March 2014

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

NAVIGATION IMPROVEMENTS
BIG BEND CHANNEL
TAMPA HARBOR
HILLSBOROUGH COUNTY, FLORIDA

Includes expansion and maintenance dredging with dredged material management area placement

U.S. Army Corps
of Engineers
JACKSONVILLE
DISTRICT

FINDING OF NO SIGNIFICANT IMPACT
NAVIGATION IMPROVEMENTS BIG BEND CHANNEL
TAMPA HARBOR FEDERAL NAVIGATION PROJECT
HILLSBOROUGH COUNTY, FLORIDA

I have reviewed the Supplemental Environmental Assessment (SEA) for the proposed navigation improvements and maintenance dredging of the federally authorized Tampa Harbor – Big Bend Navigation Project in Hillsborough County, FL. Dredged material would be placed either in Dredged Material Management Area (DMMA) 2D or 3D. This Finding incorporates by reference all discussions and conclusions contained in the SEA enclosed hereto. Based on information analyzed in the SEA, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are in summary:

a. The proposed action would be conducted in accordance with the Endangered Species Act, and specifically in compliance with the Regional Biological Opinion issued by the National Marine Fisheries Service and Statewide Programmatic Biological Opinion issued by the US Fish and Wildlife Service. The work would not jeopardize the continued existence of any threatened or endangered species or impact any designated "critical habitat."

b. This project has been coordinated with the State of Florida, and all applicable water quality standards will be met.

c. The State of Florida has concurred with the Corps consistency determination that the proposed work is consistent with the enforceable policies of the Florida Coastal Management Program.

d. The proposed work has been coordinated with the Florida State Historic Preservation Officer and appropriate federally recognized tribes. No effects to cultural resources are anticipated.

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.

f. Public benefits will be provided with unobstructed channel navigation.

In consideration of the information summarized, I find that the proposed Federal Navigation Project, expansion and maintenance dredging of the Tampa Harbor – Big Bend with dredged material placement in either DMMA 2D or 3D, will not significantly affect the human environment and does not require an Environmental Impact Statement. This finding and associated SEA will be available for review and comment by notice to the public and agencies for a period of 30 days. A copy of this document will be made available at the following website: http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#Hillsborough.

_____ _____

ALAN M. DODD
Colonel, Corps of Engineers
Commanding

Date

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
NAVIGATION IMPROVEMENTS BIG BEND CHANNEL
TAMPA HARBOR, HILLSBOROUGH COUNTY, FLORIDA

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TAMPA HARBOR, HILLSBOROUGH COUNTY, FLORIDA

1 PROJECT PURPOSE AND NEED

1.1 PROJECT DESCRIPTION.

The U.S. Army Corps of Engineers, Jacksonville District (Corps), is proposing to construct navigation improvements and to conduct periodic maintenance dredging of the Big Bend channel portion of the Tampa Harbor Federal navigation project in Hillsborough Bay, Hillsborough County, FL. A detailed description of the Big Bend channel portion of the Tampa Harbor Federal navigation project can be found in the *Feasibility Report and Environmental Assessment, Tampa Harbor – Big Bend Channel, FL* (USACE 1997*)*. In summary, the Big Bend Channel's authorized dimensions are for a 250-feet wide by -41-feet deep plus 2-feet of advanced maintenance plus 2-feet of allowable over-depth (A.O.) at mean lower low water (MLLW) entrance channel which extends from the main ship channel 10,200 feet east to connect with the irregularly shaped turning basin which would provide a turning diameter of 1,200 feet. The project also contains two 200-feet wide by -41-feet deep plus 2-feet of advanced maintenance plus 2-feet A.O. MLLW channels, one extending from the southern edge of the turning basin 2,700 feet further south (inner channel) and the other extending from the east edge of the turning basin approximately 3,500 feet further east (east channel). See Figure 2 for a graphic representation of these project features.

Despite being authorized, the Big Bend project has not yet been completely constructed to these dimensions. Therefore, the Corps proposes to widen the north side of the entrance channel by 50' (from 200' to 250') and deepen it from 37' to 41'+2' advance maintenance +2' A.O. MLLW, expand the turning basin approximately 190' to the southwest to provide the 1,200 foot turning radius and deepen it from 37' to 41'+2' advanced maintenance +2' A.O. MLLW, and deepen the inner and east channels from 37' to 41'+2' advanced maintenance +2' A.O. MLLW. In addition, two non-federal berthing areas located north and south of the east channel would be deepened from 37' to 41'+2' advanced maintenance +2' A.O. MLLW at 100% non-federal cost. Finally, per ER 1130-2-520, 8-2, c, 6, an additional 1' of A.O. MLLW would be dredged in all areas during the expansion dredging project due to the presence of hard materials in order to ensure future maintenance of the project to the authorized dimensions (41'+2'+2'). The expansion dredging is anticipated to generate approximately 4 million cubic yards (MCY) of material and the anticipated annual shoaling rate after expansion is approximately 80,000 cy per year. It is anticipated that maintenance dredging would be performed approximately every 9 years and would therefore remove approximately 720,000cy of dredged material per event. The dredged material from the expansion

and maintenance dredging projects would be placed in either dredged material management area (DMMA) 3D or 2D as described in sections 2.1.3 and 2.1.4 below.

1.2 PROJECT NEED OR OPPORTUNITY.

The Big Bend channel provides access to the authorized Tampa Harbor channel. In addition, the local pilots have complained of wind forces acting on light loaded or empty barges when passing through the project channel. Several groundings and collisions with channel markers have occurred and are attributed to wind forces. Therefore, this project would deepen and widen the existing channels to accommodate the existing and prospective vessel fleet. Finally, the accumulation of sediment, commonly referred to as shoaling, has restricted the width of the project channels and reduced their depths. The economic savings or benefits gained by maintenance dredging arise from the ability to reliably provide a navigation channel at the depth needed for deep draft transits. When project shoaling reduces the channel depth, certain losses will occur. If restrictive shoaling in Big Bend Channel is allowed to happen, definite economic losses will be realized in the form of higher transportation costs.

The major problem to shippers, using the existing Big Bend navigation features, is the lack of navigable channel depths and widths for safe and economic transport of their commodities. The existing channel does not allow optimum use of the current vessel fleet. The use of shallow to moderate draft vessels occurs at a higher unit cost for transport. Deeper depths for more draft and tonnage would reduce the unit cost for transport and enable a greater vessel selection from larger vessels in the world fleet. The problem becomes even more prominent as the trend toward larger and deeper draft vessels continues in the world fleet.

Figure 1. Tampa Bay – Big Bend Channel Location Map.

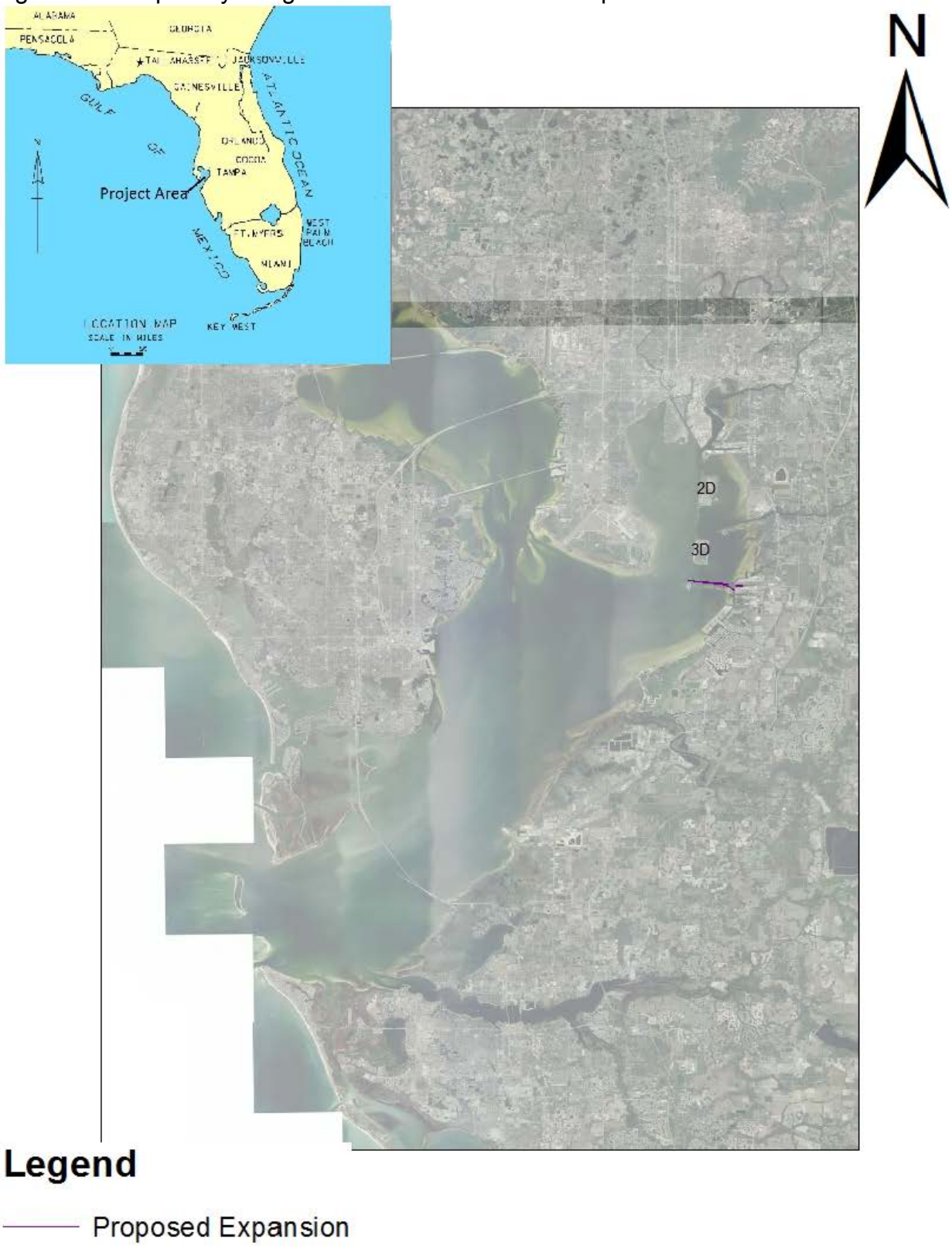
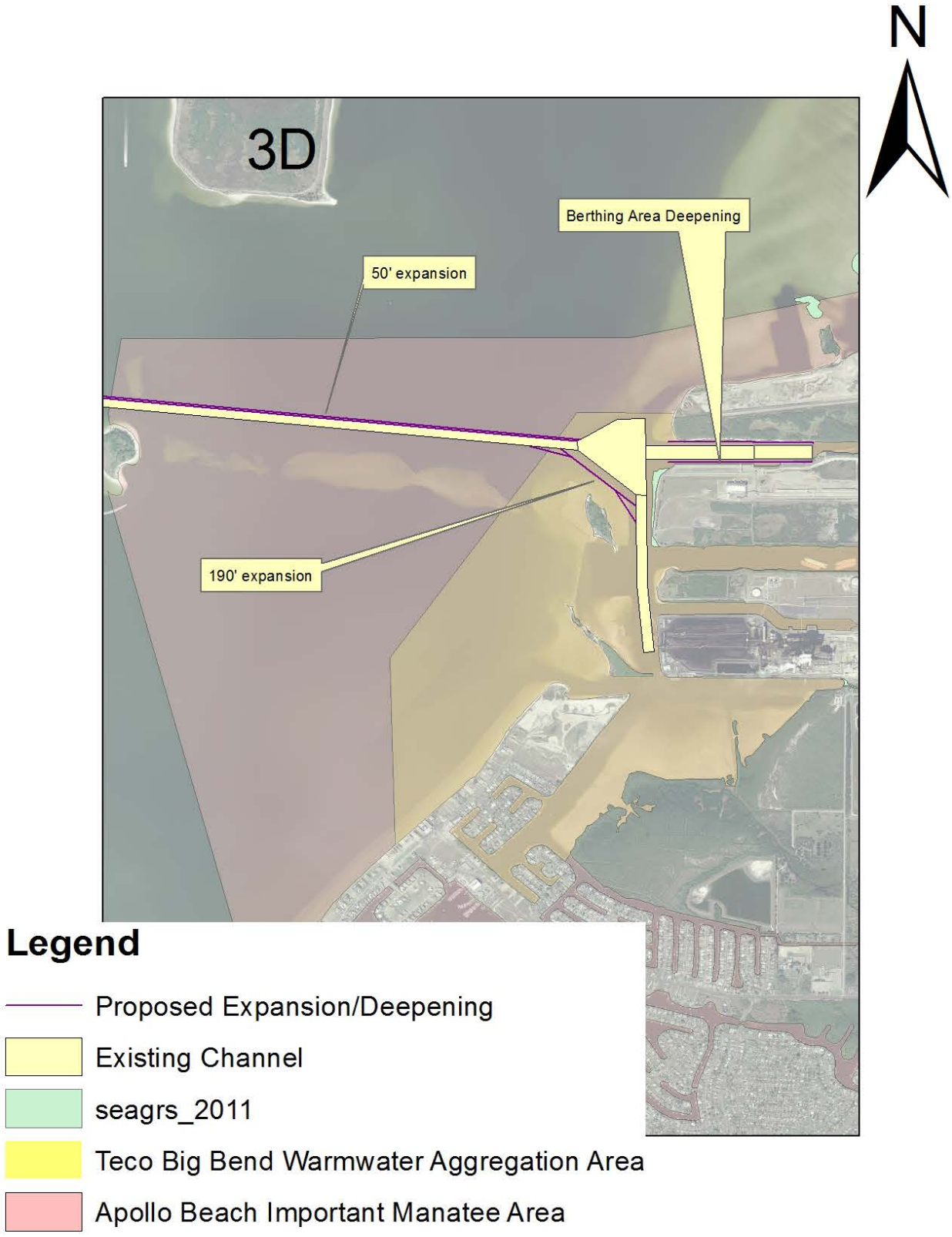


Figure 2. Tampa Harbor – Big Bend Project Map.



1.3 PROJECT AUTHORITY.

1.3.1 AUTHORIZATION.

A list of authorizations and authorizing documents for Tampa Harbor Big Bend is provided below in Table 1.

Table 1. Authorization History of Tampa Harbor Big Bend

AUTHORIZATIONS FOR THE EXISTING TAMPA HARBOR BIG BEND PROJECT		
Acts	**Work Authorized**	**Documents**
17 Aug 1999	The project for navigation, Tampa Harbor-Big Bend Channel, Florida consisting of an entrance channel extending east from the main ship channel, a turning basin, an east channel, and an inner channel at a depth of 41 feet. The authorization includes raising the dikes on placement area 3D in order to accommodate the construction material and an additional dike raising to accommodate maintenance material.	Public Law 106-53

1.4 RELATED ENVIRONMENTAL DOCUMENTS.

Related National Environmental Policy Act (NEPA), design, and planning documents for the Big Bend channel portion of the Tampa Harbor Federal navigation project, Hillsborough County, FL include the following:

- *Feasibility Report and Environmental Assessment, Tampa Harbor – Big Bend Channel, FL.* U.S. Army Corps of Engineers. Jacksonville, FL. 1997.

- *Reconnaissance Report, Tampa Harbor – Big Bend Channel and Alafia River, FL.* U.S. Army Corps of Engineers. Jacksonville, FL. 1991.

These documents are available for download at the following link: http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#Hillsborough

1.5 DECISIONS TO BE MADE.

This SEA will evaluate the effects of improving and maintaining the existing channels and dredged material placement alternatives.

1.6 SCOPING AND ISSUES.

1.6.1 RELEVANT ISSUES.

The following issues were identified as relevant to the proposed action and appropriate for further evaluation: cultural resources; air quality; threatened and endangered species including sea turtles, West Indian manatee, smalltooth sawfish, and Gulf

sturgeon; migratory birds; fish and wildlife resources; essential fish habitat; seagrass; water quality; hazardous, toxic and radioactive waste; recreation; navigation; and economics.

1.6.2 ISSUES ELIMINATED FROM FURTHER ANALYSIS.

The proposed action is expected to have little or no impact on soils, housing, population dynamics, or hardbottom habitat. A side-scan sonar survey was conducted in the project channels during 2011 and no hardbottom areas were found. In addition, this SEA supplements the 1997 EA listed in section 1.4 above. It provides an updated evaluation of the effects of the proposed action but does not re-evaluate channel expansion alternatives.

1.7 ENVIRONMENTAL COORDINATION

1.7.1 WATER QUALITY CERTIFICATION

This project would be performed in compliance with State of Florida water quality standards. In accordance with the Coastal Zone Management Act, a Federal Consistency Determination (CD) has been prepared for the proposed action (Appendix A) and will be reviewed by the State for their concurrence that the project is consistent with the enforceable policies of the Florida Coastal Management Program. State consistency review will be performed during the coordination of the draft EA. In addition the USACE will prepare an application to the State of Florida for a water quality certification to be issued in the form of an Environmental Resource Permit from the State Department of Environmental Protection.

1.7.2 ENDANGERED SPECIES ACT- SECTION 7 COORDINATION

In accordance with Section 7 of the Endangered Species Act, the project will be coordinated with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS).

1.7.3 MARINE MAMMAL PROTECTION ACT

The Corps will need to file for an Incidental Harassment Authorization (IHA) under the Marine Mammal Protection Act should blasting be required. If necessary, the IHA application process would take place closer to contract advertisement, as the IHA is only valid for one year.

2 ALTERNATIVES

The alternatives section is perhaps the most important component of this SEA. 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 decisionmaker and the public. A preferred alternative was selected based on the information and analysis presented in the sections on the Affected Environment and Probable Impacts.

2.1 DESCRIPTION OF ALTERNATIVES.

2.1.1 NO-ACTION ALTERNATIVE

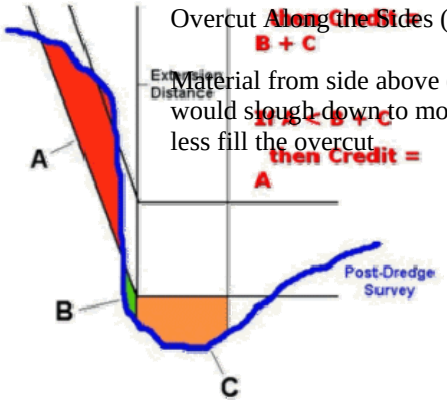
The No-Action Alternative would leave the channel in its existing dimensions and condition. No expansion or maintenance dredging would occur.

2.1.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

The project channels would be modified as described in section 1.1 above. In addition, periodic maintenance dredging of the project channels would occur approximately every 9 years.

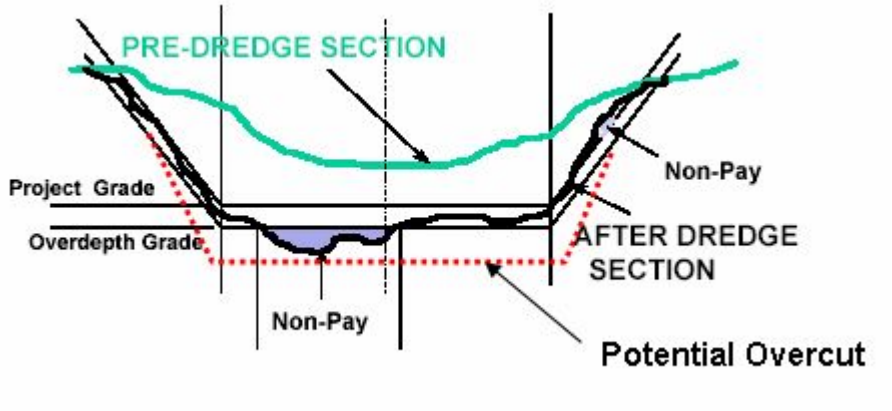
The Corps does not normally specify the type of dredging equipment to be used. This is generally left to the dredging industry to offer the most appropriate and competitive equipment available at the time. Never-the-less, certain types of dredging equipment are normally considered more appropriate depending 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, 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 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" accounts for the inherent variability and inaccuracy of the dredging equipment (normally ±2 feet).



Overcut Along the Sides (=**B**+**C**)

Material from side above (**A**) would slough down to more or less fill the overcut



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). In addition, 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.

Dredging of the project channels has been typically performed with a hydraulic cutterhead pipeline dredge although a clamshell or hopper dredge could also perform the maintenance work. The expansion dredging will require the removal of both unconsolidated material and rock. Both material types can be excavated by a cutterhead dredge. However, the areas containing rock, rock layers and lenses, and other hard materials will be difficult to excavate if the cutterhead is not of sufficient size and power. Therefore, blasting or other types of rock pre-treatment (hydrohammer/punchbarge) may be required.

The focus of the blasting work at the Big Bend project, if needed, would be to pre-treat the hard rock prior to removal by a dredge. The pre-treatment would utilize “confined blasting,” meaning the shots would be “confined” in the rock. In confined blasting, each charge is placed in a hole drilled in the rock approximately five to ten feet deep, depending on how much rock needs to be broken and the intended project depth. The

hole is capped with an inert material, such as crushed rock. This process is referred to as “stemming the hole”.

A hydrohammer is a jackhammer mounted on a backhoe. For the rest of this evaluation, the term “punchbarging” will refer to all mechanical rock removal techniques using a spud, hammer or punch. Punchbarging is the process of fracturing rock by dropping an array of chisels or spuds onto the rock, causing a fracture. A dredge (hydraulic or mechanical) excavates the rock after it is fractured. This is a slow process and can be relatively expensive. The punchbarge would work for 12-hour periods, striking the rock approximately once every 30 to 60 seconds.

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 3D DREDGED MATERIAL PLACEMENT ALTERNATIVE

Should the Corps perform the channel maintenance and expansion, the dredged material would be placed in Dredged Material Management Area (DMMA) 3D. At this writing the dikes at DMMA 3D are being raised in order to increase the capacity of the area to accommodate the dredged material from the expansion project which is anticipated to be around 4MCY. DMMA 3D is leased by the Corps from the land owner, the Tampa Port Authority (TPA) and is located approximately 1 mile north of the project area (see Figures 1&2).

2.1.4 2D DREDGED MATERIAL PLACEMENT ALTERNATIVE

It is possible that the project local sponsor (TPA) may perform the channel maintenance and/or expansion. Should the TPA perform the work, the dredged material would be placed in their DMMA 2D located approximately 3.7 miles north of the project area (see Figure 1).

2.2 PREFERRED ALTERNATIVE

The preferred alternative is to perform the proposed expansion and maintenance dredging of the project channels. Either dredged material placement alternative is environmentally acceptable and would depend on which entity performs the work.

2.3 ALTERNATIVES ELIMINATED FROM FURTHER EVALUATION

2.3.1 ALTERNATE CHANNEL DIMENSIONS

The 1997 Feasibility Report and EA evaluated dredging alternatives divided into width and depth categories. The U.S. Army Corps of Engineers, Waterways Experiment Station conducted a study using the Ships Simulation Model to determine the most feasible width design for the channel. The model is based on a simulated ship usage,

local water and weather conditions, and licensed pilot navigation using those simulated conditions. The optimum channel dimensions were determined to be a 250-foot width with a 41-foot mean lower low water depth. The channel depths where evaluated between 35 and 45 feet at 1-foot increments. The most economical depth was determined to be 41 feet with 2 feet advanced maintenance. Therefore, this EA will not evaluate further dredging alternatives but only the effects of the authorized channel expansion.

2.3.2 SIDE-CASTING/OPEN WATER DISPOSAL

This particular method of material disposition was perhaps the most widely used approach prior to the evolution of today's environmental regulatory programs addressing wetlands protection. Discussions with representatives of the relevant regulatory agencies have confirmed that this approach carries unacceptable environmental impacts in terms of the degradation or destruction of wetlands. In addition, the creation or expansion of open water islands represents a one-time opportunity for material placement and does not lend itself to active material management practices which require upland access for equipment and personnel. As a result, the use of side-casting/open water disposal was not considered an acceptable dredged material management strategy for the project channels.

2.4 COMPARISON OF ALTERNATIVES

Table 3 lists alternatives considered and summarizes the major features and consequences of the proposed action and alternatives. See section 4.0 Environmental Effects for a more detailed discussion of impacts of alternatives.

Table 2: Summary of Direct and Indirect Impacts

ALTERNATIVE ENVIRONMENTAL FACTOR	No Action	Expansion and Maintenance Dredging with DMMA 3D Dredged Material Placement	Expansion and Maintenance Dredging with DMMA 2D Dredged Material Placement
CULTURAL RESOURCES	No historic properties affected.	No historic properties affected.	No historic properties affected
AIR QUALITY	No adverse impacts.	Anticipated emissions within national ambient air quality standards. Adverse impacts not anticipated.	Anticipated emissions within national ambient air quality standards. Adverse impacts not anticipated.
SEA TURTLES	No adverse impacts.	May affect, but not likely to adversely affect, with implementation of standard and blasting/rock pre-treatment protection measures.	May affect, but not likely to adversely affect, with implementation of standard and blasting/rock pre-treatment protection measures.
WEST INIDIAN (FLORIDA) MANATEE	No adverse impacts.	May affect, but not likely to adversely affect, with implementation of standard and blasting/rock pre-treatment protection measures. TECO WWAA may require additional protection measures.	May affect, but not likely to adversely affect, with implementation of standard and blasting/rock pre-treatment protection measures. TECO WWAA may require additional protection measures.
SMALLTOOTH SAWFISH	No adverse impacts.	May affect, but not likely to adversely affect, with implementation of protection measures.	May affect, but not likely to adversely affect, with implementation of protection measures.
GULF STURGEON	No adverse impacts.	May affect, but is discountable due to rare occurrence.	May affect, but is discountable due to rare occurrence.
MIGRATORY BIRDS	No adverse impacts.	Adverse impacts minimized with implementation of protection plan.	Adverse impacts minimized with implementation of protection plan.
FISH AND WILDLIFE RESOURCES	No adverse impacts.	Wildlife temporarily displaced during dredging and placement activities. Blasting/rock pre-treatment may cause displacement.	Wildlife temporarily displaced during dredging and placement activities. Blasting/rock pre-treatment may cause displacement.
ESSENTIAL FISH HABITAT	No adverse impacts.	Estuarine water column and unconsolidated sediment habitat would be impacted during dredging. Long term suppression not expected due to anticipated dredging intervals.	Estuarine water column and unconsolidated sediment habitat would be impacted during dredging. Long term suppression not expected due to anticipated dredging intervals.
SEAGRASS	No adverse impacts.	No adverse impacts anticipated. Seagrass adjacent to the project area would be avoided during dredging and placement.	No adverse impacts anticipated. Seagrass adjacent to the project area would be avoided during dredging and placement.
WATER QUALITY	No adverse impacts.	Temporary impacts to the water column. Monitoring with shut-down should State Surface Water Standards be exceeded.	Temporary impacts to the water column. Monitoring with shut-down should State Surface Water Standards be exceeded.
HAZARDOUS, TOXIC AND RADIOACTIVE WASTE (HTRW)	No adverse impacts.	No HTRW anticipated to be encountered.	No HTRW anticipated to be encountered.

ALTERNATIVE ENVIRONMENTAL FACTOR	No Action	Expansion and Maintenance Dredging with DMMA 3D Dredged Material Placement	Expansion and Maintenance Dredging with DMMA 2D Dredged Material Placement
RECREATION	No adverse impacts.	Minimal temporary adverse impacts from dredging operation.	Minimal temporary adverse impacts from dredging operation.
NAVIGATION	Moderate long-term adverse impact on vessel safety and long-term size and tonnage capacity limitation of the channel.	Moderate short-term adverse impact from dredging equipment hampering commercial navigation. Moderate long-term benefit from increased vessel capabilities using the port and from safer navigability of the channel.	Moderate short-term adverse impact from dredging equipment hampering commercial navigation. Moderate long-term benefit from increased vessel capabilities using the port and from safer navigability of the channel.
ECONOMICS	Minor long-term adverse impact on the economy of the area from the reduced port capabilities.	Minor short-term stimulus from sale of goods and services during construction. Moderate long-term benefit to local economy from the increased port capabilities.	Minor short-term stimulus from sale of goods and services during construction. Moderate long-term benefit to local economy from the increased port capabilities.

3 AFFECTED ENVIRONMENT

The Affected Environment section succinctly describes the existing environmental resources of the areas that would be affected if any of the alternatives were implemented. This section 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 environmental resources that would affect or that would be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "no-action" alternative forms the base line conditions for determining the environmental impacts of the proposed action and reasonable alternatives.

3.1 GENERAL ENVIRONMENTAL SETTING

Big Bend channel is in the Hillsborough Bay section of Tampa Bay, a shallow salt-water estuary on the Gulf of Mexico near the middle of the Florida peninsula surrounded by three counties. The Y-shaped bay is Florida's largest open-water estuary, spans almost 400 square miles (20 miles long, 70 miles wide), and receives drainage from a 2,200 square mile watershed (USACE 2012). In spite of its size, the bay is an average of only 12 feet deep (http://tbep.org/estuary.html). Tampa Bay's natural resources have been impacted over the years as surrounding population has increased and the area has been developed with a variety of land use intensities and densities. The bay has been excavated for navigation purposes; islands and fast land have been created from dredged material; ports and residential development have encroached on the aquatic environment; and large quantities of effluent have been discharged into the bay (USACE 2012). Three main physiographic features in Tampa Bay are shallow marine grass and sand flats with an average depth of 4 feet, and deep tidal channels greater than 20 feet deep. Most of the tidal channels now include navigation channels which are dredged to depths between 20 to 43 feet (USACE 2012). Mangrove and salt marsh wetlands are also located along the shorelines of the Bay.

The project channel serves from north to south: Tampa Port Authority's Port Redwing; Mosaic Phospates Company Big Bend Terminal Dock which specializes in the shipment of wet phosphate rock, superphosphate, and occasional shipment of phosphoric acid; and the Tampa Electric Company's (TECO) Big Bend Power Station which has four coal-fired units with a combined output of more than 1,700 megawatts.

DMMAs 2D and 3D were created between 1978 and 1982 using dredged material from the federal government's deepening of Tampa Harbor (USACE 2011). DMMA 3D is an approximately 400 acre island with a designed capacity after the ongoing dike raising is complete of approximately 20 MCY. DMMA 2D is an approximately 530 acre island with a capacity of approximately 9 MCY.

3.2 GEOLOGY

A total of four (4) geotechnical investigation programs have been completed in the Big Bend area over the past 32 years. Eight (8) core borings were drilled in the Big Bend's Entrance Channel in 1982. Twenty-three (23) core borings were drilled in the Turning Basin and Entrance, East, and Inner Channels in 1993. In 1997 a total of fifteen (15) core borings were drilled in the East and Inner Channels. Six (6) core borings were completed in 2003 in the Entrance, East, and Inner Channels. Additionally a geotechnical investigation consisting of eight (8) core borings is planned for fiscal year 2014.

The existing channel bottom is underlain by unconsolidated materials consisting of sand, silt, clay, and shell. Limestone was encountered in sixteen (16) of the fifty-two (52) historical core borings. Very hard limestone was encountered in the core boring area of CB-BB-7 and CB-BB93-14 in the Entrance Channel just adjacent to the Turning Basin. The highest limestone elevation in the Entrance Channel was recorded in core boring CB-BB93-14 at -39.1 ft MLW. Limestone rock was also encountered in most core borings completed in the East Channel with top of rock elevations generally above the -41.0 ft MLW. Rock was also encountered in the Inner Channel in the area of borings CB-TC97-5 and CB-BB03-6 at elevation -38.8 ft MLW. The elevations at which the rock was encountered in the remaining borings ranged from -43.0 to -78.7 ft MLW. It is anticipated that the expansion dredging can be performed utilizing a hydraulic cutterhead pipeline dredge but some rock pre-treatment may be required. The Corps conservatively estimates that of the anticipated 4MCY of dredged material from the expansion dredging, approximately 500,000cy is rock that could require pre-treatment prior to dredging.

3.3 THREATENED AND ENDANGERED SPECIES

Threatened and Endangered species that may occur in the project area, and that may be affected by the proposed work, can be found in Table 3.

Table 3. Status of Listed Species that May Occur Within the Project Area.

Species	***State Listing****	***Federal Listing****
Green Sea Turtle	LE	LE
Hawksbill Sea Turtle	LE	LE
Loggerhead Sea Turtle	LT	LT
Leatherback Sea Turtle	LE	LE
Kemp's Ridley Sea Turtle	LE	LE
West Indian (Florida) Manatee	LE	LE
Smalltooth Sawfish	LE	LE
Gulf Sturgeon	LT	LT

* LE=Endangered and LT=Threatened

3.3.1 SEA TURTLES

The estuarine waters of Tampa Bay provide habitat for several life history stages of sea turtles, including foraging adults, foraging juveniles and subadults, and nesting females.

“The apparent order (decreasing) of abundance of turtles in the bay is: loggerheads, Kemp's ridleys, green turtles, and hawksbills. Loggerheads and Kemp's ridleys have been observed year round; seasonality of green turtles and hawksbills is unknown (FMRI 1996)”. The NMFS determined in their 2003 Gulf Regional Biological Opinion that leatherback sea turtles are generally found in deep, pelagic, offshore waters. Although they occasionally enter shallow waters to forage, they are unlikely to be associated with shipping channels. The proposed work does not overlap any designated critical habitat for these species.

3.3.2 WEST INDIAN MANATEE

The Florida manatee (*Trichechus manatus latirostris*) is a subspecies of the West Indian manatee (*Trichechus manatus*) and can be found in the project area. During periods of cold weather, they congregate at the outfall of the TECO Big Bend Power Plant which is located 3/4 mile south of the eastern end of the inner channel. Hundreds of manatees have been observed congregating at the site which is designated by the USFWS as a Warm-water Aggregation Area (WWAA). In addition, the project channels fall either within the boundaries of the WWAA or the Apollo Beach Important Manatee Area (IMA) (see figure 2). The proposed work does not overlap any designated critical habitat for this species.

3.3.3 SMALLTOOTH SAWFISH

Smalltooth sawfish (*Pristis pectinata*), a shark-like ray, is currently listed as endangered by the NMFS and may rarely occur within the project area. A smalltooth sawfish was captured and released live during sea turtle relocation trawling activities associated with a maintenance dredging project in Tampa Harbor on 12 August 2006. Currently, the core of the smalltooth sawfish Distinct Population Segment is surviving and reproducing in the waters of southwest Florida and Florida Bay, primarily within the jurisdictional boundaries of Everglades National Park where important habitat features (shallow mangrove areas) are still present and less fragmented than in other parts of the historic range. The NMFS designated critical habitat for the sawfish in 2009, but the project area does not overlap any of these locations.

3.3.4 GULF STURGEON

The Gulf sturgeon is a geographically distinct subspecies of the Atlantic sturgeon (*Acipenser oxyrinchus).* This anadromous species is generally restricted to the Gulf of Mexico from Tampa Bay to Lake Pontchartrain in Louisiana. Its range also includes the drainages of the Gulf of Mexico from the Mississippi River to the Suwannee River in Florida. It also occurs sporadically as far west as Texas and in Florida waters from Tampa Bay south to Florida Bay (Florida Museum of Natural History 2010).

Tampa Bay was the location of the first recorded significant sturgeon fishery on the Gulf of Mexico coast. The fishery began in 1886-1887 with a catch of 1,500 fish yielding 5,000 lb of roe. Two thousand fish and 6,300 lb of roe were marketed in 1887-1888. The fishery ended after the 1888-1889 season when only seven sturgeon were caught. Sturgeon catches in the Tampa Bay vicinity have been reported only sporadically since

1890. A commercial netter incidentally caught and released a Gulf sturgeon 1.8 ft in length, one mile west of Redington Beach near St. Petersburg in December 1992 (Reynolds 1993). Before this time, the most recent Gulf sturgeon catch reported from Tampa Bay was a 56.7 in female weighing 56.9 lb, collected on December 11, 1987 near Pinellas Point. No critical habitat for the Gulf sturgeon is present in the Tampa Bay area.

3.4 WATER QUALITY

Tampa Bay is classified as a class III Florida water, suitable for recreation, propagation and maintenance of a healthy and well-balanced population of fish and wildlife. In Class III waters, Florida state guidelines limit turbidity values to under 29 NTU above ambient levels outside the turbidity mixing zone during dredging operations. The Bay has suffered impacts from wetland and seagrass loss and coastline alteration; severe stormwater pollution from residential and commercial sources; dredging and harbor activities; litter; fertilizer, food processing, and other industrial discharges; and a heavy load of domestic wastewater from power and sewage treatment utilities. The bay has high nitrogen and phosphorus levels. Hillsborough Bay, where the Big Bend channel is located, receives discharges from the Hillsborough and Alafia rivers as well as a number of smaller tributaries and also receives runoff from a large portion of the city of Tampa.

3.5 ESSENTIAL FISH HABITAT

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act of 1996, waters and substrate within the project area have been identified as Essential Fish Habitat (EFH) by the Gulf of Mexico Fisheries Management Council (GMFMC). EFH is defined as those waters and substrate necessary for fish to spawn, breed, feed, or grow to maturity. Estuarine/inshore EFH within the boundaries of the proposed action consists of water column with an unconsolidated substrate. Section 3.5 (along with Section 4.3) of this document constitutes our EFH Assessment.

Table 4. Species Managed by the GMFMC and Common in the Action Area.

Species	**Seasonal Occurrence In Tampa Bay**	**Habitat Affinity**
Red Drum (*Sciaenops ocellatus*)	Adults-Common Year Round Juvenile-Common to Abundant Year Round	Soft Bottom
Pink Shrimp (*Farfantepenaeus duorarum*)	Adults- Rare from November-June Juvenile-Highly Abundant Year Round	Soft Bottom
Spanish Mackerel (*Scomberomorus maculates*)	Adults-Common Year Round Juveniles-Rare Year Round	Water Column
Stone Crab (*Menippe mercineria*)	Common Year Round	Soft Bottom

3.5.1 RED DRUM

Red drum EFH consists of all Gulf of Mexico estuaries. Eggs and larvae are planktonic and generally occur in the nearshore environment. Postlarvae and juveniles occur in estuaries and nearshore waters associated with SAV, estuarine mud bottoms, and at the water/marsh interface. Subadults occur in estuaries associated with mud bottoms

and oyster reefs. Adult red drum occur in the Gulf of Mexico and over estuarine mud bottoms and oyster reefs.

3.5.2 PINK SHRIMP

Pink shrimp EFH consists of Gulf of Mexico waters and substrates extending from the US/Mexico border to the GMFMC-SAFMC boundary. Pink shrimp eggs are demersal (dwelling near the bottom of a body of water) while larvae are planktonic and both are found in water shallower than 65 meters. Postlarvae, juveniles, and subadults are found in estuaries over sand and shell substrate. Adult pink shrimp are found in waters less than 65 meters deep, over sand and shell substrate.

3.5.3 SPANISH MACKEREL

Spanish mackerel EFH includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf Stream shoreward, including *Sargassum.* Eggs are pelagic and larvae occur mostly offshore while juveniles are found both offshore and in the beach surf. Adult Spanish mackerel are migratory, generally moving northward each spring, spending summer in the northern part of their range, and migrating south in the fall.

3.5.4 STONE CRAB

EFH for stone crab consists of Gulf of Mexico waters and substrates extending from the US/Mexico border to Sanibel, Florida from estuarine waters out to depths of 10 fathoms. Larvae are planktonic and are found in nearshore coastal waters and within estuaries. Juveniles inhabit hiding places such as crevices in and beneath rock, shell, sponges, and tunicates. Adult Florida stone crabs live in burrows and can be found in seagrass beds or on rocky substrates near and offshore out to depths of 200 feet.

3.6 SEAGRASS

Five species of seagrasses are found in Tampa Bay, including widgeongrass *(Ruppia maritima)*, manatee grass *(Syringodium filiforme)*, shoalweed *(Halodule wrightii)*, turtlegrass *(Thalassia testudinum)*, and star grass *(Halophila engelmannii)*. Turtlegrass and shoalweed are the most abundant species. Widgeongrass dominates the northern portions of the bay, whereas shoalweed and turtlegrass dominate the southern portions. Seagrass beds in the Tampa Bay area declined between 1940 and 1963, primarily due to major shoreline modifications; these losses included Hillsborough Bay (94 percent), Old Tampa Bay (45 percent) and Tampa Bay proper (35 percent) (Schomer *et al.* 1990). Since 1982, seagrass cover has expanded throughout the bay because of improved water quality (Li and Nui 2005; Sherwood 2010).

No seagrass has been previously mapped within the project footprint and little seagrass has been previously mapped in the project area. A linear strip of patchy, discontinuous seagrass was mapped by the Southwest Florida Water Management District (SWFWMD) in 2010 along the shoreline of the Red Wing terminal adjacent to the turning basin (see figure 2). However, no seagrass was mapped there in the 2012 SWFWMD survey. The 2012 SWFWMD survey also mapped seagrass along the

southern shoreline of DMMA 3D and the eastern shoreline of DMMA 2D. Extensive seagrass beds do occur along the shorelines of Hillsborough Bay adjacent to the project area (see Figure 3).

3.7 FISH AND WILDLIFE RESOURCES

Marine life common to west central Florida can be found within the project area. For instance, the bottlenose dolphin and brown pelican are two common species found throughout the coastal waters of Tampa Bay. Macro invertebrates commonly found in soft-bottom marine habitat within Florida include annelids, a variety of mollusks besides oysters, arthropods, sponges and polyps (Hoffman and Olsen 1982). The most numerous creature in the bay sediment is a primitive, fish-like invertebrate about two inches long called branchiostoma (http://tbep.org/portrait/fast_facts.html). Tampa Bay supports a wide variety of aquatic life, including the American oyster, three species of clams, blue crab, and numerous species of fish: red drum, spotted seatrout, snook, sheepshead, southern flounder, Florida pompano, striped mullet, Gulf menhaden, and the black drum (USFWS, 1984).

3.8 MIGRATORY BIRDS

Migratory birds are protected through the provisions of the Migratory Bird Treaty Act (MBTA) and the Wild Bird Conservation Act. Some 40,000 pairs of wading and shore birds of 25 species nest annually on protected islands in the bay (http://tbep.org/estuary.html). Some of this nesting occurs on DMMA's 2D and 3D. Nesting species include pelicans, cormorants, herons, egrets, gulls, ibis, spoonbills, terns, and skimmers.

3.9 AIR QUALITY

Air quality generally good throughout Tampa Bay; however, it is diminished in localized areas by pollution from the industries associated with Tampa Harbor. As of 5 December 2013 the project is located in a non-attainment area for SO_2 and Lead (http://www.epa.gov/oar/oaqps/greenbk/ancl3.html).

3.10 HTRW

In the Tampa Harbor Big Bend channel expansion and maintenance dredge areas and DMMAs potential contamination sources exist; however, there is no evidence that these areas were contaminated by specific sources. The sediment analysis history obtained by the Corps has shown that large harbors occasionally retain contaminants over many years due to stormwater runoff.

3.11 CULTURAL RESOURCES

Currently, no known resources exist within the Federal channel. Previous cultural resource studies have been conducted within the federal channel and within the project expansion areas. In 2011, the Corps contracted Panamerican Consultants, Inc. (PCI) to conduct a study on the entire Federal Channel in Tampa Bay which included most of the project area including expansion areas. The report is entitled: *Cultural Resource Assessment Survey (CRAS) for Operations and Maintenance Dredging of Tampa Bay*

Vols. 1 & 2. The survey did not result in the identification of any cultural resources within the Federal channel, although a single subbottom target, identified as target F8 by the study, was recommended for further examination. F8 was identified as a possible midden located 5 feet below the sea floor and possibly 11 feet thick. Its location would place the target within a possible expansion area near where the Big Bend channel meets the main channel.

In addition to PCI's survey, a survey was conducted by the Port on the upland area that would become the expansion areas associated with Port Redwing. The survey entitled; *Cultural Resource Assessment Survey of Proposed Addition to Port Redwing, Hillsborough County, Florida*, was conducted by Southeastern Archaeological Research, Inc. in 2003. Originally the Port Redwing expansion area was an upland area and had been the shoreline associated with Tampa Bay. A review of the 1939 aerials of the property shows that the extension of the channel cuts for the Port and Teco facilities cut through the original Tampa Bay shoreline and thus would have removed any potential resources located within the area. The development of these cuts occurred prior to legislation that would have required cultural resource investigations and thus no data exists on what would have been within the upland areas. Within the TECO facility, a single archaeological site once existed and was originally located along the shoreline. This site known as 8HI102, the Cooley Site, was a coastal midden and was reported to be eroding into the water in 1965 when it was first recorded by the University of Florida through a local informant. The Florida Master Site File (FMSF) form for the site indicates that the site was obliterated by the dredging and filling of the property. However, it should be noted that when the site was first record in 1965, the TECO development had already been constructed. Aerial maps indicated that the port facilities were constructed between 1957 and 1962. Furthermore, while the informant indicated the presence of archaeological material, no collections were reported to exist. The construction of the port prior to the site's reporting makes the site location at the facility highly improbable as the informant would have been aware of the construction. Such information would have been indicated within the university records. Thus the actual presence of the site is somewhat suspect and is most likely the reason for its location never being confirmed.

3.12 RECREATIONAL RESOURCES

Hillsborough County is heavily populated and is a major tourist destination. The county is in the Southwest Beach Region of Florida. In 2003, the Southwest Beach Region was visited by 14.2 million tourists who spent $6.4 billion. Beach tourism created 177,000 jobs in the Southwest Beach Region (Murley *et al.* 2003). Beaches that can be accessed by the general public are heavily used year-round. Beaches adjacent to condominiums, apartments, and hotels may have more limited use due to restricted access. The waters of Hillsborough County are used for swimming, fishing, scuba diving, and boating.

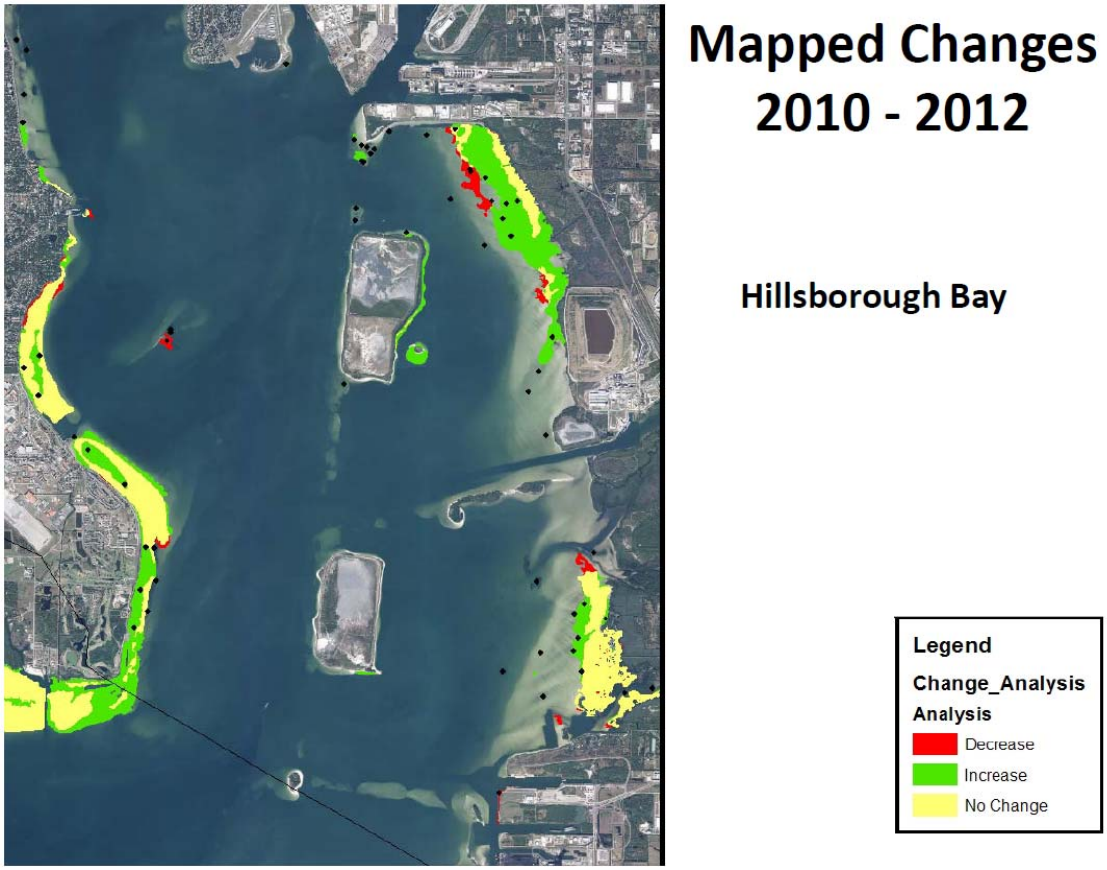
3.13 NAVIGATION

Hillsborough county waters support considerable recreational and commercial navigation. Numerous marinas and boat launches are on Hillsborough Bay and Tampa Bay. Navigation in the project area is extensive. Deep draft vessels, including large cargo ships, tankers, container ships, and cruise ships, commonly use the channels. Other boats that use the channels include watercraft used for commercial enterprises (e.g., deep-sea fishing and other charters) and recreational activities (fishing, sailing, jet skiing, pleasure boating, etc.). The Port of Tampa is the largest tonnage cargo port in Florida; numerous cargo vessels and cruise ships use the shipping channel.

3.14 ECONOMICS

The TECO Big Bend power plant imports approximately 5.5 million tons of coal for its operations annually. The Mosaic Company is the largest phosphate producer in the United States. The Mosaic plant at Big Bend processes and exports nearly 6.3 million tons of phosphate and phosphate chemicals for domestic and overseas markets annually. Combined, the TECO and Mosaic industrial operations accounted for approximately 23 percent of the total annual port cargo tonnage. Also located in the Big Bend activity center is National Gypsum, which has the capability to produce wallboard product at a rate of 400 feet per minute at its plant adjacent to US 41 at Port Redwing. Bulk raw materials and finished wallboard are shipped to and from the plant by truck (Hillsborough County, 2009).

Figure 3. Hillsborough Bay Seagrass Coverage Changes 2010-2012



(Source: SWFWMD 2012)

4 ENVIRONMENTAL EFFECTS

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

4.1 THREATENED AND ENDANGERED SPECIES

4.1.1 NO-ACTION ALTERNATIVE

There would be no impacts to threatened or endangered species from the implementation of this alternative.

4.1.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

In accordance with Section 7 of the Endangered Species Act, consultation with the USFWS and NMFS will be performed. The Corps has determined that the proposed expansion and maintenance dredging may affect, but is not likely to adversely affect sea turtles, manatees, smalltooth sawfish, and the gulf sturgeon. This determination was based on the implementation of species specific protective measures and the type of dredging equipment typically used (cutterhead). Finally, the terms and conditions of the NMFS Gulf of Mexico (Hopper Dredging) Regional Biological Opinion (GRBO) will be followed for these species.

4.1.2.1 Sea Turtles, Smalltooth Sawfish, and Gulf Sturgeon

The proposed dredging will likely be constructed with a clamshell or cutterhead dredge; therefore, adverse impacts or "takings" of sea turtles are not anticipated. However, if a hopper dredge were used it would be equipped with a rigid draghead deflector to reduce the chance of entrainment of sea turtles. In addition, due to the very low anticipated sawfish and sturgeon abundance in the area, the project is expected to have minimal impact on these species. However, if blasting is required a blasting protection plan will be implemented which would include the development of three safety radii based on the use of an unconfined blast. The use of an unconfined blast to develop safety radii for a confined blast will increase the protections afforded marine species in the area, since it does not give credit to the pressure reduction caused by the confining of the blast. Studies have shown that stemmed blasts have up to a 60 to 90% percent decrease in the strength of the pressure wave released, compared to open water blasts of the same charge weight (Nedwell and Thandavamoorthy, 1992; Hempen *et al*., 2005; Hempen *et al*., 2007). The three zones are referred to as: the “Danger Zone,” which is the innermost zone located closest to the blast; the “Safety Zone,” which is the middle zone; and the “Watch Zone,” which is the outermost zone. Finally, the following measures would be implemented:

- The contractor would instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with them. All construction

personnel would be responsible for observing water-related activities for the presence of these species.

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

- Any collision with and/or injury to a sea turtle, smalltooth sawfish, or Gulf sturgeon would be reported immediately to the NMFS Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

The primary environmental impact of punchbarging is noise and vibration. This constant pounding would serve to disrupt marine species in the area. The impulse spectrum is broadband and can have components well into the kHz range (Laughlin, 2005 and Laughlin, 2007 in Spence *et al.*, 2007). Low frequencies (<200Hz) typically dominate the overall levels for impact pile driving as seen with punchbarging (Spence *et al*., 2007). Spence *et al.* also noted that underwater sound data published in the literature exhibits a fairly wide variation in levels generated by pile driving type activities (similar to punchbarging). Variations on the order of five to ten decibels (dB) from one hit to another were noted. A punchbarge used to fracture hard material extends the length of the project temporally due to its lowered production relative to blasting; as a result, potential impacts to all fish and wildlife resources in the area are extended temporally, as well.

4.1.2.2 West Indian (Florida) Manatee

Standard protective measures would be taken during expansion and maintenance dredging activities to ensure the safety of manatees. To make the contractor and his personnel aware of the potential presence of this species in the project area, their endangered status, and the need for precautionary measures, the contract specifications would include the following standard manatee protection clauses:

- All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. Construction personnel shall be advised that there are civil and criminal penalties for harming, harassing, or killing manatees, which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

- All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

- Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

• All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

• Any collision with or injury to a manatee shall be reported immediately to the FFWCC Hotline at 1-888-404-FWCC. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-731-3336).

• Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Awareness signs that have already been approved for this use by the Florida Fish and Wildlife Conservation Commission (FFWCC) must be used (see MyFFWCC.com). One sign which reads *Caution: Manatee Habitat* must be posted. A second sign measuring at least 8 ½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shutdown of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities.

As stated in section 4.1.2 above, consultation with the USFWS will occur. Due to the presence of the Apollo Beach IMA and the TECO WWAA, additional measures to protect the manatee may be required. For example DEP ERP No. 0157891-009-DF for the Tampa Harbor Comprehensive Maintenance Dredging Project contains these additional measures for projects within Big Bend channel and berths:

• No clamshell dredging and disposal activities are authorized to occur between dusk and dawn.

• Between November 15 and March 31, at least two designated manatee observers shall be present when in-water work is being performed. These observers shall be approved by the Florida Fish and Wildlife Conservation Commission at least two weeks before the beginning of construction, and be equipped with polarized sunglasses to aid in observation. The manatee observer must be on site during all in-water construction activities and will advise personnel to cease operation upon sighting a manatee within 50 feet of any in-water construction activity. Movement of a work barge, other associated vessels, or any in-water work shall not be performed after sunset, when the possibility of spotting manatees is negligible.

• Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. The permittee shall ensure that the contractor maintains a log detailing sightings, collisions, or injuries to marine species should they occur during the contract period. Following project completion, a report summarizing incidents and sightings shall be submitted to the Florida Fish and Wildlife Conservation Commission, Imperiled

Species Management, MS 6A, 620 South Meridian Street, Tallahassee, Florida 32399-1600.

- No blasting shall occur.

If blasting is required, a blasting protection plan will be implemented with a no blast window of November 1 through March 31 (USACE 2000a, 2000b [Rev. 2005]). As stated above, the rock pre-treatment would utilize "confined blasting," meaning the shots would be "confined" in the rock. In confined blasting, each charge is placed in a hole drilled in the rock approximately five to ten feet deep, depending on how much rock needs to be broken and the intended project depth. The hole is capped with an inert material, such as crushed rock. This process is referred to as "stemming the hole". For the Port of Miami expansion that used confined blasting as a pre-treatment technique, the stemming material was angular crushed rock. The optimum size for stemming material is an average diameter of approximately 0.05 times the diameter of the blast hole. Material must be angular to perform properly (Konya, 2003).

In the Miami Harbor Phase II project completed in 2006, the following requirements were in the specifications regarding stemming material:

> **"**All blast holes shall be stemmed. The Blaster or Blasting Specialist shall determine the thickness of stemming using blasting industry conventional stemming calculations. The minimum stemming shall be 2 feet thick. Stemming shall be placed in the blast hole in a zone encompassed by competent rock. Measures shall be taken to prevent bridging of explosive materials and stemming within the hole. Stemming shall be clean, angular to subangular, hard stone chips without fines having an approximate diameter of 1/2-inch to 3/8-inch. A barrier shall be placed between the stemming and explosive product, if necessary, to prevent the stemming from settling into the explosive product. Anything contradicting the effectiveness of stemming shall not extend through the stemming."

The length of stemming material will vary based on the length of the holes drilled; however, minimum lengths will be included in the project specifications. Studies have shown that stemmed blasts have up to a 60 to 90% percent decrease in the strength of the pressure wave released, compared to open water blasts of the same charge weight (Nedwell and Thandavamoorthy, 1992; Hempen *et al*., 2005; Hempen *et al*., 2007). However, unlike open water blasts, very little documentation exists on the effects that confined blasting can have on marine animals near the blast (Keevin *et al*., 1999).

As part of the development of the protected species protection and observation protocols, which will be incorporated into the plans and specifications for the project, the Corps would work with agencies to address concerns and potential impacts associated with the blasting.

In addition to coordination with the agencies, any new scientific studies regarding the effects of blasting (confined or unconfined) on species that may be in the area (marine mammals, sea turtles, and fish, both with a swim bladder and without) will be incorporated into the design of the protection measures that will be employed with confined blasting activities during the project.

As part of the protective measures that will be employed, the Corps will develop three safety radii based on the use of an unconfined blast. The use of an unconfined blast to develop safety radii for a confined blast will increase the protections afforded marine species in the area, since it does not give credit to the pressure reduction caused by the confining of the blast. These three zones are referred to as: the "Danger Zone," which is the innermost zone located closest to the blast; the "Safety Zone," which is the middle zone; and the "Watch Zone," which is the outermost zone.

The danger zone radius will be calculated to determine the maximum distance from the blast at which mortality to protected marine species is likely to occur. The danger zone is determined by the amount of explosives used within each delay (which can contain multiple boreholes). An explosive delay is the division of a larger charge into a chain of smaller charges with more than eight milliseconds between each of the charges. This break in time breaks up the total pressure of the larger charge into smaller amounts, which makes the rock fracture more efficiently and also decreases impacts to aquatic organisms. These calculations are based on impacts to terrestrial animals in water when exposed to a detonation suspended in the water column (unconfined blast) as researched by the U.S. Navy in the 1970s (Yelverton *et al*., 1973; Richmond *et al.,* 1973), as well as on observations of sea turtle injury and mortality associated with unconfined blasts for the cutting of oil rig structures in the Gulf of Mexico (Young, 1991; O'Keefe and Young, 1994). The reduction of impact by confining the shots would more than compensate for the presumed higher sensitivity of marine species.

The Corps believes that the danger zone radius, coupled with a strong protected species observation and protection plan, is a conservative, but prudent, approach to the protection of marine wildlife species. Based on a review of the Miami Harbor project, NMFS and USFWS found these protective measures sufficient to protect marine mammals under their respective jurisdictions (NMFS, 2005; USFWS, 2002). In addition, monitoring of the Miami blast pressures found these calculations to be extremely conservative and protective (Jordan *et al*., 2007 and Hempen *et al*., 2007).

These zone calculations will be included as part of the specifications package that the contractors will bid on before the project is awarded. The calculations are as follows:

1) Danger Zone (NMFS has referred to this as the Caution Zone in previous authorizations): the radius in feet from the detonation beyond which no mortality or injury from an open water explosion is expected (NMFS 2005). The Danger Zone (feet) = 260 [79.25 m] times the cube root of weight of explosives in pounds

per delay (equivalent weight of TNT).

2) The Safety Zone (sometimes referred to as the Exclusion Zone) is the approximate distance in feet from the detonation beyond which injury (Level A harassment as defined in the MMPA) is unlikely from an open water explosion (NMFS 2005b). The Safety Zone (feet) = 520 [158.50 m] times cube root of weight of explosives in pounds per delay (equivalent weight of TNT). Ideally, the safety radius should be large enough to offer a wide buffer of protection for marine animals, while still remaining small enough that the area can be intensely surveyed.

3) The Watch Zone is three times the radius of the Danger Zone to ensure animals entering or traveling close to the Safety Zone are spotted and appropriate actions can be implemented before or as they enter any impact areas (i.e., a delay in blasting activities).

To estimate the maximum poundage of explosives that may be utilized for this project, the Corps reviewed previous blasting projects: San Juan Harbor, Puerto Rico in 1994 and the Miami Harbor project in 2005. The heaviest delay used during the San Juan Harbor project was 375 pounds per delay and during the Miami Harbor project, 376 pounds per delay. The maximum delay weight for the Tampa Harbor project will be determined during the test blast program.

The weight of explosives to be used in each blast will be limited to the lowest poundage of explosives that can adequately break the rock. The blasting program may consist of the following safety conditions that are based on industry standards in conducting confined underwater blasting, as well as Corps Safety and Health Regulations:

- Drill patterns are restricted to a minimum of an eight -foot separation from a loaded hole.

- Hours of blasting are restricted from two hours after sunrise to one hour before sunset to allow for adequate observation of the project area for protected species.

- Selection of explosive products and their practical application method must address vibration and air blast (overpressure) control for protection of existing structures and marine wildlife.

- Loaded blast holes will be individually delayed to reduce the maximum pounds per delay at point detonation, which in turn will reduce the mortality radius.

- The blast design will consider matching the energy in the “work effort” of the borehole to the rock mass or target for minimizing excess energy vented into

the water column or hydraulic shock.

- Delay timing to ensure at least eight milliseconds between delays to break larger blast weights into smaller blasts, increasing blast efficiency while reducing pressure released into the water column.

The Corps will consult with the USFWS and NMFS on the potential impacts to manatees, sea turtles, smalltooth sawfish and Gulf sturgeon associated with the blasting activities.

Test Blast Program - Prior to implementing a construction blasting program a test blast program would be completed. The test blast program would have all the same protection measures in place for protected species monitoring and protection as blasting for construction purposes. The purpose of the test blast program is to demonstrate and/or confirm the following:

- Drill boat capabilities and production rates
- Ideal drill pattern for typical boreholes
- Acceptable rock breakage for excavation
- Tolerable vibration level emitted
- Directional vibration
- Calibration for the environment (water temp, salinity, etc.)

The test blast program begins with a single range of individually delayed holes and progresses up to the maximum production blast intended for use. The test blast program will take place in the project area and will count toward the pre-treatment of material, since the blasts of the test blast program will be cracking rock. Each test blast is designed to establish limits of vibration and air blast overpressure, with acceptable rock breakage for excavation. The final test event simulates the maximum explosive detonation as to size, overlying water depth, charge configuration, charge separation, initiation methods, and loading conditions anticipated for the typical production blast.

The results of the test blast program will be formatted in a regression analysis (a statistical tool for estimating the relationships among variables) with other pertinent information and conclusions reached. This will be the basis for developing a completely engineered procedure for the construction blasting plan. During testing, the following data will be used to develop a regression analysis:

- Distance
- Pounds per delay
- Peak particle velocities (TVL)
- Frequencies of TVL
- Peak vector sum
- Air blast, overpressure

Utilization of punchbarging to pre-treat the rock in the project area prior to dredging may have an effect on manatees in the area. Both the pressure and noise associated with punchbarging can impact marine mammals.

The USFWS has not set levels defining harassment of manatees under the MMPA. However, under the MMPA NMFS has defined levels of harassment for marine mammals. Level A harassment is defined as "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild." Level B harassment is defined as "Any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including but not limited to migration, breathing, nursing, breeding, feeding or sheltering." Current NMFS practice regarding exposure of marine mammals to punchbarging noise is that cetaceans exposed to impulsive sounds at or above 180 re 1 µPa rms are considered to have been taken by Level A (i.e., injurious) harassment.

Behavioral harassment (Level B) is considered to have occurred when marine mammals are exposed to impulsive noise from punchbarging at or above 160 dB re 1 µPa rms but below injurious thresholds.

Sound levels from punchbarging could reach or exceed the 180 dB re 1 µPa sound pressure level root mean square threshold; however no injuries to manatees from sound associated with punchbarging are anticipated due to the use of a shutdown zone described below. Should manatees be near the project vicinity during punchbarging operations, indirect impacts could include alteration of behavior and autecology. For example, daily movements and/or seasonal migrations of manatees may be impeded or altered.

As a precautionary measure against possible effects, the Corps will utilize a shutdown zone during punchbarging of 40 m (130 ft). If a protected species approaches or enters a shutdown zone during punchbarging, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal. Based on this information and the proposed construction techniques, the Corps determined that punchbarging may affect, but is not likely to adversely affect the endangered Florida manatee.

4.1.3 DMMA 2D OR 3D DREDGED MATERIAL PLACEMENT ALTERNATIVES

Disposal of dredged material in either DMMA is not expected to have an impact on any threatened or endangered species.

4.2 WATER QUALITY

4.2.1 NO-ACTION ALTERNATIVE

If the proposed maintenance dredging was not performed there could be an increase in turbidity as vessel wakes disturb shoaling sediment in the channel.

4.2.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

The primary anticipated change in water quality at the expansion and maintenance dredging areas would be a temporary increase in turbidity. According to the State of Florida's Class III water quality standards, turbidity levels during dredging 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 work. If at any time the turbidity standard were exceeded, those activities causing the violation would temporarily cease. Expansion and maintenance dredging would be conducted in compliance with State of Florida water quality standards and per the requirements of DEP ERP No. 0157891-008-EI.

4.2.3 DMMA 2D OR 3D DREDGED MATERIAL PLACEMENT ALTERNATIVES

The primary anticipated change in water quality at the placement areas would be a temporary increase in turbidity at the weir structure outfalls. These DMMA's are designed to provide sufficient retention time such that the dredged material would settle out prior to the decant water flowing over the weir structure. Dredged material placement would be conducted in compliance with State of Florida water quality standards and per the requirements of DEP ERP No. 0157891-008-EI. As stated above, turbidity will be monitored according to State protocols during the proposed dredged material placement. If at any time the turbidity standard were exceeded, those activities causing the violation would temporarily cease.

4.3 ESSENTIAL FISH HABITAT

4.3.1 NO-ACTION ALTERNATIVE

The no-action alternative would not impact on EFH or federally managed fisheries along the central west coast of Florida.

4.3.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

Maintenance dredging could affect approximately 92 acres of unconsolidated substrate while expansion dredging could affect another 18 acres of unvegetated consolidated substrate adjacent to the existing channels. Effects to EFH would be to unconsolidated substrate, consolidated unvegetated substrate and estuarine water column. While managed species may be impacted the majority of the effects would be on associated and prey species for managed species.

A hopper dredge could perform the maintenance dredging. In addition, a hydraulic cutter-head pipeline dredge could perform both the maintenance and expansion dredging. Finally, a clamshell dredge could also be used in conjunction with pump-out capable barges/scows to perform both the maintenance and expansion dredging.

The Corps has determined that the proposed action would not have a substantial adverse impact on EFH or federally managed fisheries along the west coast of Florida. This determination was based on the fact that the substrate of the project area is

unvegetated 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 encompass a fraction of the entire water body and similar habitat occurs immediately adjacent.

4.3.3 DMMA 2D OR 3D DREDGED MATERIAL PLACEMENT ALTERNATIVES

As stated in section 3.6 above, the SWFWMD mapped thin linear bands of seagrass along portions of the southern shoreline of DMMA 3D and the eastern shoreline of DMMA 2D in 2012 (see Figure 3). Placement of dredging equipment including pipelines will avoid these areas entirely. In addition, turbidity in decanted water at the weir outfalls will be monitored and maintained to within State water quality standards.

EFH coordination with the NMFS Habitat Conservation Division (HCD) will be initiated concurrently with noticing of the draft NEPA document.

4.4 SEAGRASS

4.4.1 NO-ACTION ALTERNATIVE

Under the no action alternative, no expansion or maintenance dredging would occur. Therefore, there would be no impacts to seagrass.

4.4.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

As stated in 3.6 above, no seagrass has been previously mapped within the project footprint nor is any expected to occur there due to the water depths. Therefore, no impacts to seagrass are anticipated from either the maintenance or expansion dredging.

4.4.3 DMMA 2D OR 3D DREDGED MATERIAL PLACEMENT ALTERNATIVES

In order to insure that there are no impacts to this resource, the contractor will be required to inspect for seagrass prior to running any pipeline or equipment along the shorelines of either DMMA.

4.5 FISH AND WILDLIFE RESOURCES

4.5.1 NO-ACTION ALTERNATIVE

The no-action alternative would not impact fish and wildlife resources occurring in the project area.

4.5.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

Marine life common to Tampa Bay can be found within the dredging footprint. For instance, the bottlenose dolphin and brown pelican are two iconic species found throughout the coastal waters of Hillsborough County. These and other locally

abundant aquatic and avian species as well as the majority of juvenile and adult fishes could be displaced to adjacent habitat during maintenance and expansion dredging operations. Bottlenose dolphins are common in Tampa Bay, but the Corps has never documented a direct effect on bottlenose dolphins from dredging activities in the Tampa Bay area or in the United States. In the April 25, 2005 notice in the Federal Register for the issuance of an Incidental Harassment Authorization for blasting at the Port of Miami, NMFS states:

> "According to the Corps, bottlenose dolphins and other marine mammals have not been documented as being directly affected by dredging activities and, therefore, the Corps does not anticipate any incidental harassment of bottlenose dolphins. NMFS concurs." (NMFS, 2005)"

Blasting/rock pre-treatment operations may have an effect on bottlenose dolphins in the area of any activity to break up consolidated material during project construction. Direct impacts on marine mammals due to blasting activities in the project area include alteration of behavior and autecology. For example, daily movements and/or seasonal migrations of dolphins may be impeded or altered. In addition, dolphins may alter their behavior or sustain minor physical injury from detonation of blasts inside the danger zone. Although a lethal or injurious incidental take would not result from sound/noise at the edge of the danger zone, disturbances of this nature (alteration of behavior/movements) may be considered harassment under MMPA. It is likely that an effect on dolphins outside of the proposed danger zone will be in the form of a Temporary Threshold Shift (TTS). A TTS is a temporary change in the auditory function of an animal as a result of exposure to a high level of noise. Both the pressure and noise associated with blasting can injure marine mammals.

Utilizing data from confined (rock-contained) blasts such as those at the Atlantic Dry Dock in North Carolina and the Port of Miami in 2005, the Corps has been able to estimate potential effects on protected species. This data can be correlated to the data from the EPA concerning blasting impacts to marine mammals. The EPA data indicates that impacts from explosives can produce lethal and non-lethal injury as well as incidental harassment. The pressure wave from the blast is the most causative factor in injuries because it affects the air cavities in the lungs and intestines. The extent of lethal effects are proportional to the animal's mass, *i.e.*, the smaller the animal, the more lethal the effects; therefore, all data is based on the lowest possible weight of the affected mammal (infant dolphin). Non-lethal injuries include tympanic membrane ruptures; however, given that dolphin behavior relies heavily on sound, the non-lethal nature of such an injury is questionable in the long-term. For that reason, it is important to employ limits to prevent non-lethal tympanic membrane damage from occurring. Based on the EPA test data, the level of pressure impulse for which no lethal and no non-lethal injuries occur is reported to be five pounds per square inch pressure during an exposure lasting one millisecond.

More recently, studies by Finneran *et al*. (2000) demonstrated both temporary and permanent auditory threshold shifts in marine mammals as impacts from explosions. Due to the fact that marine mammals are highly acoustic, such effects on behavior should be taken into account when assessing harmful impacts. While many of these impacts are not lethal and this study has shown that the impacts tend not to be cumulative, significant changes in behavior could constitute a “take” under the MMPA.

By utilizing the confined blasting technique used and studied at Miami Harbor in 2005, the Tampa Harbor maximum shot pressures from confined blasting will be significantly lower than open-water shot pressures at the same charge weight. Radiation of the wave energy into rock reduces the available energy to reach the water column (Hempen *et al.*, 2007). The pressures entering the water column are well below those pressures that typically propagate away from open-water shot pressures relative to charge weight per delay.

As a result of the reduction in pressure waves by confining blasts in rock, the placement of a protective zone around the blast array, and monitoring for the presence of protected species, including bottlenose dolphins, the Corps does not believe that any dolphins will be killed or injured. Due to the aerial reconnaissance, on-board observers and a conservative safety radius, any impact on this species due to blasting is expected to be minor and short-term in nature. However, because the proposed action may potentially injure bottlenose dolphins within the danger zone, and may harass bottlenose dolphins by causing a TTS outside of the danger zone, the Corps will submit a request for an "incidental harassment authorization” from the NMFS. Section 101 (a)(5) of the MMPA allows the incidental (but not intentional) taking of marine mammals upon request if the taking will (1) have a negligible impact on the species or stock(s); and (2) not have an immitigable adverse impact on the availability of the species or stock(s) for subsistence uses.

Review of ichthyologic information and test blast data indicates that fish with swim bladders are more susceptible to damage from blasts, and some less-tolerant individuals may be killed within 140 feet of a confined blast (USACE, 2000c).

4.5.3 DMMA 2D OR 3D DREDGED MATERIAL PLACEMENT ALTERNATIVES

Locally abundant terrestrial and avian species could be displaced to adjacent habitat during DMMA placement operations. There could be an impact on migratory bird nesting should DMMA placement occur during the April 1 to August 31 timeframe. However, these impacts would be minimized by implementing the District’s Migratory Bird Protection Plan.

4.6 MIGRATORY BIRDS

4.6.1 NO-ACTION ALTERNATIVE

This alternative is not expected to have an impact on migratory birds.

4.6.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

Expansion and maintenance dredging would not affect migratory birds.

4.6.3 DMMA 2D OR 3D DREDGED MATERIAL PLACEMENT ALTERNATIVES

There is potential for impacts to migratory bird nesting should DMMA placement occur during the nesting season from April 1 to August 30. However, these impacts would be minimized by implementing the District's Migratory Bird Protection Plan which includes protection measures such as buffering nesting sites to avoid take under the MBTA.

4.7 AIR QUALITY

4.7.1 NO-ACTION ALTERNATIVE

The no action alternative is not expected to result in small, localized, temporary increases in concentrations of nitrogen dioxide (NO_2), SO_2, CO, VOC, and PM.

4.7.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

The proposed action may result in small, localized, temporary increases in concentrations of nitrogen dioxide (NO_2), SO_2, CO, VOC, and PM. The project is located in a non-attainment area for SO_2 and Lead (http://www.epa.gov/oar/oaqps/greenbk/ancl3.html) as of 5 December 2013. Emissions associated with the dredge plant would be the largest contribution. However, the total increases are anticipated to be relatively minor in context of the existing point and nonpoint and mobile source emissions in Hillsborough County (Table 6). Project related emissions should not adversely impact air quality given the relatively low anticipated level of emissions and the likelihood for prevailing offshore winds. With the proposed action, the criteria pollutant levels should be well within the national ambient air quality standards.

4.7.3 DMMA 2D OR 3D DREDGED MATERIAL PLACEMENT ALTERNATIVES

As with the evaluation for the proposed action above, DMMA placement may result in small, localized, temporary increases in concentrations of nitrogen dioxide (NO_2), SO_2, CO, VOC, and PM from the operation of vehicles and heavy machinery at the site.

Table 5. Hillsborough Countywide Emissions (tons per year)

	Emissions (tons)					
	NOx	**SO2**	**CO**	**VOC**	**$PM_{2.5}$**	**PM_{10}**
1999 Countywide Emissions Nonpoint + Mobile (Point and Nonpoint + Mobile)	42,908 (105,428)	6,827 (167,173)	306,595 (311,111)	51,654 (53,891)	8,498 (9,746)	25,530 (28,297)
Hillsborough County 1999 emissions from: http://scorecard.goodguide.com/env-releases/cap/county.tcl?fips_county_code=12057#emissions_summary						

4.8 HTRW

4.8.1 NO-ACTION ALTERNATIVE

No change to the amount of hazardous, toxic, or radioactive waste or its accumulation in the project area will occur as a result of the No-Action Alternative.

4.8.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

No known sources of HTRW contaminants occur within the expansion and dredging footprint. Should HTRW be found during construction of this project, it would be disposed of in accordance with all Federal, state and local regulations.

4.8.3 DMMA 2D OR 3D DREDGED MATERIAL PLACEMENT ALTERNATIVES

As with the dredging alternative discussed above, no known sources of HTRW occur within either DMMA 2D or 3D. However, should HTRW be found during dredged material placement, it would be disposed of in accordance with all Federal, state and local regulations.

4.9 CULTURAL RESOURCES

4.9.1 NO-ACTION ALTERNATIVE

The no-action alternative would have no impacts on significant resources. As stated in section 3 no known resources exist within the Federal Channel and continued use would not pose any threat to resources located in the general vicinity of the channel.

4.9.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

The Corps has determined the maintenance and expansion of the federal channel at the Port Redwing and TECO areas would have no effect to resources. Previous construction of the port and ongoing dredging maintenance and expansion has resulted in a project area that is clear of resources. The Corps 2011 study not only investigated the channel itself but an additional 100 feet of expansion zone. This expansion covers most of the expansion areas proposed by the Corps. The expansion area along the entrance channel is an additional 50 feet and falls completely within the survey area. Within this area was a single subbottom target F8. A discussed above this was reported in the 2011 study as a possible midden. Unfortunately, the depth of the target below the surface did not make a diver investigation practicable. Therefore the Corps utilized part of their geotechnical investigations to have the target bisected by three cores. These cores were brought back to the district for examination and confirmed the presence of a thick shell lens in the location of the target but not the presence of an archaeological midden. Additionally, the transect lines of the original 2011 survey were reviewed and were found to have sufficiently covered the 190’ turning basin expansion area. The survey vessel towed the equipment through the 190’ expansion area and no targets were identified. No additional work was needed as the 2011 survey did not indicate the presence of any resources or targets in this area beyond that discussed above with shell lens associated with the subbottom target of F8.

4.9.3 DMMA 2D OR 3D DREDGED MATERIAL PLACEMENT ALTERNATIVES

Placement of dredged material within either DMMA 2D or 3D would have no effect on any significant resources. The corps has previously consulted on the use of these facilities for regular channel maintenance within Tampa Bay and determined that use of these disposal sites will not affect any resources.

4.10 RECREATIONAL RESOURCES

4.10.1 NO-ACTION ALTERNATIVE

Considering the current depths of the project channels, there would be no adverse impact to recreational boating if the proposed maintenance dredging was not performed.

4.10.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

Some recreational boating and fishing occurs within the project channels and could be temporarily impacted during construction due to the presence of the dredge and associated equipment.

4.10.3 DMMA 2D OR 3D DREDGED MATERIAL PLACEMENT ALTERNATIVES

As with the evaluation of the proposed action above, recreational boating and fishing could be temporarily impacted during DMMA placement due to the presence of dredge equipment (pipelines) near the DMMAs during construction.

4.11 CUMULATIVE IMPACTS

Cumulative impact is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Table 6 summarizes the impact of such cumulative actions by identifying the past, present, and reasonably foreseeable future condition of the various resources which are directly or indirectly impacted by the proposed action and its alternatives. The table also illustrates the with-project and without-project condition (the difference being the incremental impact of the project). Also illustrated is the future condition with any reasonable alternatives (or range of alternatives).

Past, present, and future activities that may stress environmental resources that occur in the vicinity of the project area include the operations and maintenance dredging of the Tampa Harbor projects, coastal development and urbanization, commercial and recreational fishing, recreational boating, and shipping. Other future actions potentially contributing to environmental effects include channel deepening, artificial reef creation, and beneficial use of dredged material. Because the relatively small footprint and short-duration of effects attributable to expansion and maintenance dredging operations, the proposed action contributes a small to negligible incremental effect to cumulative impacts when added to the impacts of other past, present, and reasonably foreseeable actions affecting the project area.

TABLE 6: SUMMARY OF CUMULATIVE IMPACTS

	Past (historical project impacts)	Present (current project impacts)	Future without project (no expansion or maintenance)	Future with proposed dredging and DMMA placement
Sea turtles	Construction of Tampa Harbor Navigation channels may have impacted swimming turtles.	Use of draghead turtle excluder minimizes mortalities.	No effect.	Take minimized from use of hopper dredge draghead turtle excluder. Blasting could cause TTS.
Manatees/Whales	Construction of Tampa Harbor Navigation channels increased vessel traffic.	Minimal effect with use of standard protection measures.	Depth and width restrictions and Increased commodity demand results in light-loading more vessels for increased vessel traffic and port visits.	Minimal effect with use of protection measures. Blasting could cause TTS. Deeper and wider channels would reduce port visits.
Smalltooth sawfish	Mortality from commercial fishing by-catch.	Minimal effect.	Minimal effect.	Blasting could cause mortality though highly discountable due to anticipated low abundance.
Gulf Sturgeon	Minimal effect.	Minimal effect.	Minimal effect.	Blasting could cause mortality though highly discountable due to anticipated low abundance.
Water quality	Temporary increase in turbidity with past dredging activities.	Pollution prevention measures have resulted in Class III designation for Big Bend area. Temporary increase in turbidity with dredging and placement activities.	Pollution prevention measures should continue.	Temporary increase in turbidity with expansion and maintenance dredging, blasting, and placement activity.
Essential Fish Habitat	Tampa Harbor construction altered bay bottom habitat. No substantial effect on Federally managed fish species	No substantial effect on Federally managed fish species.	Minimal effect.	No substantial effect on Federally managed fish species. Benthic recovery post dredging. Blasting could cause mortality.
Seagrass	Tampa Harbor construction altered bay bottom habitat.	Ship wake erosion impacts.	Ship wake erosion impacts.	Minimal effect with use of protection/avoidance measures. Larger vessels generate larger ship wakes.
Fish and Wildlife Resources	Loss of habitat with construction of navigation channels. Disposal areas create terrestrial habitat.	Wildlife temporarily displaced during dredging and DMMA placement.	Minimal effect.	Dredging would impact benthic organisms. Wildlife temporarily displaced during dredging and DMMA placement.

	Past (historical project impacts)	Present (current project impacts)	Future without project (no expansion or maintenance)	Future with proposed dredging and DMMA placement
Migratory Birds	Minimal effect.	DMMAs provide critical nesting habitat.	Minimal effect.	Implementation of protection plan minimizes impacts.
Air Quality	Local emissions increased with dredging of navigation channels. Minor emissions from dredging equipment.	Minor emissions from dredging equipment. Vessel traffic generates emissions.	Depth and width restrictions and Increased commodity demand results in light-loading more vessels for increased vessel traffic and emissions.	Minor emissions from dredging equipment. More efficient port operation results in reduced port calls from fewer, larger vessels.
Cultural Resources	No Historic Properties affected.	No Historic Properties affected.	No Historic Properties affected.	No Historic Properties affected.
Recreation Resources	Navigation channel dredging increased recreational boating opportunities.	Dredging equipment disrupts recreational boat traffic.	Minimal effect.	Equipment could temporarily disrupt recreational activities.
Aesthetic Resources	Construction of navigation channels permanently affected local aesthetic resources.	Equipment temporarily affects aesthetic resources.	Minimal effect.	Equipment would temporarily affect aesthetic resources.
Noise	Construction of navigation channels increased local noise levels.	Dredging equipment noise is short-term and minimal.	Minimal effect.	Dredging equipment noise would be short-term and is anticipated to be minimal during dredging and placement activities.
Navigation	Navigation channel dredging improved navigational safety.	Maintenance dredging maintains navigational safety.	Depth and width restrictions and Increased commodity demand results in light-loading more vessels for increased port calls and inefficient port operation.	More efficient port operation results in reduced port calls from fewer, larger vessels. Deeper and wider channels increase navigational safety margins.
Socio-Economics	Construction of navigation channels created a significant positive economic stimulus.	Maintained navigation channels continue to provide a significant economic stimulus.	Depth and width restrictions and Increased commodity demand results in light-loading more vessels for increased port calls and inefficient port operation.	Deeper depths for more draft and tonnage reduces the unit cost for transport.

4.12 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.12.1 IRREVERSIBLE

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. Other than the use of fuel, equipment and supplies and the expenditure of federal funds, there would be no irreversible commitment of resources.

4.12.2 IRRETRIEVABLE

An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. Other than minor and temporary impacts to water quality and benthic organisms during dredging, there would be negligible irretrievable commitment of resources.

4.13 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

There may be short-term degradation of water quality due to turbidity generated at the dredging, blasting, and the disposal sites. The excavation of the material would eliminate benthic organisms within the dredging cut and the placement of material in the DMMAs would temporarily displace wildlife there. The potential exists for the incidental harassment of bottlenose dolphins during blasting/rock-pretreatment operations. However, the implementation of protective measures should minimize and mitigate for this potential impact to resident dolphins in Hillsborough Bay.

4.14 LOCAL SHORT-TERM USES AND MAINTENANCE/ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The proposed expansion and maintenance work is typically of short duration. Adversely affected benthos would be expected to recover in less than a year, possibly longer. Most fish species and other motile organisms like crabs should be able to avoid the dredging equipment. Since the project area is limited in size, the long-term productivity of fish and other motile species should not be significantly affected. As this dredging and DMMA placement is only conducted periodically, the wildlife would re-colonize and habituate these areas between events.

4.15 INDIRECT EFFECTS

The Corps believes that manatees, dolphins, and sea turtles that may be near the project area may be harassed acoustically as a result of the blast detonations/rock pre-treatment activities. This harassment is expected to be in the form of a TTS. Beneficial indirect effects may include increased employment and continued viability of Tampa Harbor.

4.16 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

This project is compatible with Federal, State, and local objectives.

4.17 CONFLICTS AND CONTROVERSY

• If blasting is required, a blasting protection plan will be implemented with a no blast window of November 1 through March 31 (USACE 2000c, 2000d [Rev. 2005]).

4.18 UNCERTAIN, UNIQUE, OR UNKNOWN RISKS

There is a potential for the blasting and punching to impact marine animals in the form of a TTS or direct mortality.

4.19 PRECEDENT AND PRINCIPLE FOR FUTURE ACTIONS

There would be no precedent or principle for future actions established.

4.20 ENVIRONMENTAL COMMITMENTS

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

- The Corps will comply with all requirements of any consultation documents provided under the Endangered Species Act from either USFWS or NMFS associated with this project. .
- The Corps will implement the Standard Manatee Construction Protection Specifications to ensure manatee protection.
- The Corps will implement the terms and conditions of the latest State of Florida Water Quality Certification for this project.
- The Corps will implement confined blasting techniques to minimize impacts to environmental resources.

4.21 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.21.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Environmental information on the project was compiled and this SEA was prepared and will be noticed. Comments received will be incorporated into this document. The project is in compliance with the National Environmental Policy Act.

4.21.2 ENDANGERED SPECIES ACT OF 1973

The project will be coordinated under the Endangered Species Act. The applicable conditions of the Gulf Regional Biological Opinion issued by the NMFS and the Statewide Programmatic Biological Opinion issued by the USFWS, as well as any project specific consultations, will be followed during construction. Therefore, the project will be in full compliance with the act.

4.21.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

This project will be coordinated with the USFWS. This project will be in full compliance with the act.

4.21.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (INTER ALIA)

(PL 89-665, the Archeology and Historic Preservation Act (PL 93-291), and executive order 11593)
Consultation with the Florida State Historic Preservation Officer (SHPO) was initiated in 2014 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), American Indian Religious Freedom Act (PL 33 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. SHPO consultation was initiated 28 March 2014. The project will not affect historic properties included in or eligible for inclusion in the National Register of Historic places. The project is in compliance with each of these Federal laws.

4.21.5 CLEAN WATER ACT OF 1972

The project shall be in compliance with this act. A Section 401 Water Quality Certification shall be obtained from the Florida Department of Environmental Protection. A Section 404(b)(1) evaluation has been completed for the project and is appended to this EA (Appendix B). All State Water Quality Standards would be met.

4.21.6 CLEAN AIR ACT OF 1972

Vehicular emission and airborne dust particulates resulting from construction activities shall be controlled. This project will be coordinated with EPA and will be in compliance with Section 309 of the act.

4.21.7 COASTAL ZONE MANAGEMENT ACT OF 1972

A federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as Appendix B. State consistency review will be performed during the coordination of the draft SEA. The Corps has determined the project is consistent with the enforceable policies of the Florida Coastal Management Program.

4.21.8 FARMLAND PROTECTION POLICY ACT OF 1981

No prime or unique farmland would be impacted by the project. Therefore, this act is not applicable to the proposed work.

4.21.9 WILD AND SCENIC RIVER ACT OF 1968

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

4.21.10 MARINE MAMMAL PROTECTION ACT OF 1972

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 et seq.) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review. The Corps will make such a request for the proposed work since blasting may be required. The blasting protection plan contains monitoring and requirements that protect manatees and bottlenose dolphins from harassment.

The Corps expects to find bottlenose dolphins (*Tursiops truncatus*) in the activity area. To address any potential take under the MMPA, the Corps will apply for an incidental harassment authorization from NMFS. In addition, the Corps will consult with USFWS on effects to manatees due to blasting during the consultation under Section 7 of the ESA.

The Corps does not anticipate the take of any marine mammals during any activities associated with the project. However, should a marine mammal be identified within the project boundaries, they will be provided protections equal to the ESA species that have had consultations completed.

4.21.11 ESTUARY PROTECTION ACT OF 1968

The Tampa Bay Estuary Program was created by Congress in 1991 to assist the community in restoring and protecting Florida's largest open-water estuary. As a designated "estuary of national significance," Tampa Bay is the economic and environmental centerpiece of a rapidly growing region supporting more than 2.3 million people (http://www.tbep.org/). This project will be coordinated with the USFWS and is in compliance with this act.

4.21.12 FEDERAL WATER PROJECT RECREATION ACT

Although the Tampa Harbor Federal navigation channels provide recreational benefits, the principles of the Federal Water Project Recreation Act, (Public Law 89-72) as amended, are not applicable to this project which is expansion and maintenance of existing Federal navigation channels.

4.21.13 SUBMERGED LANDS ACT OF 1953

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

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

The proposed project area lies between 6.5 to 7.2 miles northeast of Coastal Barrier Resource Act (CBRA) unit FL-83 Cockroach Bay. Therefore, this act is not applicable to the proposed project.

4.21.15 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 a public notice and other evaluations normally conducted for activities subject to the act. The project will be in full compliance.

4.21.16 ANADROMOUS FISH CONSERVATION ACT

Although direct mortality from blasting is technically possible, it is not anticipated due to this species low anticipated occurrence in the project area. Also, no spawning habitat occurs in Tampa Bay. The project will be coordinated with the NMFS and will be in compliance with the act.

4.21.17 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

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

4.21.18 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT

The term "dumping" as defined in the Act (3[33 U.S.C. 1402](f)) does not apply to the disposal of material in an upland DMMA. Therefore, the Marine Protection, Research and Sanctuaries Act does not apply to this project.

4.21.19 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

This Act requires preparation of an EFH assessment and coordination with NMFS. Pursuant to the Magnuson-Stevens Act, EFH consultation with NMFS for the project will be completed as part of the EA under the requirements of the May 3, 1999 EFH Finding between NMFS and the Jacksonville District. Under that finding, this EA serves as the EFH Assessment. The Corps has determined that the project would not have a substantial adverse impact on EFH or federally managed fish species occurring in Tampa Bay. This project will be in compliance with the act.

4.21.20 E.O. 11990, PROTECTION OF WETLANDS

There would be no impacts to wetlands from project activities. This project is in compliance with the goals of this Executive Order.

4.21.21 E.O. 11988, FLOOD PLAIN MANAGEMENT

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

4.21.22 E.O. 12898, ENVIRONMENTAL JUSTICE

The proposed action would not result in adverse human health or substantial environmental effects. The work would not impact "subsistence consumption of fish and wildlife".

4.21.23 E.O. 13089, CORAL REEF PROTECTION

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

4.21.24 E.O. 13112, INVASIVE SPECIES

Measures would be included in the project specifications to prevent the spread or introduction of invasive species.

5 LIST OF PREPARERS

5.1 PREPARERS

Preparer	Discipline	Role
Paul DeMarco, U.S. Army Corps of Engineers	Biologist	Principal Author
Dan Hughes,Ph.D., U.S. Army Corps of Engineers	Archaeologist	Cultural Resources
Paul Karch, U.S. Army Corps of Engineers	Environmental Engineer	Water Quality

5.2 REVIEWERS

This SEA was reviewed by the supervisory chain of the Environmental Branch and Planning Division, as well as the Construction-Operations Division, Project Management, and the Office of Counsel of the US Army Corps of Engineers, Jacksonville District.

6 PUBLIC INVOLVEMENT

6.1 SCOPING AND DRAFT EA

A Public Notice will be issued for this action in which the draft FONSI and SEA will be made available to the public. Comments received will be incorporated into this document.

6.2 AGENCY COORDINATION

Coordination will be conducted with appropriate agencies and described and discussed in this report. Agency coordination letters will be appended to this document.

6.3 LIST OF RECIPIENTS

Per the Public Notice, copies of the draft FONSI and SEA will be made available to appropriate stakeholders. A list of stakeholders receiving notification can be found within the Public Notice.

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APPENDIX A – FLORIDA COASTAL MANAGEMENT PROGRAM FEDERAL CONSISTENCY DETERMINATION

FLORIDA COASTAL ZONE MANAGEMENT PROGRAM
FEDERAL CONSISTENCY DETERMINATION

NAVIGATION IMPROVEMENTS BIG BEND CHANNEL
TAMPA HARBOR EXPANSION AND MAINTENANCE DREDGING
WITH DMMA PLACEMENT

1. Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: The proposed work is not located along a beach and dune environment nor would the proposed channel widening and maintenance effect beach processes. Therefore, this chapter does not apply.

2. Chapters 163(part II), 186, and 187, County, Municipal, State and Regional Planning. These chapters establish the Local Comprehensive Plans, the Strategic Regional Policy Plans, and the State Comprehensive Plan (SCP). The SCP sets goals that articulate a strategic vision of the state's future. Its purpose is to define in a broad sense, goals, and policies that provide decision-makers directions for the future and provide long-range guidance for an orderly social, economic and physical growth.

Response: The proposed work will be coordinated with the State and Regional Planning Office during the NEPA process.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The proposed project would provide safe navigation conditions. Therefore, this project would be consistent with the efforts of Division of Emergency Management.

4. Chapter 253, State Lands. This chapter governs the management of submerged state lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The proposed project would comply with state regulations pertaining to the above resources. The work would comply with the intent of this chapter.

5. Chapters 253, 259, 260, and 375, Land Acquisition. This chapter authorizes the state to acquire land to protect environmentally sensitive areas.

Response: The proposed project will be coordinated with the state of Florida. The project is consistent with this chapter.

6. Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the state to manage state parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The proposed work would not affect any state parks or preserves, and would, therefore, be consistent with this chapter.

7. Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project will be coordinated with the State Historic Preservation Officer (SHPO). Surveys were conducted in order to determine the presence of historic properties. The project is consistent with this chapter.

8. Chapter 288, Economic Development and Tourism. This chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: The proposed widening and maintenance of the navigation channel encourages the development of the Port of Tampa and economic growth of the area. Therefore, the work would be consistent with the goals of this chapter.

9. Chapters 334 and 339, Transportation. This chapter authorizes the planning and development of a safe balanced and efficient transportation system.

Response: The widening and maintenance of the navigation channel promotes safe commercial navigation.

10. Chapter 370, Saltwater Living Resources. This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: The proposed expansion and maintenance dredging would not have a substantial adverse impact on saltwater living resources. Benthic organisms may be adversely affected by the work and some fish mortality is expected if blasting is needed. However, the project footprint is relatively small and lies adjacent to similar habitat. Therefore, substantial impacts to the aquatic ecosystem are not anticipated. Based on the overall impacts of the project, the project is consistent with the goals of this chapter.

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Fish and Wildlife Conservation Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions which provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The project would not have a substantial adverse impact on living land and freshwater resources.

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: This project does not involve water resources as described by this chapter.

13. Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: The contract specifications would prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and would require that the contractor adopt safe and sanitary measures for the disposal of solid wastes. A spill prevention plan would be required.

14. Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This project does not involve the exploration; drilling or production of gas, oil or petroleum product and therefore, this chapter does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development. This chapter also deals with the Area of Critical State Concern program and the Coastal Infrastructure Policy.

Response: The proposed expansion and maintenance dredging will be coordinated with the local regional planning commission. Therefore, the work would be consistent with the goals of this chapter.

16. Chapters 381 (selected subsections on on-site sewage treatment and disposal systems) and 388 (Mosquito/Arthropod Control). Chapter 388 provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The project shall not further the propagation of mosquitoes or other pest arthropods.

17. Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the state by the Florida Department of Environmental Regulation (now a part of the Florida Department of Environmental Protection).

Response: A Supplemental Environmental Assessment addressing project impacts has been prepared and will be reviewed by the appropriate resource agencies including the Florida Department of Environmental Protection. Environmental protection measures would be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources would occur. Water Quality Certification is being sought from the state prior to construction. The project would comply with the intent of this chapter.

18. Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the state soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: The proposed project is not located near or on agricultural lands; therefore, this chapter does not apply.

APPENDIX B – SECTION 404(B)(1) EVALUATION

SECTION 404(b) EVALUATION

NAVIGATION IMPROVEMENTS BIG BEND CHANNEL
TAMPA HARBOR EXPANSION AND MAINTENANCE DREDGING
WITH DMMA PLACEMENT

1. Expansion dredging is expected to generate 4MCY of dredged material which will be placed into DMMA 3D or 2D. Most likely a hydraulic cutterhead dredge would be used. The dredged material would be pumped into the DMMA in a water/dredged material slurry. The DMMA is designed for the dredged material to settle out of the water which would then flow over a weir control structure and back into Hillsborough Bay. The return water discharge into waters of the United States is administratively defined as a discharge of dredged material subject to Section 404 of the Clean Water Act.

2. Nationwide permit (NWP) 16* satisfies the technical requirement for a section 404 permit for the return water as the quality of the return water is controlled by the state through the section 401 certification procedures.

3. NWP 16 has its own 404(b) evaluation and therefore the Corps incorporates that evaluation by reference into this document.

* NWP 16. Return Water From Upland Contained Disposal Areas. Return water from an upland contained dredged material disposal area. The return water from a contained disposal area is administratively defined as a discharge of dredged material by 33 CFR 323.2(d), even though the disposal itself occurs in an area that has no waters of the United States and does not require a section 404 permit. This NWP satisfies the technical requirement for a section 404 permit for the return water where the quality of the return water is controlled by the state through the section 401 certification procedures.

APPENDIX C - PERTINENT CORRESPONDENCE ASSESSMENT