. If any significant historic resources are discovered, they will be avoided by buffering so impacts to these resources will not occur due to activities associated with dredging or the placement of pipelines, anchors, spudding, or pump-out operations. Coordination with the SHPO and the appropriate federally recognized Native American tribes was initiated November 13, 2012, and is ongoing.

4.4 NOISE

4.4.1 NO ACTION ALTERNATIVE [STATUS QUO]

Grounding vessels and the rescue equipment required to free them could generate increased local noise levels as the channel shoal increases and becomes impassable.

4.4.2 MAINTENANCE DREDGING

There could be a slight temporary increase in noise levels from the maintenance dredging but background levels from vessel traffic and general public within the area are already moderate. Noise levels would return to background levels upon completion of the project.

4.4.3 MATERIAL PLACEMENT OPTIONS

There could be temporary increases in noise levels at the placement sites during the operation of the discharge equipment. Beach placement is anticipated to generate increased noise above background than nearshore placement due to the heavy equipment needed to rework the dredged material on the dry beach. Noise levels would return to background levels upon completion of the project.

4.5 SAFETY

4.5.1 NO ACTION ALTERNATIVE [STATUS QUO]

Long-term adverse impacts to vessel safety from unaddressed channel shoal buildup and reduced navigability are anticipated as a result of this alternative. As the channel shoals, larger craft, such as commercial fishing and excursion vessels, would be required to deviate to the northwest outside of the authorized Federal channel due to the obstruction. This scenario significantly increases the risk of vessel groundings, as has been documented by 2008 correspondence from the USCG, Appendix D.

4.5.2 MAINTENANCE DREDGING

The proposed maintenance would remove shoal obstructions from the Federal Inlet channel which would improve navigational safety by eliminating one of the primary causes of vessel grounding. This alternative would increase overall boater safety by facilitating improved access to IWW for all vessels including the USCG. Temporary impacts to navigation are anticipated from the presence of the dredge equipment during construction.

4.5.3 MATERIAL PLACEMENT OPTIONS

Dredge barge and pipelines could temporarily alter navigation patterns during construction; however, authorized channel depths would be restored which would provide a lasting beneficial impact.

4.6 WILDLIFE RESOURCES

4.6.1 NO ACTION ALTERNATIVE [STATUS QUO]

Shorebird monitoring conducted since the last channel dredging in 2011 has shown that there was no long-term net loss of habitat (roosting, nesting, and foraging) as a result of the dredging; thus, suspension of dredging activity could have a negligible effect on wildlife resources utilizing the project area.

4.6.2 MAINTENANCE DREDGING

4.6.2.1 Marine Mammals

No impacts to any marine mammals, particularly the West Indian manatee and bottlenose dolphin, are anticipated during the proposed maintenance dredging. During recent maintenance events of August 2011 and August 2012, observers located on the special purpose dredge USACE CURRITUCK did not document any sightings or occurrences of manatees within 50 feet of the dredge during the maintenance operation activity. Marine mammal species that were searched for included bottlenose dolphin, Atlantic spotted dolphin, and manatee.

4.6.2.2 Migratory Birds

Temporary impacts to migratory birds are anticipated as a result of the proposed maintenance dredging from removal of exposed shoal which has grown into the Federal channel. However, general census monitoring reports from 2007 to 2011 that include the general region indicate a diverse and healthy population of wading and shorebirds that are present along the shoreline adjacent to Federal Inlet channel after recent dredging events.

4.6.3 MATERIAL PLACEMENT OPTIONS

Wildlife impacts from all placement options are expected to be short-term and minimal during construction. Both proposed beach placement alternatives could temporarily impact wildlife utilizing the areas. While mobile species could relocate away from the dredging disturbance, it is anticipated that some species will be attracted to the pipe outfall and will actively forage on the infaunal organisms in the dredged material. In addition, migrating dredged sediment placed in either nearshore site is also anticipated to augment and increase wildlife habitat as the material migrates towards and onto the dry beach.

4.7 THREATENED AND ENDANGERED SPECIES

4.7.1 NO ACTION ALTERNATIVE [STATUS QUO]

4.7.1.1 Manatee

Manatees could become injured through collision or trapped by large vessels passing overhead if the clearance between the channel bottom and vessel hull is not adequately maintained.

4.7.1.2 Sea Turtle

The no-action alternative could result in loss of sea turtle nesting beach opportunity due to continued erosion or from a lack of beach or nearshore placement of the dredged material.

4.7.1.3 Piping plover

There would be no impact to Piping Plover critical habitat Unit FL-34 from the no-action alternative. In fact, Unit FL-34 could increase in area as sand accumulates into the channel from shoal accretion.

4.7.1.4 Smalltooth Sawfish

The no action alternative is not expected to impact smalltooth sawfish as this species is unlikely to occur within the Federal channel or nearshore placement sites. Shallow estuarine waters, which are more suitable (contain the essential elements) for juvenile sawfish nursery habitat, could increase should no dredging occur.

4.7.2 MAINTENANCE DREDGING

4.7.2.1 Manatee

No impacts to manatees are anticipated as a result of the proposed dredging. During the recent maintenance events of 2011 and 2012, Marine Mammal observers did not document any manatee activity occurring within 50 feet of the dredge which would have resulted in a temporary shutdown of the operation until the manatees safely migrated away from the work zone. In order to not adversely affect the manatee, the Corps would comply with the Service's Standard Manatee Conditions for In-water Work during dredging.

4.7.2.2 Sea Turtles

Data acquired from FWC documented a total of 237 nests and 293 non-nesting emergences along the New Smyrna Beach shoreline. A total of 278 nests and 136 non-nesting emergences were documented along the Volusia County Beach shoreline. All requirements of the NMFS South Atlantic Regional Biological Opinion (SARBO) would be followed during dredging activities in order to minimize impacts to swimming sea turtles.

4.7.2.3 Piping Plover

A portion of the project area is within USFWS designated critical habitat Unit FL-34. Shoal build-up of material occurs in the Halifax River that includes the inner channels of the Inlet and the IWW. General census monitoring reports conclude these areas, anecdotally known as

Figure 8. Disappearing island within Piping Plover Critical Habitat Unit FL-34 post-dredging with high recreational usage. Note the accretion of material into the IWW on lower right side of shoal. Date of image: May, 2010.

"disappearing islands" support piping plover during wintering periods of up to 10 months per year. This ephemeral feature is formed from the dynamic process of shoal build-up that is exposed at MLLW but consequently disappears during the high tide. The shoals frequently accrete material into or immediately adjacent to the Federal channel, which requires routine dredging to maintain the channel in the authorized footprint. These areas also receive significant disturbance from intense recreational usage, as shown in **Figure 8.** This usage includes unrestrained dogs, grounded watercraft, and high density human trampling on the beach. The dredge activity is not expected to impact piping plover or its critical habitat.

Corps is currently in consultation with the USFWS regarding piping plover usage of designated critical habitat that occurs within the project site. A Corps-drafted letter (6 September 2012), specific to this activity, requested consultation under Section 7 of the Endangered Species Act; a copy is included in Appendix E.

4.7.2.4 Smalltooth Sawfish

No effect is anticipated to the smalltooth sawfish as this species has not been known to occur within the project limits. No NMFS-designated critical habitat is present within the immediate area and no recent sightings have been reported to NMFS or FWC. No takings of this species or other disturbance have occurred during any of the numerous dredging events or other maintenance activities over the past 30 years.

4.7.3 MATERIAL PLACEMENT OPTIONS

4.7.3.1 Manatee

In order to not adversely affect the manatee, the USACE would comply with the Service's Standard Manatee Conditions for In-water Work during beach and nearshore placement activities. There were no impacts to manatees as a result of the recent maintenance actions that also included the south nearshore placement in 2011 and 2012.

4.7.3.2 Sea Turtles

Per the USFWS SPBO, daily early morning surveys for sea turtle nests will be required if any portion of the beach placement occurs during the period from May 1 through October 31. Only those sea turtle nests that may be affected by the placement activities will be relocated the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. However, the Corps has determined that nearshore placement would be not likely to adversely affect nesting sea turtles. Therefore, the Corps does not anticipate the need to perform daily surveys for sea turtle nests if any portion of the nearshore placement occurs during the period from May 1 through October 31.

4.7.3.3 Piping Plover

All four placement options have the potential to benefit wintering piping plover habitat. Although outside of the designated critical habitat Unit FL-34, beach placement could directly increase the usage by piping plover through potentially increasing available resources. In addition, physical conditions from nearshore placement could result in dispersion of finer sediments through downdrift processes for the successful migration of sand-sized sediments onshore, with finer sediments moving offshore. Results are pending from the ERDC RIOS study conducted after the recent maintenance activity of 2012, but are expected to support this scenario. Neither the nearshore nor beach placement areas are located within USFWS-designated critical habitat Unit FL-34. Placement of dredged material into the nearshore areas will not affect piping plover or their habitat. Furthermore, placement of material on the two proposed beach areas will enhance potential usage by piping plover by addressing erosion issues and providing increased food sources. A letter requesting initiation of consultation of the SPBO was issued by the Corps on September 6, 2012 (Appendix E) that states neither piping plover nor their critical habitat (Unit FL-34) are likely to be adversely affected by this project. Subsequently, the FWS issued the final Programmatic Piping Plover Biological Opinion (P3BO) on 22 May 2013 that provides protection to this species during USACE activities such as maintenance dredging. The P3BO may be review at: http://www.fws.gov/northflorida/Guidance-Docs/20130522_ltr_Service_Corps_Piping%20Plover%20Programmatic_BO_FINAL.pdf.

4.7.3.4 Smalltooth Sawfish

No effect to smalltooth sawfish is anticipated by placement in either of the nearshore areas as they do not contain suitable nursery or foraging habitat for smalltooth sawfish.

4.8 ESSENTIAL FISH HABITAT

Section 3.3.10, page 39, describes the "existing conditions" of the Essential Fish Habitat (EFH) in the project area. This is defined as "federally managed fisheries, and associated species such as major prey species, including affected life history stages." The following subsections describe the individual and cumulative impacts of the no action and preferred alternatives on EFH, federally managed fisheries, and associated species such as major prey species, including the affected life history stages.

4.8.1 NO ACTION ALTERNATIVE [STATUS QUO]

Increased shoal build-up in the Federal channel could lead to vessel bottom strikes, which could cause temporary increases in turbidity, further degrading habitat for fish.

4.8.2 MAINTENANCE DREDGING

The proposed maintenance dredging of the project channels could impact approximately 95 acres of previously dredged estuarine/inshore water column and unconsolidated substrate. Species managed by the NMFS that are common within the project area can be found in **Table 5,** pages 30 - 40. The USACE has determined that the proposed action would not have a substantial adverse impact on EFH or federally managed fisheries along the IWW and Atlantic coast of Florida. This determination was based on the fact that the substrate of the project area is naturally dynamic and unconsolidated, and measures shall be taken to protect adjacent habitat. Turbidity could affect 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. Routine maintenance dredging may suppress re-colonization of certain benthic organisms and therefore could impact other trophic levels within the food chain. However, it is important to note that the project channels are man-made; the actual channel widths encompass a fraction of the entire water body, and similar habitat occurs immediately adjacent to the channels. In addition, the Ponce de Leon Inlet maintenance dredging is anticipated to encompass 60 days every 2 to 5 years; thus, migrating larvae and/or juvenile fish could be subject to project related elevated turbidity and suspended sediment levels during that time period.

4.8.3 MATERIAL PLACEMENT OPTIONS

Placement of dredged material into the two nearshore placement areas could directly and indirectly impact up to 194 acres of marine/offshore water column and unconsolidated substrate. For the beach areas, up to 60 acres of ocean high salinity surf zone could be directly or indirectly impacted. However, the dredging record of this project shows that the majority of the material is extracted regularly from a small area of the entire channel, and ranges in volume from 30,000 to 60,000 cubic yards per event. Based on the historic dredging record, these limited quantities of sand could be placed approximately every 2-5 years, and therefore, the possibility of longer term adverse impacts (i.e. suppression of re-colonization of the infaunal community) is not likely. In addition, placement along portions of these areas has occurred on multiple occasions over the past 30 years. The dredged sediment is anticipated to be similar in composition to the existing beach and nearshore sediments, and only small portions of the placement areas are anticipated to be used during each individual dredging event.

4.9 AESTHETICS

4.9.1 NO ACTION ALTERNATIVE [STATUS QUO]

There would be no affect on landscape aesthetics by pursuing the no action alternative.

4.9.2 MAINTENANCE DREDGING

Temporary air pollution, water turbidity, and noise pollution increases can be expected during project construction. The dredge equipment will have a temporary effect on the view shed until completion of the project.

4.9.3 MATERIAL PLACEMENT OPTIONS

Temporary air pollution, water turbidity, and noise pollution increases can be expected during the placement of dredged material onto the beach or into the nearshore placement areas. Conversely, dredged material placement on beaches of Ponce Inlet and New Smyrna Beach and associated nearshore should augment the beach habitat available which could improve the areas aesthetic resources.

4.10 NAVIGATION

4.10.1 NO ACTION ALTERNATIVE [STATUS QUO]

The no-action alternative would result in a decrease in the navigability of the channel over time as sediments accumulate in the channel causing obstructions from shoal build-up.

4.10.2 MAINTENANCE DREDGING

The proposed action could result in a temporary disruption of normal vessel traffic in the channel due to the presence and operation of the dredge. However, long-term benefits to navigational safety would result from the action as proposed.

4.10.3 MATERIAL PLACEMENT OPTIONS

As with the maintenance dredging alternative, beach or nearshore placement could result in a temporary disruption of normal vessel traffic in the area due to the presence and operation of the material transport and deposition equipment. North beach or nearshore placement could increase the maintenance interval as material migrates back into the Federal channels from longshore transport.

4.11 ECONOMICS

4.11.1 NO ACTION ALTERNATIVE [STATUS QUO]

A potential decline in the revenue-generating capabilities of the commercial and recreational centers of Ponce Inlet, including New Smyrna Beach, would be probable as the build-up of shoal material prevents access to recreational and commercial vessel.

4.11.2 MAINTENANCE DREDGING

There would be a minor short-term economic stimulus to the local economy from the sale of goods and services in support of the dredging operation. The deepening of the Federal

navigational channel encouraged the construction of commercial and recreational centers in the Ponce Inlet and New Smyrna Beach communities, and associated local marinas and restaurants have had a positive effect on the local economy.

4.11.3 MATERIAL PLACEMENT OPTIONS

Beach or nearshore placement could help augment and maintain a recreational beach which generates revenue from tourism. North beach or nearshore placement could decrease maintenance interval, thus increasing dredging costs.

4.12 NATIVE AMERICANS

The project will not affect any Native American properties. Coordination with the following federally recognized tribes will occur during the noticing of this draft EA: Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida. Consultation as part of the National Historic Preservation Act is ongoing, see section 5.3 of this document. As this is Operations and Maintenance of an existing authorized Federal channel, and the beach and nearshore placement areas have been used several times in the past, no impacts to Native American resources or properties are anticipated from any of the proposed alternatives, pending the outcome of a completed coordination with the Tribes.

4.13 CUMULATIVE IMPACTS

4.13.1 NO ACTION ALTERNATIVE [STATUS QUO]

Continued shoaling within the Federal Ponce de Leon Inlet channel would continue with adverse consequences to navigation, wildlife through potential collisions, socio-economic operations within the community, and navigational safety through the inability of the USCG to respond efficiently to routine or emergency operations and distress calls.

4.13.2 MAINTENANCE DREDGING

The proposed action could result in a temporary loss of critical habitat for wintering piping plover. However, due to dynamic coastal processes along the shoreline, these losses are self-compensating. That is, once the shoreline has reached equilibrium post dredge, stability to piping plover critical habitat Unit FL-34 occurs. Beneficial cumulative effect may arise from the continued periodic maintenance events expected to occur in the Inlet to help stabilize the shoreline by disallowing accretion of material into channel.

4.13.3 MATERIAL PLACEMENT OPTIONS

Additional benefit may result from the placement of dredged material on the beach or in the nearshore immediately adjacent to the beaches of Ponce Inlet and New Smyrna Beach by alleviating erosion of the shoreline.

4.14 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

4.14.1 NO ACTION ALTERNATIVE [STATUS QUO]

The no-action alternative would result in avoidable effects to the resources as discussed earlier in this section.

4.14.2 MAINTENANCE DREDGING

Maintenance activities could result in some turbidity generated at the dredging site and the excavation of the material could eliminate benthic organisms within the dredging cuts. In addition, there could be a short-term disruption to recreational and commercial navigation and fishing in the Federal navigational channel from the presence and operation of the dredge plant.

4.14.3 MATERIAL PLACEMENT OPTIONS

Maintenance activities could result in some turbidity generated at the placement sites. Placement operations could bury benthic organisms present in the placement sites. In addition, there could be a short-term disruption to recreational and commercial navigation, fishing, and beach recreation during placement activities.

4.15 IRREVERSIBLE AND IRRETRIEVABLE RESOURCE COMMITMENTS

Other than the use of fuel, equipment and supplies, there would be no irreversible commitment of resources from the proposed maintenance activities. Dredging could temporarily disrupt navigation and recreational activities.

5 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

5.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Environmental information on the project has been compiled and considered while this EA was prepared. The project is in compliance with the National Environmental Policy Act (NEPA).

5.2 ENDANGERED SPECIES ACT OF 1973

This project will be coordinated with the NMFS through the South Atlantic Regional Biological Opinion (SARBO) dated September 25, 1997 as amended on October 29, 1997. This project will also be coordinated with the USFWS through the Statewide Programmatic Biological Opinion (SPBO) dated April 19, 2011, as amended on August 22, 2011. A letter requesting consultation of the SPBO was issued by the Corps on September 6, 2012 (Appendix E).

5.3 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (INTER ALIA)

Consultation with the Florida State Historic Preservation Officer (SHPO) and appropriate federally recognized Native American tribes was initiated in November 13, 2012, and is ongoing in accordance with the National Historic Preservation Act of 1966, as amended, and as part of the requirements and consultation processes contained within the NHPA implementing regulations of 36 CFR 800, this project is also in compliance, through ongoing consultation, with the Archeological Resources Protection Act (96-95), the Abandoned Shipwreck Act of 1987 (PL 100-298; 43 U.S.C. 2101-2106); American Indian Religious Freedom Act (PL 95-341), Executive Orders (E.O) 11593, 13007, & 13175 and the Presidential Memo of 1994 on Government to Government Relations. Consultation is ongoing with the SHPO and appropriate federally recognized tribes.

5.4 CLEAN WATER ACT OF 1972

This project is in compliance with this Act. A Section 401 water quality certification was issued on 22 November, 1999 (FDEP File No. 0129417-001-JC); a modification for a time extension from DEP was issued 14 July, 2009 (FDEP File No. 0129417-002-JC). Also, a minor modification to the permit (FDEP File No. 0308009-001-JC) was issued on 3 August, 2012 that included maintenance action within another shoaled area of the authorized Federal channel. All state water quality standards would be met. A Section 404(b) evaluation is included in this EA as Appendix A. Copies of these permits are included in Appendix D.

5.5 CLEAN AIR ACT OF 1972

The draft version of this EA will serve as coordination with the US Environmental Protection Agency (USEPA) to comply with Section 309 of the Act. This project is not anticipated to produce any significant new atmospheric emissions; therefore, it is anticipated that this project would comply with the Clean Air Act.

5.6 COASTAL ZONE MANAGEMENT ACT OF 1972

A Federal consistency determination (CD) in accordance with 15 CFR 930 Subpart C of the Coastal Zone Management Act (CZMA) is included in this report as Appendix B. The State of Florida conditionally concurred that the project is consistent with the Florida Coastal Zone Management Program with the letter from FDEP dated 15 May 2013. The two conditions specified for the project are:

- The Ponce de Leon Inlet maintenance dredging and sand bypassing plan detailed in the draft EA must be revised so that dredged material is placed only to the south of the inlet.

- The northern beach and nearshore placement areas can be approved if and only if a new regional sediment budget analysis is conducted and demonstrates that the placement of sand to the north of the jetty is needed to balance the sediment load.

To maintain concurrence with the CD, the Corps will conduct maintenance dredging with placement to occur in the southern beach and/or nearshore areas as described in the preferred alternative of section 2 of this EA. Should conditions render placement necessary in the northern beach and/or nearshore areas, a regional sediment budget analysis will be performed as stated in the second condition.

5.7 FARMLAND PROTECTION POLICY ACT OF 1981

No prime or unique farmland was impacted by implementation of this project. Therefore, this project is in compliance with this Act.

5.8 WILD AND SCENIC RIVER ACT OF 1968

No designated wild and scenic river reaches were affected by the project related activities. Therefore, this project is in compliance with this act.

5.9 MARINE AND MAMMAL PROTECTION ACT OF 1972

To ensure the protection of any manatees present in the project area, the conditions outlined in FDEP permit no. 10158893-005-JC and the standard USFWS manatee construction conditions for in-water work would be implemented during dredging. Manatee observers would be on-board the dredge during operations in order to perform the manatee protection monitoring, such as shut-down of dredging operations upon manatees sighted within a 50-foot radius of the dredge until they move further than 50 feet away from the operation. This project is in compliance with this act.

5.10 ESTUARY PROTECTION ACT OF 1968

The protective measures outlined in Section 4 would ensure avoidance and minimization of impacts to inner channel waters of the Ponce de Leon Inlet from the proposed dredging activities. Therefore, this project is in compliance with this act.

5.11 FEDERAL WATER PROJECT RECREATION ACT

Although the Inlet channel provides recreational benefits, the principles of the Federal Water Project Recreation Act, (Public Law 89-72) as amended, are not applicable to this project as it is Operations and Maintenance of an existing authorized Federal navigation channel.

5.12 SUBMERGED LANDS ACT OF 1953

Dredging and beach or nearshore placement would occur on submerged lands of the State of Florida. This project has been coordinated with the State which issued FDEP JCP File No. 10158893-005-JC which addresses the Sovereign Submerged Lands authorization. Therefore, the project is in compliance with this Act.

5.13 COASTAL BARRIER RESOURCES ACT AND COASTAL BARRIER IMPROVEMENT ACT OF 1990

The majority of the project lies within Coastal Barrier Resource System (CBRS) unit P-08. Maintenance dredging is consistent with provisions of the CBRS which excerpts: “maintenance of existing channel improvements... and including the disposal of dredge materials related to such improvements.” CBRS has no requirement to dispose of the material within the same CBRS unit. CBRS does not otherwise regulate how the maintenance material may be used. This CBRS exemption was verified by Service letter dated 25 September 2003.

5.14 RIVERS AND HARBORS ACT OF 1899

The proposed work could temporarily obstruct navigable waters of the United States but would ultimately improve navigability of these waters. The proposed action will be subjected to the public notice and other evaluations normally conducted for activities subject to the act. The project will be in full compliance with this Act.

5.15 ANADROMOUS FISH AND CONSERVATION ACT

Anadromous fish species would not be affected by the proposed work. The project would be coordinated with the NMFS and would be in compliance with the act.

5.16 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

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

5.17 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 placement of material for a purpose other than disposal (i.e. placement of rock material as an artificial reef or the construction of artificial reefs as mitigation). Therefore, the Marine Protection, Research and Sanctuaries Act does not apply to this project. The disposal activities addressed in this EA have been evaluated under Section 404 of the Clean Water Act.

5.18 MAGNUSON – STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

USACE has determined that the project would not have a substantial adverse impact on EFH or federally managed fish species occurring along the southeast coast of Florida. The proposed work will be coordinated with the NMFS; EFH coordination was initiated with the noticing of this draft EA. A response from NMFS was issued on 27 March 2013 with included commentary. A final response was issued by the Corps on 19 April 2013. Copies of all correspondence are included in Appendix E. The project will be in compliance with the act.

5.19 E.O. 11990, PROTECTION OF WETLANDS

No wetlands would be affected by the proposed project activities. This project is in compliance with this Executive Order.

5.20 E.O. 11988 FLOODPLAIN MANAGEMENT

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

5.21 E.O. 12898 ENVIRONMENTAL JUSTICE

This project would not result in adverse human health or substantial environmental effects. In addition, no impacts on the ability of minority or low-income populations to obtain fish or wildlife for subsistence consumption are anticipated to occur. Therefore, no impacts to minority or low-income populations are anticipated and this project would be in compliance with this Executive Order.

5.22 E.O. 13089, CORAL REEF PROTECTION

There are no coral reefs located in the project area, nor are there any "species, habitats, and other natural resources associated with coral reefs." This project is in compliance with this Executive Order.

5.23 E.O. 13112, INVASIVE SPECIES

This project is not anticipated to introduce any invasive species. This project is in compliance with this Executive Order.

6 PREPARERS AND REVIEWERS

6.1 PREPARERS

Preparer	Discipline	Role
Kathleen McConnell	Biologist	Author
Al Morris	Engineer	Engineering
Grady Caulk	Archeologist	Cultural Resources
Jase Ousley	Geologist	Geo-tech Discussion

6.2 REVIEWERS

Reviewer	Discipline	Role
Paul DeMarco	Biologist	Review
Jason Spinning	PD-EC Chief	Review
Eric Summa	PD-E Branch Chief	Review
Jackie Keiser	PM-WN Chief	Review
Shelley Trulock	Project Manager	Review

7 PUBLIC INVOLVEMENT

7.1 SCOPING AND DRAFT EA

A Public Notice (PN) will be issued by Corps Construction-Operations Division for the routine maintenance dredging project which will include a 30 day public comment period. The draft EA was released for public commentary from 25 February 2013 for 30 days. A Notice of Availability (NOA) was sent via USPS to all stakeholders, including residents whose properties abut the project area. A copy of the NOA is included in Appendix G along with the mailing list.

7.2 AGENCY COORDINATION

The EA will be coordinated with the appropriate agencies (SHPO, FDEP, USFWS, EPA, FWC, and NMFS). All agency coordination letters received as a result of this effort have been included in Appendix E.

7.3 LIST OF RECIPIENTS

The PN will be made available to the public for a 30 day comment period. A list of recipients is attached to the PN in Appendix G.

7.4 COMMENTS RECEIVED AND RESPONSES

Comments from the public review period were received and responses are incorporated into this final document. They are as follows:

Florida State Clearing house coordinated the states' review with regard to the Coastal Zone Management Act (16 U.S.C. §§ 1451 *et seq.,* as amended). The Florida Department of Environmental Protection (FDEP) commented that the proposed federal action will be consistent with the enforceable policies of the FCMP "if and only if the following conditions are satisfied. These measures include:

- The Ponce de Leon Inlet maintenance dredging and sand bypassing plan detailed in the draft EA must be revised so that dredged material is placed only to the south of the inlet.

- The northern beach and nearshore placement areas can be approved if, and only if, a new regional sediment budget analysis is conducted and demonstrates that the placement of sand to the north of the jetty is needed to balance the sediment budget."

The comment further states that should the USACE fail to implement the following measures, or some alternative measures identified and mutually agreed upon between the Department, FWC, and USACE to ensure the draft EA's consistency with the enforceable policies of the FCMP, this concurrence shall be treated as a finding that the proposed federal action is inconsistent with the enforceable policies of the FCMP, specifically Section 161.142, *F.S.,* under the provisions of 15 C.F.R. § 930.4(b).

USACE Response: USACE will comply with this concurrence of using the south nearshore or beach placement areas for subsequent maintenance dredging, unless specific use of the north nearshore or beach placement areas are required, in which case, USACE will conduct the sediment budget analysis as requested.

Comments from FDEP in a Memorandum to the Florida State Clearinghouse from the Division of Water Resource Management recommended conditional concurrence with this project. One recommended item is the completion of a regional sediment budget analysis to be conducted at the Ponce de Leon Inlet by USACE to provide a statistical basis for the effective management of sand dredged from the Federal navigation channel.

Another item addressed the beneficial use of beach quality sand for placement on eroding beaches to extend the life of proximate beach-restoration projects for less frequent nourishment. This may be accomplished by "disposal of beach-quality sand from Federal projects on, or in the nearshore area of adjacent eroding beaches." The document states that the Department may consider permitting nearshore or upland disposal of such beach-quality sand if emergency conditions exist.

Specific comments on the draft EA included clarification of the existing DEP Joint Coastal Permit No. 0308009-001-JC authorizes only nearshore and beach placement to the south of the inlet.

USACE Response: USACE anticipates a future submittal of a modification to the existing permit to include placement of dredged material along the shoreline and in the nearshore north of the inlet.

Specific comment regarding Section 2.1.3.1 (Beach Placement) stated the north beach placement has incorrectly been cited as being designated critically eroded and acceptable for dredge material placement by the Strategic Beach Management Plan although at present, this area is not designated as critically eroded, and is not a designated dredge material placement area. The document was corrected to state that the north beach placement area is not within a designated critically eroded area. Although the north nearshore has been used periodically by USACE since 1998 for dredged material placement area, it is not designated as such by the FDEP.

Specific comment regarding Section 2.1.3.2 (Nearshore Placement) stated the north nearshore placement area is likewise not identified as an acceptable placement area. The use of this area for placement will be re-evaluated after completion of a sediment budget analysis to be conducted by USACE at a later date.

The FDEP Memorandum concluded that the Division of Water Resource Management could not concur that the draft EA is consistent with Chapter 161, FL statutes unless the final EA is revised to state that the dredged material will be placed only to the south of the Ponce de Leon Inlet, and that the north placement areas along the beach and nearshore could only be approved if a new regional sediment budget analysis is conducted and demonstrates that the placement of sand to the north of the jetty is needed to balance the sediment budget.

USACE Response: The south placement areas on the beach and in the nearshore will be used for maintenance dredging events until such time that a sediment transport analysis is completed by USACE and clearly demonstrates the need for the material to balance the budget within the system. A copy of the Memorandum is included in Appendix E.

The East Central Florida Regional Planning Council (ECFRPC) comments stated that the staff has not identified any significant or adverse effects to regional resources of facilities, nor have any extra-jurisdictional impacts been identified that would adversely affect neighboring jurisdictions. The ECFRPC does note, however, that the project site has multiple biodiversity hot spots in accordance with the Natural Resources of Regional Significance (NRORS) data. It is recommended that proper environmental impact studies and wildlife mitigation plans are implemented prior to the project construction. The Proposed project is found to be consistent with the goals, policies, and objectives of the ECFRPC.

The FWC noted that the draft EA identifies the presence of a number of federally listed species within the project area and the at USACE will be conducting beach and nearshore placement of dredged material in accordance with the NMFS South Atlantic Regional Biological Opinion (SARBO), and the FWS Statewide Programmatic Biological Opinion (SPBO). FWC staff offers comments and recommendations for consideration in the Final EA regarding the applicability of the SARBO and SPBO to minimize impacts to sea turtle nesting, foraging and nesting grounds by dredging activities, the disposal of dredged material in the nearshore and beach placement areas, and increases in artificial lighting exposure; manatees during the dredging activities; shorebird and seabird critical habitat; southeastern beach mouse habitat; and adjacent gopher tortoise habitat.

The St. Johns River Water Management District did not have any comment.

8 REFERENCES

PUBLICATIONS

Bash, Jeff; Cara Berman; Susan Bolton; 2001. *Effects of Turbidity and Suspended Solids on Salmonids*. Center for Stramside Studies, University of Washington and Washington State Transportation Center, Washington Department of Transportation, Seattle, Washington

Burgess, George H.; John D. Waters; and Cathy Bester; 2011. *National Sawfish Encounter Database (NSED) Final Report.* Florida Program for Shark Research, Florida Museum of Natural History, University of Florida, Gainesville, FL

Carlson, John K.; Jason Osborne; Thomas W. Schmidt, 2006. *Monitoring the recovery of smalltooth sawfish, Pristis pectinata, using standardized relative indices of abundance*.
First Published: 28 July 2006

E. Elliott – Smith, S.M.; Haig,B.M. Powers; 2009. *Data from the 2006 International Piping Plover Census, 2009.* Department of the Interior USGS Data Series 426

Gilmore, R.G., Jr., C.J. Donohue, D.W. Cooke, and D.J. Herrema. 1981. *Fishes of the Indian River Lagoon and Adjacent Waters*. Harbor Branch Tech. Rep. No. 41. 64 pp.

Florida Department of Environmental Protection (FDEP), 2008.
Strategic Beach Management Plan for the Northeast Atlantic Coast Region (Sub-region Flagler-Volusia Beaches) Bureau of Beaches and Coastal Systems SBMP

Florida Department of Environmental Protection (FDEP). 2010. *Chapter 62-302 Surface Water Quality Standards.* Florida Administrative Code. Effective Date: 5 August, 2010

Florida Fish and Wildlife Research Institute (FWRI FWC), 2009. Statewide Sea Turtle Nesting Totals for 2009 Season

Florida Natural Areas Inventory (FNAI). 2010. *Guide to the natural communities of Florida: 2010 edition.* FNAI, Tallahassee, FL

South Atlantic Fishery Management Council (SAFMC), 1998. *Comprehensive Amendment Addressing Essential Fish Hanitat in Fishery Management Plans of the South Atlantic Region.*
4055 Faber Place Drive, Suite 201 North Charleston, SC 29405 safmc@safmc.net

Stout, I. J., 2009. *Summary Report of Trapping Activities Carried Out Under a Federal Fish and Wildlife Permit Issued to Dr. I. Jack Stout.* Department of Biology University of Central Florida

USACE ERDC:

Dredging and Environmental Research Program. ERDE/EL TR-0913

Seabergh, William C., and Leonette J. Thomas, 2002. *Weir Jetties at Coastal Inlets: Part 2, Case Studies.* ERD/CHL CHETN-IV-54 (pg 9 – 10)

Valente, Jonathon J., and Richard A. Fischer, 2011. *Reducing Human Disturbance to Waterbird Communities Near Corps of Engineers Projects.* ERDC TN-DOER-E29

US Fish and Wildlife Service (USFWS):

Federally Listed Endangered and Threatened Species and Candidates for Federal Listing in South Florida. Revised August 25, 1999.

5-Year Review: Summary and Evaluation of West Indies Manatees, 2007

5-Year Review: Summary and Evaluation of Southeastern Beach Mouse, 2008

5-Year Review: Summary and Evaluation of Piping Plover *(Chardadrius melodus)* 2009.

WEBSITES, PERSONAL COMMUNICATIONS

Florida Department of Environmental Protection (FDEP):

Water Quality Standards website:
http://www.dep.state.fl.us/water/wqssp/ofwfs.htm
Bureau of Beaches and Coastal Systems
http://www.dep.state.fl.us/beaches/programs/cda.htm

Florida Fish and Wildlife Research Institute (FWRI); Florida Fish and Wildlife Conservation Commission (FWC):

http://research.myfwc.com/
Fact Sheet for West Indies Manatee:
http://research.myfwc.com/features/category_sub.asp?id=5012
Manatee Protection Zone Mapping:
http://myfwc.com/wildlifehabitats/managed/manatee/protection-zon
FWC Statewide Sea Turtle Nesting Totals as of 2012
http://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/
Marine turtle mortality: Sea Turtle Stranding and Salvage Network (FLSTSSN):
http://myfwc.com/research/wildlife/sea-turtles/mortality/archived-stranding-data/
Marine turtle nesting data:
http://myfwc.com/research/wildlife/sea-turtles/nesting/

Florida Museum of Natural History (FLMNH): Smalltooth Sawfish Information

http://www.flmnh.ufl.edu/fish/sharks/sawfish/sawfishdatabase.html

Magnuson-Stevens Fishery Conservation and Management Act. 1996. Public Law 94-265. PDF Publication retrieved from Website 06/14/2011:

http://www.nmfs.noaa.gov/sfa/magact/mag1.html#s2

National Marine Fisheries Service (NMFS), NOAA
http://www.nmfs.noaa.gov/habitat/habitatprotection/efh/index.htm
2007 Fact Sheet for Essential Fish Habitat
South Atlantic Regional Biological Opinion (SARBO):
http://el.erdc.usace.army.mil/seaturtles/refs-bo.cfm
Smalltooth Sawfish Recovery Plan, 2009. Smalltooth Sawfish Recovery Team. St. Petersburg, FL:
http://www.nmfs.noaa.gov/pr/recovery/plans.htm
Loggerhead Sea Turtle:
http://www.nmfs.noaa.gov/pr/species/turtles/loggerhead.htm
Green Sea Turtle:
http://www.nmfs.noaa.gov/pr/species/turtles/green.htm
Kemp's ridley Sea Turtle:
http://www.nmfs.noaa.gov/pr/species/turtles/kempsridley.htm
Hawksbill Sea Turtle:
http://www.nmfs.noaa.gov/pr/species/turtles/hawksbill.htm
Leatherback Sea Turtle:
http://www.nmfs.noaa.gov/pr/species/turtles/leatherback.htm
North Atlantic Right Whale:
http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/rightwhale_northatlantic.htm

SJRWMD 2012 Water Quality information:
http://floridaswater.com/watershed/factPages/27010037.html

USACE
Vibracore Analysis; Available at:
ftp://ftp.dep.state.fl.us/pub/ENV-PRMT/volusia/issued/0308009_Ponce_de_Leon_Inlet_Maintenance_Dredging/001-JC/Application/Tab%20N-Geotechnical%20Data/Sediment%20Compatibility%20Analysis-%20Jun%202011.pdf

U.S. Fish and Wildlife Service (USFWS) Species Information:
Piping Plover Wintering Critical Habitat Mapping
http://www.fws.gov/plover/#maps
Candidate listing of Gopher Tortoise for Endangered Species Act protection:
http://www.fws.gov/northflorida/Releases-11/20110726_nr_Gopher_Tortoise-12-month_Warranted_but_Precluded_Finding_Eastern_Portion_of_range.html
West Indies Manatee Fact Sheet:
http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A007
Statewide Programmatic Biological Opinion: 2011.
http://www.fws.gov/northflorida/BOs/20110822_bo_USFWS_Statewide_Programmatic_BO_Beach_Nourish_signed.pdf

Wikipedia: http://en.wikipedia.org/wiki/Halifax_River