SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

TAMPA HARBOR - BIG BEND CHANNEL, FLORIDA

Includes expansion and maintenance dredging with dredged material management area placement

AUGUST 2017

West Indian (Florida) Manatee

Aerial View of Port Redwing

Nesting Birds in Tampa Bay

US Army Corps of Engineers ®
Jacksonville District

Aerial View of Facilities Adjacent to the Big Bend Channel

COVER PHOTO CREDITS (from left to right):

West Indian (Florida) manatee (courtesy of U.S. Geological Survey)
Aerial view of Port Redwing (courtesy of Port Tampa Bay)
Nesting birds in Tampa Bay (courtesy of Port Tampa Bay)

US Army Corps of Engineers
JACKSONVILLE DISTRICT

FINDING OF NO SIGNIFICANT IMPACT

TAMPA HARBOR –
BIG BEND CHANNEL, FLORIDA PROJECT

HILLSBOROUGH COUNTY, FLORIDA

The U.S. Army Corps of Engineers, Jacksonville District (Corps), has prepared a Supplemental Environmental Assessment (EA) in accordance with the National Environmental Policy Act of 1969, as amended (NEPA), and the White House's Council on Environmental Quality regulations, for the proposed navigation improvements and maintenance dredging of the Federally-authorized Tampa Harbor – Big Bend Channel, Florida Project in Hillsborough County, FL. Dredged material would be placed in Dredged Material Management Area (DMMA) 3-D.

The Supplemental EA evaluated the effects of both the Preferred Alternative and the No Action Alternative. Past analyses conducted pursuant to NEPA evaluated other alternatives that are no longer considered to be viable for this project, including variations in the proposed channel dimensions.

I have reviewed the Supplemental EA for the Preferred Alternative. This Finding incorporates by reference all discussions and conclusions contained in the Supplemental EA enclosed hereto. Based on information analyzed in the Supplemental EA, which reflects pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly affect 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.

All practicable means to avoid and minimize adverse environmental effects have been incorporated into the Preferred Alternative. Measures that will be in place during construction to eliminate, reduce, or avoid adverse impacts to below the threshold of significance to fish and wildlife resources include the following:

- Dredging and placement activities will occur within the authorized and permitted template;
- Water-based activities will follow standard sea turtle protection measures and the terms and conditions of the NMFS GRBO;
- Water quality shall be protected by adherence to the State of Florida water quality criteria;
- Dredging and material placement will comply with the conditions identified during consultation with the USFWS;
- USACE will incorporate the standard migratory bird protection protocols into the project plans and specifications and will require the contractor to abide by those requirements; and
- Any water-based activity would follow standard manatee protection measures.

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 DMMA 3-D, will not significantly affect the human environment and does not require an Environmental Impact Statement. 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.

JASON A. KIRK, P.E.
Colonel, U.S. Army
District Commander

7 AUG 2017
Date

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

Tampa Harbor - Big Bend Channel, Florida

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SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

Tampa Harbor - Big Bend Channel, Florida Navigation Improvements

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 (Figure 1) consistent with its authorization in Section 101(a)(18) of the Water Resources and Development Act of 1999 (P.L. 106-53). 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-foot 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. The turning basin would provide a turning diameter of 1,200 feet. The project also contains two 200-foot wide by -41-feet deep plus 2-feet of advanced maintenance plus 2-feet allowable overdepth (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 fully constructed to authorized dimensions, but from 2005 to 2010, the non-Federal Sponsor deepened portions of the Big Bend Channel to -37 feet MLLW. To fully construct the authorized project, the Corps proposes to widen the north side of the entrance channel by 50 feet (from 200 feet to 250 feet) and deepen it from the current depths of between 36 and 37 feet to 41 feet plus 2 feet of advance maintenance plus 2 feet A.O. MLLW, expand the turning basin approximately 190 feet to the southwest to provide the 1,200 foot turning diameter and deepen it from 37 feet to 41 feet plus 2 feet of advance maintenance plus 2 feet A.O. MLLW, and deepen the inner and east channels from 37 feet to 41 feet plus 2 feet of advance maintenance plus 2 feet A.O. MLLW. The dimensions outlined here for the turning basin are those currently anticipated; however, further coordination with the Tampa Bay pilots and Port Tampa Bay may result in slight modifications to these dimensions as long as they comply with the criteria outlined in the authorizing documents for this project. In addition, two non-Federal berthing areas located north and south of the east channel and a non-Federal berthing area south of the inner channel would be deepened from the existing depths

(approximately 37 feet) to 41 feet plus 2 feet of advance maintenance plus 2 feet A.O. MLLW at 100 percent non-Federal cost. Finally, per ER 1130-2-520, an additional 1 foot of A.O. MLLW would be dredged in all areas during the initial expansion dredging project due to the presence of rock 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 of the federal channel after expansion is approximately 80,000 cubic yards (cy) per year. It is anticipated that maintenance dredging would be performed approximately every 9 years; therefore, each future maintenance event would remove approximately 720,000 cy of dredged material. The dredged material from the expansion and maintenance dredging projects would be placed in dredged material management area (DMMA) 3-D or DMMA 2-D as described in Section 2.1.3 below.

1.2 PROJECT NEED OR OPPORTUNITY

The Big Bend Channel provides access to the authorized Tampa Harbor channel. 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, 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 results in 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 Harbor Big Bend Channel project location map.

Figure 2. Tampa Harbor Big Bend Channel major project features.

1.3 PROJECT AUTHORITY

1.3.1 AUTHORIZATION

Tampa Harbor - Big Bend was authorized by Public Law 106-53 on August 17, 1999, which included the following description:

> *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 3-D in order to accommodate the construction material and an additional dike raising to accommodate maintenance material.*

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.

This document is available for download at the following link: http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#Hillsborough.The information contained in the above document is incorporated by reference into this EA.

1.5 DECISIONS TO BE MADE

This Supplemental Environmental Assessment (SEA) will evaluate any changes that have occurred since the 1997 EA associated with 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 as 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 in 2011, and no hardbottom areas were found. In addition, this SEA supplements the 1997 EA listed in section 1.4 above, and the analysis included in the 1997 Feasibility Study and EA is hereby incorporated by reference. This EA provides an updated evaluation of the effects of the proposed action, but does not re-evaluate channel expansion alternatives because the Corps has not identified new alternatives to the proposed action.

1.7 ENVIRONMENTAL COORDINATION

1.7.1 COASTAL ZONE MANAGEMENT ACT CONSISTENCY DETERMINATION

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). The Florida Department of Environmental Protection (FDEP) issued an Environmental Resource Permit on April 8, 2015 (Permit #0157891-017-BI), which constitutes a finding of consistency with Florida's Coastal Zone Management Program, as required by Section 307 of the Coastal Zone Management Act. This permit expires on April 8, 2020.

1.7.2 CLEAN WATER ACT

FDEP Permit #0157891-017-BI constitutes the project's certification of compliance with state water quality standards pursuant to Section 401 of the Clean Water Act, 33 United States Code (U.S.C.) § 1341. As mentioned above, this permit was issued on April 8, 2015, and expires on April 8, 2020.

1.7.3 ENDANGERED SPECIES ACT- SECTION 7 COORDINATION

In accordance with Section 7 of the Endangered Species Act, the project was coordinated with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS). See Section 4 of this report for additional information.

1.7.4 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 describes the no-action alternative, the proposed action, and other reasonable alternatives that were evaluated. The beneficial and adverse environmental effects of the alternatives are presented in comparative form, providing a clear basis for choice to the decision maker and the public. A preferred alternative was selected based on the information and analysis presented in the sections on the Affected Environment and Probable Impacts.

2.1 DESCRIPTION OF ALTERNATIVES

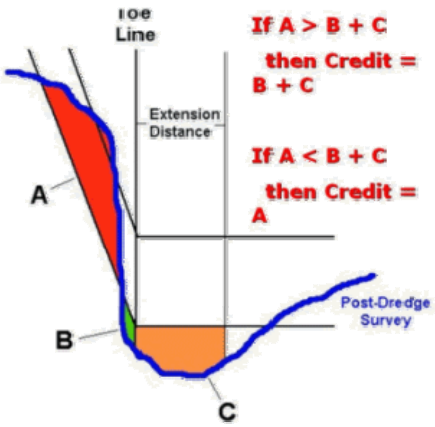
2.1.1 NO-ACTION ALTERNATIVE

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

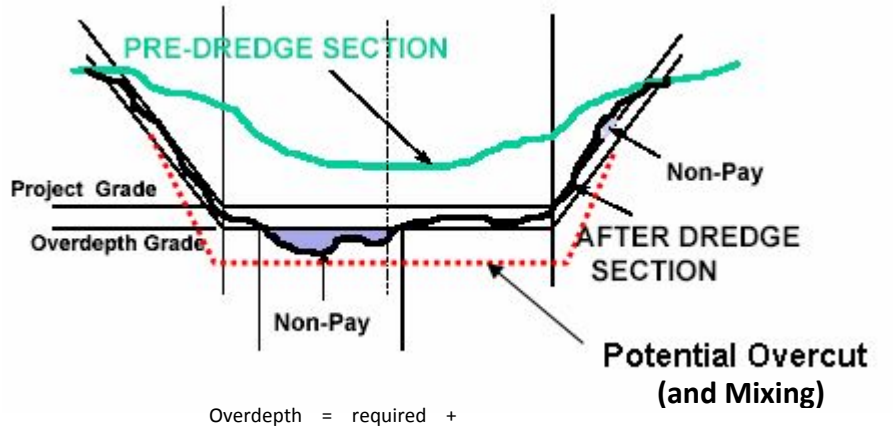
The project channels would be modified as described in section 1.1 above. In addition, periodic maintenance dredging of the project channels would occur approximately every 9 years.

2.1.2.1 Dredging Methodology



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

The plans and specifications normally require dredging beyond the project depth or width. The purpose of the "required" additional dredging is to account for shoaling between dredging cycles; i.e., to 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).



Overdepth = required + allowable

In addition, the dredge operator may practice over-cutting. An "over-cut" along the sides of the channel may be employed in anticipation of movement of material down the sides of the channel. Over-cut throughout the channel bottom may be the result of furrowing or pitting by the dredging equipment (the suction dredge's cutterhead, the hopper dredge's drag arms, or the clam-shell dredge's bucket). 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.

Pretreatment techniques are used to break-up consolidated, massive materials, like rock, prior to removal of this material by a dredge. Such factors as location, rock hardness, cost, and amount of surface requiring treatment are among factors to be taken into account when determining which method is most suitable and practicable for a given project.

2.1.2.2 Spudding/Hydrohammer/Use of Punch Barge

Methods to pre-treat the rock within the harbor without confined underwater blasting using a punch barge/hydrohammer (also called spudding) will be investigated by USACE. Spudding is the process of fracturing the rock by dropping an array of chisels or spuds onto the rock, causing a fracture. A hydrohammer is a jackhammer mounted on a backhoe. A dredge (hydraulic or mechanical) then follows this process and excavates the rock. This is a slow process and can be relatively expensive. The punch barge would work for 12-hour periods, striking the rock below approximately once every 30 to 60 seconds. The primary environmental impact of spudding or hydrohammer is noise and vibration. This constant pounding would disrupt marine mammal behavior in the area, as well as impact other marine species that may be 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 (<200 Hz) typically dominate the overall levels for impact pile driving as seen with hydrohammer or punch-barging (Spence et al. 2007). The effects of related sound waves are very similar to the effects of underwater blasting and may result in injuries similar in nature to those of unconfined underwater blasting. Spence et al. also noted that underwater sound data published in the literature typically shows a fairly wide variation in the levels generated by pile driving type activities (similar to use of a punch barge or hydrohammer). They found variations on the order of 5-10dB from one hit to another. Using the punch barge will also extend the length of the project temporally due to the slower production with the harder materials, thus temporally increasing any potential impacts to all fish and wildlife resources in the area.

2.1.2.3 Confined Underwater Blasting

The use of confined underwater blasting as a pretreatment technique is anticipated to be required for some of the deepening and widening of the project, where standard construction methods are unsuccessful due to the hardness of the rock. The analysis of potential blasting will be based on evaluations of core boring logs.

2.1.2.3.1 Methods

The focus of the proposed blasting work is to pretreat bedrock prior to removal by a dredge utilizing 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 5 to 10 feet deep below the desired depth (see Figure 3) depending on how much rock needs to be broken and the intended project depth. The hole is then capped with an inert material, such as crushed rock (Figure 4). This process is referred to as “stemming the hole.” The blasting charge is set and then the chain of explosives within the rock is detonated.

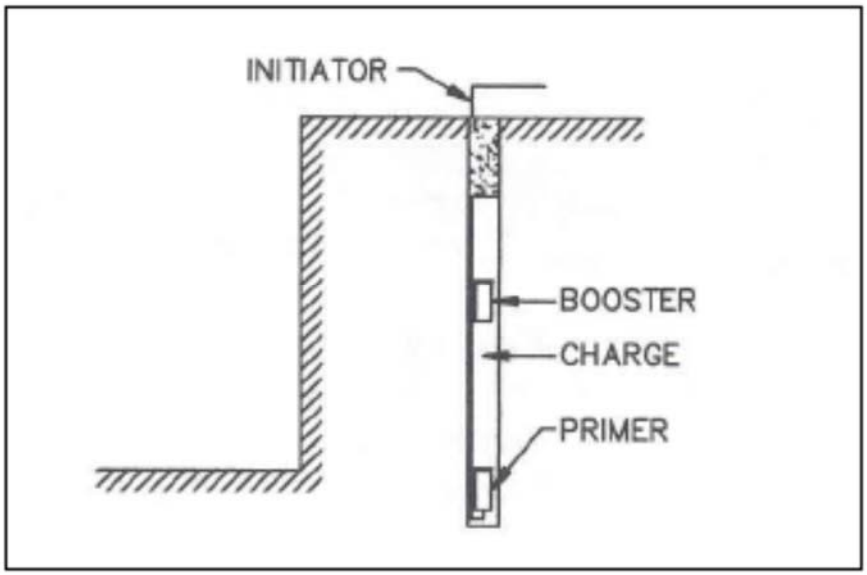


Figure 3. Typical stemmed hole for loading charges.

Figure 4. Stemming material.

For the Port of Miami Phase II expansion in 2005, blasting was successfully used as a pretreatment technique, and the stemming material was angular crushed rock. It is expected that the specifications for any construction utilizing blasting at Tampa Harbor – Big Bend Channel would have similar stemming requirements as those that were used for the Miami Harbor Phase II project. The optimum size of stemming material is material that has an average diameter of approximately 0.05 times the diameter of the blast hole. Material must be angular to perform

properly (Konya 2003). For this project, project-specific specifications will be prepared. In the Miami Harbor Phase II project, the following requirements were in the specifications regarding stemming material:

> *"1.22.9.20 Stemming. All blast holes shall be stemmed. The Blaster* or *Blasting Specialist shall determine the thickness of stemming using the blasting industry conventional stemming calculation. 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."*

It is expected that the specifications for any construction utilizing blasting at Tampa Harbor –Big Bend would have similar stemming requirements as those that were used for the Miami Harbor Phase II project. The length of stemming material will vary based on the length of the hole drilled; however, minimum lengths will be included in the project specific specifications. Studies have shown that stemmed blasts have up to a 60-90% 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, i.e., unconfined blasts (Figure 5), very little peer-reviewed research exists on the effects that confined blasting can have on marine animals near the blast (Keevin *et al*. 1999). The visual evidence from a typical confined blast is shown in Figure 6.

Figure 5. Unconfined blast of seven pounds of explosives.

Figure 6. Confined blast of 3,000 pounds of explosives.

To estimate the maximum poundage of explosives that may be utilized for this project, USACE has reviewed two previous blasting projects, one at San Juan Harbor, Puerto Rico in 2000 and one at Miami Harbor in 2005. The San Juan Harbor project's heaviest delay was 375 lbs per delay and in Miami it was 376 lbs per delay. It is unknown at this time what the maximum delay weight will be for this project. This will be determined during the test blast program.

2.1.2.3.2 Blast Specifications

The USACE biologists, working with senior geologists, concluded that the assumptions made during the Miami project concerning minimization of the effects of blasting are applicable and accurate for the Tampa Harbor – Big Bend project. Based upon industry standards and USACE safety & health regulations, the blasting program may consist of the following:

1) 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.
2) Drill patterns are restricted to a minimum of an 8-foot separation from a loaded hole.
3) 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.
4) 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.
5) 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.
6) 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.
7) Delay timing adjustments will be a minimum of 8-milliseconds between delay detonations to stagger the blast pressures and prevent cumulative addition of pressures in the water.

2.1.2.3.3 Safety Radii

The confined underwater blasting program will incorporate the use of three safety radii (Figure 7) typically utilized for projects involving unconfined blasts. This conservative use of an *unconfined* blast in development of the safety radii for a *confined* blast will increase the protections afforded marine species in the area. These three zones are referred to as the "danger zone," which is the inner most zone, located closest to the blast; the "safety zone," which is the middle zone and the "watch zone," which is the outer most 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). 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 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). The reduction of impact by confining the shots would more than compensate for the presumed higher sensitivity of marine species. It is the belief of USACE that the danger zone radius, coupled with a strong protected species observation and protection plan is a conservative and prudent approach to the protection of marine wildlife species. Based on a review by NMFS-OPR for the Miami Harbor phase II project, NMFS and USFWS found these protective measures sufficient to protect marine mammals under their respective jurisdictions (NMFS 2005; USFWS 2002; NMFS 2011).

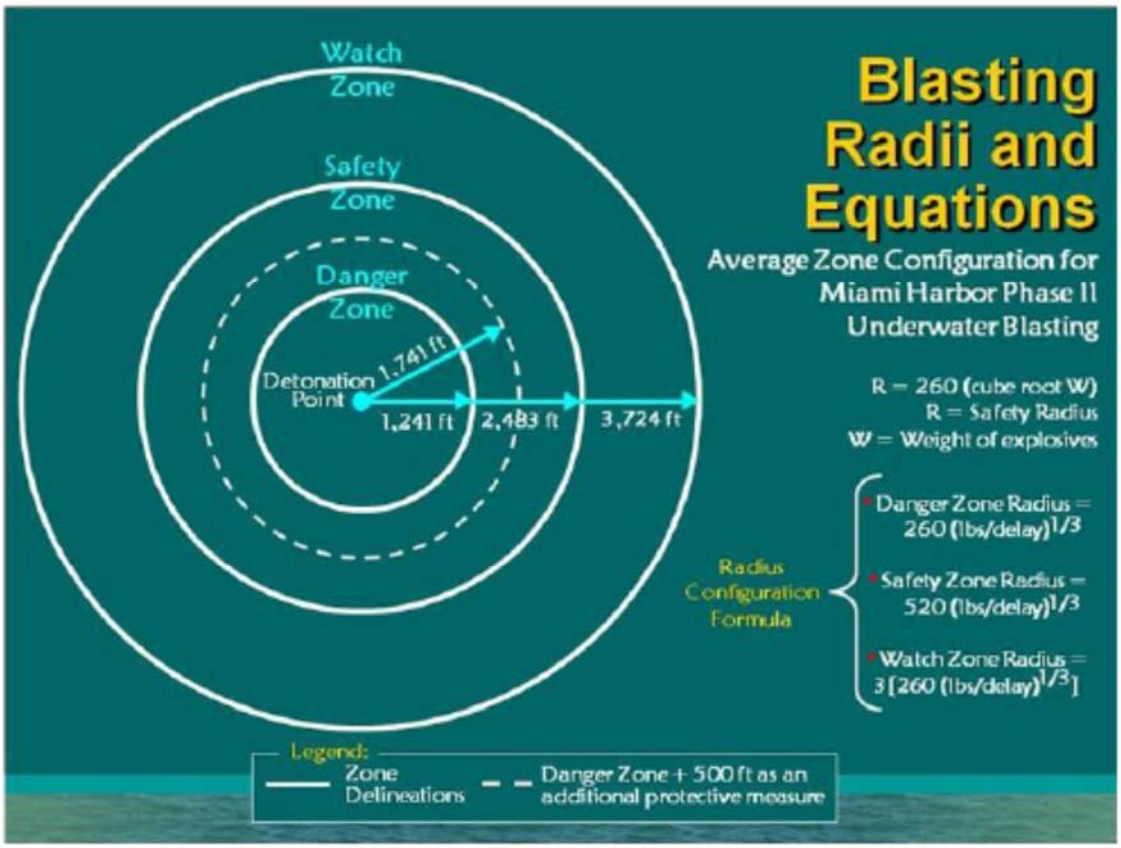


Figure 7. Blast zone radii and equations.

These zone calculations will be included as part of the specifications package that the contractors will bid on before the project is awarded. Ideally, the safety radius (all three zones) 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.

Radii specifications are as follows:

1) Danger Zone (NMFS refers to this as the Caution Zone): The radius in feet from the detonation beyond which no expected mortality or injury from an open water explosion is likely to occur (NMFS 2005). The danger zone (feet) = 260 [79.25 meters] X the cube root of weight of explosives in pounds per delay (equivalent weight of TNT).

2) The Safety Zone is the approximate distance in feet beyond which injury (Level A harassment as defined in the Marine Mammal Protection Act [MMPA]) is unlikely to occur from an open water explosion (NMFS 2005). The safety zone (feet) = 520 [158.50 meters] X cube root of weight of explosives in lbs per delay (equivalent weight of TNT).

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

4) Exclusion Zone extends to 500 feet outside the Danger Zone radius. Detonation will not occur if a marine mammal or reptile may be within that zone (based on observational data).

Because of the potential duration of the blasting and the proximity of the inshore blasting to a manatee use area, a number of issues will need to be addressed. As such, USACE is considering a blasting window when manatees are less likely to be present. Other dredging and construction activities may take place during this period of time, but confined underwater blasting would not be utilized during this period.

It is crucial to balance the demands of the blasting operations with the overall safety of protected species in the project area. A radius that is excessively large will result in significant delays that prolong the blasting, construction, traffic, and overall disturbance to the area. A radius that is too small puts the animals at too great a risk should one go undetected by the observers and move into the blast area. Because of these factors, the goal is to establish the smallest radius possible without compromising animal safety and provide adequate observer coverage for whatever radius is agreed upon.

2.1.2.3.4 Monitoring/Watch Plan

A watch plan will be formulated based on the required monitoring radii and optimal observation locations. The watch plan will be consistent with the program that was utilized successfully at Miami Harbor in 2005 and will consist of at least five observers for each drill barge (if multiple drill barges are used) including at least one (1) aerial observer, two (2) boat-based observers, and two (2) observers stationed on the drill barge (Figures 8-11). Another observer will be placed in the most optimal observation location (boat, barge, fixed structure, shore, or aircraft) on a day-by-day basis depending on the location of the blast and the placement of dredging equipment, as determined by the blaster in charge and the chief protected species observer. This process will

ensure complete coverage of the three zones as well as any critical areas. The watch will begin at least one hour prior to each blast and continue for one-half hour after each blast (Jordan *et al*. 2007).

Figure 8. Typical observer helicopter.

Figure 9. View of typical altitude of aerial observer operations.

Figure 10. Typical vessel for boat-based observer.

Figure 11. Observer on drill barge.

2.1.2.3.5 Fish Repulsion

In the past, to reduce the potential for fish to be injured or killed by the blasting, USACE has allowed, and the resource agencies have requested, that blasting contractors utilize a small,

unconfined explosive charge, usually a one-pound booster, detonated about 30-seconds before the main blast to drive fish away from a blasting zone. It is assumed that noise or pressure generated by the small charge will drive fish from the immediate area, thereby reducing impacts from the larger and potentially more-damaging blast. Blasting companies use this method as a "good faith effort" to reduce potential impacts to aquatic resources. The explosives industry recommends firing a "warning shot" to frighten fish out of the area before seismic exploration work is begun (Anonymous 1978 in Keevin *et al*. 1997).

There is limited data available on the effectiveness of fish scare charges at actually reducing the magnitude of fish kills and the effectiveness may be based on the fish's life history. Some states require the use of fish scares (Illinois, New Jersey and Washington) while others (Alaska and Texas) have determined that they are ineffective and "potentially harmful to piscivorous fishes, marine mammals and birds which are attracted to feed on fish that are stunned or wounded by the repelling charge." Florida does not have a regulation specific to the use of scare charges associated with blasting (Lisa Gregg, pers. Comm., August 5, 2011), but the Florida Fish and Wildlife Conservation Commission (FFWCC) has requested the use of scare charges associated with previous projects that utilized blasting like the 2005 blasting at Miami Harbor. Numerous incidental observations (cited in Keevin *et al.* 1997) during blasting operations suggest that these charges are not effective in scaring fish from the blasting zone.

Keevin *et al.* (1997) conducted a study to test if fish scare charges are effective in moving fishes away from blast zones. They used three freshwater species, largemouth bass; channel catfish and flathead catfish, equipping each fish with an internal radio tag to allow the fishes movements before and after the scare charge to be tracked. Fish movement was compared with a predicted LD 0% mortality distance for an open water shot (no confinement) for a variety of charge weights. Largemouth bass showed little response to repelling charges and none would have moved from the kill zone calculated for any explosive size. Only one of the flathead catfish and two of the channel catfish moved to a safe distance for any blast. This means that only 11% of the fish used in the study would have survived the blasts.

These results call into question the true effectiveness of this minimization methodology. However, some argue that based on the monetary value of fish (American Fishery Society 1992 in Keevin *et al.* 1997) including high value commercial or recreational species like snook and tarpon found in southeast Florida inlets like Port Everglades, the low cost associated with repelling charge use would be offset if only a few fish were moved from the kill zone (Keevin *et al*. 1997).

2.1.2.3.6 Protocol

A blast-day (or blast-event) is made up of all the actions during a blast from the Notice to Project Team and Local Authorities two hours before the blast is detonated through the end of the protected species watch 30 minutes after the blast detonation. The typical events in a blast-event are outlined below.

Typical Blast Timeline:

- Time of Event (T) minus 2 HOURS: Notice to Project Team and Local Authorities
- T minus 1 HOUR: Protected Species Watch Begins
- T minus 15 MINUTES: Notice to Mariners (channel closes)
- T minus 1 MINUTE: Fish Scare
- Blast detonation
- T plus 5 MINUTES: All Clear Signal
- T plus 30 MINUTES: Protected Species Watch Ends
- DELAY CAPSULE (can occur between T - 1 hour and detonation): If an animal is observed in either the danger or safety zones, the blast is delayed to monitor the animal until it leaves, on its own, from both the danger and safety zones.

This timeframe lasts a minimum of 2 hours and 35 minutes, although it can be extended if a protected species (like a dolphin, manatee or turtle) enters the exclusion zone. The animal is monitored until it leaves, on its own, from both the danger and exclusion zones. There can be more than one blast-day (blast-event) in a calendar day, although two is typically the maximum for each drill barge used during construction.

2.1.2.3.7 Vibration

In an urban environment such as the port, which is surrounded by commercial properties, utilities, and residential communities, protection of structures must be considered. Once the areas of the project requiring blasting are identified, critical structures within the blast zones would be determined. Where vibration damage may occur, energy ratios and peak particle velocities shall be limited in accordance with state or county requirements, whichever is more stringent. Furthermore, vibration-monitoring devices will be installed to ensure that established vibration limits are not exceeded. If the energy ratio or peak particle velocity limits are exceeded, blasting will be stopped until the probable cause has been determined and corrective measures taken. Critical monitoring locations may include structures such as bulkheads, hazardous materials storage areas, and buried utilities.

Ground-borne vibration can be generated by a number of sources, including road and railways, and construction activities such as piling, blasting, and tunneling. Vibration can be defined as regularly repeated movement of a physical object about a fixed point. The parameter normally used to assess the ground vibration is the peak particle velocity (PPV) expressed in millimeters per second (mm/s).

To completely define ground vibration, the amplitude and frequency of the motion are measured in the three orthogonal directions generally in terms of velocity which is considered to be the best descriptor for assessing human comfort and the potential damage response of structures. The vibration velocity signals are summed (in real time) and the maximum amplitude of this vector sum is defined as the Peak Vector Sum (PVS). Vibration can cause varying degrees of

damage in buildings and affect vibration-sensitive machinery or equipment. Its effect on people may be to cause disturbance or annoyance or, at higher levels, to affect a person's ability to work.

Vibration data reviewed by USACE included the two most recent blasting projects completed by the district: the deepening of San Juan Harbor in 2000 and of Miami Harbor in 2005. Both used confined underwater blasting. Both projects had significant structural resources located near the blast that were of concern (the San Juan site included the National Park Service's Castillo San Felipe del Morro, a 400 plus year old fortress overlooking the harbor and 30 additional historic sites within boundaries of the National Monument). In Miami, the harbor is bounded on the north by the port facilities and on the south by Fisher Island, a residential island. In both cases, a network of monitoring locations was established by the blasting contractor to capture vibration associated with the detonation of each blast. Additionally, at El Morro, the contractor installed monitoring devices on each crack in the stucco that covers the structure's interior walls, and a photo was taken after installation to serve as a preconstruction baseline. During construction, the crack was monitored throughout the blasting project to ensure that crack's width or length had not increased (Figure 12).

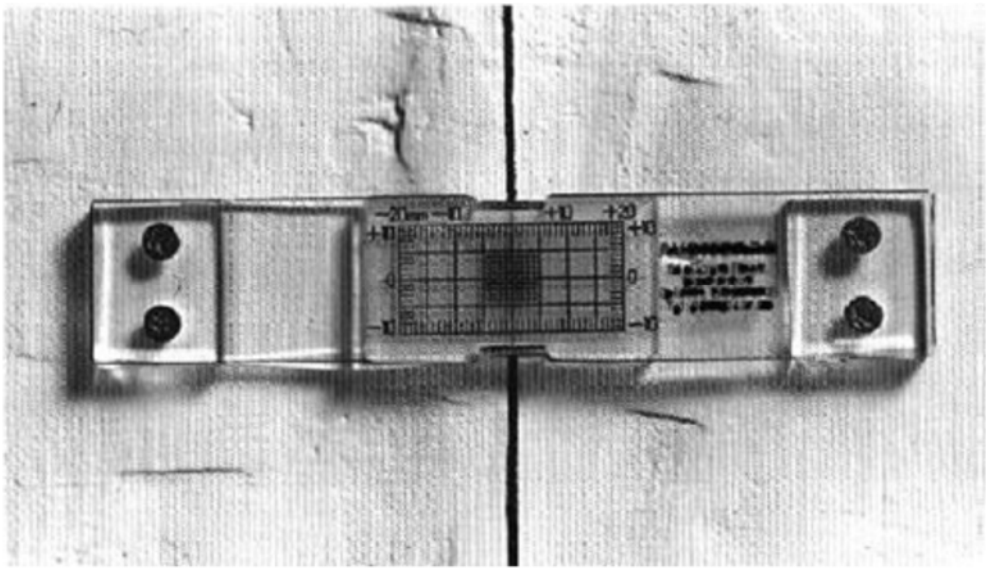


Figure 12. Typical crack monitoring device.

At Miami Harbor, the maximum PVS allowed for the project was 1.0 mm/second. The average maximum PVS for the Miami Harbor deepening in 2005 was 0.3828mm/second with a range of 0.0819mm/second - 1.08mm/second during the 40 blast detonations. During both projects, no adverse impacts were reported to any of the surrounding structures by either the vibration monitoring contractor, or the building's owners/trustees.

2.1.2.3.8 Air Pressure

The USACE Safety and Health Requirements Manual (EM 385-1-1, 3 November 2003) states, “Air blast pressure exerted on structures resulting from blasting shall not exceed 133 dB (0.013 psi)." Industry standard vibration limitations would be incorporated into the design process. A conservative regression analysis of similar projects may be used to develop the design and then continually updated with calibration of the environment. The contractor will also be required to abide by state and local blasting requirements in addition to the USACE Safety Manual previously referenced in this paragraph.

2.1.2.3.9 Duration of Confined Blasting During Construction

The duration of the blasting (pretreatment) is dependent upon a number of factors including hardness of rock, how close the drill holes are placed, and the type of equipment that will be used to remove the pretreated rock. For comparison, the harbor deepening project at Miami Harbor in 2005 to 2006 estimated between 200 to 250 days of blasting with one-shot per day per drill barge (a blast-day) to pretreat the rock associated with that project. However, the contractor completed the project in 38 days with 40 blasts. The number of days needed to complete blasting operations at Tampa Harbor – Big Bend is unknown at this time.

2.1.2.3.10 Test Blast Program

Prior to implementing a construction blasting program, a test blast program will be completed. The test blast program will have all the same protection measures in place for protected species monitoring as if 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 of the environment

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 pretreatment 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 with other pertinent information and conclusions reached. This will be the basis for developing a completely

engineered procedure for a construction blasting plan. During the testing the following data will be used to develop the regression analysis:

- distance
- pounds per delay
- peak particle velocities (TVL)
- frequencies (TVL)
- peak vector sum
- air blast, overpressure

2.1.2.3.11 Fish Kill Monitoring

In addition to monitoring for protected marine mammals, sawfish, and reptiles in the area during blasting operations, USACE will work with the resource agencies to develop a monitoring plan for fish kills associated with each blasting event. This effort may be similar to the effort that was developed by the FFWCC in association with the Miami Harbor deepening project. This plan will be developed in detail in the project specifications, but may include collection, enumeration and identification of dead and injured fish floating on the surface after each blast. In addition, blast data will be collected from the daily blasting reports provided after each shot by the blasting contractor, as well as environmental data such as tidal currents (in-coming or outgoing). Due to health and safety restrictions, all collections will be made from the surface only. No diving to recover fish carcasses is authorized.

2.1.2.3.12 Coordination

As part of the development of the protected species observation protocols that will be incorporated into the plans and specifications for the project, USACE will continue to coordinate with the resource agencies (specifically NMFS, FFWCC, USFWS, NPS and USEPA) and non-governmental organizations (NGO) to address concerns and potential impacts associated with the use of blasting as a construction technique.

2.1.2.3.13 Study Data

In addition to coordination with the agencies and NGOs, findings from any new scientific studies regarding the effects of blasting (confined or unconfined) on species that may be in the area (marine mammals, sea turtles, fishes [both with a swim bladder and without]) and reptiles will be incorporated into the design of the protection measures that will be employed in association with confined blasting activities in the port. Examples of these studies may include:

- “Caged Fish Study”. As part of the August 1 and 2, 2006 After Action Review conducted for the Miami Harbor Phase II dredging project, which included blasting as a construction technique, USACE, in partnership with FFWCC, committed to conduct a study on the effects of blast pressures on finfishes with air bladders in close proximity to the blast. This study would attempt to answer the questions regarding proximity to the blast array,

injury and death associated with confined blasting not resolved with research conducted with the Wilmington Harbor blasting conducted in 1999 (Moser 1999a and Moser 1999b). This study is expected to be completed as part of the Miami Harbor 2013-2015 dredging project.

- Other blasting project monitoring reports for projects, both from inside and outside of Florida, using confined underwater blasting as a construction technique completed prior to development of plans and specifications.

To summarize this pretreatment section, USACE has concluded that confined blasting is the *least* environmentally impactful method for pretreatment of hard, consolidated rock in the port. Each blast will last no longer than 15 seconds in duration, and may even be as short as two seconds. Additionally, the blasts would be confined in the rock substrate with stemming. Because the blasts are confined within the rock structure, the distance of the blast effects are reduced significantly as compared to an unconfined blast (Nedwell and Thandavamoorthy 1992; Hempen *et al*. 2005; Hempen *et al*. 2007).

While the contractor selected by USACE determines the construction methodology, USACE through a Request for Proposal (RFP) process could rate the technical portion of a contractor's proposal to ensure evaluation of quality standards for excavation equipment. Using a Request for Proposal (RFP) contracting approach helps establish technical standards for rock excavation equipment.

2.1.2.4 Bed Levelers

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 DISPOSAL ALTERNATIVES

2.1.3.1 3-D 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) 3-D. The Corps completed construction in 2015 on a project to raise the dikes at DMMA 3-D to increase the capacity of the DMMA to accommodate the dredged material from the expansion project, which is anticipated to be approximately 4 mcy. DMMA 3-D is leased by the Corps from the land owner, Port Tampa Bay, and is located approximately 1 mile north of the project area (see Figures 1 and 2).

2.1.3.2 Island Expansion

The Alafia Bank Sanctuary was originally created in the 1920s through the sidecasting of dredged material during the construction of the Alafia Channel. Material was added to the islands in 1960 and 1977 to combat chronic erosion at the western end of the islands. The islands support one of the largest and most diverse nesting colonies in the continental United States. Cargill Fertilizer owns the islands, and leases them to the Audubon Society for operation as a sanctuary. The Audubon provided a letter to the U.S. Fish and Wildlife Service dated September 23, 1993, in support of the placement of material at Alafia Bank, and subsequent recent conversations with Audubon confirm their continuing desire to expand these islands to mitigate for ongoing erosion.

The creation or expansion of open water islands represents a one-time opportunity for material placement. While the creation or expansion of open water islands can be an environmentally beneficial use of the material for the purposes of creating scarce colonial bird nesting habitat, plans for implementing this type of effort were not finalized at the time of the drafting of this document and would require additional consideration to pursue. The expansion of Alafia Bank (specifically, Sunken Island to the west) was analyzed in the 1997 EA.

2.1.3.3 Dredged Hole Restoration

Restoring dredged holes in the Tampa Bay to create seagrass habitat is a second option for beneficial use of dredged materials. There are several dredged holes in the vicinity of the project area. Whiskey Stump Key includes two large holes and one small hole, which cover approximately 53 acres total. Filling all three holes would require a volume of approximately 950,000 cy of dredged materials. This alternative was analyzed in the 1997 EA.

2.1.3.4 2-D Dredged Material Placement Alternative

DMMA 2-D is an alternative upland disposal option should DMMA 3-D be unavailable for use. The island is 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. All of the dredged material placement alternatives are environmentally acceptable, but the 3-D Dredged Material Placement Alternative (or DMMA 2-D if DMMA 3-D is unavailable) is the Corps' Preferred Alternative.

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.

The Corps does not have any new information relevant to the channel dimensions to warrant consideration of additional dredging alternatives not previously evaluated. Therefore, this EA will not evaluate further dredging alternatives; it will only evaluate the effects of the authorized channel expansion.

2.4 COMPARISON OF ALTERNATIVES

Table 1 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.

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Table 1. Summary of Direct and Indirect Impacts.

ALTERNATIVE ENVIRONMENTAL FACTOR	No Action	Expansion and Maintenance Dredging with DMMA 3-D Dredged Material Placement	Expansion and Maintenance Dredging with DMMA 2-D 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.

ALTERNATIVE ENVIRONMENTAL FACTOR	No Action	Expansion and Maintenance Dredging with DMMA 3-D Dredged Material Placement	Expansion and Maintenance Dredging with DMMA 2-D Dredged Material Placement
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.

ALTERNATIVE ENVIRONMENTAL FACTOR	No Action	Expansion and Maintenance Dredging with DMMA 3-D Dredged Material Placement	Expansion and Maintenance Dredging with DMMA 2-D Dredged Material Placement
HAZARDOUS, TOXIC AND RADIOACTIVE WASTE (HTRW)	No adverse impacts.	No HTRW anticipated to be encountered.	No HTRW anticipated to be encountered.
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.

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3 AFFECTED ENVIRONMENT

The Affected Environment section 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 baseline conditions for determining the environmental impacts of the proposed action and reasonable alternatives.

Further detailed information about the affected environment is discussed in the 1997 *Feasibility Report and Environmental Assessment, Tampa Harbor – Big Bend Channel, FL,* and is hereby incorporated by reference.

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). The three main physiographic features in Tampa Bay are shallow marine grass, 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 that 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: Port Tampa Bay'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 2-D and 3-D were created between 1978 and 1982 using dredged material from the Federal government's deepening of Tampa Harbor (USACE 2011). DMMA 3-D is an approximately 400-acre island with a current designed capacity of approximately 20 mcy. DMMA 2-D is an approximately 530 acre island with a capacity of approximately 9 mcy.

3.2 GEOLOGY

A total of seven geotechnical core and one (1) vibracore boring programs in the Big Bend Channel have been completed over the past 34 years. The most recent core boring investigation completed for this report consisted of a total of seven (7) core borings completed in the Turning Basin and East Channel between January and March 2014. A total of twenty-four (24) vibracore borings were also completed throughout the project area during the 2014 investigation. Eight (8) core borings were drilled in the Big Bend's Main Entrance Channel in 1982. Twenty-three (23) core borings were drilled in the Turning Basin and Main Entrance, East, and Inner Channels in 1993. In 1997 a total of fourteen (14) core borings were drilled in the East and Inner Channels. Six (6) core borings were completed in 2003 in the Main Entrance, East, and Inner Channels.

Materials encountered in the Big Bend Channel project location consisted of sands, silts, sandy-silts, lean clays, fat clays, organic clays, sandy-clays, silty-clays, and a compacted, indurated, cohesive, very stiff, very dry, high plasticity, expanding, greenish gray clay. Limestone was encountered in 16 of the 52 historical core borings. Very hard limestone was encountered in core borings CB-BB-7 and CB-BB93-14 in the Entrance Channel adjacent to the Turning Basin. The highest limestone elevation in the Entrance Channel was recorded in core boring CB-BB93-14 at -39.1-feet mean low water (MLW). Limestone rock was also encountered in most core borings completed in the East Channel, with top-of-rock elevations generally above -41.0-feet 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-feet MLW. The elevations at which the rock was encountered in the remaining borings ranged from -43.0 to -78.7-feet 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 4 mcy of dredged material from the expansion dredging, approximately 500,000 cy is rock that could require pre-treatment prior to dredging.

3.3 THREATENED AND ENDANGERED SPECIES

The 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 2**.**

Table 2. Status of listed species that may occur in 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	LT
Smalltooth Sawfish	LE	LE

Species	*State Listing**	*Federal Listing**
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). NMFS determined in their 2003 Gulf Regional Biological Opinion (revised in 2005 and 2007) 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 13). The proposed work does not overlap any designated critical habitat for this species.

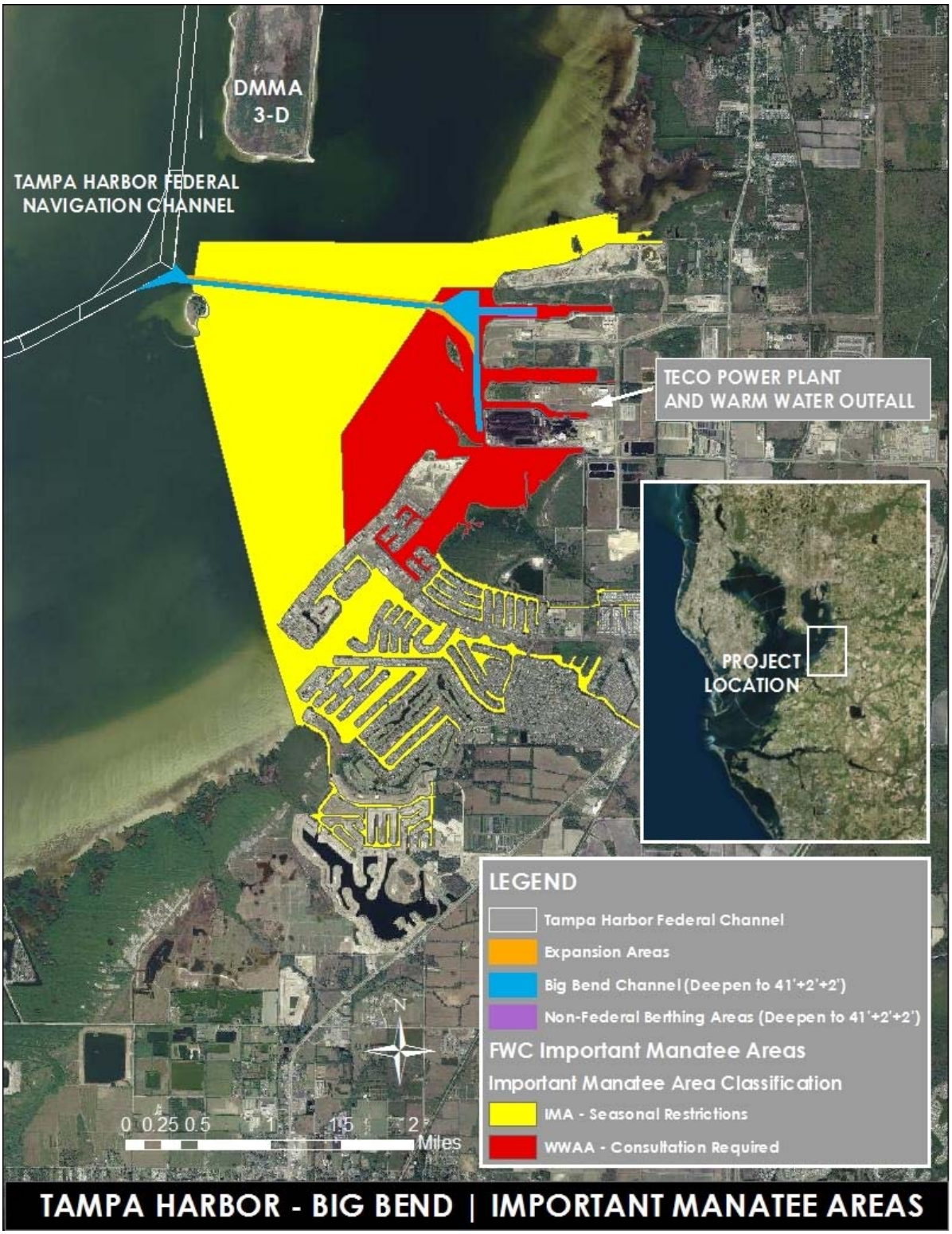

Figure 13. Important Manatee Areas (IMAs) in the project area. There is no critical habitat in the project area.

3.3.3 SMALLTOOTH SAWFISH

The 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. It 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 pounds 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 feet 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 inch female weighing 56.9 pounds, 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; however, water quality has improved dramatically in the last ten years. 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 (MSFCMA), waters and substrate within the project area have been identified as Essential Fish Habitat (EFH) by the Gulf of Mexico Fisheries Management Council (GMFMC). The GMFMC is one of eight regional Fishery Management Councils established by the MSFCMA to manage fishery resources from where state waters end, out to the 200-mile limit of the Gulf of Mexico. Regional Fishery Management Councils are tasked by the MSFCMA to identify, describe, map, and protected EFH. 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 3. 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, i.e., 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 the sandy shoals of capes and offshore bars and high profile rocky bottom and barrier island oceanside 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. In the late 1800s, seagrasses covered approximately 75,000 acres of the bay. Seagrass beds in the Tampa Bay area declined between 1940 and 1963 due to declining water quality and shoreline modifications; these losses included Hillsborough Bay (94 percent), Old Tampa Bay (45 percent) and Tampa Bay proper (35 percent) (Schomer *et al.* 1990). Tampa Bay reached a low point in seagrass coverage in 1982 of around 21,500 acres. Since 1982, seagrass cover has expanded throughout the bay because of improved water quality (Li and Nui 2005; Sherwood 2010). Tampa Bay met its recovery goal of expanding seagrasses in the bay to 1950s extents based on the most recent seagrass survey conducted in 2014 (40,295 acres; TBEP, 2015).

The Southwest Florida Water Management District (SWFWMD) conducts seagrass surveys approximately every two years in the Tampa Bay region. The surveys are conducted through interpretation of aerial imagery with limited groundtruthing. No seagrass has been previously mapped within the project footprint and little seagrass has been previously mapped in the project area. SWFWMD mapped a linear strip of patchy, discontinuous seagrass in 2010 along the shoreline of the Red Wing terminal adjacent to the turning basin; however, no seagrass was mapped there in the 2015 SWFWMD survey. The 2015 SWFWMD survey also mapped patchy seagrass along the southern shoreline of DMMA 3-D and the eastern shoreline of DMMA 2-D. Extensive seagrass beds do occur along the shorelines of Hillsborough Bay adjacent to the project area (see Figure 14).

Figure 14. Seagrass resources located in the project area.

3.1 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, including 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).

3.2 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 over 25 species of ducks, wading birds, and shorebirds nest annually on protected islands in the bay (http://tbep.org/estuary.html). DMMA's 2-D and 3-D are extremely important nesting habitat for a number of beach nesting species, as they provide a safe environment away from humans and many predators. Nesting species include pelicans, cormorants, herons, egrets, gulls, ibis, spoonbills, terns, and skimmers.

3.3 AIR QUALITY

Air quality is generally good throughout Tampa Bay; however, it is diminished in localized areas by pollution from the industries associated with Tampa Harbor. As of December 2016, the project is located in a non-attainment area for SO_2 and lead (http://www.epa.gov/oar/oaqps/greenbk/ancl3.html).

3.4 HTRW

Potential contamination sources exist in the Tampa Harbor Big Bend Channel expansion dredge areas and in the DMMAs; 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.

3.5 CULTURAL RESOURCES

There are no previously identified cultural resources within the Federal Navigation Channel or DMMAs 2-D and 3-D; however, prehistoric and historic sites have been identified within the vicinity of Tampa Bay. This region has both a maritime tradition dating back to a Spanish expedition in 1528 and even earlier traditions of Native American habitation (Espey, Huston & Associates 1988; Lydecker 2005). Typical Native American habitation sites include coastal shell middens and mounds. While no specific archaeological sites have yet to be found within the water of the Bay, evidence of Native American occupation has been recovered in numerous spoil

areas from past dredging events and immediately adjacent to the coastline. For example, dredging in the vicinity of Gadsden Point identified thick layers of shell midden containing diagnostic artifacts dating from the Paleoindian through the Late Archaic Periods (Goodyear et al. 1983).

In addition to the prehistoric resources, a number of historic shipwrecks have been documented within the Tampa Bay vicinity during the historic period, with a large portion of these wrecks occurring in the late-nineteenth and early-twentieth centuries. A review of the Life Saving Service Reports, the National Oceanic and Atmospheric Administration (NOAA) Automated Wreck and Obstruction Information System (AWOIS) lists, and the Northern Shipwrecks Database, as well as other studies of ship losses, show that many vessels have been lost in the Tampa Bay area since the early seventeenth century. Approximately 110 vessels are reported to have been wrecked within the project area, dating from 1535 to 2006. Vessels range from the Confederate sloop Carolina and the Confederate schooner Spitfire, both sunk by Union vessel Ethan Allen in1862; to the sternwheel steamer City of Athens, lost in Tampa Bay in 1885; to the oiler Gemini, stranded at Egmont Key in 1973.

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 five 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.

To examine the potential need for an archaeological survey of Target F8, the Corps utilized part of their ongoing geotechnical coring investigations at the port. The purpose was to examine the materials associated with the previously identified Target F8. Three cores were placed within the target to bisect the area and feature. 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. Based on this, it was determined that no further archaeological survey would be warranted for Target F8, as the target is a natural occurring feature (shell lens) within the bay and is not associated with archaeological materials.

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 and DMMA 2D is an approximately 530 acre island that have been previously utilized for placement of excavated material. Due to the nature of DMMA 2D and 3D as man-made islands, the utilization of these locations has been previously determined to have no effect

to historic properties. The Florida SHPO concurred with this determination in 1999 and 2012 and the Seminole Tribe of Florida's Tribal Historic Preservation Officer (THPO) concurred with this determination in 2012 (Appendix C).

3.6 NATIVE AMERICANS

No portion of the proposed project area exists within or adjacent to known Native American-owned lands, reservation lands, or Traditional Cultural Properties. However, Native American groups have lived throughout this region in the past, and their decedents continue to live within the State of Florida and throughout the United States. Pursuant to Section 106 of the National Historic Preservation Act (16 USC 470), obligations regarding USACE Trust Responsibilities to federally-recognized Native American Tribes, prior consultation on the project has not indicated any historic use of the project area.

3.7 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.

3.8 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).

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4 ENVIRONMENTAL EFFECTS

This section includes the scientific and analytic basis for comparison of the alternatives. See **Table 1** in Section 2.0, Alternatives, for a summary of impacts. The following section includes anticipated effects 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 was conducted. The Corps determined during this NEPA process that the proposed expansion and maintenance dredging may affect, but is not likely to adversely affect, sea turtles, manatees, smalltooth sawfish, and Gulf sturgeon. This determination was based on the implementation of species specific protective measures outlined in this document and in the biological opinions relevant to this project, and on 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; issued in 2003, and revised in 2005 and 2007) 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.

NMFS was consulted regarding the effects of blasting on the species. Based on their letter dated October 13, 2015, they concur with the Corps' determination that the blasting activities, as described above, may affect, but are not likely to adversely affect species under their jurisdiction.

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 threatened 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.

The Corps determined that the project may affect, but is not likely to adversely affect, the manatee, and initiated consultation with the USFWS on April 4, 2014. USFWS concurred with the Corps' determination in a letter dated August 22, 2014. In addition to the above standard protection conditions for manatees, the Corps agreed to include the following additional measures:

- No blasting or rock pre-treatment will occur between November 1 and March 31.
- Two dedicated, qualified manatee observers will be present for dredging work conducted between November 1 and March 31. These observers shall 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.
- No clamshell dredging and disposal activities are authorized to occur between dusk and dawn.
- Qualified observers are required year-round during any clamshell dredging in the IMA/WWAA.
- A Blast and Watch Plan will be developed prior to any blasting activities and submitted to USFWS and other agencies for review at least 30 days prior to blasting. The Blast and Watch Plan will be followed during blasting.
- Fendering shall be employed between large vessels when moored together, or when moored to wharves or bulkheads, to reduce the possibility of crushing a manatee.
- A log will be maintained detailing work activities and sightings, collisions, or injuries to protected marine species during the contract period.

4.1.3 DMMA 2-D OR 3-D 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 expansion and maintenance dredging was not performed, there could be an increase in turbidity as vessel wakes disturb shoaled sediments 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, any activities causing a 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 FDEP Environmental Resource Permit (ERP) No. 0157891-017-BI, which expires on April 8, 2020.

4.2.3 DMMA 2-D OR 3-D 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 FDEP ERP No. 0157891-017-BI. 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 to 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 the vision of marine life within the sediment plume as well as those marine organisms with gills, but these effects would be temporary as they would be limited to the actual dredging and placement operations. 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 2-D OR 3-D 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 3-D and the eastern shoreline of DMMA 2-D in 2015 (see Figure 14). 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 state water quality standards.

EFH coordination with the NMFS Habitat Conservation Division (HCD) was conducted concurrently with the public comment period for the draft NEPA document. NMFS provided comments on the project on July 10, 2014 (see Appendix C).

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

4.4.3 DMMA 2-D OR 3-D DREDGED MATERIAL PLACEMENT ALTERNATIVES

To insure that there are no impacts to seagrasses, the contractor will be required to inspect the pipeline placement location and any staging areas at the islands for seagrasses 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 the 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 the 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, which would be an 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 2-D OR 3-D 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 including the Corps' standard protection measures for migratory birds in the project specifications.

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 2-D OR 3-D DREDGED MATERIAL PLACEMENT ALTERNATIVES

There is potential for impacts to migratory bird nesting should DMMA placement occur during the nesting season from March 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 December 2016. 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 (see **Table 4**). 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 4. Hillsborough County 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 2-D OR 3-D DREDGED MATERIAL PLACEMENT ALTERNATIVES

As with the dredging alternative discussed above, no known sources of HTRW occur within either DMMA 2-D or 3-D. 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 poses no effect to historic properties.

4.9.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

Expansion and maintenance dredging of the shipping channel and berths associated with Tampa Harbor Big Bend Channel, and the expansion areas, with disposal of the material at the upland disposal area of DMMA 2D or 3D, will have no effect on historic properties. This determination is based on previous studies and a review of geotechnical cores within the project area. Pursuant to Section 106 of the National Historic Preservation Act (NHPA) (16 USC 470) and obligations regarding the USACE's Trust Responsibilities to federally-recognized Native American Tribes, consultation on this project has occurred with the Florida Division of Historical Resources and the appropriate federally-recognized tribes. The State Historic Preservation Officer (SHPO) concurred with the Corps' determination in a letter dated April 8, 2014.

4.9.3 DMMA 2-D OR 3-D DREDGED MATERIAL PLACEMENT ALTERNATIVES

Placement of dredged material within either DMMA 2-D or 3-D poses no effect to historic properties. 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 NATIVE AMERICANS

4.10.1 NO-ACTION ALTERNATIVE

There would be no effect to Native Americans with the No Action Alternative.

4.10.2 EXPANSION AND MAINTENANCE DREDGING ALTERNATIVE

Expansion and maintenance dredging of the shipping channel and berths associated with Tampa Harbor Big Bend Channel, and the expansion areas, with disposal of the material at the upland disposal area of DMMA 2D or 3D, will have no effect on Native Americans. Pursuant to Section 106 of the National Historic Preservation Act (NHPA) (16 USC 470) and obligations regarding the USACE's Trust Responsibilities to federally-recognized Native American Tribes, consultation on this project has occurred with the appropriate federally-recognized tribes.

4.10.3 DMMA 2-D OR 3-D DREDGED MATERIAL PLACEMENT ALTERNATIVES

Placement of dredged material within either DMMA 2-D or 3-D would have no effect on Native Americans. 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 have no effect.

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 5** 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 incremental effect to cumulative impacts when added to the impacts of other past, present, and reasonably foreseeable actions affecting the project area.

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Table 5. 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. Impacts from blasting would be temporary in nature.
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 the 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 the 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; USACE 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 its 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

The Corps analyzed all available environmental information and prepared this SEA. The Corps made the draft version of this SEA available to the public for comment through a Public Notice dated March 31, 2014. Comments received were incorporated into this document and are provided in the Correspondence Appendix. The project is in compliance with the National Environmental Policy Act.

4.21.2 ENDANGERED SPECIES ACT OF 1973

The project was coordinated under the Endangered Species Act. The applicable conditions of the Gulf Regional Biological Opinion issued by NMFS, and the Statewide Programmatic Biological Opinion issued by USFWS will be followed during construction. The project will comply with the conditions outlined in the NMFS concurrence letter dated October 13, 2015. The construction conditions include establishing four safety radii (discussed in detail in Section 2.1.2.3), stemming the drill hole, and the use of boat and aerial-based observers. In addition, no blasting will occur between November 1 and March 31 to ensure the protection of manatees transiting to and from the TECO warm water aggregation area.

The USFWS concurred with the Corps determination that the project is not likely to adversely affect manatees in a letter dated August 22, 2014. Conservation measures agreed upon during consultation include the following:

- Standard Manatee Conditions for In-water Work will be followed.
- No blasting or rock pre-treatment will occur November 1 through March 31.
- Two dedicated, qualified manatee observers will be present for dredging work conducted November 1 through March 31.
- No nighttime (dusk to dawn) clamshell dredging will be conducted.
- Qualified observers will be present for any clamshell dredging within the lMA/WWAA year round.
- A Blast and Watch Plan will be developed prior to any blasting activities and submitted to the Service and other agencies for review at least 30 days prior to blasting. The Blast and Watch Plan will be followed during blasting.
- Fendering shall be employed between large vessels when moored together or when moored to wharves or bulkheads to reduce the possibility of crushing a manatee.
- A log will be maintained detailing work activities and sightings, collisions, or injuries to protected marine species during the contract period.

The project is in full compliance with the act.

4.21.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

This project was coordinated with the USFWS on April 4, 2014. The USFWS provided comments on the project in a letter dated August 22, 2014, and their comments were incorporated into this assessment. This project is 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 SHPO has been completed in accordance with the National Historic Preservation Act of 1966, as amended, and as part of the requirements and consultation

processes contained within the National Historic Preservation Act implementing regulations of 36 CFR 800. This project is also in compliance, through ongoing consultation, with the Archeological Resources Protection Act (96-95), the Abandoned Shipwreck Act of 1987 (PL 100-298; 43 U.S.C. 2101-2106); American Indian Religious Freedom Act (PL 95-341), Executive Orders (E.O) 11593, 13007, & 13175, and the Presidential Memo of 1994 on Government to Government Relations. 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 is in compliance with this act. The Florida Department of Environmental Protection issued a Section 401 Water Quality Certification on April 8, 2015, in the form of Environmental Resource Permit #0157891-017-BI. 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 will be met.

4.21.6 CLEAN AIR ACT OF 1972

Vehicular emission and airborne dust particulates resulting from construction activities shall be controlled. The study area is in attainment with all air quality criteria and the proposed project will not cause the study area to go out of attainment. This project was coordinated with EPA during the public comment period and is 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 A. The State of Florida issued an ERP on April 8, 2015, which serves as the state's final concurrence of the project's consistency with 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. An Incidental Harassment Authorization will be requested for the proposed use of confined blasting techniques. The project will be in compliance with the act.

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 was coordinated with the Environmental Protection Agency and the Tampa Bay Estuary Program, 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. As the project will not impact any units that are part of the Coastal Barrier Resources System, 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 was subject to a public notice and other evaluations normally conducted for activities subject to the act. The project is in full compliance with this act.

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 was coordinated with the NMFS, and their comments are incorporated into this analysis. The project is 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 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 was 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 determined that the project would not have a substantial adverse impact on EFH or Federally managed fish species occurring in Tampa Bay. NMFS provided comments on the Draft EA on July 10, 2014. This project is 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," and no disproportionate adverse impacts on minority or low-income populations are anticipated.

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
Aubree Hershorin, Ph.D., U.S. Army Corps of Engineers	Ecologist	Secondary Author

5.2 REVIEWERS

This SEA was reviewed by the supervisory chain of the Environmental Branch and Planning Division, as well as the Construction, Operations, and Project Management Divisions of the U.S. Army Corps of Engineers, Jacksonville District.

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6 PUBLIC INVOLVEMENT

6.1 SCOPING AND DRAFT EA

A Public Notice was issued for this action on March 31, 2014, and the draft FONSI and SEA were made available to the public for review and comment. Comments received from the public notice period were incorporated into this document.

6.2 AGENCY COORDINATION

Coordination was conducted with the appropriate agencies. As appropriate, these consultations are discussed in detail in this report. Agency coordination letters are provided in Appendix C.

6.3 LIST OF RECIPIENTS

Per the Public Notice, copies of the draft FONSI and SEA were made available to appropriate stakeholders. The list of stakeholders receiving notification is found in Appendix D.

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APPENDIX A

FLORIDA COASTAL MANAGEMENT PROGRAM

FEDERAL CONSISTENCY DETERMINATION

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FLORIDA COASTAL ZONE MANAGEMENT PROGRAM
FEDERAL CONSISTENCY DETERMINATION

Tampa Harbor - Big Bend Channel, Florida
Navigation Improvements

Hillsborough County, Florida

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 affect 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 was 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 was 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 was 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. The contractor would be required to provide a spill prevention plan.

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 was coordinated with the local regional planning commission during the NEPA process. The proposed work is 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: This Supplemental Environmental Assessment addressing project impacts was prepared and 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. The State of Florida issued an environmental resource permit for this work, which indicates the project's consistency with state water quality standards. 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

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SECTION 404(b) EVALUATION

Tampa Harbor - Big Bend Channel, Florida
Navigation Improvements

Hillsborough County, Florida

1. Expansion dredging is expected to generate 4 mcy of dredged material which will be placed into DMMA 3-D or 2-D. 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; 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.

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APPENDIX C

PERTINENT CORRESPONDENCE

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DIVISIONS OF FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State

DIVISION OF HISTORICAL RESOURCES

Mr. James C. Duck
Planning Division, Environmental Branch
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

July 26, 1999

RE: DHR Project File No. 994278
Cultural Resource Assessment Request
Draft Environmental Assessment and Finding of No Significant Impact for the Disposal Island 2D Dike Heighth Increase
Hillsborough County, Florida

Dear Mr. Duck:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), we have reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*. The authority for this procedure is the National Historic Preservation Act of 1966 (Public Law 89-665), as amended.

We have reviewed the referenced draft environmental assessment. We concur with the determination that no significant historic properties will be affected by the proposed project activities. Therefore, it is our opinion that the project will have no effect on any sites listed, or eligible for listing , in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservation Planner, at 850-487-2333 or 800-847-7278. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

for George W. Percy, Director
Division of Historical Resources and
State Historic Preservation Officer

GWP/Ese

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

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

AUG 15 2011

Mr. Fred Dayhoff, Tribal Representative
NAGPRA, Section 106
Miccosukee Tribe of Indians of Florida
Post Office Box 440021
Tamiami Station
Miami, Florida 33144

Dear Mr. Dayhoff:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects associated with the proposed routine operations and management dredging of the Tampa Bay channel in association with a dredge management plan. The Corps determined that a survey would be needed and the Jacksonville District contracted Panamerican Consultants, Inc.(PCI). Enclosed is their draft report, *Update of Tampa Harbor Dredge Management Plan (DMMP) and Preparation of an Environmental Assessment (EA) and Cultural Resource Assessment Survey (CRAS) with Fish and Wildlife Coordination Act Report.* This study represents a thorough analysis of the Tampa Bay channel system and its associated disposal sites. The Contractor has identified potential targets that exists adjacent to the federal channel and re-confirmed the existence of previously identified targets associated with Egmont Key. In addition, the contractor has identified areas of probability adjacent to the federal channel that should be studied should the Corps ever expand the channel in those locations.

It is the intention of the Corp that this document serve as baseline data for the Tampa Bay channel for which future determinations of affect in association with National Historic Preservation Act will be made. The Corps request your comments on the summary of the draft document. If there are any questions or should you require the full report, please contact Mr. Dan Hughes at 904-232-3028 or e-mail at daniel.b.hughes@usace.army.mil.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

Enclosure

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

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

AUG 15 2011

Ms. Laura Kammerer
Division of Historical Resources
State Historic Preservation Office
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Ms. Kammerer:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects associated with the proposed routine operations and management dredging of the Tampa Bay channel in association with a dredge management plan. The Corps determined that a survey would be needed and the Jacksonville District contracted Panamerican Consultants, Inc.(PCI). Enclosed is their draft report, *Update of Tampa Harbor Dredge Management Plan (DMMP) and Preparation of an Environmental Assessment (EA) and Cultural Resource Assessment Survey (CRAS) with Fish and Wildlife Coordination Act Report*. This study represents a thorough analysis of the Tampa Bay channel system and its associated disposal sites. The Contractor has identified potential targets that exists adjacent to the federal channel and re-confirmed the existence of previously identified targets associated with Egmont Key. In addition, the contractor has identified areas of probability adjacent to the federal channel that should be studied should the Corps ever expand the channel in those locations.

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Sincerely,

Eric P. Summa
Chief, Environmental Branch

Enclosure

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

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

AUG 15 2011

Mr. Willard Steele, THPO
Seminole Tribe of Florida
Tribe Historic Preservation Office
30290 Josie Billie Highway
PMP 1004
Clewiston, FL 33440

Dear Mr. Steele:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects associated with the proposed routine operations and management dredging of the Tampa Bay channel in association with a dredge management plan. The Corps determined that a survey would be needed and the Jacksonville District contracted Panamerican Consultants, Inc.(PCI). Enclosed is their draft report, *Update of Tampa Harbor Dredge Management Plan (DMMP) and Preparation of an Environmental Assessment (EA) and Cultural Resource Assessment Survey (CRAS) with Fish and Wildlife Coordination Act Report.* This study represents a thorough analysis of the Tampa Bay channel system and its associated disposal sites. The Contractor has identified potential targets that exists adjacent to the federal channel and re-confirmed the existence of previously identified targets associated with Egmont Key. In addition, the contractor has identified areas of probability adjacent to the federal channel that should be studied should the Corps ever expand the channel in those locations.

It is the intention of the Corp that this document serve as baseline data for the Tampa Bay channel for which future determinations of affect in association with National Historic Preservation Act will be made. The Corps request your comments on the draft document. If there are any questions, please contact Mr. Dan Hughes at 904-232-3028 or e-mail at daniel.b.hughes@usace.army.mil.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

Enclosure

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FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Eric Summa
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

September 23, 2011

Re: DHR Project File No.: 2011-03678 / Received by DHR: August 17, 2011
1A-32 Permit No.: 1011.47
Update of Tampa Harbor Dredged Material Management Plan (DMMP) and Preparation of an Environmental Assessment (EA) and Cultural Resources Assessment Survey (CRAS) with Fish and Wildlife Coordination Act Report (CAR)

Dear Mr. Summa:

Our office received and reviewed the above referenced survey report in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*, and Chapter 267, *Florida Statutes,* for assessment of possible adverse impact to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places (NRHP).

Between January and April, 2011, Panamerican Consultants, Inc. (PCI) conducted an underwater remote sensing survey of ocean dredged material disposal sites (ODMDS), the Egmont Channel, and parts of Tampa Bay. PCI also conducted a preliminary archaeological and historical survey of two proposed upland disposal sites. The survey was completed on behalf of the US Army Corps of Engineers, Jacksonville District and G.E.C., Inc. in order to provide baseline data for the Tampa Bay channel that will inform future determinations of effects once the Corps establishes project parameters for the proposed dredging.

PCI identified nine hundred eleven (911) magnetic anomalies, four hundred thirty-six (436) side scan sonar contacts, and one thousand six hundred seventy-six (1,676) subbottom features within the surveyed area during the investigation. PCI determined that nine (9) of the magnetic anomalies have signatures indicative of potentially significant cultural resources and sixty-eight (68) are located within the Egmont Key NRHP offshore area. PCI found that two (2) acoustic contacts may represent significant cultural resources and fifty-nine (59) are located within the Egmont Key NRHP offshore area. PCI recommends that these acoustic and magnetic anomalies be avoided or subjected to further investigation to determine their exact nature and eligibility for listing in the NRHP.

PCI determined that fourteen (14) features and twelve (12) paleo margins identified in the subbottom profiler survey have the potential to yield submerged prehistoric archaeological sites. PCI recommends avoidance of these areas or further investigation.

PCI notes that the two potential upland disposal sites contain cultural resources listed in the NRHP, Egmont Key (8HI117), Mullet Key (8PI121), and the Fort DeSoto Batteries (8PI48). PCI recommends that survey assessments be comprehensively updated for these sites prior to use in order to assess present conditions and allow for determinations of effect.

Based on the information provided, our office concurs with these determinations and finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code*. We look forward to further consultation with the Corps once project parameters have been defined.

For any questions concerning our comments, please contact Rudy Westerman, Historic Preservationist, by electronic mail at rjwesterman@dos.state.fl.us, or by phone at 850.245.6333. We appreciate your continued interest in protecting Florida's historic properties.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

Pc: Andrew Lydecker – PCI

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

TRIBAL HISTORIC
PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA
AH-TAH-THI-KI MUSEUM

30290 JOSIE BILLIE HWY
PMB 1004
CLEWISTON, FL 33440

PHONE: (863) 983-6549
FAX: (863) 902-1117

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TREASURER
MICHAEL D. TIGER

Dan Hughes
Department of the Army
Jacksonville District Corps of Engineers
PO Box 4970
Jacksonville, Florida 32232-0019

THPO#: 009613

March 13, 2012

Subject: Assessment of Effects for the Proposed Increase in Elevation for Dredge Material Management Island 3D, Hillsborough County, Florida

Dear Mr. Hughes,

The Seminole Tribe of Florida's Tribal Historic Preservation Office (STOF-THPO) has received the Jacksonville Corps of Engineers correspondence regarding the above mentioned project. The STOF-THPO has no objection to your proposal at this time. However, the STOF-THPO would like to be informed if cultural resources that are potentially ancestral or historically relevant to the Seminole Tribe of Florida are inadvertently discovered during the construction process.

We thank you for the opportunity to review the information that has been sent to date regarding this project. Please reference ***THPO-009613*** in any future documentation about this project.

Sincerely,

Direct routine inquiries to:

Paul N. Backhouse, Ph.D.
Acting Tribal Historic Preservation Officer
Seminole Tribe of Florida

Anne Mullins
Compliance Review Supervisor
annemullins@semtribe.com

AES:am:pb

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

REPLY TO
ATTENTION OF

MAR 2 0 2014

Planning and Policy Division
Environmental Branch

Dr. Paul Backhouse, THPO
Seminole Tribe of Florida
Tribe Historic Preservation Office
30290 Josie Billie Highway
PMP 1004
Clewiston, FL 33440

Dear Dr. Backhouse:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects associated with the proposed operations and maintenance dredging of the shipping channel and berths associated with Tampa Harbor Big Bend Channel. The Corps proposes to widen the north side of the entrance channel by 50' and deepen it from 37' to 46' expand the turning basin approximately 190' to the southwest to provide the 1,200 foot turning radius and deepen it from 37' to 46' and deepen the inner and east channels from 37' to 46'. In addition, two non-federal berthing (Port Redwing and TECO berths) areas located north and south of the east channel would be deepened from 37' to 46 (Figures G-01 & G-03). Material to be dredged will be placed in the Dredged Material Management Area D/A-2 or 3D (DMMA) (3D is the primary site for disposal but both may be utilized).

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 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 subbottom 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.

To examine the potential need for an archaeological survey of Target F8, the Corps utilized part of their ongoing geotechnical coring investigations at the port. The purpose was to examine the materials associated with the previously identified Target F8. Three cores were placed within the target to bisect the area and feature. 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. Based on this it was determined that no archaeological survey would be further warranted for Target F8 as the target is a natural occurring feature (shell lens) within the bay and is not associated with archaeological materials.

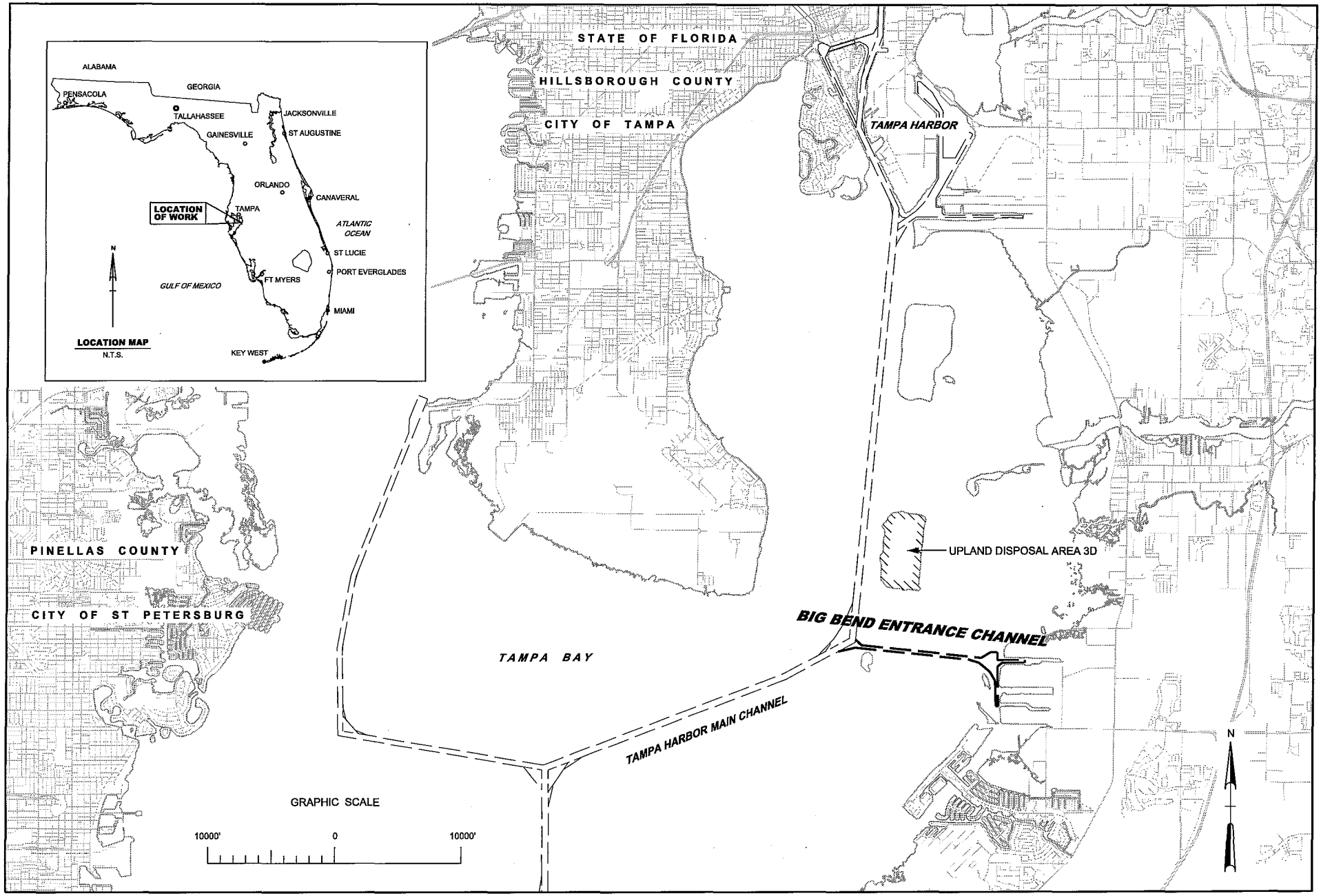
In addition to PCI's survey, a survey was conducted by the Port on the upland area that would become the expansion areas associated with Port Redwing. The survey entitled: *Cultural Resource Assessment Survey of Proposed Addition to Port Redwing, Hillsborough County, Florida*, was conducted by Southeastern 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. No resources were identified within the project area.

The Corps has determined that maintenance dredging of the shipping channel and berths associated with Tampa Harbor Big Bend Channel and expansion areas with disposal in located in with the upland disposal area of DMMA 2 or 3D will have no effect on historic properties. This determination is based previous studies and review of geotechnical cores within the project area. I request your comments on the determination of no effect. If there are any questions, please contact Mr. Dan Hughes at 904-232-3028 or e-mail at daniel.b.hughes@usace.army.mil.

Sincerely,

Eric Summa
Chief, Environmental Branch

Enclosure



US Army Corps of Engineers • Jacksonville District

WQC PERMIT PLATE
NOT FOR CONSTRUCTION

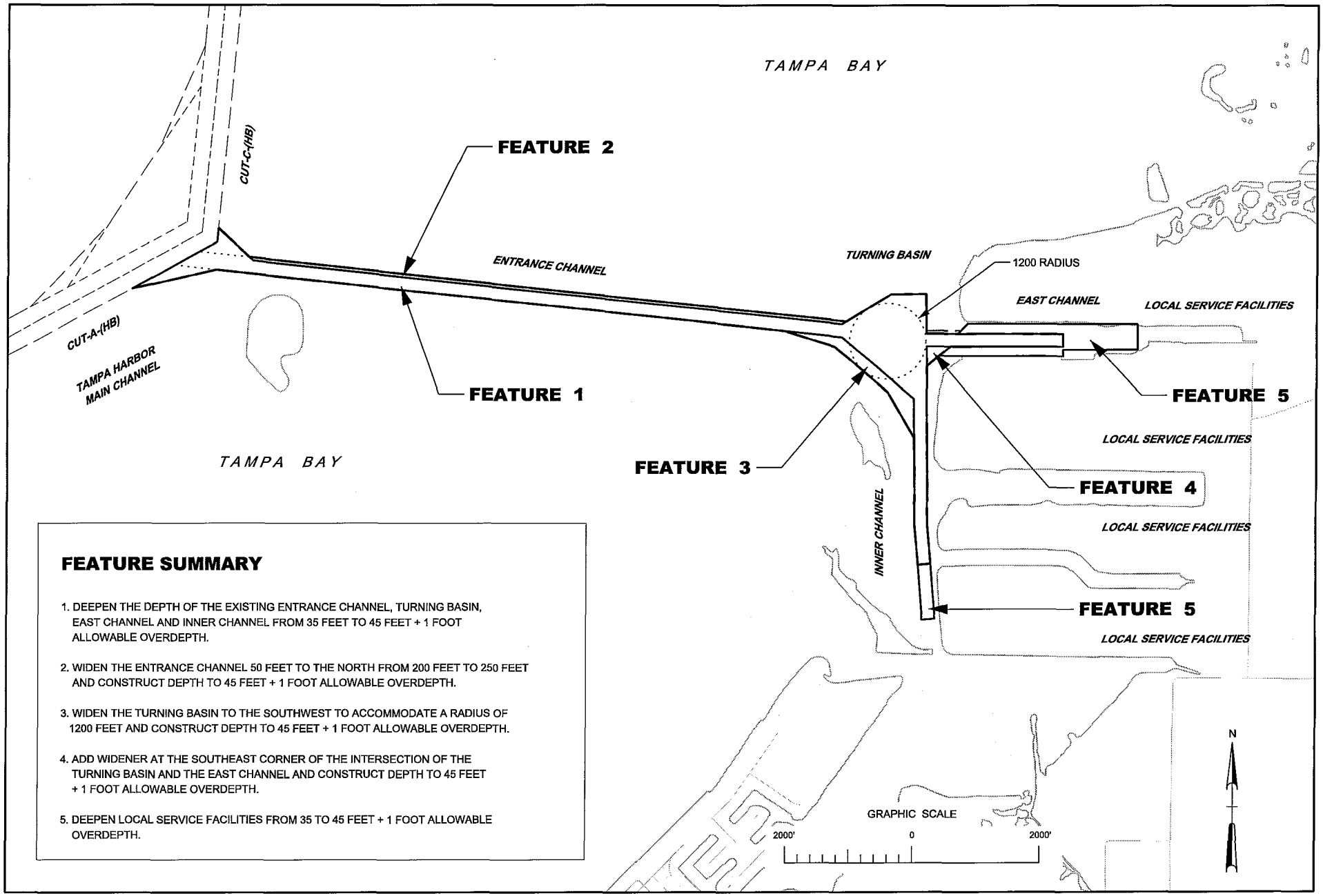
DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

Dsn by:	SRC
Dwn by:	MR2
Ckd by:	LRP
Dated:	APRIL 2014

TAMPA HARBOR, FLORIDA
BIG BEND CONSTRUCTION AND MAINTENANCE DREDGING
WQC PERMIT PLATE

PROJECT LOCATION MAP

PLATE
G-01



FEATURE SUMMARY

1. DEEPEN THE DEPTH OF THE EXISTING ENTRANCE CHANNEL, TURNING BASIN, EAST CHANNEL AND INNER CHANNEL FROM 35 FEET TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.
2. WIDEN THE ENTRANCE CHANNEL 50 FEET TO THE NORTH FROM 200 FEET TO 250 FEET AND CONSTRUCT DEPTH TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.
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US Army Corps of Engineers • Jacksonville District	WQC PERMIT PLATE NOT FOR CONSTRUCTION	Dsn by: SRC Dwn by: MR2	TAMPA HARBOR, FLORIDA BIG BEND CONSTRUCTION AND MAINTENANCE DREDGING WQC PERMIT PLATE	PLATE
	DEPARTMENT OF THE ARMY JACKSONVILLE DISTRICT, CORPS OF ENGINEERS JACKSONVILLE, FLORIDA	Ckd by: LRP Dated: APRIL 2014	DEEPENING PROJECT FEATURES OVERVIEW	G-03

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

REPLY TO
ATTENTION OF

MAR 2 0 2014

Planning and Policy Division
Environmental Branch

Mr. Fred Dayhoff, Tribal Representative
NAGPRA, Section 106
Miccosukee Tribe of Indians of Florida
Post Office Box 440021
Tamiami Station
Miami, Florida 33144

Dear Mr. Dayhoff:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects associated with the proposed operations and maintenance dredging of the shipping channel and berths associated with Tampa Harbor Big Bend Channel. The Corps proposes to widen the north side of the entrance channel by 50' and deepen it from 37' to 46' expand the turning basin approximately 190' to the southwest to provide the 1,200 foot turning radius and deepen it from 37' to 46' and deepen the inner and east channels from 37' to 46'. In addition, two non-federal berthing (Port Redwing and TECO berths) areas located north and south of the east channel would be deepened from 37' to 46 (Figures G-01 & G-03). Material to be dredged will be placed in the Dredged Material Management Area D/A-2 or 3D (DMMA) (3D is the primary site for disposal but both may be utilized).

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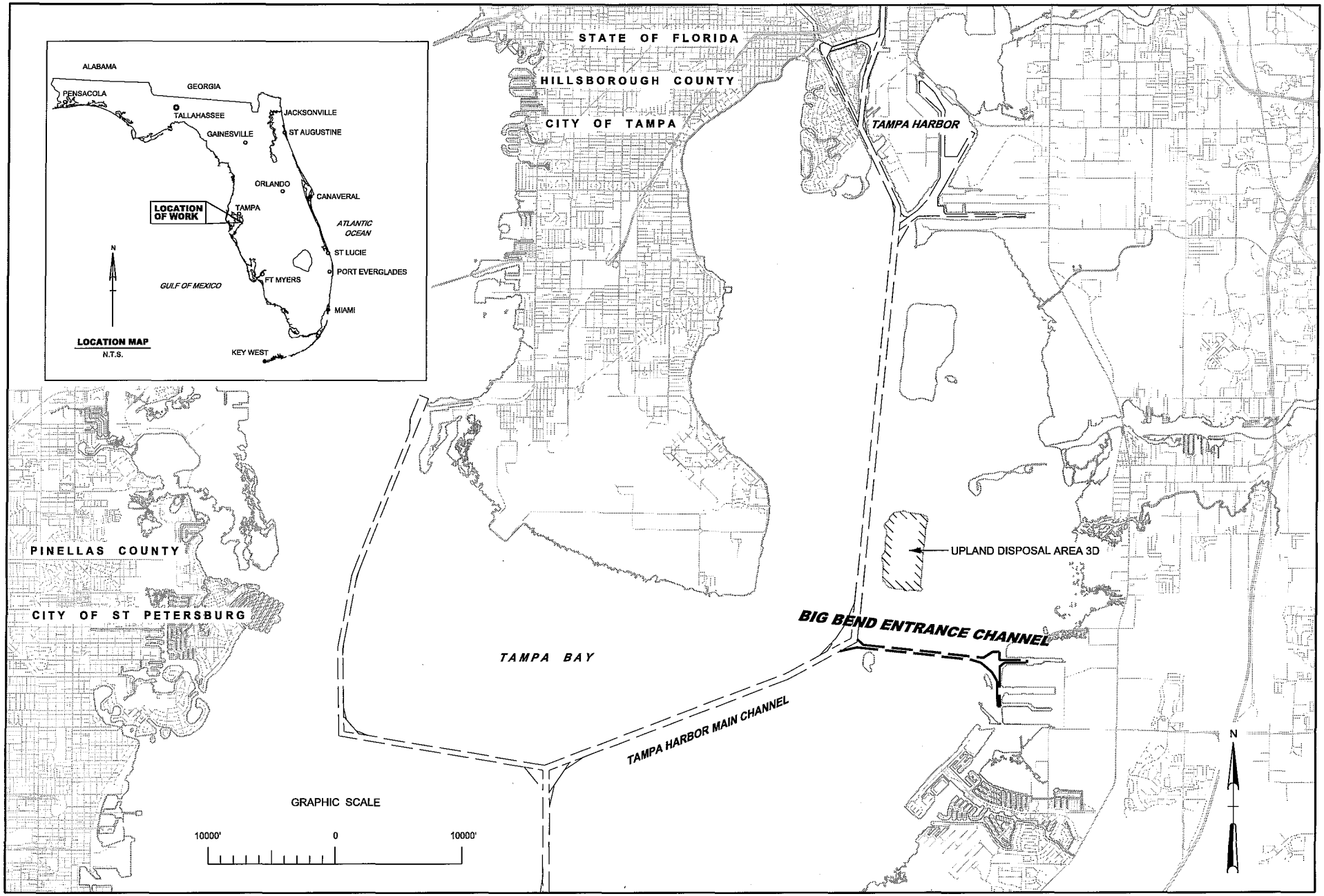
The Corps has determined that maintenance dredging of the shipping channel and berths associated with Tampa Harbor Big Bend Channel and expansion areas with disposal in located in with the upland disposal area of DMMA 2 or 3D will have no effect on historic properties. This determination is based previous studies and review of geotechnical cores within the project area. I request your comments on the determination of no effect. If there are any questions, please contact Mr. Dan Hughes at 904-232-3028 or e-mail at daniel.b.hughes@usace.army.mil.

Sincerely,

Eric Summa
Chief, Environmental Branch

Enclosure



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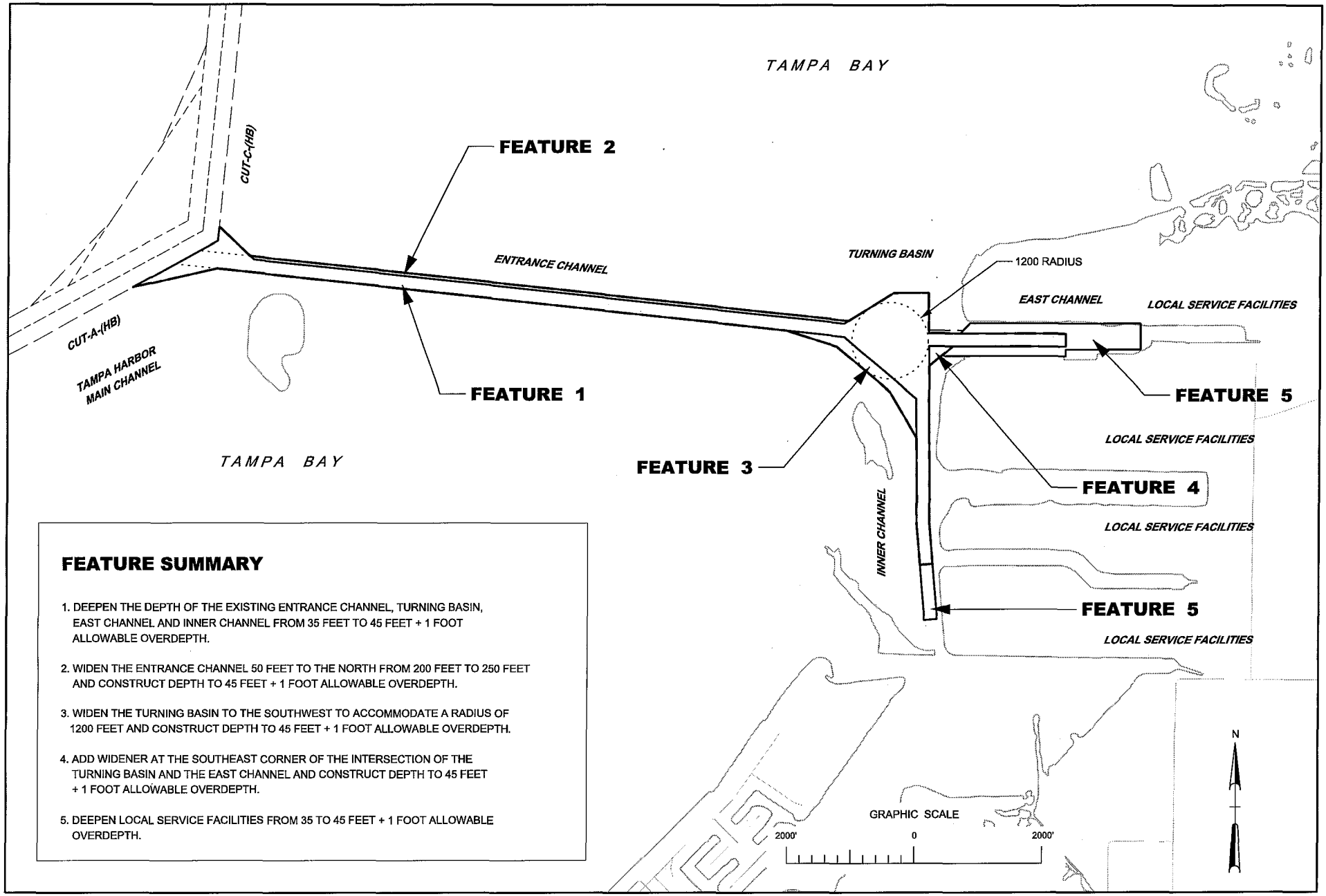
	DEPARTMENT OF THE ARMY **JACKSONVILLE DISTRICT, CORPS OF ENGINEERS** **JACKSONVILLE, FLORIDA**	Ckd by: LRP Dated: APRIL 2014	**PROJECT LOCATION MAP**	G-01



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

REPLY TO
ATTENTION OF

MAR 2 0 2014

Planning and Policy Division
Environmental Branch

Robert Bendus, SHPO
Division of Historical Resources
State Historic Preservation Officer
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Mr. Bendus:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects associated with the proposed operations and maintenance dredging of the shipping channel and berths associated with Tampa Harbor Big Bend Channel. The Corps proposes to widen the north side of the entrance channel by 50' and deepen it from 37' to 46' expand the turning basin approximately 190' to the southwest to provide the 1,200 foot turning radius and deepen it from 37' to 46' and deepen the inner and east channels from 37' to 46'. In addition, two non-federal berthing (Port Redwing and TECO berths) areas located north and south of the east channel would be deepened from 37' to 46 (Figures G-01 & G-03). Material to be dredged will be placed in the Dredged Material Management Area D/A-2 or 3D (DMMA) (3D is the primary site for disposal but both may be utilized).

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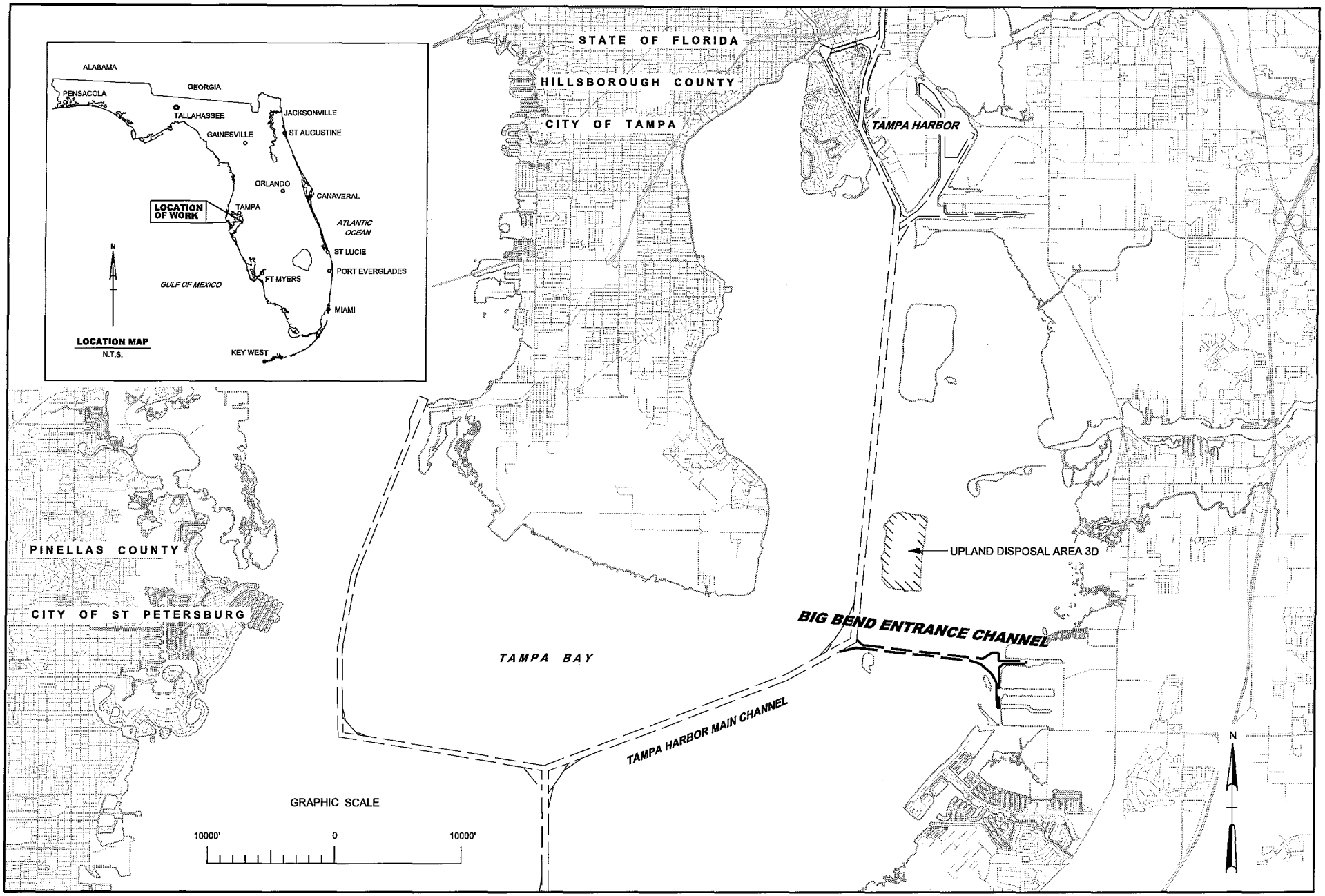
Sincerely,

for Eric Summa
Chief, Environmental Branch

Enclosure



US Army Corps of Engineers • Jacksonville District	WQC PERMIT PLATE NOT FOR CONSTRUCTION	Dsn by: SRC Dwn by: MR2	**TAMPA HARBOR, FLORIDA** **BIG BEND CONSTRUCTION AND MAINTENANCE DREDGING** **WQC PERMIT PLATE**	PLATE
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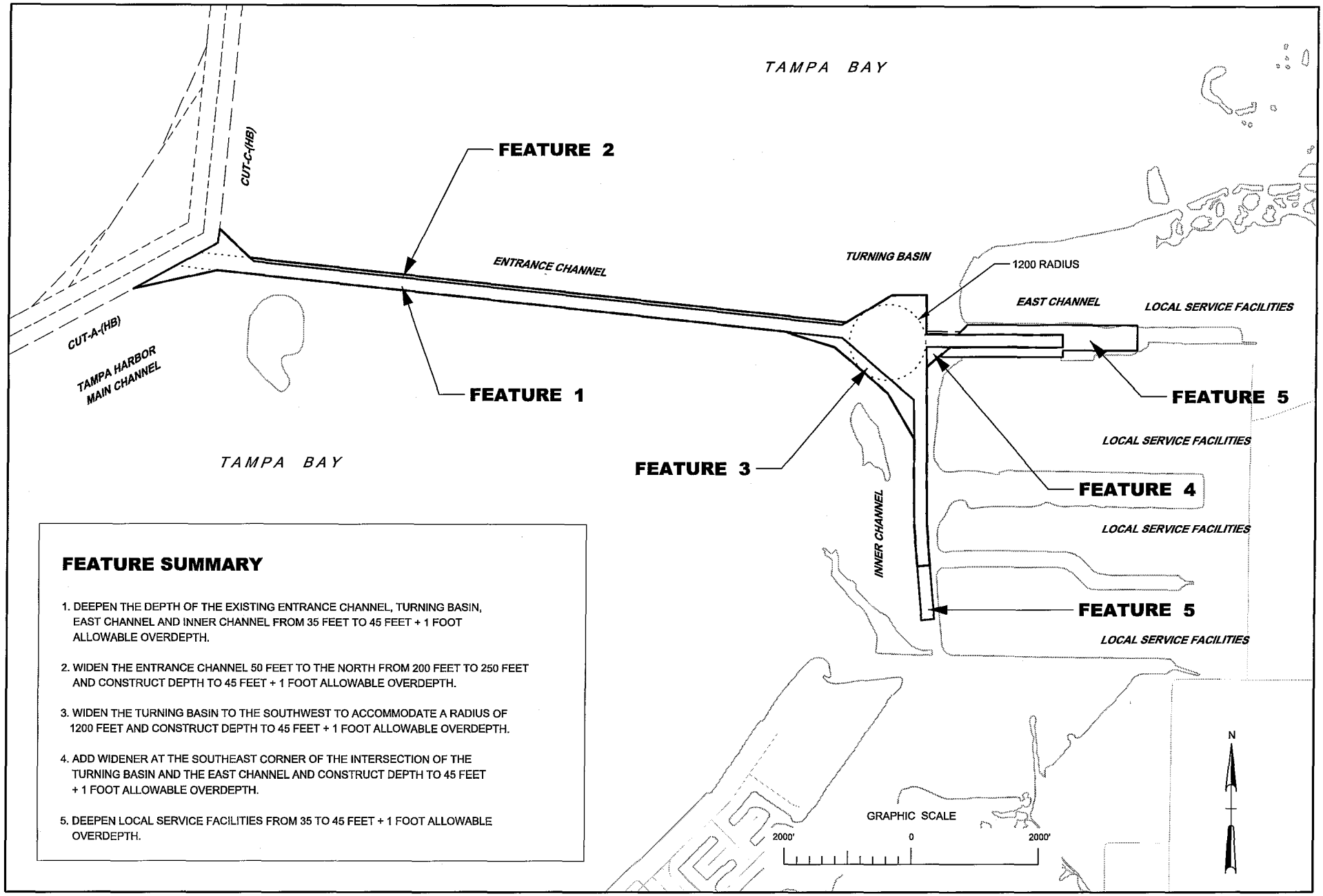

FEATURE SUMMARY

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

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

MAR 3 1 2014

PUBLIC NOTICE

TO WHOM IT MAY CONCERN: The District Engineer, Jacksonville District, U.S. Army Corps of Engineers, has prepared a Supplemental Environmental Assessment for navigation improvements to the Big Bend Channel portion of the Tampa Harbor Federal navigation project in Hillsborough County, Florida. The activity includes the expansion and maintenance dredging of the entrance, inner and east channels, the turning basin, and local service facilities/berthing areas (see enclosed location map G-01 and drawing G-03). Drawing G-03 displays and describes the proposed navigation improvement features (5). This Federal project is currently being evaluated and coordinated pursuant to 33 CFR 335 through 338.

Comments regarding the project should be submitted either in writing or e-mail to the District Engineer at the above address within 30 days from the date of this notice. Any person who has an interest, which may be affected by the construction of this project, may request a public hearing. The request must be submitted in writing to the District Engineer within 30 days of the date of this notice and must clearly set forth the interest, which may be affected and the manner in which the interest may be affected by this activity.

If you have any questions concerning this project, you may contact Mr. Paul DeMarco of this office, telephone 904-232-1897; or E-mail: Paul.m.demarco@usace.army.mil.

WATERWAY & LOCATION: Big Bend channel is located in along the eastern shoreline of Hillsborough Bay in Hillsborough County, Florida.

WORK & PURPOSE: 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 2,100 feet further east (east channel).

Despite being authorized, the Big Bend project has not yet been completely constructed to these dimensions. Therefore, the Corps proposes deepen the project depths of the existing entrance channel, turning basin, East channel and inner channel from 35' to 41'+2' advance maintenance +2' A.O. MLLW (**Feature 1**), widen the north side of the entrance channel by 50' (from 200' to 250') and deepen it from 35' to 41'+2' advance maintenance +2' A.O. MLLW (**Feature 2**), widen the turning basin approximately 190' to the southwest to provide the 1,200 foot turning radius and deepen it from 35' to 41'+2' advanced maintenance +2' A.O. MLLW (**Feature 3**), add a widener at the southeast corner of the intersection of the turning basin and east channel and deepen it from 35' to 41'+2' advanced maintenance +2' A.O. MLLW (**Feature 4**). In addition, local service facilities (non-federal berthing areas) located north, south, and east of the east channel and at the south end of the inner channel would be deepened from 35' to 41'+2' advanced maintenance +2' A.O. MLLW at 100% non-federal cost (**Feature 5**). 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 80,000cy 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. Most likely a hydraulic cutterhead dredge would be used to perform the expansion dredging and some rock pre-treatment may be necessary prior to dredging in order to achieve project depth.

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.

PROJECT AUTHORIZATION: The Big Bend Channel Deepening was authorized by Public Law 106-53, dated 17 August 1999, which states: "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."

APPLICABLE LAWS: The following laws are, or may be, applicable to the review of the proposed disposal sites and to the activities affiliated with this Federal project:

1. Section 404 of the Clean Water Act of 1977 (PL 95-217) (33 U.S.C. 1344).

2. Sections 102 and 103 of the Marine Protection, Research, and Sanctuaries Act of 1972 (PL 92-532, 86 Stat. 1052).

3. The National Environmental Policy Act of 1969 (PL 91-190) (42 U.S.C. 4321-4347).

4. Sections 307(c)(1) and (2) of the Coastal Zone Management Act of 1972 (16 U.S.C. 1456(c)(1) and (2), 86 Stat. 1280).

5. The Fish and Wildlife Act of 1956 (16 U.S.C. 472a et seq).

6. The Migratory Marine Game-Fish Act of 1959 (16 U.S.C. 760c-760g).

7. The Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 66l-666c).

8. The Endangered Species Act of 1973 (PL 93-205) (16 U.S.C. 668aa-668cc-6, 87 Stat. 884).

9. The National Historic Preservation Act of 1966 (16 U.S.C. 470, 80 Stat. 915).

10. Section 313 of the Clean Water Act of 1977 (33 U.S.C. 1323, 85 Stat. 816).

11. The Magnuson-Stevens Fishery Conservation and Management Act of 1966 (16 USC 1801 et seq. PL 104-208).

EVALUATION FACTORS: All factors, which may be relevant to the proposal, will be considered including the cumulative effects thereof. Among these are conservation, economics, aesthetics, general environmental concerns, wetlands, historic resources, fish and wildlife values, flood hazards, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the public.

The evaluation of the impact of the activity on the public interest will include application of the guidelines promulgated by the Administrator, EPA, (40 CFR part 230). See Appendix B to the Supplemental Environmental Assessment.

EVALUATION:

a. Environmental Assessment (EA): A draft Supplemental EA for the Navigation Improvements to the Big Bend Channel Portion of the Tampa Harbor Federal navigation project has been prepared and is available for review online at:
http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#Hillsborough
or a copy of this revised EA can be made available upon request.

b. Environmental Impact Statement (EIS): The evaluation of the project area suggests that the proposed action would have no significant impacts on the quality of the human environment and an Environmental Impact Statement, pursuant to the National Environmental Policy Act (NEPA), will not be required (see enclosed Draft Finding of No Significant Imapact).

c. Threatened or Endangered Species: Consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service pursuant to Section 7 of the Endangered Species Act (ESA) will be conducted. The construction of the project as proposed may affect manatees, sea turtles, smalltooth sawfish, and Gulf sturgeon but not affect their critical habitat.

d. Coastal Zone Management: A federal consistency determination in accordance with 15 CFR 930 Subpart C is included in the draft supplemental EA. State consistency review will be performed during the coordination of the draft supplemental EA. The Corps has determined the project is consistent with the enforceable policies of the Florida Coastal Management Program.

e. Essential Fish Habitat: This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. The proposal would impact estuarine water column with an unconsolidated substrate considered EFH by the NMFS. Our initial determination is that the proposed action would not have a significant adverse impact on EFH or federally managed fisheries along the northeast coast of Florida. However, our final determination is subject to review by and coordination with the National Marine Fisheries Service.

f. Water Quality Certification, Section 401 of the Clean Water Act: The USACE is preparing 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. This project would be performed in compliance with State of Florida water quality standards.

g. Historic Resources: The Corps has determined that maintenance dredging of the shipping channel and berths associated with Tampa Harbor Big Bend Channel and expansion areas with disposal located in the upland disposal area of DMMA 2 or 3D will have no effect on historic properties. This determination is based on previous studies and review of geotechnical cores within the project area.

Any person who has an interest which may be affected by the disposal of this dredged material may request a public hearing. The request must be submitted in writing to the district engineer within the comment period of this notice and must clearly set forth the interest which may be affected and the manner in which the interest may be affected by this activity.

DISSEMINATION OF NOTICE: You are requested to communicate the information contained in this notice to any other parties whom you deem likely to have an interest in this matter.

COORDINATION: This notice is being sent to the following agencies:

Kenneth R Auspger

for Eric P. Summa
Chief, Environmental Branch

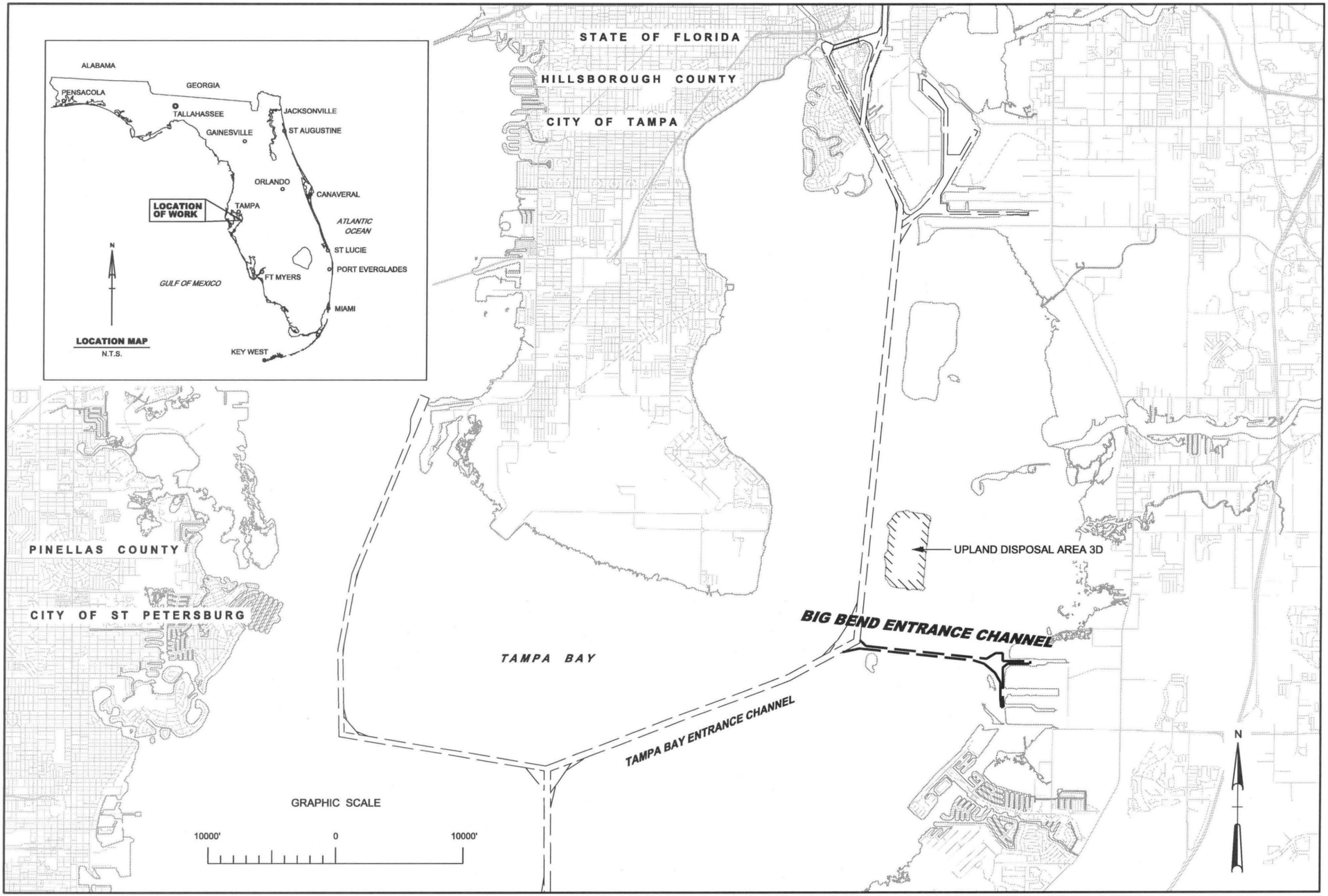
FEDERAL AGENCIES:
U.S. COAST GUARD
U.S. FISH & WILDLIFE SERVICE
NATIONAL MARINE FISHERIES SERVICE
FEDERAL ENERGY REGULATORY COMMISSION
U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION
FEDERAL MARITIME COMMISSION
NATURAL RESOURCES CONSERVATION SERVICE
GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

FEDERAL EMERGENCY MANAGEMENT AGENCY

STATE AGENCIES:
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
STATE HISTORIC PRESERVATION OFFICE
FLORIDA STATE CLEARINGHOUSE
FLORIDA MARINE PATROL
TAMPA BAY REGIONAL PLANNING COUNCIL
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
WEST COAST INLAND NAVIGATION DISTRICT

ENVIRONMENTAL ORGANIZATIONS:
FLORIDA AUDUBON SOCIETY
NATIONAL AUDUBON SOCIETY
FLORIDA WILDLIFE FEDERATION
NATIONAL WILDLIFE FEDERATION
SIERRA CLUB
FLORIDA DEFENDERS OF THE ENVIRONMENT
NATIONAL ESTUARY PROGRAM
AMERICAN LITTORAL SOCIETY
OCEAN CONSERVANCY
MOTE MARINE LABORATORY
SAVE THE MANATEE CLUB
SURFRIDER

LOCAL GOVERNMENTS:
PINELLAS COUNTY DEPARTMENT OF PUBLIC WORKS
CITY OF BRADENTON
CLEARWATER CHAMBER OF COMMERCE
CITY OF ANNA MARIA
CITY OF PALMETTO
SAND KEY CIVIC ASSOCIATION
MANATEE PORT AUTHORITY
PORT TAMPA BAY
TAMPA BAY PARTNERSHIP
AGENCY ON BAY MANAGEMENT



US Army Corps of Engineers
Jacksonville District

WQC PERMIT PLATE
NOT FOR CONSTRUCTION

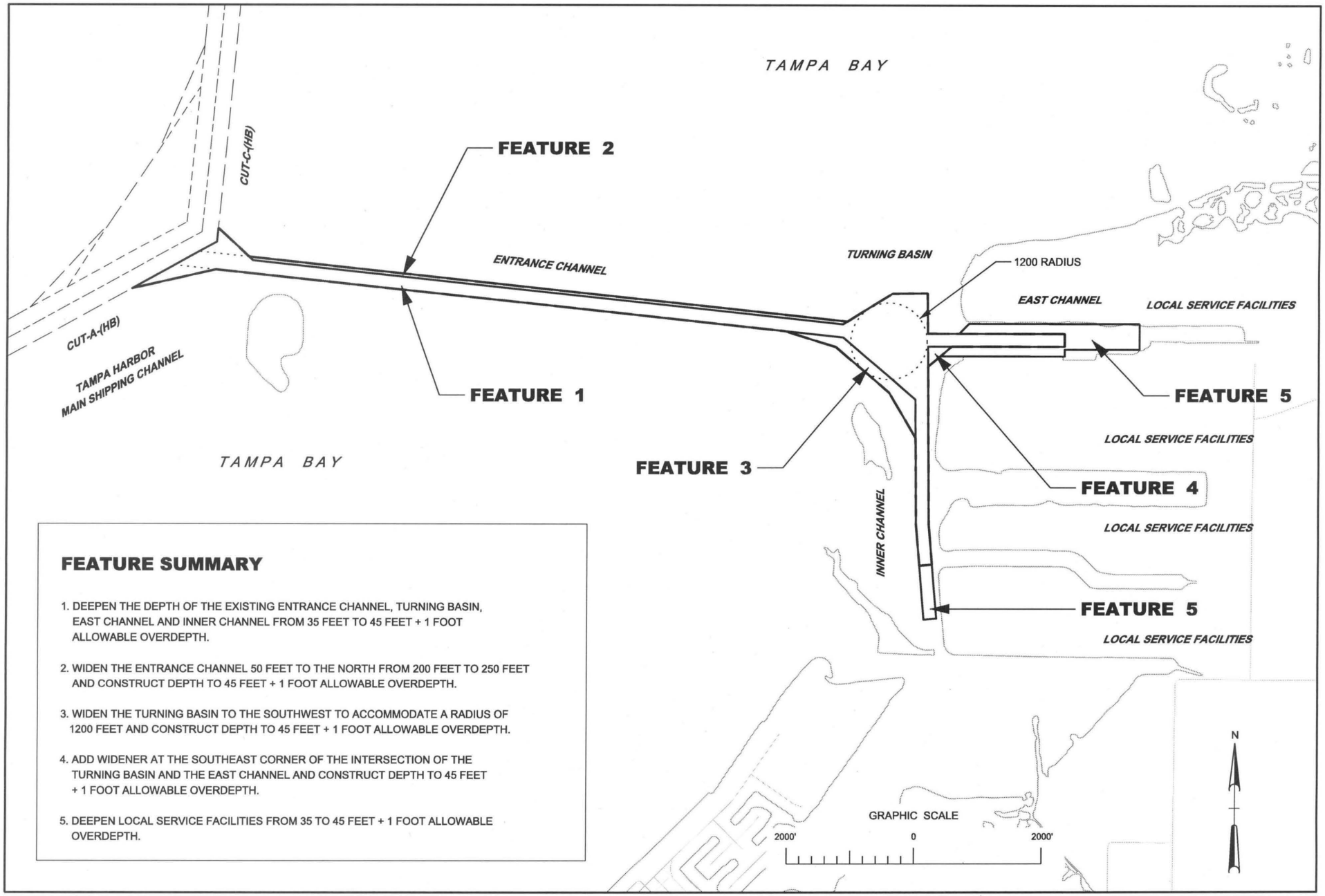
DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

Dsn by:	SRC
Dwn by:	MR2
Ckd by:	LRP
Dated:	APRIL 2014

TAMPA HARBOR, FLORIDA
BIG BEND CONSTRUCTION AND MAINTENANCE DREDGING
WQC PERMIT PLATE

PROJECT LOCATION MAP

PLATE
G-01



FEATURE SUMMARY

1. DEEPEN THE DEPTH OF THE EXISTING ENTRANCE CHANNEL, TURNING BASIN, EAST CHANNEL AND INNER CHANNEL FROM 35 FEET TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.
2. WIDEN THE ENTRANCE CHANNEL 50 FEET TO THE NORTH FROM 200 FEET TO 250 FEET AND CONSTRUCT DEPTH TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.
3. WIDEN THE TURNING BASIN TO THE SOUTHWEST TO ACCOMMODATE A RADIUS OF 1200 FEET AND CONSTRUCT DEPTH TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.
4. ADD WIDENER AT THE SOUTHEAST CORNER OF THE INTERSECTION OF THE TURNING BASIN AND THE EAST CHANNEL AND CONSTRUCT DEPTH TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.
5. DEEPEN LOCAL SERVICE FACILITIES FROM 35 TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.

US Army Corps of Engineers • Jacksonville District	WQC PERMIT PLATE NOT FOR CONSTRUCTION	Dsn by: SRC Dwn by: MR2	**TAMPA HARBOR, FLORIDA** **BIG BEND CONSTRUCTION AND MAINTENANCE DREDGING** **WQC PERMIT PLATE**	PLATE
	DEPARTMENT OF THE ARMY **JACKSONVILLE DISTRICT, CORPS OF ENGINEERS** **JACKSONVILLE, FLORIDA**	Ckd by: LRP Dated: APRIL 2014	**DEEPENING PROJECT FEATURES OVERVIEW**	G-03

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

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

REPLY TO
ATTENTION OF

APR 0 4 2014

Planning and Policy Division
Environmental Branch

Mr. David Bernhart
NOAA Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701

Dear Mr. Bernhart:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, proposes to widen, deepen and maintain the Big Bend channel portion of the Tampa Harbor Federal navigation project. This project is currently being evaluated under NEPA. Completion of the dredging project may employ a hopper dredge, clamshell dredge, cutterhead dredge or rock pre-treatment. The dredging will remove approximately 4.0 million cubic yards of material of which approximately 500,000 cubic yards is consolidated rock. The widening would occur along the entrance channel's northern edge over a channel length of 10,200 feet and to a depth of 46 feet. Also included is the widening of the southwestern edge of the turning basin, the southeastern corner of the intersection of the turning basin and east channel and the deepening of these areas and both the east and inner channels to 46 feet. In addition, local service facilities (non-federal berthing areas) located north, south, and east of the east channel and at the south end of the inner channel would be deepened to 46 feet at 100% non-federal cost. Material removed from the dredging would be placed in either Dredged Material Management Area (DMMA) 2D or 3D. The dredging is proposed to take place in 2014/2015.

Listed species or designated critical habitat within the action area under the jurisdiction of the National Marine Fisheries Service (NMFS) include the endangered smalltooth sawfish, threatened Gulf sturgeon, threatened loggerhead turtle, endangered green turtle, endangered Kemp's ridley turtle, and endangered hawksbill turtle. There is no designated critical habitat for these species in the project area.

Enclosed please find the Corp's biological assessment of the effects of the proposed project on listed species in the action area. We request the initiation of informal consultation under section 7 of the Endangered Species Act concerning the effects of the proposed activities on the smalltooth sawfish, Gulf sturgeon, loggerhead turtle, green turtle, Kemp's ridley turtle, and hawksbill turtle. We also request an initiation of consultation under the Marine Mammal Protection Act of 1972 concerning effects of the proposed activities on marine mammals within the action area.

After reviewing the status of the species in the action area and the special conditions placed in our confined blasting and dredging specifications, the Corps determines that the widening and deepening of the Big Bend channel portion of Tampa Harbor may affect, but is not likely to adversely affect, the species listed above. The Corps requests that you concur with this determination.

If you have any questions, please contact Mr. Paul DeMarco at 904-232-1897 or by email at Paul.M.DeMarco@usace.army.mil.

Sincerely,

Kenneth R Dugger

for Eric P. Summa
Chief, Environmental Branch

Enclosure

ENDANGERED SPECIES ACT
BIOLOGICAL ASSESSMENT
TAMPA HABROR, BIG BEND CHANNEL
EXPANSION AND MAINTENANCE DREDGING

PREPARED FOR THE NATIONAL MARINE FISHERIES SERVICE

US Army Corps
of Engineers ®
Jacksonville District

APRIL 2014

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1 BACKGROUND/HISTORY

The purpose of this Biological Assessment (BA) is to address the effect of the expansion and maintenance dredging of the Big Bend channel portion of the Tampa Harbor Federal navigation project on species listed as threatened or endangered under the Endangered Species Act (ESA) and their designated critical habitat. The U.S. Army Corps of Engineers (Corps) is authorized to construct the proposed project.

The project includes expansion and maintenance dredging and dredged material management area (DMMA) placement activities associated with widening the north side of the entrance channel by 50' and deepening it, expanding the turning basin approximately 190' to the southwest to provide a 1,200 foot turning radius, add a widener at the southeast corner of the intersection of the turning basin and the east channel and deepening it, deepening the inner and east channels, and deepening local service facilities (non-federal berthing areas) located north, south, and east of the east channel and at the south end of the inner channel. Because of the nature of the project, it has the potential to impact the following ESA-listed marine species under the purview of the National Marine Fisheries Service (NMFS) that occur in the area: loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempii*), smalltooth sawfish (*Pristis pectinata*), and Gulf sturgeon (*Acipenser oxyrinchus desotoi*).

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.

1.1 Project Authority

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

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

2 DESCRIPTION OF PROPOSED ACTION & ACTION AREA

Tampa Bay is a large estuary located along the central Gulf of Mexico coast of Florida. The Tampa Harbor Federal Navigation Project consists of about 70 miles of channels from the mouth of the Tampa Bay to the City of Tampa (see Figure 1).

This BA addresses the environmental impacts associated with expansion and maintenance dredging and DMMA 2D or 3D placement of materials from the widening and deepening of the Big Bend channel portion of the Tampa Harbor Federal Navigation Channel. The authorized project consists of a 250-feet wide by -41-feet deep plus 2-feet A.O MLLW entrance channel which would extend 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 would contain two 200-feet wide by -41-feet deep 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 2,100 feet further east (east channel). However, the 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' and deepen it from 35' to 41' + 2' advanced maintenance + 2' A.O. MLLW, expand the turning basin approximately 190' to the southwest to provide the 1,200 foot turning radius, add a widener at the southeast corner of the intersection of the turning basin and the east channel and deepen it from 35' to 41' + 2' advanced maintenance + 2' A.O. MLLW, and deepen the inner and east channels from 35' to 41' + 2' advanced maintenance + 2' A.O. MLLW. In addition, local service facilities (non-federal berthing areas) located north, south, and east of the east channel and at the south end of the inner channel would be deepened from 35' to 41'+2' advanced maintenance +2' A.O. MLLW at 100% non-federal cost. This plan would generate approximately 4.0 million cubic yards of dredge material. Approximately 500,000cy cubic yards of the dredged materials are anticipated to be consolidated rock. Subsequent to the expansion, maintenance dredging is anticipated to be required every 9 years and would remove approximately 720,000cy of dredged material per event. The project includes dredged material placement in either DMMA 2D or 3D depending on the entity which performs the proposed expansion and maintenance dredging. It is possible that the project local sponsor, Tampa Port Authority (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. Otherwise the Corps would perform the dredging and place the material in DMMA 3D which is leased from the TPA.

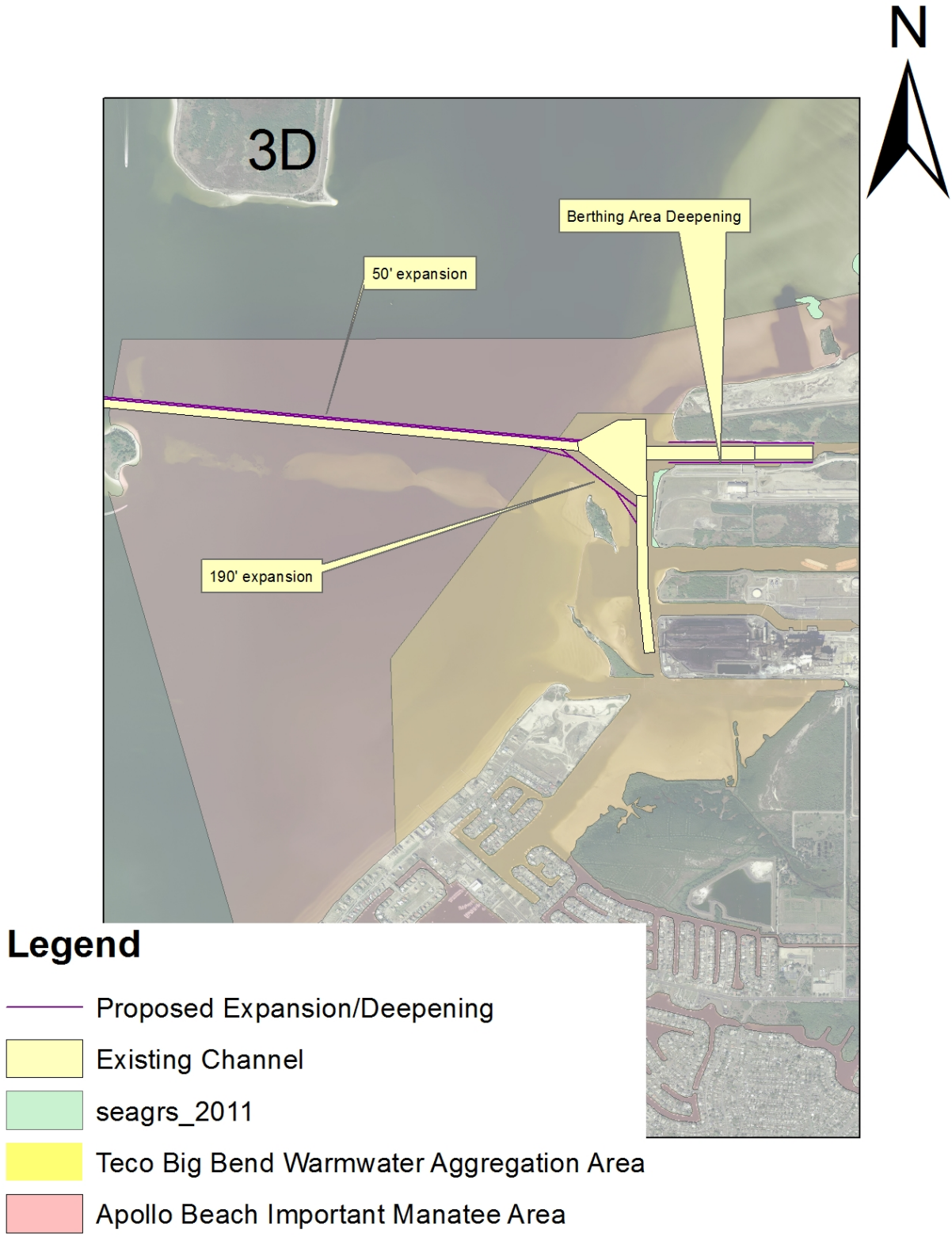

Figure 1: Location Map showing the Big Bend portion of the Tampa Harbor Federal Project.

2.1 Dredging Techniques

The USACE does not normally specify the type of dredging equipment to be used due to restrictions associated with the Competition in Contracting Act (10 US Code 2304 and 41 US Code 253). The decision regarding equipment used during construction is generally left to the dredging industry contractors, allowing them to offer the most appropriate and competitive equipment available at the time. Nevertheless, certain types of dredging equipment are 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."

Dredging equipment uses either hydraulic or mechanical means to transport material from the substrate to the surface. Hydraulic dredges use water to pump the dredged material as slurry to the surface and mechanical dredges use a bucket-type device to excavate and raise the material from the channel bottom. The most common hydraulic dredges include cutterhead-suction and hopper dredges; the most common mechanical dredges include clamshells, backhoes, and marine excavator dredges. Public Law 100-329 requires dredges working on U.S. government projects to have U.S. built hulls, which can limit the options for equipment types if a new type of dredge is developed overseas.

Various project elements influence the selection of the dredge type and size. These factors include the type of material to be dredged (rock, clay, sand, silt, or combination); the water depth; the dredge cut thickness, length, and width; the sea or wave conditions; vessel traffic conditions; environmental restrictions; other operating restrictions; and the required completion time. In addition, all of these factors impact dredge production and, as a result, costs. Multiple dredges of the same or different types may be used to expedite work or to accommodate varying conditions within the dredging areas.

2.1.1 Hopper Dredge

The hopper dredge, or trailing suction dredge, is a self-propelled ocean-going vessel with a section of the hull compartmented into one or more hoppers. Fitted with powerful pumps, the dredges suck sediment from the channel bottom through long intake pipes, called drag arms, and store it in the hoppers. Normal hopper dredge configuration has two dragarms, one on each side of the vessel. A dragarm is a pipe suspended over the side of the vessel with a suction opening called a draghead for contact with the bottom (**Figure2**). Depending on the hopper dredge, a slurry of water and sediment is generated from the plowing of the draghead "teeth," the use of high pressure water jets, and the suction velocity of the pumps. The dredged slurry is distributed within the vessels hopper allowing for solids to settle out and the water portion of the slurry to be discharged from the vessel during operations through its overflow system. When the hopper

attains a full load, dredging stops and the ship travels to an in-water disposal site, where the dredged material is discharged through the bottom of the ship by splitting the hull. Some hopper dredges are capable of pumping the material back out of the vessel and through a series of shore-pipe to a designated placement/disposal location.

Hopper dredges are well suited to dredging heavy sands. They can maintain operations safely, effectively, and economically in relatively rough seas and because they are mobile, they can be used in high-traffic areas. They are often used at ocean entrances and offshore, but cannot be used in confined or shallow areas. Hopper dredges can move quickly to disposal sites under their own power (maximum speed unloaded - ≤ 17 knots; maximum loaded - ≤ 16 knots), but since the dredging stops during the transit to and from the disposal area, the operation loses efficiency if the haul distance is too far. Based on the review of hopper dredge speed data provided by the Corps' Silent Inspector program, the average speed for hopper dredges while dredging is between 1-3 knots, with most dredges never exceeding 4 knots (Jay Rosatti, ERDC; personal communication). Hopper dredges also have several limitations. Considering their normal operating conditions, hopper dredges cannot dredge continuously. The precision of hopper dredging is less than other types of dredges; therefore, they have difficulty dredging steep side banks and cannot effectively dredge around structures. Finally, hopper dredges are unable to dredge rock and highly consolidated materials. Therefore, they could not be used to perform the proposed expansion dredging but could be used to perform the proposed maintenance dredging.

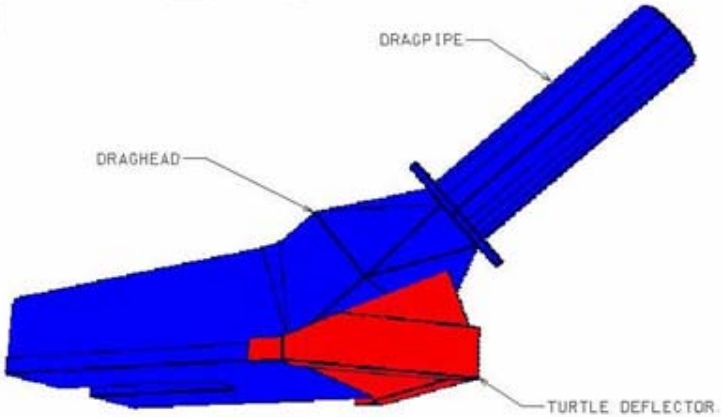

Figure 2: Hopper dredge and turtle deflecting draghead schematics

2.1.2 Pipeline and Cutter Suction Dredge

Pipeline dredges are designed to handle a wide range of materials including clay, hardpan, silts, sands, gravel, and some types of rock formations without blasting. They are used for new work and maintenance in projects where suitable placement/disposal areas are available and operate in an almost continuous dredging cycle resulting in maximum production, economy, and efficiency. Pipeline dredges are capable of dredging in shallow or deep water and have accurate bottom and side slope cutting capability. Limitations of pipeline dredges include relative lack of mobility, long mobilization and demobilization, inability to work in high wave action and currents, and are impractical in high traffic areas.

Pipeline dredges are rarely self-propelled and; therefore, must be transported to and from the dredge site. Pipeline dredge size is based on the inside diameter of the discharge pipe which commonly ranges from 6" to 36." They require an extensive array of support equipment including pipeline (floating, shore, and submerged), boats (crew, work, survey), barges, and pipe handling equipment. Most pipeline dredges have a cutterhead on the suction end. A cutterhead is a mechanical device that has rotating teeth to break up or loosen the bottom material so that it can be sucked through the dredge. Some cutterheads are rugged enough to break up rock for removal (**Figure**).

During the dredging operation a cutterhead suction dredge is held in position by two spuds at the stern of the dredge, only one of which can be on the bottom while the dredge swings. There are two swing anchors some distance from either side of the dredge, which are connected by steel cable to the swing winches. The dredge swings to port and starboard alternately, passing the cutter through the bottom material until the proper depth is achieved. The dredge advances by "walking" itself forward on the spuds. This is accomplished by swinging the dredge to the port, using the port spud and appropriate distance, then the starboard spud is dropped and the port spud raised. The dredge is then swung an equal distance to the starboard and the port spud is dropped and the starboard spud raised.

Cutterhead pipeline dredges work best in large areas with deep shoals, where the cutterhead is buried in the bottom. A cutterhead removes dredged material through an intake pipe and then pushes it out the discharge pipeline directly into the placement site. Most, but not all, pipeline dredging operations involve upland placement of the dredged material. Therefore, the discharge end of the pipeline is connected to shore pipe. When effective pumping distances to the placement site become too long, a booster pump is added to the pipeline to increase the efficiency of the dredging operation.

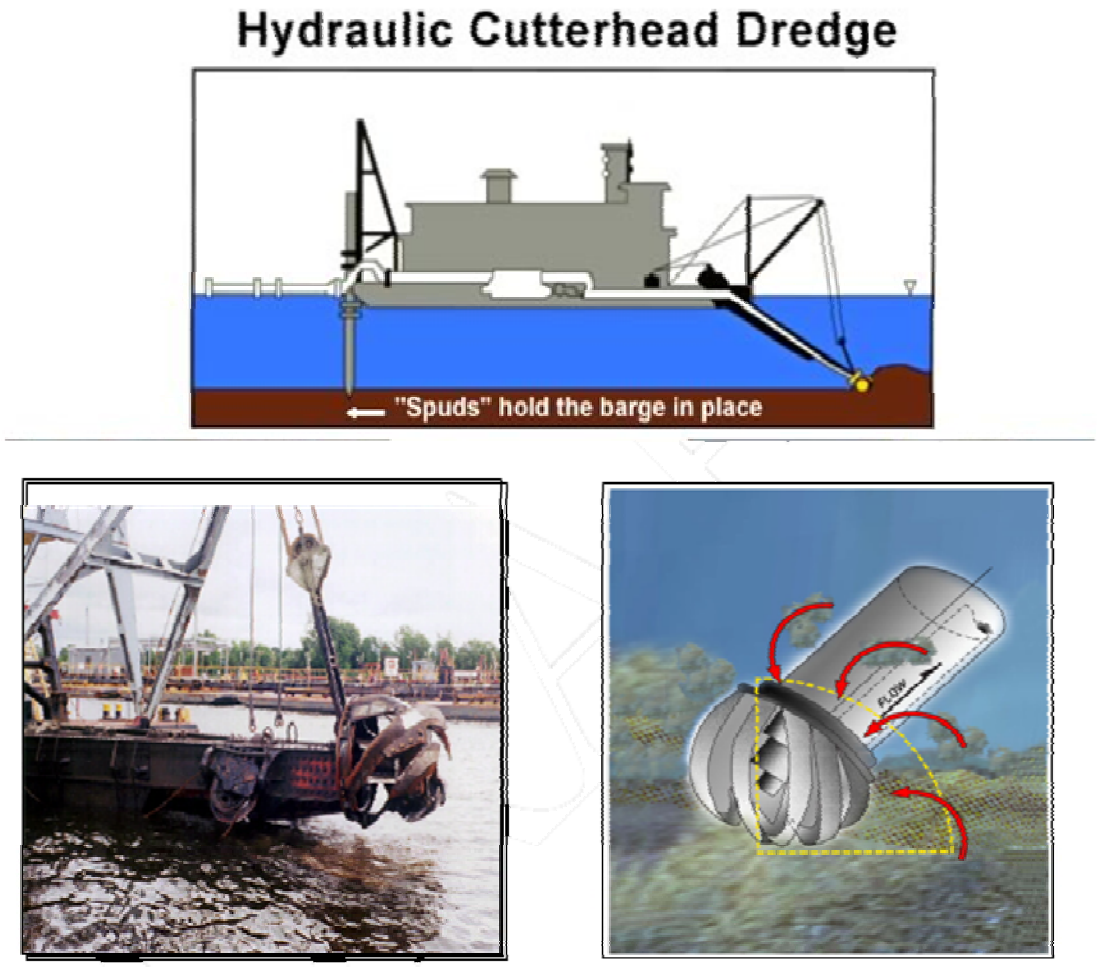

Figure 3: Cutterhead pipeline dredge schematic and representative close-up photographs

2.1.3 Clamshell Dredges

Clamshell dredges are the most common of the mechanical dredges. Clamshell dredges use a number of different bucket types for mud, gravel, rock, or boulders. The clamshell dredging operation cycle lowers a bucket in the open position to the bottom surface; penetrates the bottom sediments with the weight of the bucket; closes the bucket, and raises the bucket above hopper level, swinging forward to dump the material into the scow; and then the bucket swings back to repeat the entire process. The dredging depth is limited by the length of the wire used to lower the bucket and production depends upon the bucket size, dredging depth, and type of material. Clamshell dredges are able to work in confined areas, can pick up large particles, and are less sensitive to sea (wave) conditions than other dredges. Their capacity, however, is low and they are unable to dig in firm or consolidated materials, such as rock. Therefore, they could not be used to perform the proposed expansion dredging but could be used to perform the proposed maintenance dredging.

Clamshell dredges require a tug to move the dredge to and from the dredge and disposal locations. In unconsolidated sediments, the primary environmental impact of clamshell dredges is increased turbidity due to the re-suspension of sediments as the bucket moves through the water column. Operational controls such as a reduction in bucket speed may reduce impacts, as would the use of a closed bucket system. Silt curtains may be deployed around the dredge if water quality standards cannot be met using operational controls.

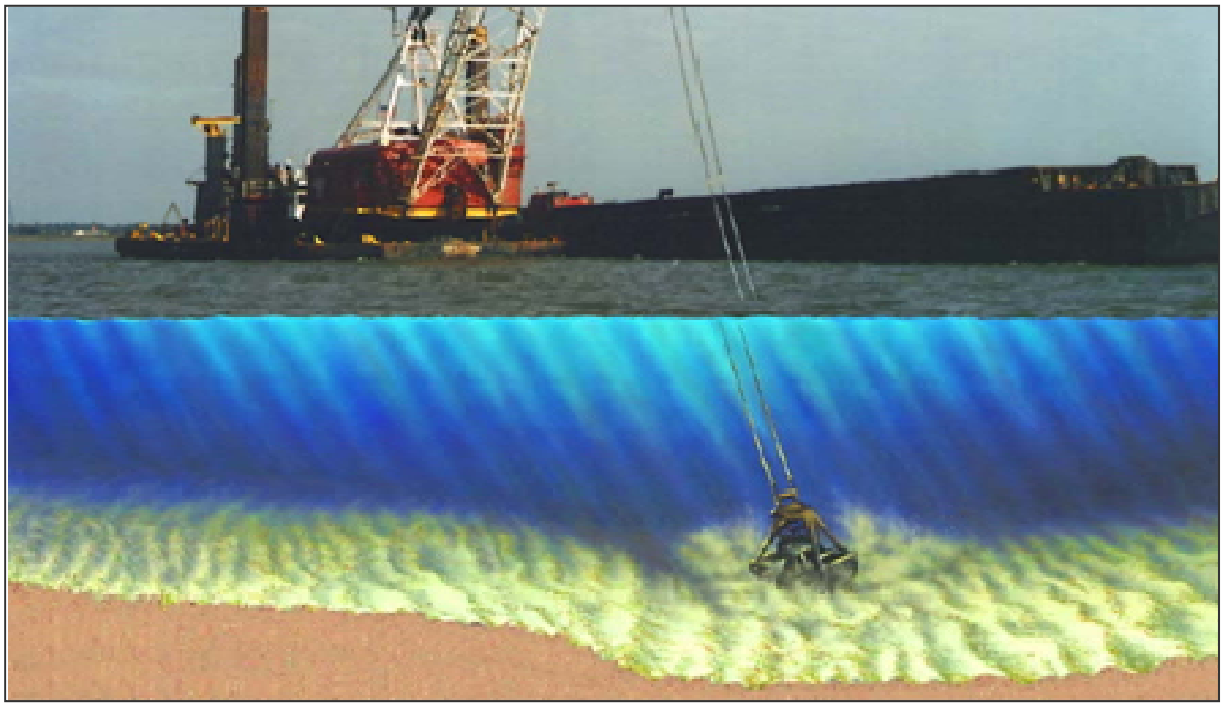

Figure 4: Mechanical Dredging with Clamshell.

2.1.4 Backhoe Marine Excavator

A backhoe dredge is a back-acting excavating machine that is usually mounted on pontoons or a barge. The backhoe digs toward the machine with a bucket penetrating the surface from the top of the cut face. The operation cycle is similar to the clamshell dredge, as are the factors affecting production. Backhoe marine excavators have accurate positioning ability and are able to excavate firm or consolidated materials. However, they are susceptible to swells and have low to moderate production. Backhoe marine excavators could be used to excavate unconsolidated overburden, fractured rock, and possibly some unfractured rock. The dredge requires a tug to move the dredge to and from a location.

Environmental impacts from backhoe marine excavator dredging in unconsolidated sediment are similar to those of a clamshell dredge, as are the operational controls to reduce that impact. Slowing the movement of the bucket through the water is an example of an operational control. Environmental impacts are significantly less for a backhoe marine excavator dredge removing

fractured (blasted) rock as the volume of fine-grained sediment is significantly less in fractured rock than unconsolidated sediment and as a result the potential for sediment re-suspension is reduced. The same operational controls can be applied to fractured rock as to unconsolidated sediment, such as slowing the bucket speed in the water.

2.1.5 Rock Pre-Treatment Techniques

Pre-treatment techniques are used to break-up consolidated massive materials, like rock, prior to removal of this material by a dredge. Such factors as location, rock hardness, cost, and amount of surface requiring treatment are among factors to take into account when determining which method is most suitable and practicable for a given project.

2.1.5.1 Spudding/Hydrohammer/Punchbarging/Rigging

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.

The primary environmental impact of punchbarging is noise and vibration. This constant pounding would serve to disrupt marine mammal behavior in the area, as well as impact other marine species that may be 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.

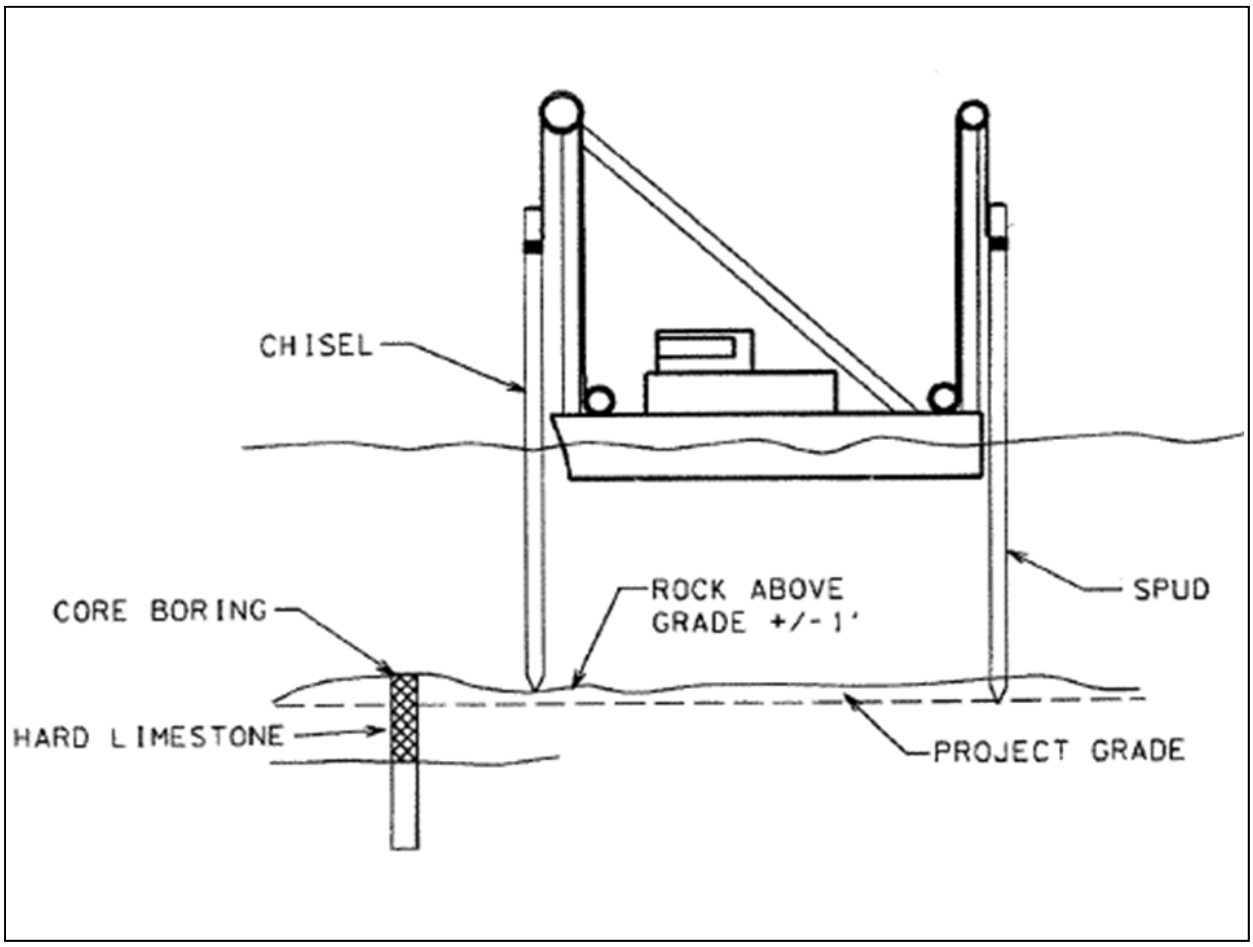

Figure 5: Typical punchbarge set-up.

2.1.5.2 Blasting

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," shown in Figure and Figure . For the Port of Miami Phase II project 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).

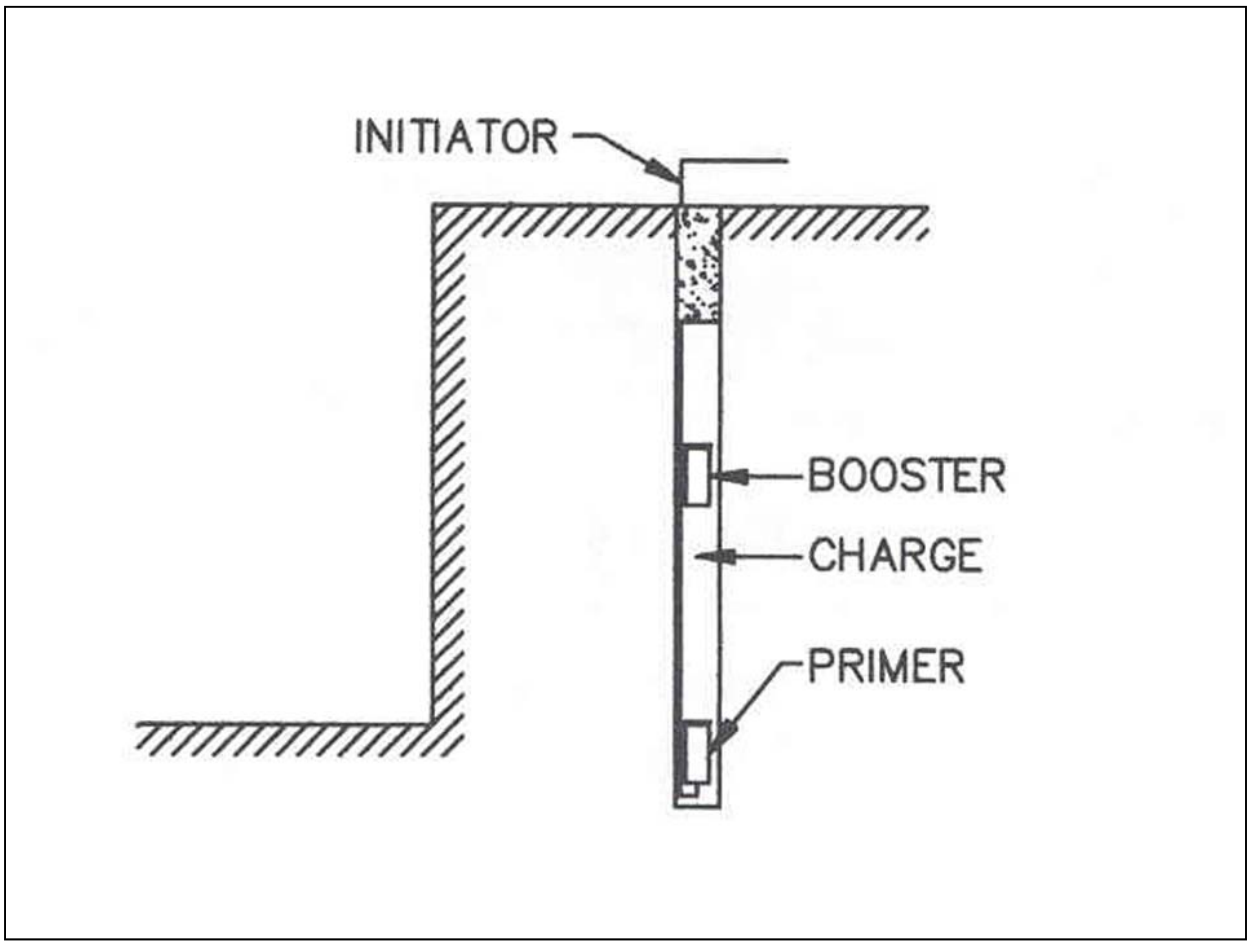

Figure 6: Typical stemmed hole.

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."

Figure 7: Stemming material utilized. Bag is approximate volume of material used.

Figure 8: Unconfined blast using seven pounds of explosives.

The length of stemming material will vary based on the length of the holes drilled; however, minimum lengths will be included in the project specific 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, USACE would work with agencies and non-governmental organizations (NGOs) to address concerns and potential impacts associated with the blasting.

Figure 9: Confined blast of 3,000 pounds of explosives.

In addition to coordination with the agencies and NGOs, any new scientific studies published before the specifications are advertised 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, USACE 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 (Jordan, *et al.*, 2007 in USACE, 2010).

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 (Jordan, *et al.*, 2007 in USACE, 2010).

The USACE 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 FWS found these protective measures sufficient to protect marine mammals under their respective jurisdictions (NMFS, 2005b; FWS, 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] X 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] X 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; Jordan, *et al.*, 2007 in USACE, 2010).

To estimate the maximum poundage of explosives that may be utilized for this project, USACE 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 USACE 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.

2.1.5.2.1 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 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

3 LISTED SPECIES AND CRITICAL HABITAT IN THE ACTION AREA

The following species under the jurisdiction of NMFS are known to occur in the action area:

<u>Endangered</u>

Smalltooth sawfish	*Pristis pectinata*
Green sea turtle	*Chelonia mydas*
Leatherback sea turtle	*Dermochelys coriacea*
Hawksbill sea turtle	*Eretmochelys imbricata*
Kemp's ridley sea turtle	*Lepidochelys kempii*

<u>Threatened</u>

Gulf sturgeon	*Acipenser oxyrinchus desotoi*
Loggerhead sea turtle	*Caretta caretta*

3.1 Species Not Likely to be Affected

Leatherback turtles are generally found in deep, pelagic, offshore waters, although they occasionally come into shallow waters to feed on aggregations of jellyfish. Leatherbacks are unlikely to be found associated with ship channels, and are unlikely to be impacted by dredging or blasting activities. Pipeline dredges are relatively slow moving and are not known to take sea turtles (NMFS, 2003). Since they are not likely to be present in ship channels due to their non-benthic feeding habits, the USACE determined that the likely impacts to the species would be discountable.

4 ENVIRONMENTAL BASELINE CONDITIONS

4.1 Smalltooth Sawfish

Smalltooth sawfish are tropical marine and estuarine fish that have the northwestern terminus of their Atlantic range in the waters of the eastern U.S. Their distribution is limited to peninsular Florida and, within that area, they can only be found with any regularity off the extreme southern portion of the state (NMFS, 2003). Although they are not typically found in the Tampa Bay estuary, a relocation trawler captured a large smalltooth sawfish during maintenance dredging activities in August 2006.

The primary reason for the decline of the smalltooth sawfish population has been bycatch in various commercial and recreational fisheries. The secondary reason for the decline of the smalltooth sawfish population is habitat loss and degradation. Other threats to the species include entanglement in marine debris, injury from saw removal, pollution, and disturbance of natural behavior by divers and other marine activities (NMFS, 2009). Life history characteristics are a limiting factor for the species' ability to recover. Sawfish are slow growing, late maturing, and produce small numbers of young; hence, recovery will take decades, even if all threats are effectively eliminated (NMFS, 2009).

There is no designated critical habitat for smalltooth sawfish located in the action area.

4.2 Gulf Sturgeon

The Gulf sturgeon is found in the Gulf of Mexico, primarily from Tampa Bay to the mouth of the Mississippi River. Gulf sturgeon utilize the lower riverine, estuarine, and marine environment from September through May for feeding and migration, but spend the majority of their life in fresh water. Major population limiting factors are thought to include barriers (dams) to historical spawning habitats, loss of habitat, poor water quality, and overfishing (USFWS and NMFS, 1995; USFWS and NMFS, 2009). USFWS and NMFS considered the status of the Gulf sturgeon to be stable in their 5-year review of the species' status, and recommended no change to the listing of this species (USFWS and NMFS, 2009).

Life history characteristics make the Gulf sturgeon slow to recolonize areas from which they are extirpated. In addition, population growth has been shown to be very slow. Major population

limiting factors are thought to include barriers (dams) to historical spawning habitats, loss of habitat, poor water quality, and overfishing (USFWS and NMFS, 1995; USFWS and NMFS, 2009).

Dredging operations can destroy benthic feeding areas, disrupt spawning migrations, and re-suspend fine sediments causing siltation over required substrate in spawning habitat. Because Gulf sturgeon are benthic omnivores, the modification of the benthos affects the quality, quantity, and availability of prey (USFWS and NMFS, 2009). Hydraulic dredges (e.g., hopper) can lethally harm sturgeon directly by entraining sturgeon in dredge drag arms and impeller pumps (NMFS, 2003). Potential impacts from hydraulic dredge operations may be avoided by imposing work restrictions during sensitive time periods (i.e., spawning, migration, staging, feeding) when sturgeon are most vulnerable to mortalities from dredging activity. When possible, it is best to schedule dredging when sturgeon are not likely to be in the project area.

There are no Gulf sturgeon critical habitat units found in the action area.

4.3 Loggerhead Turtle

Loggerhead turtles have a wide distribution, including the Atlantic, Pacific, and Indian oceans. Loggerheads nest in the temperate and subtropical regions of their geographic distribution. The most common nesting areas in the U.S. include the coastal region between North Carolina and Florida, including the Florida Gulf Coast. In the southeastern U.S., the nesting season for loggerheads is late May through early September. Females lay approximately five nests annually on high energy beaches characterized as narrow and steeply sloped with coarse-grained sand. There is a two month incubation period after which eggs hatch, resulting in births from June through November. Hatchlings struggle through the surf and attempt to swim away from land until they are able to take refuge in the downward current of surface water of the ocean. Several months are often spent in these nursery areas, until ocean currents move the young turtles further offshore to grow. The pelagic existence lasts between seven and 12 years before juveniles migrate back to nearshore coastal areas to mature until adulthood. Adults migrate between foraging habitats and beaches for nesting along the continental shelf or long distances across oceanic waters (NMFS and USFWS, 1993).

Concerns for the loggerhead are based on the numerous human activities that impact nesting areas. Examples of loss of nesting habitat include alterations of beaches, such as beach armoring to prevent erosion for beachfront development or beach nourishment to replace sand lost to natural erosion. Adult mortality can be caused by a number of factors, including, but certainly not limited to coastal development that destroys foraging habitat and numerous types of fisheries that involve bycatch (NMFS and USFWS 1993). Although populations appear to be rebounding in some areas of their distribution, this is not the case in all areas. Data collected by the USFWS indicated a steady and steep decline in the number of nests sighted in Florida from 1998-2007 (NMFS and USFWS 2007a). A study conducted by the Loggerhead Biological Review Team in 2009 identified nine distinct population segments (DPSs) of loggerheads distributed globally. Loggerheads in the action area are included in the South Atlantic Ocean DPS, which was

determined to be in decline. The study recommended that additional information be collected to determine whether the status of this DPS should be changed from threatened to endangered (Conant et al., 2009).

There is no designated critical habitat for the loggerhead turtle in the action area.

4.4 Green Turtle

Green sea turtles are distributed in all the world's oceans, including the Gulf of Mexico and the Caribbean. For U.S. populations, nesting occurs primarily in the U.S. Virgin Islands, Puerto Rico, and the Atlantic coast of Florida. Nesting season takes place from April through September with an incubation period of approximately two months. Because green sea turtles are herbivores and feed primarily on sea grasses and algae, adults are found in nearshore areas. Juveniles are more frequently found offshore, rafting in algae and leading a pelagic existence until adulthood. The green turtle was protected under the ESA in 1978, with breeding populations in Florida, the Pacific Ocean, and Mexico listed as endangered, and all others as threatened (NMFS and USFWS 2007c).

Current threats to the green turtle are similar the threats to the loggerhead, and they include loss of nesting habitat, death as fisheries bycatch, and poaching. A status review of the endangered nesting populations of green turtles recommended that the populations remain listed as endangered, as there is not currently evidence that these populations have recovered (NMFS and USFWS 2007c).

There is no designated critical habitat for the green turtle in the action area.

4.5 Hawksbill Turtle

The hawksbill is a medium-sized sea turtle with adults in the Caribbean ranging in size from approximately 62.5 to 94.0 cm straight carapace length. Neonate hawksbill turtles are believed to enter an oceanic phase after hatching, and they eventually return to neritic foraging habitat. Females have high nesting fidelity, and typically lay three to five clutches at approximately two-week intervals each nesting season (NMFS and USFWS, 2007b). Hawksbills are the most tropical of the marine turtles, and are closely associated with coral reefs and other hard-bottom habitats; however, they are found in other habitats including inlets, bays, and coastal lagoons (NMFS and USFWS, 1993; NMFS, 2003).

Hawksbill turtles principally forage on sponges, but they also consume other benthic organisms. Adults typically return to coastal areas to forage following a juvenile pelagic period. Hawksbill turtles are not regular nesters in the action area, but they experience risks in the marine environment including entanglement in fishing equipment, ingestion of marine debris, and capture as incidental bycatch of commercial fisheries. Secondary impacts occur through the destruction of hardground habitats that provide forage for the hawksbill (NMFS and USFWS, 1993a).

There is no designated critical habitat for the hawksbill turtle in the action area.

4.6 Kemp's Ridley Turtle

Internationally, the Kemp's ridley is considered the most endangered sea turtle. Kemp's ridleys nest primarily at Rancho Nuevo, a stretch of beach in Mexico, Tamaulipas State. The species occurs mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean. Adults of this species are usually confined to the Gulf of Mexico, although adult-sized individuals sometimes are found on the east coast of the United States. Nesting occurs from April into July and is essentially limited to the beaches of the western Gulf of Mexico, near Rancho Nuevo in southern Tamaulipas, Mexico. The mean clutch size for Kemp's ridleys is 100 eggs/nest, with an average of 2.5 nests/female/season. In the Gulf, studies suggest that benthic immature Kemp's ridleys stay in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Florida coast. Stomach contents of Kemp's ridleys taken from the lower Texas coast consisted of mainly nearshore crabs and mollusks, as well as fish, shrimp, and other foods considered to be shrimp fishery discards. Pelagic stage Kemp's ridleys presumably feed on the available sargassum and associated infauna, or on the other epipelagic species found in the Gulf of Mexico (NMFS, 2003).

Kemp's ridley turtles are only occasional nesters in the action area. After a period of time in the pelagic zone, juveniles return to coastal waters to forage. Forage consists primarily of various items including mollusks, natural and synthetic debris, sea horses, and tunicates. Adult Kemp's ridleys occur primarily in Gulf of Mexico nearshore waters shallower than 37 meters (121.4 feet). They are largely cancrivorous (crab eating), benthic feeders. Kemp's ridleys are only occasional nesters in the action area. Primary marine threats to Kemp's ridleys include capture as incidental bycatch in commercial fisheries, entanglement in fishing equipment, and ingestion of marine debris (NMFS and USFWS, 2010).

There is no designated critical habitat for the Kemp's ridley turtle in the action area.

5 EFFECTS OF THE ACTION

5.1 Smalltooth Sawfish

5.1.1 Effects of Dredging

The 1991 SARBO states that "clamshell dredges are the least likely to adversely affect sea turtles because they are stationary and impact very small areas at a given time. Any sea turtle injured or killed by a clamshell dredge would have to be directly beneath the bucket. The chances of such an occurrence are extremely low…(NMFS, 1991)." NMFS also determined that "Of the three major dredge types, only the hopper dredge has been implicated in the mortality of endangered and threatened sea turtles." This determination was repeated in the 1995 and 1997 SARBOs (NMFS, 1995 and 1997; USACE, 2010).

The USACE believes that the logic set forth about dredges in the 1991, 1995, and 1997 SARBOs for sea turtles holds true for smalltooth sawfish as well. In their Gulf Regional Biological Opinion (GRBO), NOAA Fisheries determined that there has never been a reported take of a smalltooth sawfish by a hopper dredge. NOAA Fisheries determined that such take is unlikely to occur because of smalltooth sawfishes' affinity for shallow, estuarine systems (2003). In addition, smalltooth sawfish are rare in the action area and the likelihood of their entrainment is very low. Should a hopper dredge be utilized during construction of this project, the probability of a smalltooth sawfish being taken is so unlikely as to be discountable.

As part of the standard plans and specifications for the project, the USACE agrees to implement the NMFS "Sea Turtle and Smalltooth Sawfish Construction Conditions:"

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

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

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

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

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

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

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

5.1.2 Effects of Blasting

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, 2000). Sawfish, as chondrichthyans, do not have air bladders; therefore, they would be more tolerant of blast overpressures closer to the discharge, possibly even within 70 feet of a blast (USACE, 2010).

Fish with swimbladders are more vulnerable to explosions than those without these gas-filled sacs. Investigators have found the swimbladder to be the most frequently damaged organ during explosions, and gas-containing organs have also been implicated as a causative factor of internal damage and mortality in other vertebrate species exposed to underwater explosions (Lewis, 1996). Sailors exposed to depth charges and torpedo explosions, while escaping their sinking ships during World War II, suffered damage to gas-containing organs (Cameron et al., 1944; Ecklund, 1943; Gage, 1945; Palma and Uldall, 1943; Yaguda, 1945). The lungs, stomach, and intestines were ruptured or hemorrhaged, while other organs were relatively unaffected. Similar results have been observed in underwater explosions tests with other mammalian species (Richmond et al., 1973; USACE, 2010).

Species lacking swimbladders or with small swimbladders are highly resistant to explosive pressures (Aplin 1947; Fitch and Young 1948; Goertner et al. 1994). For example, Aplin (1947) noted that two opal-eye perch (*Girella nigricans*), located 15.24 meters from a nine kilogram charge of 60 percent petrogel, were killed and their viscera reduced to a "pulp." However, two species lacking swimbladders, including four sculpin (*Scorpaena guttata*) and a cabezone (*Scorpoenicthys marmoratus*), were located in the same cage and did not sustain any damage to their internal organs when exposed to the same charge. Wiley et al. (1981) and Goertner et al. (1994) also noted that hogchokers (*Trinectes maculatus*), another species lacking swimbladders, were extremely tolerant of underwater explosions. This species greatly exceeded the tolerance of any species with swimbladders that they had tested, and were not killed beyond a distance of one meter from a 4.5 kilogram charge of pentolite (USACE, 2010).

5.1.3 Effects of Punching

The effects of punching on smalltooth sawfish are similar to those of blasting since use of a punchbarge results in pressure waves under water as the punch hits the rock bottom. The blasting analysis found in section 5.1.2 is incorporated as the worst-case effects of use of a punchbarge for smallooth sawfish.

The Corps determines that expansion and maintenance dredging of the Big Bend channel portion of the Tampa Harbor Federal navigation project may affect, but is not likely to adversely affect the endangered smalltooth sawfish.

5.2 Gulf Sturgeon

5.2.1 Effects of Dredging

Few studies exist that specifically evaluate the impacts of dredging on sturgeon. However, based on known incidental take history from both Endangered Species Observer (ESO) and non-ESO reporting, maintenance dredging of federal navigation channels using hydraulic (cutterhead and hopper) and mechanical (clamshell) dredge types may adversely affect Atlantic sturgeon populations. From 1990-2007, a total of 24 sturgeon takes (eleven Atlantic, eleven shortnose, and two Gulf) have been documented for hopper (n=16), cutterhead (n=5), and clamshell (n=3) dredging activities along the Atlantic (North and South) and Gulf coasts. Of the documented incidental takes, 15 were lethal, 8 were non-lethal, and 1 was unknown (USACE, 2010).

Although incidental takes of sturgeon have been documented for hydraulic and mechanical dredging, only hydraulic hopper dredge operations are capable of effectively screening for an incidental take. Hydraulic hopper dredges have included ESOs to monitor and report incidental takes of sturgeon since 1995. The proportion of hydraulic cutterhead and clamshell dredging operations being observed (using ESOs or other observing method) are unknown, but it is probably minimal due to the limited concern regarding potential for lethal or injurious take by these types of dredging equipment. Therefore, take data does not consider observer coverage equally for all dredging operations. However, based on the current understanding of different dredging operations relative to sturgeon behavior, clamshell and hydraulic cutterhead dredges are still considered by the NMFS as alternative dredge types to reduce potential entrainment impacts to sturgeon (NMFS, 1998; USACE, 2010).

5.2.2 Effects of Blasting

Previous reviews of the effects of blasting on fish in port deepening projects suggests that the confinement of the blast in the rock greatly reduces the impacts from the blasting and pressure waves in marine mammals, reptiles, and fish (Keevin and Hempen, 1997). At the Port of Miami Phase II project conducted in 2005, blasting operations consisted of 40 blast events over a 38-day time frame. Of the 40 blast events, 23 were monitored (57.5%) by the FWC. Injured and dead fishes were collected after the “all clear” signal was given for these events. The “all-clear” is normally at least two to three minutes after the shot is fired; this gap is important since seagulls and frigate birds quickly learned to approach the blast site and swoop in to eat some of the stunned, injured and dead fish floating on the surface. FWC staff and volunteers collected the carcasses of floating fish. It should be noted that not all dead fish float after a blast; due to safety concerns, no plans exist for sub-surface diving in the blast zone to collect non-floating carcasses. The fish were described to the lowest taxonomic level possible (usually species), and the injury types were categorized. The data forms are available from FWC and USACE on request (USACE, 2010).

A summary of the data shows that 24 different genera were collected during the Miami Harbor blasting. The species with the highest abundance were white grunts (*Haemulon plumieri*) (N=51); scrawled cowfish (*Lactophrys quadricornis*) (N=43) and Pygmy filefish (*Monocanthus setifer*) (N=30). Total fish collected during the 23 blasts was N=288 or an average of 12.5 fish per blast (range of three to 38). Table 5 presents a review of the three blasts with the greatest number of fish killed and the maximum charge weight per delay for the Miami Harbor project (USACE, 2010).

Table 1: **Miami Harbor Blasting Fish Survey (Maximum Charge Weight per Delay)**

Date	Max Charge Wt/delay (lbs)	Fish killed
7/26/2005	85	38
7/25/2005	112	35
8/10/2005	17	28

There appears to be no direct correlation between charge weight and fish killed that can be determined from such a small sample; a review of the entire 23 blasts does not indicate a discernible pattern. Factors that affect fish mortality include, but are not limited to: fish size, body shape (fusiform, etc.), and proximity of the blast to a vertical structure like a bulkhead (in the August 10, 2005 blast as an example, a much smaller charge weight resulted in a higher fish kill due to the closeness of a bulkhead; USACE, 2010).

If we use the 12.5 fish/blast kill estimate based solely on the Miami Harbor blasting, and multiply it by the 40 shots, we reach a total estimate of floating fish killed in Miami of 500 fish. As stated previously, not all carcasses float to the surface and there is no way to estimate how many carcasses will not float. However, we can say that at Miami, the minimum estimated fish kill based on field data (collected fish) was 500. It should be noted that no tarpon or snook (species of concern for the state) were observed or collected (USACE, 2010).

This system of estimating impacts is limited physically by the ability to collect the fish carcasses. As previously stated, due to human health and safety concerns, collection of carcasses from the bottom of the blast zone will not be conducted. In addition, this method of estimating impacts does not address eggs or larval fish that may be in the water column near the blast. Instead of estimating the number of fish, eggs and larvae killed or injured (injured are considered killed for the purposes of this analysis), a model would need to be developed based on site geology to estimate potential charge weights per hole and blast pattern to address mortality. In addition, the injury/mortality radius for a maximum blast at the project site would need to be determined. While this proposed model would not quantify fish, eggs, and larvae that were injured or killed, it would define distance and charge parameters (i.e., a fish, egg, or larvae within "X" feet of "X" charge would be injured or killed; USACE 2010).

Using the Danger Zone equation previously discussed in Section 2.1.5.2 (MR_{ow} (feet) = 260 $w_{ow}^{1/3}$ equation), the kill radius of a one pound open water booster test was 260 feet at Miami

Harbor. The kill radius would have been only 56 feet as a conservative assessment for a one pound charge that was confined by stemming within rock at Miami Harbor. The same charge may have a kill radius of only 22 feet when confined within competent rock and well stemmed. The kill radii for the shots recorded at Miami Harbor of 17, 32, 67, and 134 pounds per delay may have been 140, 180, 230 and 290 feet, respectively. Radiation of the wave energy into rock reduced the available energy reaching the water column. The pressures entering the water column were well below those pressures that typically propagate away from open-water charges relative to charge weight per delay (solid media, like rock, can mitigate wave energy; Jordan, *et al.*, 2007).

There are a number of physical attributes of the pressure waveform from the confined shots that suggest mortality would be lower than indicated by the peak-pressure measurements. The rapid oscillation from a high, brief overpressure and a moderate, but longer underpressure associated with detonation of high explosives in the water column is most probably responsible for organ damage and mortality in fish. This oscillation in waveform is responsible for the rapid contraction and overextension of the swim bladder, resulting in internal damage and mortality (Wiley *et al*., 1981). It has also been suggested that the negative phase (relative to ambient) of the pressure wave is responsible for organ damage (particularly the swim bladder) and mortality (Anonymous, 1948; Hubbs and Rechnitzer,1952; Wiley *et al*., 1981). When reviewing the data from Miami Harbor, it was determined that the high-frequency compressing pressures, usually associated with the detonation of high explosives, were reduced in amplitude and negative pressures were small relative to the background noise (USACE, 2010).

Hubbs and Rechnitzer (1952) determined that the lethal threshold peak pressure for a variety of marine fish species exposed to dynamite blasts varied from 40 psi to 70 psi. The more conservative pressure of 40 psi from Hubbs and Rechnitzer (1952) was used to develop the safety radii equations used at Miami, and as proposed for Big Bend, even though the range defined by Hubbs and Rechnitzer extends much further than for 70 psi. Keevin (1995) found no mortality or internal organ damage to bluegill exposed to a high explosive at pressures at or below 60 psi (420 kPa). The 40 psi value is also conservative because the waveform of the mortality value was established from an open-water testing program and not from similar confined shots that did not have clear extension (negative pressure) phases for measurable impulse and energy measures (USACE, 2010).

The blasting at Miami Harbor and subsequent analyses clearly demonstrate that explosives shot in open water will produce both higher amplitude and more rapidly oscillating shock waves than rock removal shots. Thus, blasting in rock (when stemming of the blast is used to control the blasting agent's release of pressure into the water column) will result in lower aquatic organism mortality than the same explosive weight detonated in open water. This conclusion is important because the majority of aquatic organism mortality models were developed using open-water shot data that will overestimate rock-removal shot mortality. Safety zones calculated using open-water mortality models are used to establish watch plans and optimal observer locations to protect aquatic organisms (Jordan *et al*., 2007). If the observation area becomes too large, based

on the use of open-water shot pressures, it is possible that the level of intended species protection may be diminished. It is much easier to monitor a small area than a very large area. As the dimensions of a watch zone unnecessarily increase, there is undoubtedly a safety radius that would preclude blasting because of the high cost of monitoring, long blasting delays due to aquatic organisms wandering into the enlarged blast zone, and the reduced efficiency of being able to protect the organisms of concern (USACE, 2010).

5.2.3 Effects of Punching

The effects of punching on Gulf sturgeon are similar to those of blasting since use of a punchbarge results in pressure waves under water as the punch hits the rock bottom. The blasting analysis found in section 5.2.2 is incorporated as the worst-case effects of use of a punchbarge for Gulf sturgeon.

Given the unlikely presence of Gulf sturgeon in the project area during expansion and maintenance dredging activities, it is the Corps determination that while the project may affect Gulf sturgeon under NMFS' jurisdiction, the project is not likely to adversely affect them, and the likelihood of affect is so small as to be discountable.

5.3 Sea Turtles

5.3.1 Effects of Dredging

The impacts of dredging operations on sea turtles have been assessed by NMFS (NMFS, 1991; NMFS, 1995; NMFS, 1997a; NMFS, 1997b; NMFS, 2003) in the various versions of the South Atlantic Regional Biological Opinion (SARBO) and the 2003 (revised in 2005 and 2007) Gulf Regional Biological Opinion (GRBO). The life history of the four sea turtle species commonly found in Tampa Bay, and the four most likely to be affected by in-water construction activities is found in the GRBO; in addition, the species' individual recovery plans are incorporated by reference (NMFS, 2003; NMFS and FWS, 1991; NMFS and FWS, 1991a; NMFS and FWS, 1991b; NMFS and FWS, 1992; NMFS and FWS, 1993; NMFS and FWS, 1995). The 1991 SARBO states "clamshell dredges are the least likely to adversely affect sea turtles because they are stationary and impact very small areas at a given time. Any sea turtle injured or killed by a clamshell dredge would have to be directly beneath the bucket. The chances of such an occurrence are extremely low…" (NMFS, 1991). NMFS also determined that "of the three major dredge types, only the hopper dredge has been implicated in the mortality of endangered and threatened sea turtles." NMFS repeated the 1991 determination in the 1995 and 1997 SARBOs (NMFS, 1995 and 1997a and b). Based on these determinations, the Corps believes that the use of a mechanical and/or cutterhead dredge for the proposed expansion and maintenance dredging, may affect, but is not likely to adversely affect listed sea turtles. In addition, the Corps has determined that the use of a hopper dredge to perform the proposed maintenance dredging may affect listed sea turtles.

5.3.2 Effects of Blasting

The highest potential impact to sea turtles may result from the use of explosives to remove areas of rock within the project area. Due to the presence of safety zones and measures associated with all proposed blasting activities, it is highly unlikely that blasting will have an adverse effect on listed sea turtles. However, it is extremely likely that both the pressure and noise associated with blasting would physically damage sensory mechanisms and other physiological functions of individual sea turtles if they were located within the blast safety radius. Impacts associated with blasting can be broken into two categories: direct impacts and indirect impacts.

To date, there has not been a single comprehensive study to determine the effects of underwater explosions on reptiles that defines the relationship between distance/pressure and mortality or damage (Keevin and Hempen, 1997). However, there have been studies that demonstrate that sea turtles are killed and injured by underwater explosions (Keevin and Hempen, 1997). Sea turtles with untreated internal injuries would have increased vulnerability to predators and disease. Nervous system damage was cited as a possible impact to sea turtles caused by blasting (U.S. Department of Navy 1998 as cited in USACE, 2000). Damage of the nervous system could kill sea turtles through disorientation and subsequent drowning. The Navy's review of previous studies suggests that rigid masses such as bone (or carapace and plastron) could protect tissues beneath them; however, there are no observations available to determine whether turtle shells would indeed afford such protection (USACE, 2010).

Christian and Gaspin's (1974) estimates of safety zones for swimmers found that beyond a cavitation area, waves reflected off a surface have reduced pressure pulses; therefore, an animal at shallow depths would be exposed to a reduced impulse. Studies conducted by Klima *et al*., (1988) evaluated unconfined blasts of approximately 42 pounds (a low number) on sea turtles placed in surface cages at varying distances from the explosion (four ridley and four loggerhead sea turtles). The findings of the Christian and Gaspin 1974 study, which only considered very small unconfined explosive weights, imply that the turtles in the Klima *et al*. (1988) study would be under reduced effects of the shock wave. Despite this possible lowered level of impact, five of eight turtles were rendered unconscious at distances of 229 to 915 meters from the detonation site. Unconscious sea turtles that are not detected, removed and rehabilitated likely have low survival rates. Such results would not have resulted given blast operations confined within rock substrates rather than unconfined blasts (USACE, 2010).

The proposed action will use confined blasts, significantly reducing the pressure wave strength and the area around the discharge where injury or death could occur (Hempen *et al*., 2007). The Corps assumes that tolerance of turtles to blast overpressures is approximately equal to that of marine mammals (Department of the Navy 1998 in USACE, 2000), that is death would not occur to individuals farther than 400 feet from a confined blast (Konya, 2003; USACE, 2010).
For assessing impacts of blasting operations on sea turtles, the Corps relied on the previous analyses conducted by NMFS-Protected Resources Division as part of their ESA consultations on the Miami Harbor GRR (NMFS Consult #F/SER/2002/01094 – Feb 26, 2003) (NMFS, 2003a) and the Miami Harbor Phase II project (NMFS, Consult #I/SER/2002/00178 dated Sept

23, 2002) (NMFS, 2002). The results from 38 days of blasting conducted in Miami indicated that 16 sea turtles were recorded in the action area, without a single stranding of an injured or dead turtle reported (Trish Adams, FWS pers.com, 2005; and Wendy Teas, NMFS, pers.com 2005). In the ESA consultations for the two projects in Miami, with regard to impacts on sea turtles, NMFS found that "NOAA Fisheries believes that the use of the mitigative measures above in addition with capping the hole the explosives are placed in (which will greatly reduce the explosive energy released into the water column) will reduce the chances of a sea turtle being adversely affected by explosives to discountable levels" (NMFS, 2003a; USACE, 2010).

Pressure data collected during the Miami Harbor Phase II project by USACE geophysicists and biologists indicated that using the three zones previously described, the pressures associated with the blasts return to background levels (one to two psi) at the margin of the danger zone. This means that any animal located inside the safety zone, but outside the danger zone, would not be exposed to any additional pressure effects from a confined blast (Hempen *et al*., 2007; USACE, 2010).

Based on the protective measures proposed for this project, in concert with the reduction in pressure from the blast due to the confinement of the pressure in the substrate, the impacts to sea turtles associated with blasting should be minimal. The Corps has concluded that blasting is the *least* environmentally impactful method for removing the rock in the expansion areas. Each blast will last no longer than 15 seconds in duration, and may even be as short as two seconds. Additionally, the blasts are confined in rock substrate with stemming. Because the blasts are confined within the rock structure, the distance of the blast effects are reduced significantly as compared to an unconfined blast (Nedwell and Thandavamoorthy, 1992; Hempen *et al*., 2005; Hempen *et al*., 2007; USACE, 2010).

5.3.3 Effects of Punching

Use of a punchbarge to pre-treat the rock prior to removal by a dredge would require the punchbarge to work for 12-hour periods, 7 days a week. During this period, the punchbarge would strike the rock approximately once every 30-seconds. This constant pounding would serve to disrupt sea turtle behavior in the area by harassment. Using the punchbarge would also likely extend the length of the project temporally due to the lower production with the harder materials relative to blasting, thus increasing any potential impacts to all fish and wildlife resources in the area. Low frequencies (<200 Hz) typically dominate the overall levels for impact pile driving as seen with punchbarge (Spence et al., 2007). Spence et al. also noted that underwater sound data published in the literature typically shows a fairly wide variation in the levels generated by pile driving type activities (which punchbarging or hydrohammer is similar to). They found variations on the order of 5-10dB from one hit to another were noted.

5.3.4 Indirect Effects

Indirect impacts on sea turtles due to dredging/blasting/punching and construction activities in the project area include alteration of behavior and autecology. For example, daily movements of

sea turtles may be impeded or altered. These effects would be temporary, only lasting as long as the construction dredging activities.

The Corps has determined that the use of blasting/punching to pre-treat any rock prior to the proposed expansion dredging, may affect, but is not likely to adversely affect listed sea turtles.

6 CUMULATIVE EFFECTS

The regulations for interservice consultation found at 50 CFR 402 define cumulative effects as "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consideration." The Corps is not aware of any future state or private activities, not involving Federal activities, which are reasonably certain to occur within the action area.

7 CONCLUSIONS

In conclusion, the Corps has determined the likelihood of a smalltooth sawfish or Gulf sturgeon being in the project area is slim, since the area lacks the habitat preferred by these species. Therefore, the proposed action may affect, but is not likely to adversely affect the endangered smalltooth sawfish and the threatened Gulf sturgeon. Based on the information provided in Sections 5.1 and 5.2, the Corps has determined that the probability of a smalltooth sawfish or Gulf sturgeon being taken during the proposed expansion and maintenance dredging is so unlikely as to be discountable.

The Corps has determined that the proposed expansion dredging may affect, but is not likely to adversely affect the loggerhead sea turtle, green sea turtle, hawksbill sea turtle, or Kemp's ridley sea turtle. Due to the restrictions and special conditions placed in the construction specifications for the proposed project, the Corps does not anticipate any injurious or lethal take of these species. Finally, the Corps will abide by the conditions of the Gulf Regional Biological Opinion if a hopper dredge is used to perform the proposed maintenance dredging to protect listed species.

The USACE requests that the NMFS concur with these determinations.

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

REPLY TO
ATTENTION OF

APR 0 4 2014

Planning and Policy Division
Environmental Branch

Mr. Dave Hankla
U.S. Fish and Wildlife Service
North Florida Field Office
7915 Baymeadows Way, Suite 200
Jacksonville, Florida 32256-7517

Dear Mr. Hankla:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, proposes to widen, deepen and maintain the Big Bend channel portion of the Tampa Harbor Federal navigation project. This project is currently being evaluated under NEPA. Completion of the dredging project may employ a hopper dredge, clamshell dredge, cutterhead dredge or rock pre-treatment. The dredging will remove approximately 4.0 million cubic yards of material of which approximately 500,000 cubic yards is consolidated rock. The widening would occur along the entrance channel's northern edge over a channel length of 10,200 feet and to a depth of 46 feet. Also included is the widening of the southwestern edge of the turning basin, the southeastern corner of the intersection of the turning basin and east channel and the deepening of these areas and both the east and inner channels to 46 feet. In addition, local service facilities (non-federal berthing areas) located north, south, and east of the east channel and at the south end of the inner channel would be deepened to 46 feet at 100% non-federal cost. Material removed from the dredging would be placed in either Dredged Material Management Area (DMMA) 2D or 3D. The dredging is proposed to take place in 2014/2015.

Listed species or designated critical habitat within the action area under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) includes the endangered Florida manatee.

Enclosed please find the USACE's biological assessment of the effects of the proposed project on listed species in the action area. We request initiation of consultation under section 7 of the Endangered Species Act concerning the effects of the proposed activities on the Florida manatee. We also request an initiation of consultation under the Marine Mammal Protection Act of 1972 concerning effects of the proposed activities on manatees within the action area.

After reviewing the status of the species in the action area and the special conditions placed in our confined blasting and dredging specifications, the Corps determines that the widening and deepening of the Big Bend channel portion of Tampa Harbor may affect, but is not likely to adversely affect the Florida manatee. The Corps requests that you concur with our finding.

If you have any questions, please contact Mr. Paul DeMarco at 904-232-1897 or by email at Paul.M.DeMarco@usace.army.mil.

Sincerely,

Kenneth R Duggan

for Eric P. Summa
Chief, Environmental Branch

Enclosure

ENDANGERED SPECIES ACT
BIOLOGICAL ASSESSMENT
TAMPA HABROR, BIG BEND CHANNEL
EXPANSION AND MAINTENANCE DREDGING

PREPARED FOR THE U.S. FISH AND WILDLIFE SERVICE

APRIL 2014

US Army Corps
of Engineers ®
Jacksonville District

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1 BACKGROUND/HISTORY

The purpose of this Biological Assessment (BA) is to address the effect of the expansion and maintenance dredging of the Big Bend channel portion of the Tampa Harbor Federal navigation project on species listed as threatened or endangered under the Endangered Species Act (ESA) and their designated critical habitat. The U.S. Army Corps of Engineers (Corps) is authorized to construct the proposed project.

The project includes expansion and maintenance dredging and dredged material management area (DMMA) placement activities associated with widening the north side of the entrance channel by 50' and deepening it, expanding the turning basin approximately 190' to the southwest to provide a 1,200 foot turning radius, add a widener at the southeast corner of the intersection of the turning basin and the east channel and deepening it, deepening the inner and east channels, and deepening local service facilities (non-federal berthing areas) located north, south, and east of the east channel and at the south end of the inner channel . Because of the nature of the project, it has the potential to impact the following ESA-listed marine species under the purview of the U.S. Fish and Wildlife Service (USFWS) that occur in the area: Florida manatee (*Trichechus manatus latirostris*).

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.

1.1 Project Authority

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

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

2 DESCRIPTION OF PROPOSED ACTION & ACTION AREA

Tampa Bay is a large estuary located along the central Gulf of Mexico coast of Florida. The Tampa Harbor Federal Navigation Project consists of about 70 miles of channels from the mouth of the Tampa Bay to the City of Tampa (see Figure 1).

This BA addresses the environmental impacts associated with expansion and maintenance dredging and DMMA 2D or 3D placement of materials from the widening and deepening of the Big Bend channel portion of the Tampa Harbor Federal Navigation Channel. The authorized project consists of a 250-feet wide by -41-feet deep plus 2-feet allowable over-depth (A.O.) MLLW entrance channel which would extend 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 would contain two 200-feet wide by -41-feet deep 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 2,100 feet further east (east channel). However, the 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' and deepen it from 35' to 41' + 2' advanced maintenance + 2' A.O. MLLW, expand the turning basin approximately 190' to the southwest to provide the 1,200 foot turning radius, add a widener at the southeast corner of the intersection of the turning basin and the east channel and deepen it from 35' to 41' + 2' advanced maintenance + 2' A.O. MLLW, and deepen the inner and east channels from 35' to 41' + 2' advanced maintenance + 2' A.O. MLLW. In addition, local service facilities (non-federal berthing areas) located north, south, and east of the east channel and at the south end of the inner channel would be deepened from 35' to 41'+2' advanced maintenance +2' A.O. MLLW at 100% non-federal cost. This plan would generate approximately 4.0 million cubic yards of dredge material. Approximately 500,000cy cubic yards of the dredged materials are anticipated to be consolidated rock. Subsequent to the expansion, maintenance dredging is anticipated to be required every 9 years and would remove approximately 720,000cy of dredged material per event. The project includes dredged material placement in either DMMA 2D or 3D depending on the entity which performs the proposed expansion and maintenance dredging. It is possible that the project local sponsor, Tampa Port Authority (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. Otherwise the Corps would perform the dredging and place the material in DMMA 3D which is leased from the TPA.

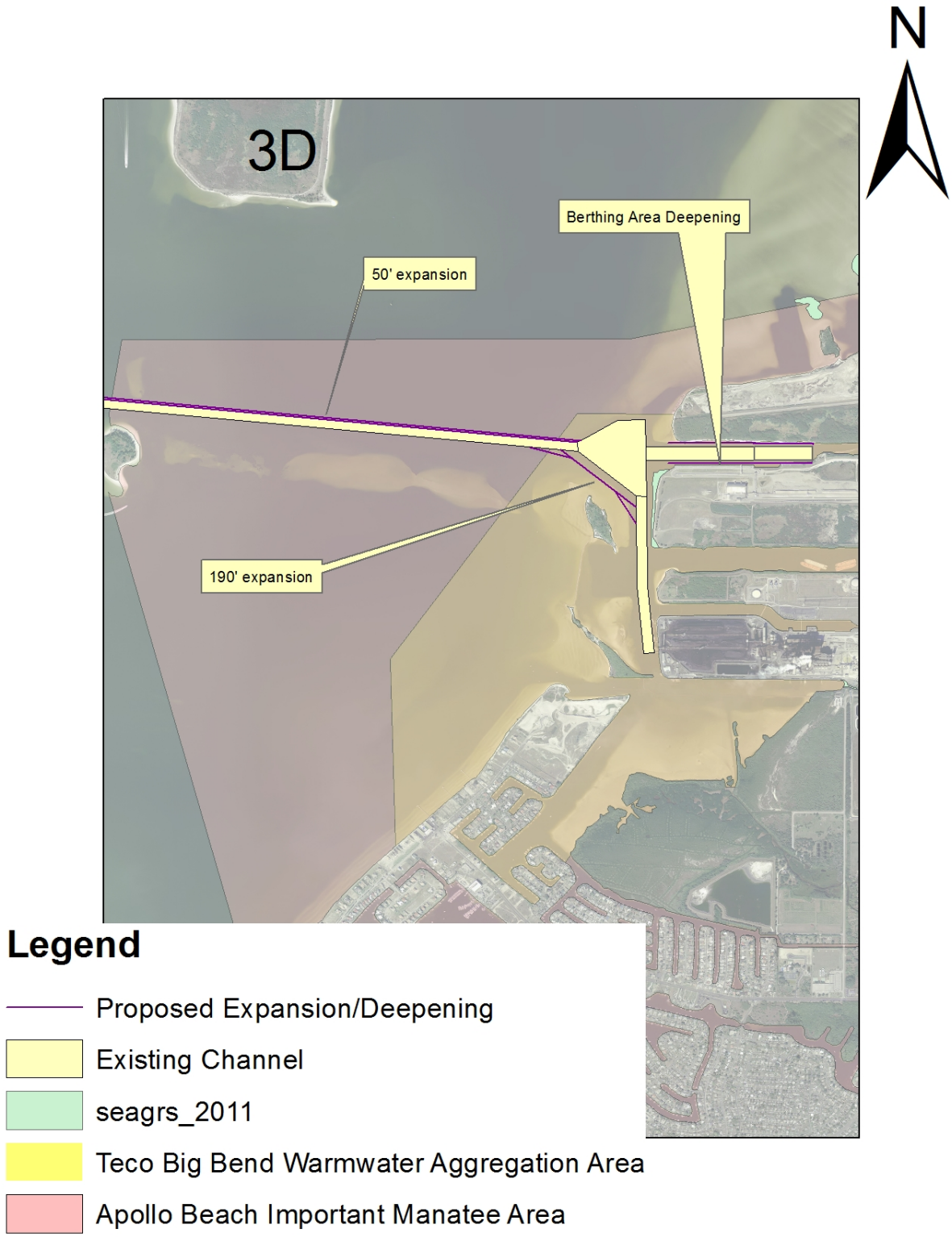

Figure 1: Location Map showing the Big Bend portion of the Tampa Harbor Federal Project.

2.1 Dredging Techniques

The USACE does not normally specify the type of dredging equipment to be used due to restrictions associated with the Competition in Contracting Act (10 US Code 2304 and 41 US Code 253). The decision regarding equipment used during construction is generally left to the dredging industry contractors, allowing them to offer the most appropriate and competitive equipment available at the time. Nevertheless, certain types of dredging equipment are 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."

Dredging equipment uses either hydraulic or mechanical means to transport material from the substrate to the surface. Hydraulic dredges use water to pump the dredged material as slurry to the surface and mechanical dredges use a bucket-type device to excavate and raise the material from the channel bottom. The most common hydraulic dredges include cutterhead-suction and hopper dredges; the most common mechanical dredges include clamshells, backhoes, and marine excavator dredges. Public Law 100-329 requires dredges working on U.S. government projects to have U.S. built hulls, which can limit the options for equipment types if a new type of dredge is developed overseas.

Various project elements influence the selection of the dredge type and size. These factors include the type of material to be dredged (rock, clay, sand, silt, or combination); the water depth; the dredge cut thickness, length, and width; the sea or wave conditions; vessel traffic conditions; environmental restrictions; other operating restrictions; and the required completion time. In addition, all of these factors impact dredge production and, as a result, costs. Multiple dredges of the same or different types may be used to expedite work or to accommodate varying conditions within the dredging areas.

2.1.1 Hopper Dredge

The hopper dredge, or trailing suction dredge, is a self-propelled ocean-going vessel with a section of the hull compartmented into one or more hoppers. Fitted with powerful pumps, the dredges suck sediment from the channel bottom through long intake pipes, called drag arms, and store it in the hoppers. Normal hopper dredge configuration has two dragarms, one on each side of the vessel. A dragarm is a pipe suspended over the side of the vessel with a suction opening called a draghead for contact with the bottom (**Figure 2**). Depending on the hopper dredge, a slurry of water and sediment is generated from the plowing of the draghead "teeth," the use of high pressure water jets, and the suction velocity of the pumps. The dredged slurry is distributed within the vessels hopper allowing for solids to settle out and the water portion of the slurry to be discharged from the vessel during operations through its overflow system. When the hopper

attains a full load, dredging stops and the ship travels to an in-water disposal site, where the dredged material is discharged through the bottom of the ship by splitting the hull. Some hopper dredges are capable of pumping the material back out of the vessel and through a series of shore-pipe to a designated placement/disposal location.

Hopper dredges are well suited to dredging heavy sands. They can maintain operations safely, effectively, and economically in relatively rough seas and because they are mobile, they can be used in high-traffic areas. They are often used at ocean entrances and offshore, but cannot be used in confined or shallow areas. Hopper dredges can move quickly to disposal sites under their own power (maximum speed unloaded - ≤ 17 knots; maximum loaded - ≤ 16 knots), but since the dredging stops during the transit to and from the disposal area, the operation loses efficiency if the haul distance is too far. Based on the review of hopper dredge speed data provided by the Corps' Silent Inspector program, the average speed for hopper dredges while dredging is between 1-3 knots, with most dredges never exceeding 4 knots (Jay Rosatti, ERDC; personal communication). Hopper dredges also have several limitations. Considering their normal operating conditions, hopper dredges cannot dredge continuously. The precision of hopper dredging is less than other types of dredges; therefore, they have difficulty dredging steep side banks and cannot effectively dredge around structures. Finally, hopper dredges are unable to dredge rock and highly consolidated materials. Therefore, they could not be used to perform the proposed expansion dredging but could be used to perform the proposed maintenance dredging.

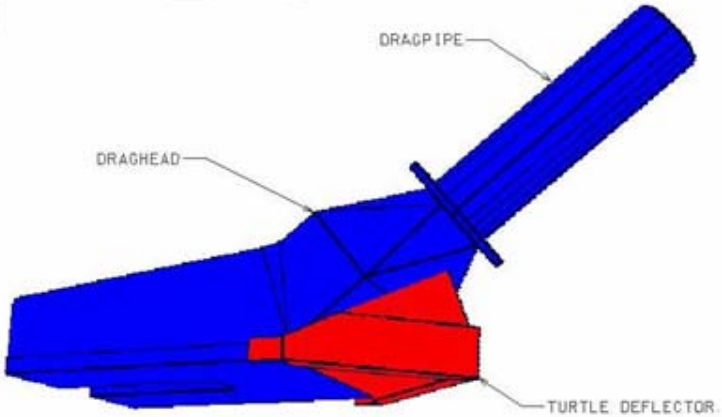

Figure 2: Hopper dredge and turtle deflecting draghead schematics

2.1.2 Pipeline and Cutter Suction Dredge

Pipeline dredges are designed to handle a wide range of materials including clay, hardpan, silts, sands, gravel, and some types of rock formations without blasting. They are used for new work and maintenance in projects where suitable placement/disposal areas are available and operate in an almost continuous dredging cycle resulting in maximum production, economy, and efficiency. Pipeline dredges are capable of dredging in shallow or deep water and have accurate bottom and side slope cutting capability. Limitations of pipeline dredges include relative lack of mobility, long mobilization and demobilization, inability to work in high wave action and currents, and are impractical in high traffic areas.

Pipeline dredges are rarely self-propelled and; therefore, must be transported to and from the dredge site. Pipeline dredge size is based on the inside diameter of the discharge pipe which commonly ranges from 6" to 36." They require an extensive array of support equipment including pipeline (floating, shore, and submerged), boats (crew, work, survey), barges, and pipe handling equipment. Most pipeline dredges have a cutterhead on the suction end. A cutterhead is a mechanical device that has rotating teeth to break up or loosen the bottom material so that it can be sucked through the dredge. Some cutterheads are rugged enough to break up rock for removal (**Figure 3**).

During the dredging operation a cutterhead suction dredge is held in position by two spuds at the stern of the dredge, only one of which can be on the bottom while the dredge swings. There are two swing anchors some distance from either side of the dredge, which are connected by steel cable to the swing winches. The dredge swings to port and starboard alternately, passing the cutter through the bottom material until the proper depth is achieved. The dredge advances by "walking" itself forward on the spuds. This is accomplished by swinging the dredge to the port, using the port spud and appropriate distance, then the starboard spud is dropped and the port spud raised. The dredge is then swung an equal distance to the starboard and the port spud is dropped and the starboard spud raised.

Cutterhead pipeline dredges work best in large areas with deep shoals, where the cutterhead is buried in the bottom. A cutterhead removes dredged material through an intake pipe and then pushes it out the discharge pipeline directly into the placement site. Most, but not all, pipeline dredging operations involve upland placement of the dredged material. Therefore, the discharge end of the pipeline is connected to shore pipe. When effective pumping distances to the placement site become too long, a booster pump is added to the pipeline to increase the efficiency of the dredging operation.

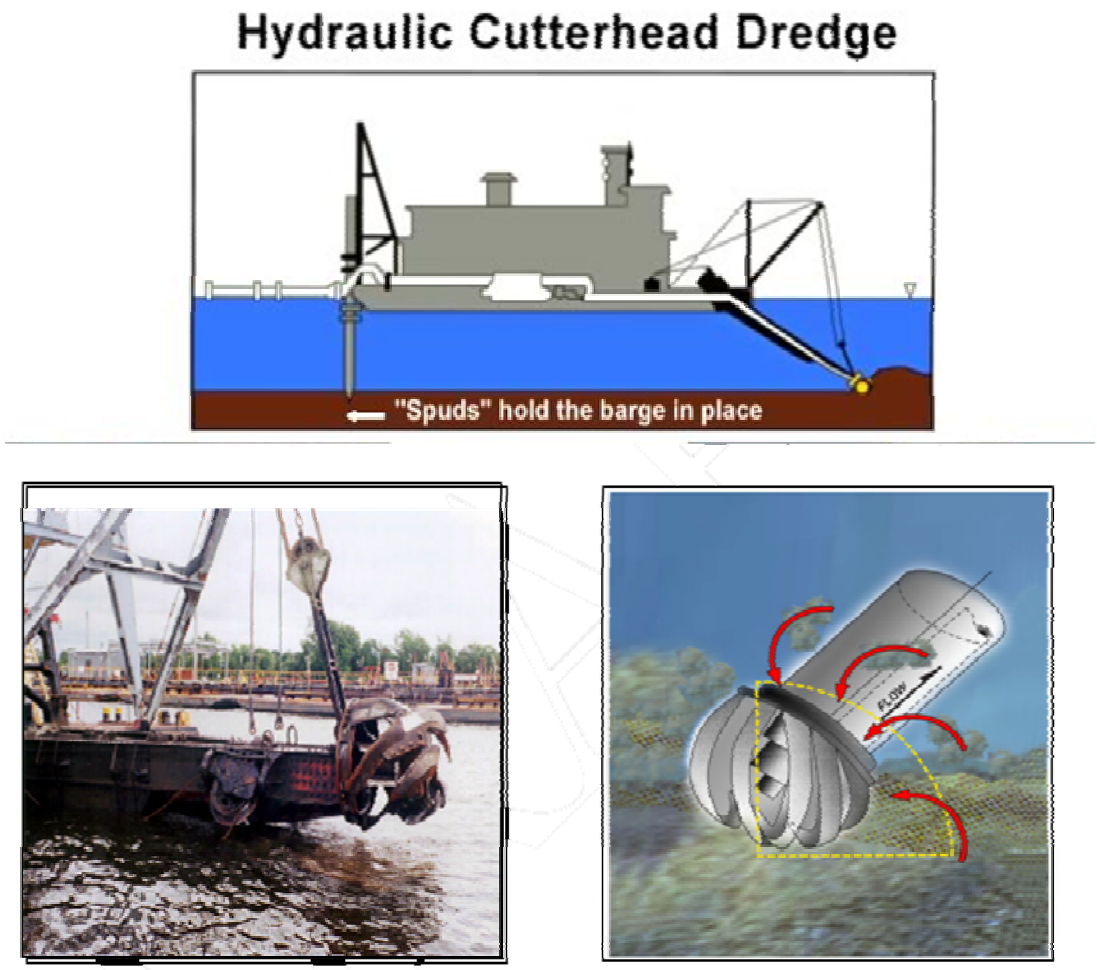

Figure 3: Cutterhead pipeline dredge schematic and representative close-up photographs

2.1.3 Clamshell Dredges

Clamshell dredges are the most common of the mechanical dredges. Clamshell dredges use a number of different bucket types for mud, gravel, rock, or boulders. The clamshell dredging operation cycle lowers a bucket in the open position to the bottom surface; penetrates the bottom sediments with the weight of the bucket; closes the bucket, and raises the bucket above hopper level, swinging forward to dump the material into the scow; and then the bucket swings back to repeat the entire process. The dredging depth is limited by the length of the wire used to lower the bucket and production depends upon the bucket size, dredging depth, and type of material. Clamshell dredges are able to work in confined areas, can pick up large particles, and are less sensitive to sea (wave) conditions than other dredges. Their capacity, however, is low and they are unable to dig in firm or consolidated materials, such as rock. Therefore, they could not be used to perform the proposed expansion dredging but could be used to perform the proposed maintenance dredging.

Clamshell dredges require a tug to move to and from the dredge and disposal locations. In unconsolidated sediments, the primary environmental impact of clamshell dredges is increased turbidity due to the re-suspension of sediments as the bucket moves through the water column. Operational controls such as a reduction in bucket speed may reduce impacts, as would the use of a closed bucket system. Silt curtains may be deployed around the dredge if water quality standards cannot be met using operational controls.

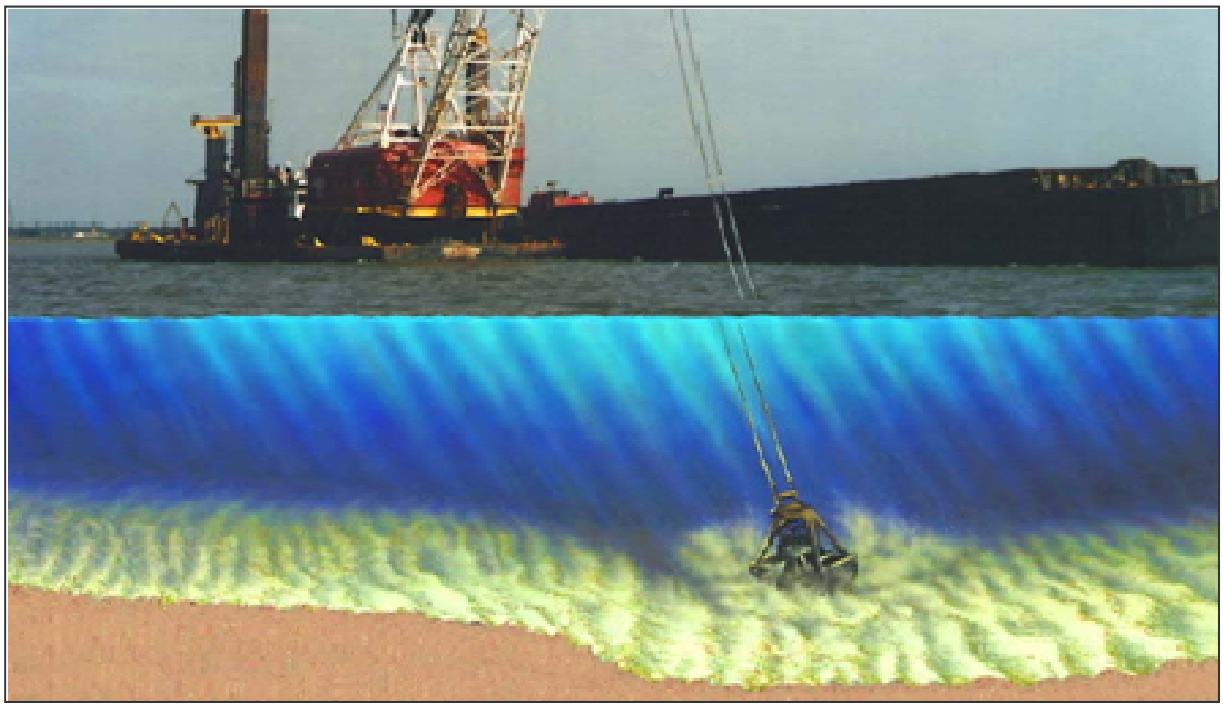

Figure 4: Mechanical Dredging with Clamshell.

2.1.4 Backhoe Marine Excavator

A backhoe dredge is a back-acting excavating machine that is usually mounted on pontoons or a barge. The backhoe digs toward the machine with a bucket penetrating the surface from the top of the cut face. The operation cycle is similar to the clamshell dredge, as are the factors affecting production. Backhoe marine excavators have accurate positioning ability and are able to excavate firm or consolidated materials. However, they are susceptible to swells and have low to moderate production. Backhoe marine excavators could be used to excavate unconsolidated overburden, fractured rock, and possibly some unfractured rock. The dredge requires a tug to move the dredge to and from a location.

Environmental impacts from backhoe marine excavator dredging in unconsolidated sediment are similar to those of a clamshell dredge, as are the operational controls to reduce that impact.

Slowing the movement of the bucket through the water is an example of an operational control. Environmental impacts are significantly less for a backhoe marine excavator dredge removing fractured (blasted) rock as the volume of fine-grained sediment is significantly less in fractured rock than unconsolidated sediment and as a result the potential for sediment re-suspension is reduced. The same operational controls can be applied to fractured rock as to unconsolidated sediment, such as slowing the bucket speed in the water.

2.1.5 Rock Pre-Treatment Techniques

Pre-treatment techniques are used to break-up consolidated massive materials, like rock, prior to removal of this material by a dredge. Such factors as location, rock hardness, cost, and amount of surface requiring treatment are among factors to take into account when determining which method is most suitable and practicable for a given project.

2.1.5.1 Spudding/Hydrohammer/Punchbarging/Rigging

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.

The primary environmental impact of punchbarging is noise and vibration. This constant pounding would serve to disrupt marine mammal behavior in the area, as well as impact other marine species that may be 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.

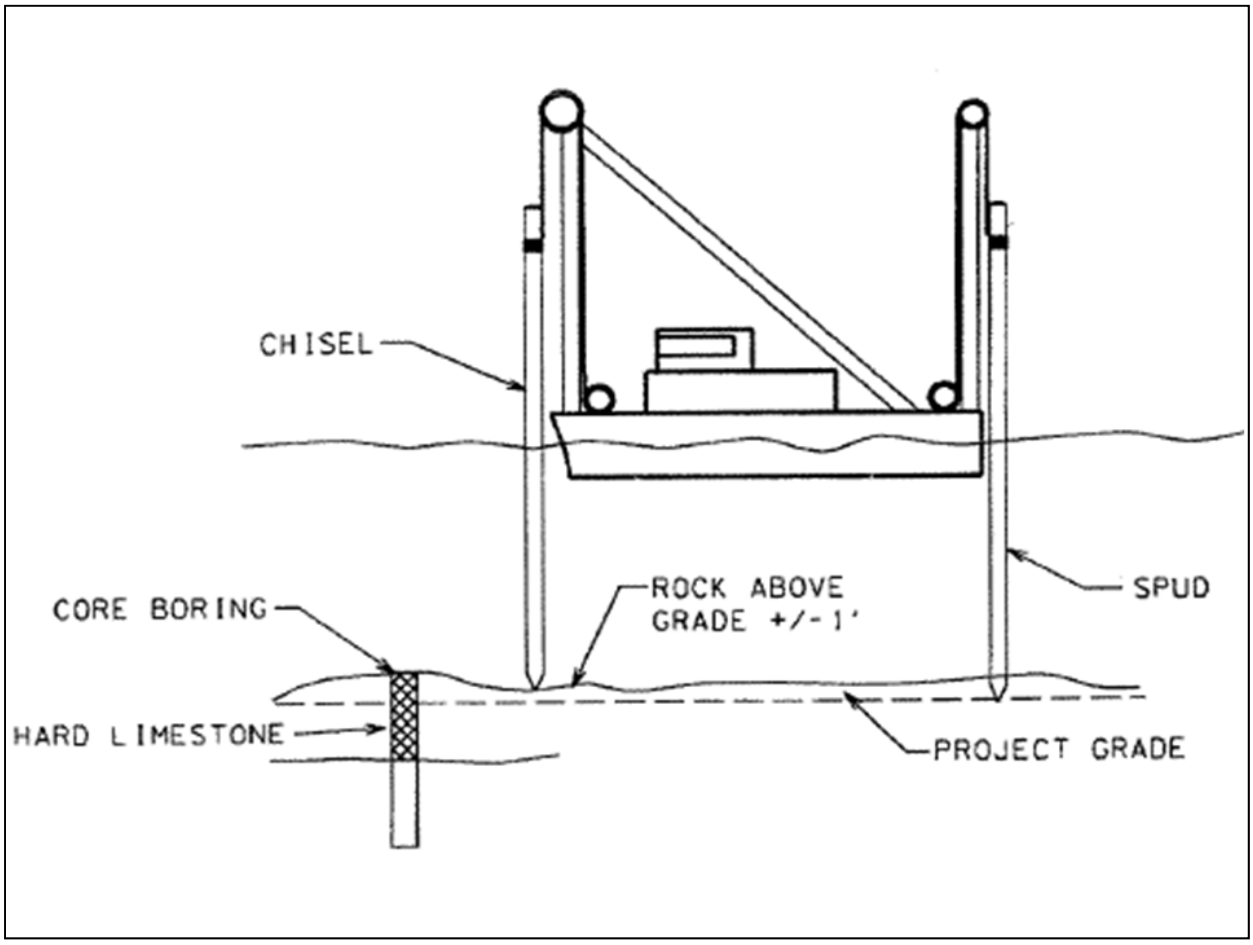

Figure 5: Typical punchbarge set-up.

2.1.5.2 Blasting

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," shown in Figure 6 and Figure 7. 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).

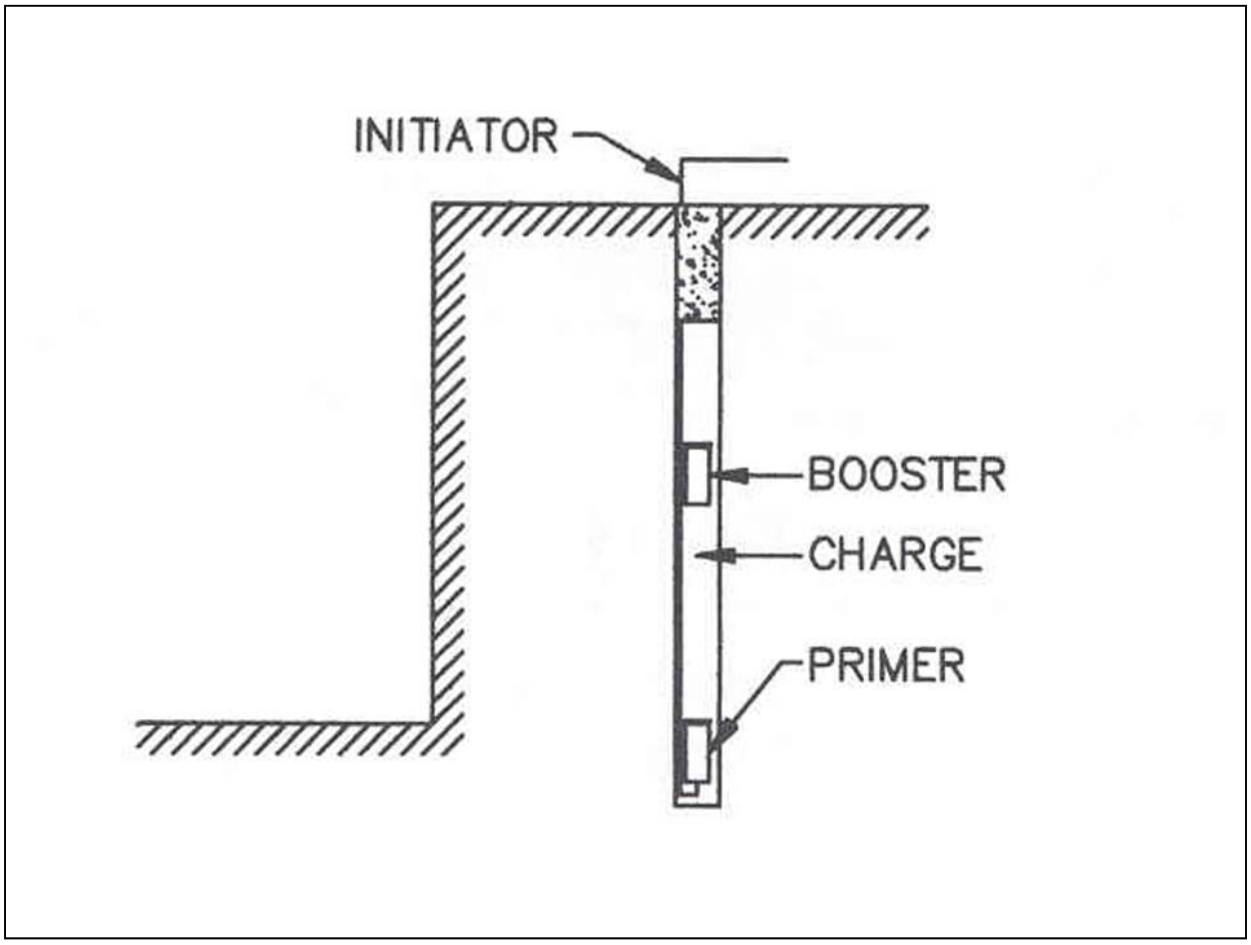

Figure 6: Typical stemmed hole.

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."

Figure 7: Stemming material utilized. Bag is approximate volume of material used.

Figure 8: Unconfined blast using seven pounds of explosives.

The length of stemming material will vary based on the length of the holes drilled; however, minimum lengths will be included in the project specific 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, USACE would work with agencies and non-governmental organizations (NGOs) to address concerns and potential impacts associated with the blasting.

Figure 9: Confined blast of 3,000 pounds of explosives.

In addition to coordination with the agencies and NGOs, any new scientific studies published before the specifications are advertised 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, USACE 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 (Jordan, *et al.*, 2007 in USACE, 2010).

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 (Jordan, *et al.*, 2007 in USACE, 2010).

The USACE 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 FWS found these protective measures sufficient to protect marine mammals under their respective jurisdictions (NMFS, 2005b; FWS, 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] X 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] X 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.

2.1.5.2.1 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 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

3 LISTED SPECIES & CRITICAL HABITAT IN THE ACTION AREA

Listed species under the purview of the USFWS which may occur in the vicinity of and may be affected by the project include: the endangered West Indian manatee (*Trichechus manatus*).

4 ENVIRONMENTAL BASELINE CONDITIONS

4.1 West Indian Manatee

The Florida manatee (*Trichechus manatus latirostris*) is a subspecies of the West Indian manatee (*Trichechus manatus*) and can be found throughout the southeastern United States, including in the project area. Manatees may travel great distances during warm months, and they have been sighted in Massachusetts and Texas (USFWS, 2007). Manatees are a sub-tropical species and are cold intolerant. In Florida, they prefer warm-water sites during the winter, leaving only to feed during warming trends. Manatees congregate near warm water sites, such as natural

springs, power plants, and deep canals, when temperatures drop. Florida manatees are found in freshwater, brackish, and marine environments, including coastal tidal rivers and streams, mangrove swamps, salt marshes, freshwater springs, and vegetated bottoms. Manatees are herbivores and feed on aquatic vegetation. Preferred feeding areas in coastal and riverine habitats appear to be shallow grass beds near deep channels. Primary threats include watercraft-related strikes, entanglement in fishing lines and crab pot lines, exposure to cold and red tide (USFWS, 2007).

Several Federal and state manatee protection areas are located in Tampa Bay, including around several power plants. Manatees inhabit both fresh and salt water and have been observed in canals, rivers, estuaries, bays, and on rare occasion have been observed as far as 6 km off the Florida Gulf coast (USFWS, 2001). Aerial surveys indicate that as many as 190 manatees may use Tampa Bay (Ackerman, 1995). Surveys show that over 900 manatees inhabit the west coast of Florida. The highest concentrations of manatees along Florida's Gulf coast exist in Citrus, Levy, Lee, and Collier Counties. Data suggest that of the manatees living in the Tampa Bay area, most occur within the bay where water temperatures are more stable year round. Only 15 manatees were surveyed in the eastern portion of Tampa Bay during aerial surveys in 1992 (Ackerman, 1995).

During periods of cold weather, manatees in the project area would likely be congregating at the outfall of the Tampa Electric Company (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). Although manatee critical habitat exists in some of the tributaries of Tampa Bay, there is no critical habitat in the project area.

5 EFFECTS OF THE ACTION

5.1 West Indian Manatee

5.1.1 Effects of Dredging

Expansion and maintenance dredging is not likely to adversely affect the manatee because the following USFWS standard "Manatee Protection Measures" will be incorporated into the plans and specifications for the project:

(a) 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 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.

(b) 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.

(c) 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.

(d) 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.

(e) Any collision with or injury to a manatee shall be reported immediately to the FWC 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).

(f) 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 (FWC) must be used (see MyFWC.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 shut down of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities.

5.1.2 Effects of Blasting

Utilization of blasting to remove the consolidated material may have an effect on manatees in the area of the blasts. Both the pressure and noise associated with blasting can injure marine mammals.

Should manatees be near the project vicinity during blasting operations, direct impacts could include alteration of behavior and autecology. For example, daily movements and/or seasonal migrations of manatees may be impeded or altered. In addition, manatees may alter their behavior or sustain minor physical injury from detonation of blasts outside the danger zone. Although an incidental take would not result from sound/noise at this distance, disturbances of this nature (alteration of behavior/movements) may be considered harassment under MMPA and ESA.

Utilizing data from rock-contained blasts such as those at Miami Harbor in 2005, the Corps has been able to estimate potential effects on protected species, including the manatee. This data can be correlated to the data from the Environmental Protection Agency (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 for an affected mammal (infant dolphin). Non-lethal injuries include tympanic membrane ruptures; however, given that manatee 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 when 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 [particularly dolphins and manatees, (Reynolds, 2003)] 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 and the ESA.

By utilizing the confined blasting technique used and studied at Miami Harbor in 2005, the maximum shot pressures from confined blasting will be significantly lower than open-water shot pressures at the same charge weight for this project. 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 during confined blasting are well below those pressures that typically propagate away from open-water shot pressures relative to charge weight per delay.

5.1.3 Monitoring Program (Protective Species Watch Program)

To limit the impacts to species as a result of blasting activities, the Corps proposes mitigative measures through the implementation of a Protective Species Watch Program similar to the program conducted as part of the Port of Miami project (Jordan et al., 2007).

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 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. 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. The time delay breaks up the total pressure of the larger charge into smaller amounts, which makes the rock fracture more efficiently and decreases impacts to aquatic organisms. The danger zone radius is calculated based on research of unconfined blasts. Therefore, a reduction of impact by confining the shots is anticipated, which would more than compensate for the presumed higher sensitivity of marine species (Jordan et al., 2007).

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 (NOAA, 2005; USFWS, 2002). In addition, monitoring of the Miami blast pressures found these calculations to be extremely conservative and protective (Jordan et al., 2007; Hempen et al., 2007).

As a result of the reduction in pressure waves by confining blasts in rock, placing a protective zone around the blast array, and monitoring for the presence of protected species including the Florida manatee, the Corps does not believe that any manatee will be killed or injured.

5.1.4 Effects of Punching

Use of a punchbarge or hydrohammer to pre-treat the rock prior to removal by a dredge would require the punchbarge to work for 12-hour periods, 7 days a week. During this period, the punchbarge would strike the rock approximately once every 30-seconds. This constant pounding would serve to disrupt manatee behavior in the area by harassment. For example, daily movements of manatees in the project area, should they be in the area during construction, may be impeded or altered. These effects would be temporary, only lasting as long as the punching

activities are occurring. Using the punchbarge would also likely extend the length of the project temporally due to the lower production with the harder materials relative to blasting, thus increasing any potential impacts to all fish and wildlife resources in the area. Low frequencies (<200 Hz) typically dominate the overall levels for impact pile driving as seen with hydrohammer or punchbarging (Spence et al., 2007). Spence et al., also noted that underwater sound data published in the literature typically shows a fairly wide variation in the levels generated by pile driving type activities (which using a punchbarge or hydrohammer is similar to). They found variations on the order of 5-10dB from one hit to another.

6 ENVIRONMENTAL COMMITMENTS

Efforts to eliminate or significantly reduce the potential impacts associated with dredging activities will be addressed by implementing the following actions:

a. Prior to the commencement of construction activities, the contractor will instruct all personnel associated with the project on which endangered species may be in the area, and on the civil and criminal penalties for harming, harassing, or killing them.

b. Construction access and staging areas will be identified in the contract plans and specification. Contractor vehicles, construction equipment, and storage facilities will be required to stay within the identified construction area.

c. Any incident involving the death or injury of any listed threatened or endangered species described in this Biological Assessment shall be immediately reported to the U.S. Army Corps of Engineers (Jacksonville) and the U.S. Fish and Wildlife Service (Tampa).

d. If rock pre-treatment is required, a protection plan will be implemented with a no pre-treatment window of November 1 through March 31 (USACE 2000a, 2000b [Rev. 2005]).

7 CONCLUSIONS

In conclusion, the Corps has determined that the proposed action may affect, but is not likely to adversely affect, the Florida manatee.

Based on this determination, the USACE requests that the USFWS concur with our determination for the West Indian (Florida) manatee.

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FLORIDA DEPARTMENT *of* STATE

RICK SCOTT
Governor

KEN DETZNER
Secretary of State

Mr. Eric Summa
Planning and Policy Division
Jacksonville USACE
P.O. Box 4970
Jacksonville, Florida 32232-0019

April 8, 2014

Re: DHR Project File No. 2014-01286/ Received by DHR: April 2, 2014
Project: Big Bend Construction and Maintenance Dredging
County: Hillsborough

Dear Mr. Summa,

This office reviewed the referenced project for possible effects on historic properties listed, or eligible for listing, on the *National Register of Historic Places.* The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, and its implementing regulations in *36 CFR Part 800: Protection of Historic Properties.*

It is the opinion of this office that the proposed project will have no effect on historic properties listed, or eligible for listing, on the *National Register of Historic Places.*

If you have any questions, please contact Michael Hart, Historic Sites Specialist, by phone at 850.245.6333, or by electronic mail at Michael.Hart@dos.myflorida.com.

Sincerely

Robert F. Bendus, Director
Division of Historical Resources
and State Historic Preservation Officer

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May 9, 2014

Kristina May
Beaches, Inlets and Ports Program
Division of Water Resource Management
Florida Department of Environmental Protection
2600 Blair Stone Road, MS 3544
Tallahassee, FL 32399
Kristina.may@dep.state.fl.us

Re: Tampa Bay Port Big Bend Channel Expansion, Florida Department of Environmental Protection (FDEP) Environmental Resource Permit (ERP) Application 0157891-017-BI, Hillsborough County

Dear Ms. May:

Florida Fish and Wildlife Conservation Commission (FWC) staff has reviewed the above-referenced ERP application and provides the following comments and recommendations for your consideration during your review under Chapter 373, Florida Statutes (F.S.), and in accordance with FWC's authorities under Chapter 379, F.S.

Project Description

The U.S. Army Corps of Engineers (USACE) is proposing navigational improvements and periodic maintenance to a 275-acre area in the Big Bend Channel in Hillsborough Bay, Hillsborough County. The USACE has submitted an ERP application for expansion and maintenance dredging in the Big Bend entrance channel, turning basin, inner channel, and berthing areas. The application requests the approval to dispose of dredged material in Spoil Island 3D (a.k.a. DMMA 3D). According to the application, blasting is being retained as an option to facilitate the project's construction.

Based on the *Supplemental Environmental Assessment* (SEA) submitted in support of the application, the USACE is proposing to widen the north side of the existing channel entrance by 50 feet and deepen it from 37 to 41 feet. The proposed project will also expand the turning basin 190 feet to the southwest and deepen it from 37 to 41 feet in that area, and deepen the southeast corner of the turning basin to 45 feet. In addition, two non-federal birthing areas located north and south of the east channel would be deepened from 37 to 41 feet. USACE anticipates that the dredging would generate approximately 4 million cubic yards of material and the shoaling rate after expansion is approximately 80,000 cubic yards per year. USACE also anticipates maintenance dredging would occur approximately every 9 years and generate 720,000 cubic yards of material per event. The dredged material would be placed in either dredged material management area (DMMA) 3D if maintenance is performed by the USACE or DMMA 2D if maintenance is performed by the Tampa Port Authority. The DMMA sites are located 1 mile and 3.7 miles north of the project area, respectively. The widening and deepening is being proposed to reduce vessel grounding and collision with channel markers, particularly in high winds.

The USACE has not specified the type of dredging equipment to be used. Depending on the size and power of the equipment used, blasting or other types of rock pre-treatment such as punchbarging may be required. Blasting, if needed, would be "confined blasting". This pre-treatment would consist of the placement of a charge in a hole drilled in the rock approximately five to ten feet, depending on depth of rock and intended project depth.

The USACE has also issued a draft *Finding of No Significant Impact* for the SEA for the proposed improvements and maintenance dredging of the federally authorized Tampa Harbor-Big Bend Navigation Project with placement of dredged material in either DMMA 2D or DMMA 3D. Dredging and placement of dredged material associated with these construction activities would be conducted in accordance with the:

- Endangered Species Act of 1973
- Gulf Regional Biological Opinion dated 2007 issued by the National Marine Fisheries Service
- Statewide Programmatic Biological Opinion, Beach Placement and Shore Protection dated 2011 issued by the U.S. Fish and Wildlife Service (USFWS)

Potentially Affected Resources

FWC staff conducted a geographic information system (GIS) analysis of the project area. Based on this analysis, the project area is located near, within or adjacent to:

- Four wood stork (*Mycteria americana*, Federally Endangered [FE]) nesting colony core foraging areas (CFA). The CFA constitutes a 15-mile radius around the nesting colony.
    - 615333
    - Unnamed
    - 615336
    - East Lake/Bellows Lake
- Florida Elemental Occurrence for the following listed species:
    - Black skimmer (*Rynchops niger*, State Species of Special Concern[SSC])
    - American oystercatcher (*Haematopus palliates*, SSC)
    - Least tern (*Sterna antillarum*, State Threatened [ST])
- 40 documented Florida manatee (*Trichechus manatus latirostris*, FE) mortalities within 1 mile of the project site
- U.S. Fish and Wildlife Service (USFWS) Consultation Area for the Piping Plover (*Charadrius melodus*, Federally Threatened [FT])

Section 3.3 of the SEA identifies the potential presence of the following state- and federally listed species that may be affected by the proposed work:

- Green sea turtle (*Chelonia mydas*, FE)
- Hawksbill sea turtle (*Eretmochelys imbricate*, FE)
- Loggerhead sea turtle (*Caretta caretta*, FT)
- Leatherback sea turtle (*Dermochelys coriacea*, FE)
- Kemp's Ridley sea turtle (*Lepidochelys kempii*, FE)
- Florida manatee (*Trichechus manatus latirostris*, FE)
- Smalltooth sawfish (*Pristis pectinate*, FE)

- Gulf sturgeon (*Acipenser oxyrinchus desotoi*, FT)

Section 3.5 of the SEA identifies that waters and substrate within the project area have been identified as Essential Fish Habitat, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act of 1996, for the following species:

- Red drum (*Sciaenops ocellatus*)
- Pink shrimp (*Farfantepenaeus duorarum*)
- Spanish mackerel (*Scomberomorus maculates*)
- Stone crab (*Menippe mercineria*)

Section 3.8 of the SEA indicates that nesting by migratory birds occurs on DMMA 2D and DMMA 3D.

In Section 4.1.2 of the SEA, the USACE has determined that the proposed expansion and maintenance project "may affect, but is not likely to adversely affect" sea turtles, Florida manatee, smalltooth sawfish and the Gulf sturgeon. The USACE will request initiation of Section 7 consultation with the USFWS and the National Marine Fisheries Service.

Comments and Recommendations

The following comments and recommendations are offered for consideration in the final permit.

Sea Turtles

The project activities will occur within or near habitats utilized by sea turtles. The USACE anticipates the proposed dredging will likely occur using a clamshell or cutterhead dredge and "takings" of sea turtles are not anticipated. A hopper dredge, if used, will be equipped with a rigid draghead deflector to reduce the potential entrainment of sea turtles. The USACE will implement a blasting protection plan which includes the development of three safety radii based on the use of an unconfined blast. The USACE anticipates that potential impacts from punchbarging will be temporary. Please notifiy FWC staff once the final selected construction method has been determined so that we can ensure the appropriate staff are available to assist with any issues that may arise during final in-water work.

Florida Manatee

The project activities will occur within habitats utilized by the Florida manatee including a major warm water aggregation area at the Big Bend Power Station adjacent to the project. The USACE has committed to implementing conservation measures to ensure that impacts to the Florida manatee are avoided or minimized. These measures include the 2011 Standard Manatee In-Water Construction Conditions, as well as other conditions utilized during maintenance dredging (FDEP Permit No. 0157891-009-DF) and implementing a blast and watch plan. Information concerning blasting provided in the application refers to those conditions used in Phase II of the Port of Miami. We have updated those conditions to reflect the most recent measures that were agreed upon for Phase III of the Port of Miami (Enclosure 1).

Smalltooth Sawfish and Gulf Sturgeon

The USACE anticipates the proposed dredging and maintenance project will have minimal impacts on the smalltooth sawfish and Gulf sturgeon due to the low abundance of these species in the area and the FWC agrees with this determination. If blasting is utilized during construction, the USACE has agreed to implement a blasting protection plan and other measures to avoid or minimize any potential impacts to the smalltooth sawfish and Gulf sturgeon. Because blasting is sporadic and intermittent as opposed to punchbarging, which would be continuous throughout the day, the predicted behavioral disturbance of blasting is less than prolonged disturbance of punchbarging. FWC recommends the use of blasting versus punchbarging, due to the temporal effects of blasting on fish and wildlife resources.

Essential Fish Habitat

The project is located in areas identified as Essential Fish Habitat. The USACE has stated that the placement of dredging equipment (including pipelines) will avoid mapped areas of seagrass and decanted water will be monitored and maintained to within state water quality standards. In addition, the USACE has indicated that the contractor will be required to survey for seagrass beds prior to placing any pipeline or equipment in the vicinity of the DMMA's. The distribution and abundance of all seagrass species naturally fluctuate temporally and spatially for a variety of reasons (e.g., changes in water quality, current flow, etc.), especially in patchy seagrass habitats. The absence of seagrass in a particular area during a single survey event is not an indication that the area is not viable seagrass habitat. For this reason, impact assessment should consider the broader seagrass habitat established by multiple surveys, and not just the most recent surveyed vegetated portions. FWC staff recommends that calculations of seagrass impact acreage include the cumulative acreage of all viable seagrass habitat, based on multiple surveys. This approach would be consistent with other projects either permitted or under development by the USACE.

Migratory Birds

Potential habitat for listed migratory birds occurs within the project area and documented migratory bird nesting has occurred on DMMA 2D and DMMA 3D. The USACE intends to minimize potential impacts to nesting migratory birds by implementing the District's Migratory Bird Protection Plan which includes measures such as buffering nesting sites to avoid take under the Migratory Bird Treaty Act. FWC staff recommends that the attached Nesting Seabirds and Shorebirds Protection Conditions also be included (Enclosure 2). These conditions were included in the permits for DMMA 2D and DMMA 3D permit (No. 198600947 IP-LC) in 2013 and inclusion of these conditions for this permit is consistent with the conditions currently being implemented for the prosposed sites. Please contact FWC staff for more information if necessary.

The project area is located within the consultation area for the piping plover. We recommend the USACE coordinate with the USFWS regarding this federally listed species with regards to any potential impacts as a result of the construction activities. The USFWS North Florida Office can be reached at (904) 731-3336.

We would appreciate the opportunity to participate on interagency teams for this project and to provide technical assistance to the USACE. We remain committed to partnering with the USACE throughout the duration of the Tampa Harbor Big Bend Channel navigation improvement project to further assist in protecting Florida's fish and wildlife resources. If you need any further assistance, please do not hesitate to contact Jane Chabre either by phone at (850) 410-5367 or at FWCConservationPlanningServices@MyFWC.com. If you have any technical questions regarding the content of this letter, please contact Mark Schulz at (863) 648-3820 or email at Mark.Schulz@MyFWC.com.

Sincerely,

Scott Sanders, Director
Office of Conservation Planning Services

ss/mas
ENV 1-2-2
Tampa Harbor Big Bend Channel Navigation Improvements_18964_050914

Enclosures: Enclosure 1: FWC Recommended Manatee and Marine Turtle Protective Measures, Tampa Bay Big Bend Channel Expansion, DEP File No. 0157891-017-BI, May 7, 2014.

Enclosure 2: FWC Recommended Nesting Seabirds and Shorebirds Protection Conditions, Tampa Bay Big Bend Channel Expansion, FDEP File No. 0157891-017-BI, May 7, 2014

cc: Col. Alan M. Dodd
District Engineer
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Eric P. Summa, Chief, Environmental Branch
U.S. Army Corps of Engineers, Jacksonville District
Eric.P.Summa@usace.army.mil

Paul DeMarco, Biologist
U.S. Army Corps of Engineers, Jacksonville District
Paul.M.Demarco@usace.army.mil

Paul Karch, Environmental Engineer
U.S. Army Corps of Engineers, Jacksonville District
Paul.J.Karch@usace.army.mil

Lauren Milligan, FDEP, Lauren.milligan@dep.state.fl.us
Jeff Wilcox, FWC, Jeff.Wilcox@MyFWC.com

Mary Duncan, FWC, Mary.Duncan@MyFWC.com
Robin Boughton, FWC, Robin.Boughton@MyFWC.com
Nancy Douglass, FWC, Nancy.Douglass@MyFWC.com
Jack Daugherty, FWC, Jack.Daugherty@MyFWC.com
Ryan Moreau, FWC, Ryan.Moreau@MyFWC.com
Bob McMichael, FWC, Bob.McMichael@MyFWC.com
Maria Merrill, FWC, Maria.Merrill@MyFWC.com
Ron Mezich, FWC, Ron.Mezich@MyFWC.com
Brie Ochoa, FWC, Brie.Ochoa@MyFWC.com
Kent Smith, FWC, Kent.Smith@MyFWC.com
Robbin Trindell, FWC, Robbin.Trindell@MyFWC.com
Lisa Gregg, FWC, Lisa.Gregg@MyFWC.com
Carol Knox, FWC, Carol.Knox@MyFWC.com
Jim Estes, FWC, Jim.Estes@MyFWC.com
David Heil, FWC, David.Heil@MyFWC.com
Phillip Stevens, FWC, Phillip.Stevens@MyFWC.com
Luiz Barbieri, FWC, Luiz.Barbieri@MyFWC.com
Steve Rockwood, FWC, Steve.Rockwood@MyFWC.com
Brad Gruver, FWC, Brad.Gruver@MyFWC.com
Gregg Poulakis, FWC, Gregg.Poulakis@MyFWC.com
Mike Sommers, FWC, Mike.Sommers@MyFWC.com

Enclosure 1
Manatee and Marine Turtle Protective Measures
Tampa Bay Port Big Bend Channel Expansion, DEP File No. 0157891-017-BI
April 25, 2014

Manatee and Marine Turtle Protection Conditions for Dredging Activities:

1. The following conditions shall be followed to protect manatees and sea turtles during all in-water dredging activities:

    a. All personnel associated with the project shall be instructed about the presence of sea turtles, manatees and manatee speed zones, and the need to avoid collisions with (and injury to) these protected marine species. The permittee shall advise all construction personnel 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.

    b. 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.

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

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

    e. Any collision with or injury to a manatee shall be reported immediately to the FWC Hotline at 1-888-404-3922, and to FWC at ImperiledSpecies@myFWC.com.

    f. Any collision with and/or injury to a sea turtle should also be reported immediately to the Sea Turtle Stranding and Salvage Network (STSSN) at SeaTurtleStranding@myfwc.com. Care should be taken in handling sick or injured sea turtle specimens to ensure effective treatment and care and in handling dead sea turtle specimens to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

    g. 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. Temporary signs that have already been approved for this use by the FWC shall be used. One sign which reads *Caution: Boaters* shall be posted. A second sign measuring at least 8

½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shut-down of in-water operations shall be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

h. Between November 15 and March 31, at least two dedicated observers shall be designated when in-water work is being performed on a dredge and shall perform no other duties that may interfere with their ability to observe for protected marine species (such as manatees, sea turtles, dolphins, etc.) during dredging activities. That person shall have significant prior on-the-job experience observing for protected marine species (including manatees) during previous dredging events where the activities were similar in nature to this project. Observers shall be equipped with polarized sunglasses to aid in observation during the daytime.

i. A log detailing work activities, sightings, collisions, or injuries to protected marine species during the contract period shall be maintained. Observer logs and a report summarizing incidents and sightings shall be submitted to FWC at ImperiledSpecies@myfwc.com. Logs and a report shall be submitted within 30 days following each event, which is defined as the time period between when mobilization of equipment begins and when demobilization of equipment ends, or submitted on an annual basis, for multi-year projects.

j. No nighttime mechanical dredging, such as clamshell, shall occur. The use of clamshell dredges shall be prohibited at night year round (dusk and dawn).

2. The following conditions for hopper dredging are recommended for inclusion to ensure the applicant remains compliant with Florida Statute 379.2431 (1):

a. Handling of sea turtles captured during hopper dredging projects shall be conducted only by persons with prior experience and training in these activities and who is duly authorized to conduct such activities as a NMFS-approved sea turtle observer or have submitted documentation to the USACE of meeting the FWC Marine Turtle Conservation Guidelines specific to stranding activities (Section 3). The USACE will forward documentation to FWC at MTP@myfwc.com and to JCPCompliance@dep.state.fl.us for review concurrent with the submission of the contractor Environmental Protection Plan.

b. Any activity involving the use of nets to harass and/or to capture and handle sea turtles in Florida waters requires a Marine Turtle Permit from FWC. Permits may be obtained by contacting FWC at MTP@myfwc.com.

In addition to the above recommended conditions, the inclusion of the following information will ensure FWC staff can assist the applicant in the case of sea turtle capture, recovery, or injury during project activities:

c. A summary (use FWC Trawl Report) of all trawling activity, including non-capture trawling, and all sea turtles captured in Florida waters, including all measurements, the latitude and longitude (in decimal degrees) of captures and tow start-stop points, and times for the start-stop points of the tows, including those tows on which no turtles are captured, shall be submitted to MTP@myfwc.com by January 15 of the following year or at the end of the project.

d. The STSSN Coordinator shall be notified by contacting Allen.Foley@myfwc.com at the start-up and completion of hopper dredging operations. In the event of capturing or recovering sea turtles or sea turtle parts, the STSSN should be contacted at SeaTurtleStranding@myfwc.com.

3. The contractor's Environmental Protection Plan (EPP) shall be submitted for review and comment to DEP at JCPCompliance@dep.state.fl.us and copied to ImperiledSpecies@myfwc.com. This plan shall also include monitoring of fish and wildlife during construction, as well as steps that will be followed to address any unavoidable take that should occur. In addition, the conditions outlined within the EPP shall include:

   a. A list of the dedicated protected marine species observers, their contact information and their qualifications, shall be included in the EPP. Copies of this Plan shall be provided for review at least 30 days prior to the proposed date of the dredging(s) as a matter of comity. Any further modifications to this Plan related to observers shall be coordinated with these entities prior to implementation. These entities shall also be notified at the initiation and completion of dredging events.

Manatee and Marine Turtle Protection Conditions for Blasting Activities:

1. Blasting activities shall only occur during daylight hours and shall not take place between November 15 and March 31 of any year.

2. A Blast and Watch Plan (BWP) shall be developed and submitted prior to any blasting activities that will specify protected marine species (such as manatees, sea turtles, dolphins, etc.) and protection measures employed, before, during and after each blast. This BWP shall adequately incorporate all protection requirements for a blasting and watch program and shall be followed during all blasting events (including testing).

   a. Copies of the BWP shall be provided to the DEP, FWC, USFWS and the NMFS for review at least 30 days prior to the proposed date of the blast(s) as a matter of comity. Any further modifications to the plan shall be coordinated with these entities prior to implementation. These entities shall also be notified at the initiation and completion of all in-water blasting events. The addresses are:

      i.) DEP: JCPCompliance@dep.state.fl.us
      ii.) FWC: ImperiledSpecies@myfwc.com and Allen.Foley@myfwc.com;
      iii.) NMFS-PR1, 1315 East West Highway, Silver Spring, MD 20910
      iv.) NMFS-SERO-Protected Species Management Branch, 263 13th Ave South, St. Petersburg, FL 33701

3. The following elements of a blast program shall be incorporated into the BWP: The amount of explosive charge proposed, the explosive charge's equivalency in TNT, how it will be executed (depth of drilling, stemming, amount of time between delays, etc.), a drawing depicting the placement of the charges, size of the safety radius and how it will be marked (also depicted on a map), tide tables for the blasting event(s), and estimates of times and days for blasting events (with an understanding this is an estimate, and may change due to weather, equipment, etc). This material should be recorded by the Protected Species Observer lead for each blasting event and included in the final report to the Corps in an appendix. For each explosive charge placed, three zones will be calculated, denoted on monitoring reports, and provided to protected species

observers before each blast for incorporation in the watch plan for each planned detonation. These zones are:

a. Danger/Exclusion Zone: The distance in feet from blast (radius) = (260 $w^{1/3}$) + 500 feet. The "w" is the maximum charge weight (in tetryl or TNT pounds) per delay of an individual confined shot. Detonation will not occur if a marine animal is known to be (or based on previous sightings, may be) within this circular area around the detonation site.

b. Safety Zone: The distance in feet from blast (radius) = (520 $w^{1/3}$). The "w" is the maximum charge weight (in tetryl or TNT pounds) per delay of an individual confined shot. Any protected marine animal within this circular area around the Danger/Exclusion Zone shall be monitored continuously. Detonation should not occur if a marine animal appears to be traveling towards and nears the Danger/Exclusion Zone and detonation site during countdown.

c. Watch Zone: Three times the radius of the Danger/Exclusion Zone. This is the minimum watch distance to insure that animals entering or traveling close to the exclusion and safety zones are spotted and appropriate actions can be implemented before or as the animal enters the exclusion zone (i.e., a delay in blasting activities).

4. A list of the observers and their contact information, detailed information regarding their qualifications, and proposed positions for the watch, including a map depicting the proposed locations for boat or land-based observers shall be included in the BWP. Qualified observers shall have significant prior on the job experience observing for protected marine species (including manatees, sea turtles, dolphins, etc.) during previous in-water blasting events where the blasting activities were similar in nature to this project. Each observer's past experience must: 1) be in the same observer position proposed for this project; 2) include experience working as part of an observation team during an in-water blasting project; and 3) have extensive manatee or sea turtle observation experience during previous dredging or blasting projects and/or during manatee or sea turtle research studies.

   a. A formal coordination meeting will be held at least two days prior to the first blast event. Attendants will include the observers in the watch program, construction contractors, demolition subcontractors, and other interested parties, such as the U.S. Coast Guard, FWC, USFWS, and DEP. The construction contractors, demolition subcontractors and observers will present the protocol and logistics of the project.

   b. The watch program shall consist of a minimum of six observers and one coordinator. There should be a minimum of one aerial survey observer, with the other observers elevated in positions on boats or on land, depending upon the specific project. Each observer shall be equipped with a two-way radio that shall be dedicated exclusively to the watch. Extra radios should be available in case of failures. All of the observers shall be in close communication with the blasting subcontractor in order to halt the blast event if the need arises. If all observers do not have working radios and cannot contact the primary observer and the blasting subcontractor during the pre-blast watch, the blast shall be postponed until all observers are in radio contact. Observers will also be equipped with polarized sunglasses, binoculars, a red flag for backup visual communication, and a sighting log with a map to record sightings. All blasting events will be weather dependent. Climatic conditions must be suitable for optimal viewing conditions, determined by the observers.

c. The watch program shall include a continuous aerial survey to be conducted by aircraft, as approved by the Federal Aviation Administration. The event shall be halted if an animal(s) is spotted within the Danger/Exclusion Zone. An "all-clear" signal shall be obtained from the aerial observer before detonation can occur. The blasting event shall be halted immediately upon request of any of the observers. If animals are sighted in the Danger/Exclusion Zone, the blast event shall not take place until the animal(s) moves out of the area under its own volition. Animals shall not be herded away or harassed into leaving. Specifically, the animals shall not be intentionally approached by project watercraft. If the animal(s) is not sighted a second time, the event may resume 30 minutes after the last sighting.

d. The watch program shall begin at least one hour prior to the scheduled start of blasting to identify the possible presence of manatees, dolphins, sea turtle, or whales (in the nearshore and offshore areas). The watch program shall continue until at least one half-hour after detonations are complete.

e. If any one of the blast or watch conditions is not met prior to or during the blasting, the watch observers shall have the authority to terminate the blasting event, until resolution can be reached with the Contracting Officer. The Contracting Officer or their representative will contact FWC, USFWS and NMFS, as appropriate.

f. If an injured or dead marine mammal or sea turtle is sighted after the blast event, the observers shall maintain contact with the injured or dead animal until authorities arrive. The observer coordinator shall contact the Contracting Officer, or their representative, who will contact the resource agencies.

5. After each blasting event, the observers and contractors shall evaluate any problems encountered during blasting events and logistical solutions shall be presented to the Contracting Officer. Corrections to the watch or blast programs and BWP shall be made prior to the next blasting event.

   a. If an injured or dead marine mammal or sea turtle is sighted after the blast event, blasting shall be postponed until consultations are completed and determinations can be made of the cause of injury or mortality. If blasting injuries are documented, all demolition activities shall cease until a revised plan addressing the likely cause of injury or death is agreed upon by the Corps, FWC, NMFS and USFWS. In the event of an injury or death, the Corps will contact the resource agencies at the following phone numbers:

      i.) FWC Hotline: 1-888-404-FWCC and 850-922-4330 (manatees and sea turtles).
      ii.) NMFS SERO-PRD: 772-570-5312 (sea turtles and sawfish)
      iii.) NMFS- Emergency Stranding Hotline – 1-877-433-8299

   b. Within 30 days after completion of all blasting events, the observer coordinator shall submit a report to the Corps, who will provide it to FWC, NMFS and USFWS providing a description of the event, number and location of animals seen and what actions were taken when animals were seen. Any problems associated with the event and suggestions for improvements shall also be documented in the report.

Enclosure 2
FWC Recommended Nesting Seabirds and Shorebirds Protection Conditions
Tampa Bay Big Bend Channel Expansion, FDEP File No. 0157891-017-BI
May 7, 2014

1. **Pre-Construction Meeting.** A meeting between representatives of the contractor, the US Fish and Wildlife Service (FWS), the FWC, and Bird Monitors as appropriate, shall be held prior to commencement of work on projects. At least 10-business days advance notice must be provided prior to conducting this meeting. The meeting will provide an opportunity for explanation and/or clarification of the protection measures as well as additional guidelines when construction occurs during nesting season, such as staging equipment and reporting within the work area as well as follow up meetings during construction.

2. **Nesting Seabird and Shorebird Protection Conditions:** Nesting seabird and shorebird (i.e. shorebird) surveys should be conducted by trained, dedicated individuals (Bird Monitor) with proven shorebird identification skills and avian survey experience. A list of candidate Bird Monitors with their contact information, summary of qualifications including bird identification skills, and avian survey experience shall be provided to the DEP and FWC. This information will be submitted to the FWC regional biologist (contact information attached) prior to any construction or hiring for shorebird surveys for revision and consultation. Bird Monitors shall use the following survey protocols:

    a. Bird Monitors shall review and become familiar with the general information, employ the data collection protocol, and implement data entry procedures outlined on the FWC's Florida Shorebird Database (FSD) website (www.FLShorebirdDatabase.org). An outline of data to be collected, including downloadable field data sheets, is available on the website.

    b. Breeding season varies by species. Most species have completed the breeding cycle by September 1, but flightless young may be present through September. The following dates are based on the best available information regarding ranges and habitat use by species around the state:

    All Gulf Coast counties: February 15 – September 1 except:
    Spoil islands in Hillsborough: March 1- September 1
    Citrus and Levy: March 15- September 1
    Dixie and Taylor: April 1 – September 1

    On the dredge spoil islands in Hillsborough Bay, weekly surveys will be conducted by a qualified bird monitor beginning no later than March 1 to determine the onset of nesting. Once nesting is documented, the Migratory Bird Protection plan will be implemented and daily monitoring will begin. If no nesting is observed prior to April 1, daily surveys will be initiated on that date or 10 days prior to project commencement (including

surveying activities and other pre-construction presence on the site), whichever is later. Surveys shall be conducted until all breeding activity has concluded for the season, as determined by the bird monitor.

c. Breeding season surveys shall be conducted in all potential beach-nesting bird habitats within the project boundaries that may be impacted by construction or pre-construction activities. One or more shorebird survey routes shall be established in the FSD website to cover these areas.

d. During the pre-construction and construction phases of the project, surveys for detecting breeding activity and the presence of flightless chicks will be completed on a daily basis (once nesting has initiated or beginning April 1, whichever is later) prior to movement of equipment, operation of vehicles, or other activities that could potentially disrupt breeding behavior or cause harm to the birds or their eggs or young.

e. Surveys shall be conducted by walking or driving the project area (and/or boating along the shoreline) and visually surveying for the presence of shorebirds exhibiting breeding behavior, shorebird chicks, or shorebird juveniles as outlined in the FSD *Breeding Bird Protocol for Shorebirds and Seabirds*. Use of binoculars is required.
If an ATV or other vehicle is needed to cover large project areas, operators will adhere to the FWC's Best Management Practices for Operating Vehicles on the Beach (http://myfwc.com/conservation/you-conserve/wildlife/beach-driving/). Specifically, the vehicle must be operated at a speed <6 mph and when operating on beaches run at or below the high-tide line. The Bird Monitor will stop at no greater than 200 meter intervals to visually inspect for breeding activity.

f. Once breeding is confirmed by the presence of a scrape, eggs, or young, the Bird Monitor will notify the FWC Regional Species Conservation Biologist (**contact information attached**) within 24 hours. All breeding activity will be reported to the FSD website within one week of data collection.

3. **Seabird and Shorebird Buffer Zones and Travel Corridors.** Within the project area, the permittee shall establish a disturbance-free buffer zone around any location where shorebirds have been engaged in breeding behavior, including territory defense. A 300 ft-wide buffer is considered adequate based on published studies. However, a smaller, site-specific buffer may be implemented upon approval by the FWC Regional Species Conservation Biologist (**contact information attached**) as needed. All sources of human disturbance (including pedestrians, pets, and vehicles) shall be prohibited in the buffer zone.

    a. The Bird Monitor shall keep breeding sites under sufficient surveillance to determine if birds appear agitated or disturbed by construction or other

activities in adjacent areas. If birds do appear to be agitated or disturbed by these activities, then the width of the buffer zone shall be increased immediately to sufficient size to protect breeding birds.

b. Reasonable and traditional pedestrian access should not be blocked where breeding birds will tolerate pedestrian traffic. Pedestrian traffic may be tolerated when breeding was initiated within 300 feet of an established pathway. The permittee shall work with the FWC Regional Species Biologist to determine if pedestrian access can be accommodated without compromising nesting success.

c. Designated buffer zones shall be marked with posts, twine, and signs stating "Do Not Enter, Important Nesting Area" or similar language around the perimeter which includes the name and a phone number of the entity responsible for posting. Posts should not exceed 3'in height once installed. Symbolic fencing (twine, string, or rope) should be placed between all posts (at least 2.5' above the ground in sea turtle nesting habitat) and rendered clearly visible to pedestrians. If pedestrian pathways are approved by the FWC Regional Species Conservation Biologist within the 300-foot buffer zone, these should be clearly marked. The posting shall be maintained in good repair until breeding is completed or terminated. Although solitary nesters may leave the buffer zone with their chicks, the posted area continues to provide a potential refuge for the family until breeding is complete. Breeding is not considered to be completed until all chicks have fledged.

d. No construction activities, pedestrians, movement of vehicles, or stockpiling of equipment shall be allowed within the buffer area.

e. Travel corridors shall be designated and marked outside the buffer areas so as not to cause disturbance to breeding birds. Heavy equipment, other vehicles, or pedestrians may transit past breeding areas in these corridors. However, other activities such as stopping or turning shall be prohibited within the designated travel corridors adjacent to the breeding site. When flightless chicks are present within or adjacent to travel corridors, movement of vehicles shall be accompanied by the Bird Monitor who will ensure no chicks are in the path of the moving vehicle and no tracks capable of trapping flightless chicks result.

f. To discourage nesting within the travel corridor, it is recommended that the Permittee maintain some activity within these corridors on a daily basis, without disturbing any nesting shorebirds documented on site or interfering with sea turtle nesting, especially when those corridors are established prior to commencement of construction.

g. Passive methods to modify breeding site suitability in upland placement areas shall be limited to flooding or flagging of potential breeding sites prior to the start of breeding, or by other appropriate measures that have been approved by the FWC Regional Species Biologist. The Bird Monitor shall survey these areas prior to flooding or flagging.

4. **Seabird and Shorebird Notification.** If shorebird breeding occurs within the project area, a bulletin board will be placed and maintained in the construction staging area with the location map of the construction site showing the bird breeding areas and a warning, clearly visible, stating that "NESTING BIRDS ARE PROTECTED BY LAW INCLUDING THE FLORIDA ENDANGERED AND THREATENED SPECIES ACT AND THE STATE and FEDERAL MIGRATORY BIRD ACTS".

5. **Equipment Storage and Placement.** Staging areas for construction equipment shall be located off the shoreline whenever possible. Nighttime storage of construction equipment not in use shall be off the shoreline to minimize disturbance to shorebird nesting activities. In addition, all construction pipes that are placed on the shoreline shall be located as far landward as possible. Temporary storage of pipes shall be off the shoreline to the maximum extent possible. If it will be necessary to extend construction pipes past a known shorebird nesting site or over-wintering area for piping plovers, then whenever possible those pipes should be placed landward of the site before birds are active in that area. No pipe or sand shall be placed seaward of a shorebird nesting site during the shorebird nesting season.

Florida Fish and Wildlife Conservation Commission
Regional Species Biologist - Contacts for Shorebird Issues
January 2012

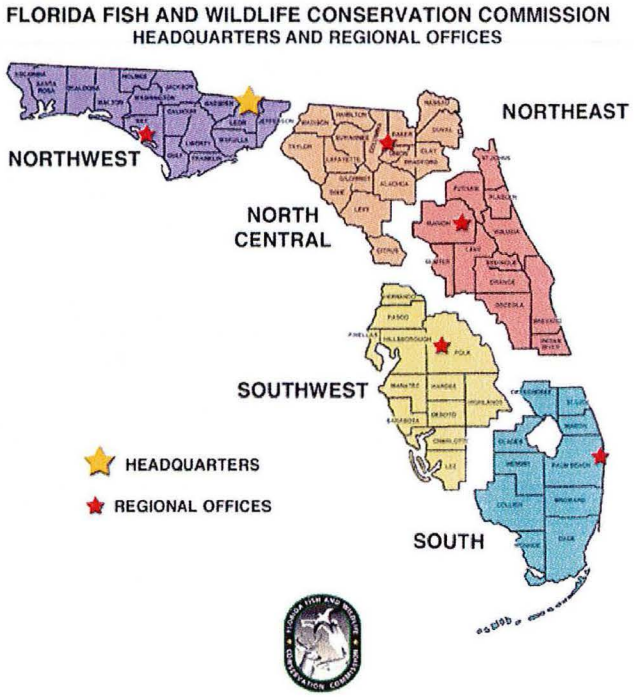
Northwest Region
Dr. John Himes
FL Fish and Wildlife Conservation Commission
3911 Highway 2321
Panama City, FL 32409-1658
(850) 265-3676

North Central Region
Dr. Terry Doonan
FL Fish and Wildlife Conservation Commission
P.O. Box 177
Olustee, FL 32072
(386) 758-0525

Northeast Region
Mr. Alex Kropp
FL Fish and Wildlife Conservation Commission
1239 S.W. 10th Street
Ocala, FL 34474-2797
(352) 732-1225

Southwest Region
Ms. Nancy Douglass
FL Fish and Wildlife Conservation Commission
3900 Drane Field Road
Lakeland, FL 33811-1299
(863) 648-3205

South Region
Mr. Ricardo Zambrano
FL Fish and Wildlife Conservation Commission
8535 Northlake Boulevard
West Palm Beach, FL 33412
(561) 625-5122



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

MARJORY STONEMAN DOUGLAS BUILDING
3900 COMMONWEALTH BOULEVARD
TALLAHASSEE, FLORIDA 32399-3000

RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
LT. GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

May 29, 2014

Mr. Paul M. DeMarco, Biologist
Jacksonville District, Planning Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, FL 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers – Supplemental Environmental Assessment, Tampa Harbor Big Bend Channel Navigation Improvements – Hillsborough County, Florida.
SAI # FL201404016859C

Dear Mr. DeMarco:

The Florida State Clearinghouse has coordinated a review of the referenced Supplemental Environmental Assessment (EA) under the following authorities: Presidential Executive Order 12372; § 403.061(42), *Florida Statutes*; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321-4347, as amended.

The Florida Department of Environmental Protection (DEP) advises that the DEP's Beaches, Inlets and Ports Program staff is processing an application from the U.S. Army Corps of Engineers (USACE) for an environmental resource permit (ERP File No. 0157891-017-BI) to construct the proposed project, and has forwarded a request for additional information to complete the ERP review process. For additional information and assistance regarding state review of the ERP application, please contact Ms. Kristina May at (850) 245-7545 or Kristina.May@dep.state.fl.us.

The Florida Fish and Wildlife Conservation Commission's (FWC) staff also reports that the proposed project is being reviewed concurrently via the state's permitting process. The FWC has provided a number of comments and recommended conditions for inclusion in the future ERP. Notification is requested regarding the final selected construction method to ensure the minimization of potential impacts to sea turtles during dredging. Since the project will occur within the warm water aggregation area near the Big Bend Power Station and other habitats utilized by manatees, the 2011 Standard Manatee In-Water Construction Conditions and blast and watch plans will be implemented by the USACE. For further detailed comments and recommendations, please refer to the enclosed FWC letters and contact Mr. Mark Schulz at (863) 648-3820 or Mark.Schulz@MyFWC.com.

Based on the information contained in the Supplemental EA and enclosed agency comments, the state has determined that, at this stage, the proposed activities are consistent with the Florida Coastal Management Program (FCMP). To ensure the project's continued consistency with the FCMP, the concerns identified by our reviewing agencies must be addressed prior to project implementation. The state's continued concurrence will be based on the activities' compliance with FCMP authorities, including federal and state monitoring of the activities to ensure their continued conformance, and the adequate resolution of issues identified during this and ongoing regulatory reviews. The state's final concurrence of the project's consistency with the FCMP will be determined upon completion of the environmental permitting process, in accordance with Section 373.428, *Florida Statutes*.

Thank you for the opportunity to review the draft document. Should you have any questions regarding this letter, please don't hesitate to contact me at Lauren.Milligan@dep.state.fl.us or (850) 245-2170.

Yours sincerely,

Lauren P. Milligan, Coordinator
Florida State Clearinghouse
Office of Intergovernmental Programs

Enclosures

cc: Roxane Dow, DEP, BMESP
Scott Sanders, FWC
Trisha Neasman, SWFWMD

Project Information	
Project:	FL201404016859C
Comments Due:	05/12/2014
Letter Due:	05/31/2014
Description:	DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT, TAMPA HARBOR BIG BEND CHANNEL NAVIGATION IMPROVEMENTS - HILLSBOROUGH COUNTY, FLORIDA.
Keywords:	ACOE - SEA, TAMPA HARBOR BIG BEND CHANNEL NAVIGATION - HILLSBOROUGH CO.
CFDA #:	12.107

Agency Comments:

FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

FWC staff reports that the proposed project is also being reviewed via the environmental resource permitting (ERP) process (DEP File No. 0157891-017-B1). The FWC has provided a number of comments and recommended conditions for inclusion in the future ERP. Notification is requested regarding the final selected construction method to ensure the minimization of potential impacts to sea turtles during dredging. Since the project will occur within the warm water aggregation area near the Big Bend Power Station and other habitats utilized by manatees, the 2011 Standard Manatee In-Water Construction Conditions and blast and watch plans will be implemented by the USACE. In addition, FWC recommends that calculations of seagrass impact acreage include the cumulative acreage of all viable seagrass habitat, based on multiple surveys, since the distribution and abundance of seagrass fluctuates temporally and spatially in the bay. For further detailed comments and recommendations, please refer to the enclosed FWC letters and contact Mr. Mark Schulz at (863) 648-3820 or Mark.Schulz@MyFWC.com.

TAMPA BAY RPC - TAMPA BAY REGIONAL PLANNING COUNCIL

No Comments

HILLSBOROUGH - HILLSBOROUGH COUNTY

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

The DEP advises that Beaches, Inlets and Ports Program staff is processing an application from the USACE for an environmental resource permit (ERP File No. 0157891-017-BI) to construct the proposed project, and has forwarded a request for additional information to complete the ERP review process. For additional information and assistance regarding state review of the ERP application, please contact Ms. Kristina May at (850) 245-7545 or Kristina.May@dep.state.fl.us.

STATE - FLORIDA DEPARTMENT OF STATE

No Comment/Consistent

SOUTHWEST FLORIDA WMD - SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

The Environmental Assessment (EA) relies on the SWFWMD's seagrass mapping data. The seagrasses in Hillsborough Bay and surrounding areas are often patchy to sparse thin-bladed Halodule wrightii. Consequently, their presence may not always be captured in SWFWMD mapping data. There are benthic signatures just north of Picnic Island and within the footprint of the spoil island, behind the breakwater structure, that should be field verified to confirm the presence/absence of seagrass. A field reconnaissance is recommended in these areas, as the SWFWMD's mapping data is from 2012 and has a minimum mapping unit of 0.5 acre (i.e., any seagrass features smaller than 0.5 acre in size may not be documented in the maps). In addition, the EA should address the impact of wave energy propagated within the turning basin on the adjacent reinforced spoil island.

Florida Fish and Wildlife Conservation Commission

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Immokalee

Bo Rivard
Panama City

Charles W. Roberts III
Tallahassee

Executive Staff
Nick Wiley
Executive Director

Eric Sutton
Assistant Executive Director

Karen Ventimiglia
Chief of Staff

Office of the
Executive Director
Nick Wiley
Executive Director

(850) 487-3796
(850) 921-5786 FAX

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600
Voice: (850) 488-4676

Hearing/speech-impaired:
(800) 955-8771 (T)
(800) 955-8770 (V)

MyFWC.com

May 12, 2014

Ms. Lauren Milligan
Office of Intergovernmental Programs
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, Mail Station 47
Tallahassee, FL 32399-3000
Lauren.milligan@dep.state.fl.us

Re: Department of Army, Jacksonville District Corps of Engineers, Supplemental Environmental Assessment, Navigation Improvements Big Bend Channel Tampa Harbor, Hillsborough County, SAI #FL201404016859C

Dear Ms. Milligan:

Florida Fish and Wildlife Conservation Commission (FWC) staff has reviewed the Supplemental Environmental Assessment (SEA) for the Navigation Improvements to the Big Bend Channel at Tampa Harbor. FWC staffs are providing comments and recommendations pursuant to the Coastal Zone Management Act/Florida Coastal Management Program.

The U.S. Army Corps of Engineers (USACE) is proposing navigational improvements and periodic maintenance to a 275-acre area in the Big Bend Channel in Hillsborough Bay, Hillsborough County. FWC staff reviewed the Environmental Resource Permit (ERP) Application 0157891-017-BI for this project and provided the attached letter containing recommended conditions to be included in the permit. The Supplemental Environmental Assessment was reviewed as part of the ERP application materials and the attached comments are specific to that assessment.

The FWC appreciates the opportunity to review the SEA and associated ERP for Navigation Improvements to the Big Bend Channel at Tampa Harbor and remains committed to assisting the USACE and the Tampa Port Authority with minimizing potential impacts to fish and wildlife resources during the Port expansion. We find the information submitted to this point consistent with our authorities under Chapter 379, Florida Statutes, and we will review additional project information as it becomes available. If you need any further assistance, please do not hesitate to contact Jane Chabre either by phone at (850) 410-5367 or at FWCConservationPlanningServices@MyFWC.com. If you have any technical questions regarding the content of this letter, please contact Mark Schulz at (386) 758-0525 or email at Mark.Schulz@MyFWC.com.

Sincerely,

Jennifer D. Goff

Jennifer D. Goff
Land Use Planning Program Administrator
Office of Conservation Planning Services

jdg/mas
ENV 1-3-2
Tampa Harbor Big Bend Channel Navigation Improvements_18964_051214

Enclosure

cc: Col. Alan M. Dodd
District Engineer
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Eric P. Summa, Chief, Environmental Branch
U.S. Army Corps of Engineers, Jacksonville District
Eric.P.Summa@usace.army.mil

Paul DeMarco, Biologist
U.S. Army Corps of Engineers, Jacksonville District
Paul.m.demarco@usace.army.mil

Paul Karch, Environmental Engineer
U.S. Army Corps of Engineers, Jacksonville District
Paul.J.Karch@usace.army.mil

Kristina May, FDEP, Kristina.may@dep.state.fl.us
Jeff Wilcox, FWC, Jeff.Wilcox@MyFWC.com
Mary Duncan, FWC, Mary.Duncan@MyFWC.com
Robin Boughton, FWC, Robin Boughton@MyFWC.com
Nancy Douglass, FWC, Nancy.Douglass@MyFWC.com
Jack Daugherty, FWC, Jack.Daugherty@MyFWC.com
Ryan Moreau, FWC, Ryan.Moreau@MyFWC.com
Bob McMichael, FWC, Bob.McMichael@MyFWC.com
Maria Merrill, FWC, Maria.Merrill@MyFWC.com
Ron Mezich, FWC, Ron.Mezich@MyFWC.com
Brie Ochoa, FWC, Brie.Ochoa@MyFWC.com
Kent Smith, FWC, Kent.Smith@MyFWC.com
Robbin Trindell, FWC, Robbin.Trindell@MyFWC.com
Lisa Gregg, FWC, Lisa.Gregg@MyFWC.com
Carol Knox, FWC, Carol.Knox@MyFWC.com
Jim Estes, FWC, Jim.Estes@MyFWC.com
David Heil, FWC, David.Heil@MyFWC.com
Phillip Stevens, FWC, Phillip.Stevens@MyFWC.com
Luiz Barbieri, FWC, Luiz.Barbieri@MyFWC.com
Steve Rockwood, FWC, Steve.Rockwood@MyFWC.com
Brad Gruver, FWC, Brad.Gruver@MyFWC.com
Gregg Poulakis, FWC, Gregg.Poulakis@MyFWC.com
Mike Sommers, FWC, Mike.Sommers@MyFWC.com

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(800) 955-8770 (V)

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May 9, 2014

Kristina May
Beaches, Inlets and Ports Program
Division of Water Resource Management
Florida Department of Environmental Protection
2600 Blair Stone Road, MS 3544
Tallahassee, FL 32399
Kristina.may@dep.state.fl.us

Re: Tampa Bay Port Big Bend Channel Expansion, Florida Department of Environmental Protection (FDEP) Environmental Resource Permit (ERP) Application 0157891-017-BI, Hillsborough County

Dear Ms. May:

Florida Fish and Wildlife Conservation Commission (FWC) staff has reviewed the above-referenced ERP application and provides the following comments and recommendations for your consideration during your review under Chapter 373, Florida Statutes (F.S.), and in accordance with FWC's authorities under Chapter 379, F.S.

Project Description

The U.S. Army Corps of Engineers (USACE) is proposing navigational improvements and periodic maintenance to a 275-acre area in the Big Bend Channel in Hillsborough Bay, Hillsborough County. The USACE has submitted an ERP application for expansion and maintenance dredging in the Big Bend entrance channel, turning basin, inner channel, and berthing areas. The application requests the approval to dispose of dredged material in Spoil Island 3D (a.k.a. DMMA 3D). According to the application, blasting is being retained as an option to facilitate the project's construction.

Based on the *Supplemental Environmental Assessment* (SEA) submitted in support of the application, the USACE is proposing to widen the north side of the existing channel entrance by 50 feet and deepen it from 37 to 41 feet. The proposed project will also expand the turning basin 190 feet to the southwest and deepen it from 37 to 41 feet in that area, and deepen the southeast corner of the turning basin to 45 feet. In addition, two non-federal birthing areas located north and south of the east channel would be deepened from 37 to 41 feet. USACE anticipates that the dredging would generate approximately 4 million cubic yards of material and the shoaling rate after expansion is approximately 80,000 cubic yards per year. USACE also anticipates maintenance dredging would occur approximately every 9 years and generate 720,000 cubic yards of material per event. The dredged material would be placed in either dredged material management area (DMMA) 3D if maintenance is performed by the USACE or DMMA 2D if maintenance is performed by the Tampa Port Authority. The DMMA sites are located 1 mile and 3.7 miles north of the project area, respectively. The widening and deepening is being proposed to reduce vessel grounding and collision with channel markers, particularly in high winds.

The USACE has not specified the type of dredging equipment to be used. Depending on the size and power of the equipment used, blasting or other types of rock pre-treatment such as punchbarging may be required. Blasting, if needed, would be "confined blasting". This pre-treatment would consist of the placement of a charge in a hole drilled in the rock approximately five to ten feet, depending on depth of rock and intended project depth.

The USACE has also issued a draft *Finding of No Significant Impact* for the SEA for the proposed improvements and maintenance dredging of the federally authorized Tampa Harbor-Big Bend Navigation Project with placement of dredged material in either DMMA 2D or DMMA 3D. Dredging and placement of dredged material associated with these construction activities would be conducted in accordance with the:

- Endangered Species Act of 1973
- Gulf Regional Biological Opinion dated 2007 issued by the National Marine Fisheries Service
- Statewide Programmatic Biological Opinion, Beach Placement and Shore Protection dated 2011 issued by the U.S. Fish and Wildlife Service (USFWS)

Potentially Affected Resources

FWC staff conducted a geographic information system (GIS) analysis of the project area. Based on this analysis, the project area is located near, within or adjacent to:

- Four wood stork (*Mycteria americana*, Federally Endangered [FE]) nesting colony core foraging areas (CFA). The CFA constitutes a 15-mile radius around the nesting colony.
    - 615333
    - Unnamed
    - 615336
    - East Lake/Bellows Lake
- Florida Elemental Occurrence for the following listed species:
    - Black skimmer (*Rynchops niger*, State Species of Special Concern[SSC])
    - American oystercatcher (*Haematopus palliates*, SSC)
    - Least tern (*Sterna antillarum*, State Threatened [ST])
- 40 documented Florida manatee (*Trichechus manatus latirostris*, FE) mortalities within 1 mile of the project site
- U.S. Fish and Wildlife Service (USFWS) Consultation Area for the Piping Plover (*Charadrius melodus*, Federally Threatened [FT])

Section 3.3 of the SEA identifies the potential presence of the following state- and federally listed species that may be affected by the proposed work:

- Green sea turtle (*Chelonia mydas*, FE)
- Hawksbill sea turtle (*Eretmochelys imbricate*, FE)
- Loggerhead sea turtle (*Caretta caretta*, FT)
- Leatherback sea turtle (*Dermochelys coriacea*, FE)
- Kemp's Ridley sea turtle (*Lepidochelys kempii*, FE)
- Florida manatee (*Trichechus manatus latirostris*, FE)
- Smalltooth sawfish (*Pristis pectinate*, FE)

- Gulf sturgeon (*Acipenser oxyrinchus desotoi*, FT)

Section 3.5 of the SEA identifies that waters and substrate within the project area have been identified as Essential Fish Habitat, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act of 1996, for the following species:

- Red drum (*Sciaenops ocellatus*)
- Pink shrimp (*Farfantepenaeus duorarum*)
- Spanish mackerel (*Scomberomorus maculates*)
- Stone crab (*Menippe mercineria*)

Section 3.8 of the SEA indicates that nesting by migratory birds occurs on DMMA 2D and DMMA 3D.

In Section 4.1.2 of the SEA, the USACE has determined that the proposed expansion and maintenance project "may affect, but is not likely to adversely affect" sea turtles, Florida manatee, smalltooth sawfish and the Gulf sturgeon. The USACE will request initiation of Section 7 consultation with the USFWS and the National Marine Fisheries Service.

Comments and Recommendations

The following comments and recommendations are offered for consideration in the final permit.

Sea Turtles

The project activities will occur within or near habitats utilized by sea turtles. The USACE anticipates the proposed dredging will likely occur using a clamshell or cutterhead dredge and "takings" of sea turtles are not anticipated. A hopper dredge, if used, will be equipped with a rigid draghead deflector to reduce the potential entrainment of sea turtles. The USACE will implement a blasting protection plan which includes the development of three safety radii based on the use of an unconfined blast. The USACE anticipates that potential impacts from punchbarging will be temporary. Please notifiy FWC staff once the final selected construction method has been determined so that we can ensure the appropriate staff are available to assist with any issues that may arise during final in-water work.

Florida Manatee

The project activities will occur within habitats utilized by the Florida manatee including a major warm water aggregation area at the Big Bend Power Station adjacent to the project. The USACE has committed to implementing conservation measures to ensure that impacts to the Florida manatee are avoided or minimized. These measures include the 2011 Standard Manatee In-Water Construction Conditions, as well as other conditions utilized during maintenance dredging (FDEP Permit No. 0157891-009-DF) and implementing a blast and watch plan. Information concerning blasting provided in the application refers to those conditions used in Phase II of the Port of Miami. We have updated those conditions to reflect the most recent measures that were agreed upon for Phase III of the Port of Miami (Enclosure 1).

Smalltooth Sawfish and Gulf Sturgeon

The USACE anticipates the proposed dredging and maintenance project will have minimal impacts on the smalltooth sawfish and Gulf sturgeon due to the low abundance of these species in the area and the FWC agrees with this determination. If blasting is utilized during construction, the USACE has agreed to implement a blasting protection plan and other measures to avoid or minimize any potential impacts to the smalltooth sawfish and Gulf sturgeon. Because blasting is sporadic and intermittent as opposed to punchbarging, which would be continuous throughout the day, the predicted behavioral disturbance of blasting is less than prolonged disturbance of punchbarging. FWC recommends the use of blasting versus punchbarging, due to the temporal effects of blasting on fish and wildlife resources.

Essential Fish Habitat

The project is located in areas identified as Essential Fish Habitat. The USACE has stated that the placement of dredging equipment (including pipelines) will avoid mapped areas of seagrass and decanted water will be monitored and maintained to within state water quality standards. In addition, the USACE has indicated that the contractor will be required to survey for seagrass beds prior to placing any pipeline or equipment in the vicinity of the DMMA's. The distribution and abundance of all seagrass species naturally fluctuate temporally and spatially for a variety of reasons (e.g., changes in water quality, current flow, etc.), especially in patchy seagrass habitats. The absence of seagrass in a particular area during a single survey event is not an indication that the area is not viable seagrass habitat. For this reason, impact assessment should consider the broader seagrass habitat established by multiple surveys, and not just the most recent surveyed vegetated portions. FWC staff recommends that calculations of seagrass impact acreage include the cumulative acreage of all viable seagrass habitat, based on multiple surveys. This approach would be consistent with other projects either permitted or under development by the USACE.

Migratory Birds

Potential habitat for listed migratory birds occurs within the project area and documented migratory bird nesting has occurred on DMMA 2D and DMMA 3D. The USACE intends to minimize potential impacts to nesting migratory birds by implementing the District's Migratory Bird Protection Plan which includes measures such as buffering nesting sites to avoid take under the Migratory Bird Treaty Act. FWC staff recommends that the attached Nesting Seabirds and Shorebirds Protection Conditions also be included (Enclosure 2). These conditions were included in the permits for DMMA 2D and DMMA 3D permit (No. 198600947 IP-LC) in 2013 and inclusion of these conditions for this permit is consistent with the conditions currently being implemented for the prosposed sites. Please contact FWC staff for more information if necessary.

The project area is located within the consultation area for the piping plover. We recommend the USACE coordinate with the USFWS regarding this federally listed species with regards to any potential impacts as a result of the construction activities. The USFWS North Florida Office can be reached at (904) 731-3336.

We would appreciate the opportunity to participate on interagency teams for this project and to provide technical assistance to the USACE. We remain committed to partnering with the USACE throughout the duration of the Tampa Harbor Big Bend Channel navigation improvement project to further assist in protecting Florida's fish and wildlife resources. If you need any further assistance, please do not hesitate to contact Jane Chabre either by phone at (850) 410-5367 or at FWCConservationPlanningServices@MyFWC.com. If you have any technical questions regarding the content of this letter, please contact Mark Schulz at (863) 648-3820 or email at Mark.Schulz@MyFWC.com.

Sincerely,

Scott Sanders, Director
Office of Conservation Planning Services

ss/mas
ENV 1-2-2
Tampa Harbor Big Bend Channel Navigation Improvements_18964_050914

Enclosures: Enclosure 1: FWC Recommended Manatee and Marine Turtle Protective Measures, Tampa Bay Big Bend Channel Expansion, DEP File No. 0157891-017-BI, May 7, 2014.

Enclosure 2: FWC Recommended Nesting Seabirds and Shorebirds Protection Conditions, Tampa Bay Big Bend Channel Expansion, FDEP File No. 0157891-017-BI, May 7, 2014

cc: Col. Alan M. Dodd
District Engineer
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Eric P. Summa, Chief, Environmental Branch
U.S. Army Corps of Engineers, Jacksonville District
Eric.P.Summa@usace.army.mil

Paul DeMarco, Biologist
U.S. Army Corps of Engineers, Jacksonville District
Paul.M.Demarco@usace.army.mil

Paul Karch, Environmental Engineer
U.S. Army Corps of Engineers, Jacksonville District
Paul.J.Karch@usace.army.mil

Lauren Milligan, FDEP, Lauren.milligan@dep.state.fl.us
Jeff Wilcox, FWC, Jeff.Wilcox@MyFWC.com

Mary Duncan, FWC, Mary.Duncan@MyFWC.com
Robin Boughton, FWC, Robin.Boughton@MyFWC.com
Nancy Douglass, FWC, Nancy.Douglass@MyFWC.com
Jack Daugherty, FWC, Jack.Daugherty@MyFWC.com
Ryan Moreau, FWC, Ryan.Moreau@MyFWC.com
Bob McMichael, FWC, Bob.McMichael@MyFWC.com
Maria Merrill, FWC, Maria.Merrill@MyFWC.com
Ron Mezich, FWC, Ron.Mezich@MyFWC.com
Brie Ochoa, FWC, Brie.Ochoa@MyFWC.com
Kent Smith, FWC, Kent.Smith@MyFWC.com
Robbin Trindell, FWC, Robbin.Trindell@MyFWC.com
Lisa Gregg, FWC, Lisa.Gregg@MyFWC.com
Carol Knox, FWC, Carol.Knox@MyFWC.com
Jim Estes, FWC, Jim.Estes@MyFWC.com
David Heil, FWC, David.Heil@MyFWC.com
Phillip Stevens, FWC, Phillip.Stevens@MyFWC.com
Luiz Barbieri, FWC, Luiz.Barbieri@MyFWC.com
Steve Rockwood, FWC, Steve.Rockwood@MyFWC.com
Brad Gruver, FWC, Brad.Gruver@MyFWC.com
Gregg Poulakis, FWC, Gregg.Poulakis@MyFWC.com
Mike Sommers, FWC, Mike.Sommers@MyFWC.com

Enclosure 1
Manatee and Marine Turtle Protective Measures
Tampa Bay Port Big Bend Channel Expansion, DEP File No. 0157891-017-BI
April 25, 2014

Manatee and Marine Turtle Protection Conditions for Dredging Activities:

1. The following conditions shall be followed to protect manatees and sea turtles during all in-water dredging activities:

   a. All personnel associated with the project shall be instructed about the presence of sea turtles, manatees and manatee speed zones, and the need to avoid collisions with (and injury to) these protected marine species. The permittee shall advise all construction personnel 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.

   b. 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.

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

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

   e. Any collision with or injury to a manatee shall be reported immediately to the FWC Hotline at 1-888-404-3922, and to FWC at ImperiledSpecies@myFWC.com.

   f. Any collision with and/or injury to a sea turtle should also be reported immediately to the Sea Turtle Stranding and Salvage Network (STSSN) at SeaTurtleStranding@myfwc.com. Care should be taken in handling sick or injured sea turtle specimens to ensure effective treatment and care and in handling dead sea turtle specimens to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

   g. 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. Temporary signs that have already been approved for this use by the FWC shall be used. One sign which reads *Caution: Boaters* shall be posted. A second sign measuring at least 8

½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shut-down of in-water operations shall be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

h. Between November 15 and March 31, at least two dedicated observers shall be designated when in-water work is being performed on a dredge and shall perform no other duties that may interfere with their ability to observe for protected marine species (such as manatees, sea turtles, dolphins, etc.) during dredging activities. That person shall have significant prior on-the-job experience observing for protected marine species (including manatees) during previous dredging events where the activities were similar in nature to this project. Observers shall be equipped with polarized sunglasses to aid in observation during the daytime.

i. A log detailing work activities, sightings, collisions, or injuries to protected marine species during the contract period shall be maintained. Observer logs and a report summarizing incidents and sightings shall be submitted to FWC at ImperiledSpecies@myfwc.com. Logs and a report shall be submitted within 30 days following each event, which is defined as the time period between when mobilization of equipment begins and when demobilization of equipment ends, or submitted on an annual basis, for multi-year projects.

j. No nighttime mechanical dredging, such as clamshell, shall occur. The use of clamshell dredges shall be prohibited at night year round (dusk and dawn).

2. The following conditions for hopper dredging are recommended for inclusion to ensure the applicant remains compliant with Florida Statute 379.2431 (1):

a. Handling of sea turtles captured during hopper dredging projects shall be conducted only by persons with prior experience and training in these activities and who is duly authorized to conduct such activities as a NMFS-approved sea turtle observer or have submitted documentation to the USACE of meeting the FWC Marine Turtle Conservation Guidelines specific to stranding activities (Section 3). The USACE will forward documentation to FWC at MTP@myfwc.com and to JCPCompliance@dep.state.fl.us for review concurrent with the submission of the contractor Environmental Protection Plan.

b. Any activity involving the use of nets to harass and/or to capture and handle sea turtles in Florida waters requires a Marine Turtle Permit from FWC. Permits may be obtained by contacting FWC at MTP@myfwc.com.

In addition to the above recommended conditions, the inclusion of the following information will ensure FWC staff can assist the applicant in the case of sea turtle capture, recovery, or injury during project activities:

c. A summary (use FWC Trawl Report) of all trawling activity, including non-capture trawling, and all sea turtles captured in Florida waters, including all measurements, the latitude and longitude (in decimal degrees) of captures and tow start-stop points, and times for the start-stop points of the tows, including those tows on which no turtles are captured, shall be submitted to MTP@myfwc.com by January 15 of the following year or at the end of the project.

d. The STSSN Coordinator shall be notified by contacting Allen.Foley@myfwc.com at the start-up and completion of hopper dredging operations. In the event of capturing or recovering sea turtles or sea turtle parts, the STSSN should be contacted at SeaTurtleStranding@myfwc.com.

3. The contractor's Environmental Protection Plan (EPP) shall be submitted for review and comment to DEP at JCPCompliance@dep.state.fl.us and copied to ImperiledSpecies@myfwc.com. This plan shall also include monitoring of fish and wildlife during construction, as well as steps that will be followed to address any unavoidable take that should occur. In addition, the conditions outlined within the EPP shall include:

   a. A list of the dedicated protected marine species observers, their contact information and their qualifications, shall be included in the EPP. Copies of this Plan shall be provided for review at least 30 days prior to the proposed date of the dredging(s) as a matter of comity. Any further modifications to this Plan related to observers shall be coordinated with these entities prior to implementation. These entities shall also be notified at the initiation and completion of dredging events.

Manatee and Marine Turtle Protection Conditions for Blasting Activities:

1. Blasting activities shall only occur during daylight hours and shall not take place between November 15 and March 31 of any year.

2. A Blast and Watch Plan (BWP) shall be developed and submitted prior to any blasting activities that will specify protected marine species (such as manatees, sea turtles, dolphins, etc.) and protection measures employed, before, during and after each blast. This BWP shall adequately incorporate all protection requirements for a blasting and watch program and shall be followed during all blasting events (including testing).

   a. Copies of the BWP shall be provided to the DEP, FWC, USFWS and the NMFS for review at least 30 days prior to the proposed date of the blast(s) as a matter of comity. Any further modifications to the plan shall be coordinated with these entities prior to implementation. These entities shall also be notified at the initiation and completion of all in-water blasting events. The addresses are:

      i.) DEP: JCPCompliance@dep.state.fl.us
      ii.) FWC: ImperiledSpecies@myfwc.com and Allen.Foley@myfwc.com;
      iii.) NMFS-PR1, 1315 East West Highway, Silver Spring, MD 20910
      iv.) NMFS-SERO-Protected Species Management Branch, 263 13th Ave South, St. Petersburg, FL 33701

3. The following elements of a blast program shall be incorporated into the BWP: The amount of explosive charge proposed, the explosive charge's equivalency in TNT, how it will be executed (depth of drilling, stemming, amount of time between delays, etc.), a drawing depicting the placement of the charges, size of the safety radius and how it will be marked (also depicted on a map), tide tables for the blasting event(s), and estimates of times and days for blasting events (with an understanding this is an estimate, and may change due to weather, equipment, etc). This material should be recorded by the Protected Species Observer lead for each blasting event and included in the final report to the Corps in an appendix. For each explosive charge placed, three zones will be calculated, denoted on monitoring reports, and provided to protected species

observers before each blast for incorporation in the watch plan for each planned detonation. These zones are:

a. Danger/Exclusion Zone: The distance in feet from blast (radius) = (260 $w^{1/3}$) + 500 feet. The "w" is the maximum charge weight (in tetryl or TNT pounds) per delay of an individual confined shot. Detonation will not occur if a marine animal is known to be (or based on previous sightings, may be) within this circular area around the detonation site.

b. Safety Zone: The distance in feet from blast (radius) = (520 $w^{1/3}$). The "w" is the maximum charge weight (in tetryl or TNT pounds) per delay of an individual confined shot. Any protected marine animal within this circular area around the Danger/Exclusion Zone shall be monitored continuously. Detonation should not occur if a marine animal appears to be traveling towards and nears the Danger/Exclusion Zone and detonation site during countdown.

c. Watch Zone: Three times the radius of the Danger/Exclusion Zone. This is the minimum watch distance to insure that animals entering or traveling close to the exclusion and safety zones are spotted and appropriate actions can be implemented before or as the animal enters the exclusion zone (i.e., a delay in blasting activities).

4. A list of the observers and their contact information, detailed information regarding their qualifications, and proposed positions for the watch, including a map depicting the proposed locations for boat or land-based observers shall be included in the BWP. Qualified observers shall have significant prior on the job experience observing for protected marine species (including manatees, sea turtles, dolphins, etc.) during previous in-water blasting events where the blasting activities were similar in nature to this project. Each observer's past experience must: 1) be in the same observer position proposed for this project; 2) include experience working as part of an observation team during an in-water blasting project; and 3) have extensive manatee or sea turtle observation experience during previous dredging or blasting projects and/or during manatee or sea turtle research studies.

a. A formal coordination meeting will be held at least two days prior to the first blast event. Attendants will include the observers in the watch program, construction contractors, demolition subcontractors, and other interested parties, such as the U.S. Coast Guard, FWC, USFWS, and DEP. The construction contractors, demolition subcontractors and observers will present the protocol and logistics of the project.

b. The watch program shall consist of a minimum of six observers and one coordinator. There should be a minimum of one aerial survey observer, with the other observers elevated in positions on boats or on land, depending upon the specific project. Each observer shall be equipped with a two-way radio that shall be dedicated exclusively to the watch. Extra radios should be available in case of failures. All of the observers shall be in close communication with the blasting subcontractor in order to halt the blast event if the need arises. If all observers do not have working radios and cannot contact the primary observer and the blasting subcontractor during the pre-blast watch, the blast shall be postponed until all observers are in radio contact. Observers will also be equipped with polarized sunglasses, binoculars, a red flag for backup visual communication, and a sighting log with a map to record sightings. All blasting events will be weather dependent. Climatic conditions must be suitable for optimal viewing conditions, determined by the observers.

c. The watch program shall include a continuous aerial survey to be conducted by aircraft, as approved by the Federal Aviation Administration. The event shall be halted if an animal(s) is spotted within the Danger/Exclusion Zone. An "all-clear" signal shall be obtained from the aerial observer before detonation can occur. The blasting event shall be halted immediately upon request of any of the observers. If animals are sighted in the Danger/Exclusion Zone, the blast event shall not take place until the animal(s) moves out of the area under its own volition. Animals shall not be herded away or harassed into leaving. Specifically, the animals shall not be intentionally approached by project watercraft. If the animal(s) is not sighted a second time, the event may resume 30 minutes after the last sighting.

d. The watch program shall begin at least one hour prior to the scheduled start of blasting to identify the possible presence of manatees, dolphins, sea turtle, or whales (in the nearshore and offshore areas). The watch program shall continue until at least one half-hour after detonations are complete.

e. If any one of the blast or watch conditions is not met prior to or during the blasting, the watch observers shall have the authority to terminate the blasting event, until resolution can be reached with the Contracting Officer. The Contracting Officer or their representative will contact FWC, USFWS and NMFS, as appropriate.

f. If an injured or dead marine mammal or sea turtle is sighted after the blast event, the observers shall maintain contact with the injured or dead animal until authorities arrive. The observer coordinator shall contact the Contracting Officer, or their representative, who will contact the resource agencies.

5. After each blasting event, the observers and contractors shall evaluate any problems encountered during blasting events and logistical solutions shall be presented to the Contracting Officer. Corrections to the watch or blast programs and BWP shall be made prior to the next blasting event.

   a. If an injured or dead marine mammal or sea turtle is sighted after the blast event, blasting shall be postponed until consultations are completed and determinations can be made of the cause of injury or mortality. If blasting injuries are documented, all demolition activities shall cease until a revised plan addressing the likely cause of injury or death is agreed upon by the Corps, FWC, NMFS and USFWS. In the event of an injury or death, the Corps will contact the resource agencies at the following phone numbers:

      i.) FWC Hotline: 1-888-404-FWCC and 850-922-4330 (manatees and sea turtles).
      ii.) NMFS SERO-PRD: 772-570-5312 (sea turtles and sawfish)
      iii.) NMFS- Emergency Stranding Hotline – 1-877-433-8299

   b. Within 30 days after completion of all blasting events, the observer coordinator shall submit a report to the Corps, who will provide it to FWC, NMFS and USFWS providing a description of the event, number and location of animals seen and what actions were taken when animals were seen. Any problems associated with the event and suggestions for improvements shall also be documented in the report.

Enclosure 2
FWC Recommended Nesting Seabirds and Shorebirds Protection Conditions
Tampa Bay Big Bend Channel Expansion, FDEP File No. 0157891-017-BI
May 7, 2014

1. **Pre-Construction Meeting.** A meeting between representatives of the contractor, the US Fish and Wildlife Service (FWS), the FWC, and Bird Monitors as appropriate, shall be held prior to commencement of work on projects. At least 10-business days advance notice must be provided prior to conducting this meeting. The meeting will provide an opportunity for explanation and/or clarification of the protection measures as well as additional guidelines when construction occurs during nesting season, such as staging equipment and reporting within the work area as well as follow up meetings during construction.

2. **Nesting Seabird and Shorebird Protection Conditions:** Nesting seabird and shorebird (i.e. shorebird) surveys should be conducted by trained, dedicated individuals (Bird Monitor) with proven shorebird identification skills and avian survey experience. A list of candidate Bird Monitors with their contact information, summary of qualifications including bird identification skills, and avian survey experience shall be provided to the DEP and FWC. This information will be submitted to the FWC regional biologist (contact information attached) prior to any construction or hiring for shorebird surveys for revision and consultation. Bird Monitors shall use the following survey protocols:

    a. Bird Monitors shall review and become familiar with the general information, employ the data collection protocol, and implement data entry procedures outlined on the FWC's Florida Shorebird Database (FSD) website (www.FLShorebirdDatabase.org). An outline of data to be collected, including downloadable field data sheets, is available on the website.

    b. Breeding season varies by species. Most species have completed the breeding cycle by September 1, but flightless young may be present through September. The following dates are based on the best available information regarding ranges and habitat use by species around the state:

    All Gulf Coast counties: February 15 – September 1 except:
    Spoil islands in Hillsborough: March 1- September 1
    Citrus and Levy: March 15- September 1
    Dixie and Taylor: April 1 – September 1

    On the dredge spoil islands in Hillsborough Bay, weekly surveys will be conducted by a qualified bird monitor beginning no later than March 1 to determine the onset of nesting. Once nesting is documented, the Migratory Bird Protection plan will be implemented and daily monitoring will begin. If no nesting is observed prior to April 1, daily surveys will be initiated on that date or 10 days prior to project commencement (including

surveying activities and other pre-construction presence on the site), whichever is later. Surveys shall be conducted until all breeding activity has concluded for the season, as determined by the bird monitor.

c. Breeding season surveys shall be conducted in all potential beach-nesting bird habitats within the project boundaries that may be impacted by construction or pre-construction activities. One or more shorebird survey routes shall be established in the FSD website to cover these areas.

d. During the pre-construction and construction phases of the project, surveys for detecting breeding activity and the presence of flightless chicks will be completed on a daily basis (once nesting has initiated or beginning April 1, whichever is later) prior to movement of equipment, operation of vehicles, or other activities that could potentially disrupt breeding behavior or cause harm to the birds or their eggs or young.

e. Surveys shall be conducted by walking or driving the project area (and/or boating along the shoreline) and visually surveying for the presence of shorebirds exhibiting breeding behavior, shorebird chicks, or shorebird juveniles as outlined in the FSD *Breeding Bird Protocol for Shorebirds and Seabirds*. Use of binoculars is required.
If an ATV or other vehicle is needed to cover large project areas, operators will adhere to the FWC's Best Management Practices for Operating Vehicles on the Beach (http://myfwc.com/conservation/you-conserve/wildlife/beach-driving/). Specifically, the vehicle must be operated at a speed <6 mph and when operating on beaches run at or below the high-tide line. The Bird Monitor will stop at no greater than 200 meter intervals to visually inspect for breeding activity.

f. Once breeding is confirmed by the presence of a scrape, eggs, or young, the Bird Monitor will notify the FWC Regional Species Conservation Biologist (**contact information attached**) within 24 hours. All breeding activity will be reported to the FSD website within one week of data collection.

3. **Seabird and Shorebird Buffer Zones and Travel Corridors.** Within the project area, the permittee shall establish a disturbance-free buffer zone around any location where shorebirds have been engaged in breeding behavior, including territory defense. A 300 ft-wide buffer is considered adequate based on published studies. However, a smaller, site-specific buffer may be implemented upon approval by the FWC Regional Species Conservation Biologist (**contact information attached**) as needed. All sources of human disturbance (including pedestrians, pets, and vehicles) shall be prohibited in the buffer zone.

    a. The Bird Monitor shall keep breeding sites under sufficient surveillance to determine if birds appear agitated or disturbed by construction or other

activities in adjacent areas. If birds do appear to be agitated or disturbed by these activities, then the width of the buffer zone shall be increased immediately to sufficient size to protect breeding birds.

b. Reasonable and traditional pedestrian access should not be blocked where breeding birds will tolerate pedestrian traffic. Pedestrian traffic may be tolerated when breeding was initiated within 300 feet of an established pathway. The permittee shall work with the FWC Regional Species Biologist to determine if pedestrian access can be accommodated without compromising nesting success.

c. Designated buffer zones shall be marked with posts, twine, and signs stating "Do Not Enter, Important Nesting Area" or similar language around the perimeter which includes the name and a phone number of the entity responsible for posting. Posts should not exceed 3'in height once installed. Symbolic fencing (twine, string, or rope) should be placed between all posts (at least 2.5' above the ground in sea turtle nesting habitat) and rendered clearly visible to pedestrians. If pedestrian pathways are approved by the FWC Regional Species Conservation Biologist within the 300-foot buffer zone, these should be clearly marked. The posting shall be maintained in good repair until breeding is completed or terminated. Although solitary nesters may leave the buffer zone with their chicks, the posted area continues to provide a potential refuge for the family until breeding is complete. Breeding is not considered to be completed until all chicks have fledged.

d. No construction activities, pedestrians, movement of vehicles, or stockpiling of equipment shall be allowed within the buffer area.

e. Travel corridors shall be designated and marked outside the buffer areas so as not to cause disturbance to breeding birds. Heavy equipment, other vehicles, or pedestrians may transit past breeding areas in these corridors. However, other activities such as stopping or turning shall be prohibited within the designated travel corridors adjacent to the breeding site. When flightless chicks are present within or adjacent to travel corridors, movement of vehicles shall be accompanied by the Bird Monitor who will ensure no chicks are in the path of the moving vehicle and no tracks capable of trapping flightless chicks result.

f. To discourage nesting within the travel corridor, it is recommended that the Permittee maintain some activity within these corridors on a daily basis, without disturbing any nesting shorebirds documented on site or interfering with sea turtle nesting, especially when those corridors are established prior to commencement of construction.

g. Passive methods to modify breeding site suitability in upland placement areas shall be limited to flooding or flagging of potential breeding sites prior to the start of breeding, or by other appropriate measures that have been approved by the FWC Regional Species Biologist. The Bird Monitor shall survey these areas prior to flooding or flagging.

4. **Seabird and Shorebird Notification.** If shorebird breeding occurs within the project area, a bulletin board will be placed and maintained in the construction staging area with the location map of the construction site showing the bird breeding areas and a warning, clearly visible, stating that "NESTING BIRDS ARE PROTECTED BY LAW INCLUDING THE FLORIDA ENDANGERED AND THREATENED SPECIES ACT AND THE STATE and FEDERAL MIGRATORY BIRD ACTS".

5. **Equipment Storage and Placement.** Staging areas for construction equipment shall be located off the shoreline whenever possible. Nighttime storage of construction equipment not in use shall be off the shoreline to minimize disturbance to shorebird nesting activities. In addition, all construction pipes that are placed on the shoreline shall be located as far landward as possible. Temporary storage of pipes shall be off the shoreline to the maximum extent possible. If it will be necessary to extend construction pipes past a known shorebird nesting site or over-wintering area for piping plovers, then whenever possible those pipes should be placed landward of the site before birds are active in that area. No pipe or sand shall be placed seaward of a shorebird nesting site during the shorebird nesting season.

Florida Fish and Wildlife Conservation Commission
Regional Species Biologist - Contacts for Shorebird Issues
January 2012

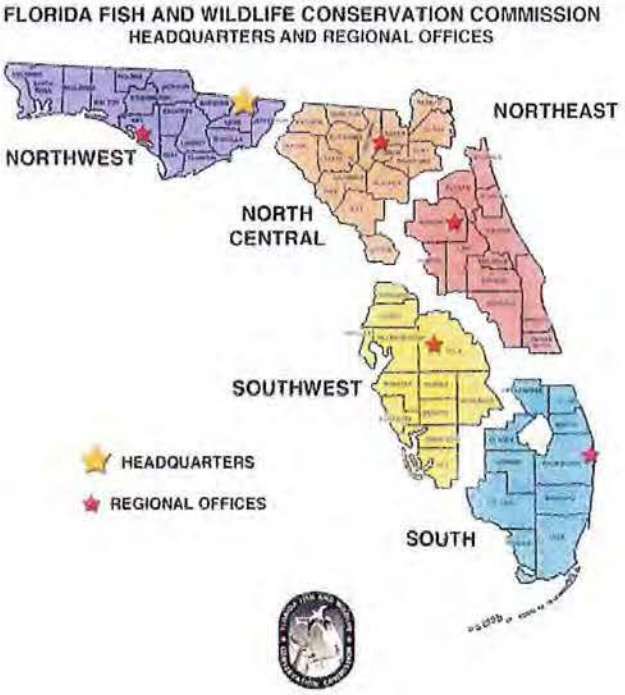
Northwest Region
Dr. John Himes
FL Fish and Wildlife Conservation Commission
3911 Highway 2321
Panama City, FL 32409-1658
(850) 265-3676

North Central Region
Dr. Terry Doonan
FL Fish and Wildlife Conservation Commission
P.O. Box 177
Olustee, FL 32072
(386) 758-0525

Northeast Region
Mr. Alex Kropp
FL Fish and Wildlife Conservation Commission
1239 S.W. 10th Street
Ocala, FL 34474-2797
(352) 732-1225

Southwest Region
Ms. Nancy Douglass
FL Fish and Wildlife Conservation Commission
3900 Drane Field Road
Lakeland, FL 33811-1299
(863) 648-3205

South Region
Mr. Ricardo Zambrano
FL Fish and Wildlife Conservation Commission
8535 Northlake Boulevard
West Palm Beach, FL 33412
(561) 625-5122



Hillsborough
SCH-Corps
2014-0179

RECEIVED

MAY 19 2014

DEP Office of
Intergovt'l Programs

COUNTY: HILLSBOROUGH

DATE: 4/1/2014
COMMENTS DUE DATE: 5/12/2014
CLEARANCE DUE DATE: 5/31/2014
SAI#: FL201404016859C
REFER TO: FL199607180575C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
ENVIRONMENTAL PROTECTION	SOUTHWEST FLORIDA WMD		
FISH and WILDLIFE COMMISSION			
X STATE			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

_ **Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.**

X **Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.**

_ **Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.**

_ **Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.**

Project Description:

DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT, TAMPA HARBOR BIG BEND CHANNEL NAVIGATION IMPROVEMENTS - HILLSBOROUGH COUNTY, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA

- ✓ No Comment
- Comment Attached
- Not Applicable

Federal Consistency

- ✓ No Comment/Consistent
- Consistent/Comments Attached
- Inconsistent/Comments Attached
- Not Applicable

From:

Division/Bureau: Historical Resources

Reviewer: Michael Hart

Date: 5/13/14

RECEIVED
BUREAU OF
HISTORIC PRESERVATION
2014 APR -3 A 9:59

Tampa Harbor, Big Bend Channel site visit summary

DEP File No. 0157891-017-BI

Applicant: U.S. Army Corps of Engineers

Location of activity: Big Bend entrance channel, turning basin, inner channel, east channel, and two non-federal berthing areas, Hillsborough County, within Tampa Harbor, Class III Waters, not an aquatic preserve.

Date of site visit: June 4, 2014, 9 am – 2 pm

Attendees:
Kristina May, DEP Beaches, Inlets and Ports Program
Jennifer Peterson, DEP Beaches, Mines and ERP Support Program
Brittany Banko, DEP Southwest District, Permitting and Waste Cleanup Program
Anthony Pidala, DEP Southwest District, Permitting and Water Cleanup Program

SITE 1: Nearest to entrance channel, area of known historical SAV resources
Approximate location: 27º48'8.85" N, -82º24'45.09" W
We started at the South end of the seawall and swam about half-way to the North end; we stopped just short of the point where the solid seawall is replaced by stacked bricks. Site contained oyster clumps covered in algae, but no SAV or coral resources. Snapping shrimp were very abundant (noisy), and we saw several large fish along the seawall.

SITE 2: Protected area (behind man-made revetment) near spoil-island
Approximate location: 27°48'11.91"N, 82°24'59.34"W
We started on the west-side of the revetment around the middle of the spoil island. There were patches of red macroalgae (*Gracilaria* possibly) and small clumps of oyster and rubble covered in algae and barnacles. Many small fish were using the rubble field. The shoreline was covered in limestone rubble, which was likely the source of the material we observed underwater. We snorkeled toward the island and then north ~ 50m past the edge of the island; see notes.

Approximate location: 27º48'17.54" N, -82º24'58.12" W
Sparse patches of *Halodule wrightii* were scattered in this shallow area just north of the spoil-island. Clumps of red macroalgae (*Gracilaria* possibly) were present along the shoreline. We snorkeled around the north-eastern edge of the island and observed patches of *Halodule wrightii* and red macroalgae (*Gracilaria* possibly) in that area as well. A pinfish was observed in a patch of macroalgae.

Approximate location: 27º48'8.83" N, -82º24'53.49" W
We started at the south-eastern edge of the island and swam north along the majority of the eastern side. There were sparse patches of *Halodule wrightii* scattered in this shallow area. Small clumps of oyster and rubble were present and covered in algae and barnacles. Stingray was observed.

SITE 3: Edge of expansion area south of turning basin, in eastern portion of channel:
Target: 27°48'24.91"N, 82°25'1.05"W; visibility was poor; water was *too deep to investigate via snorkel*.

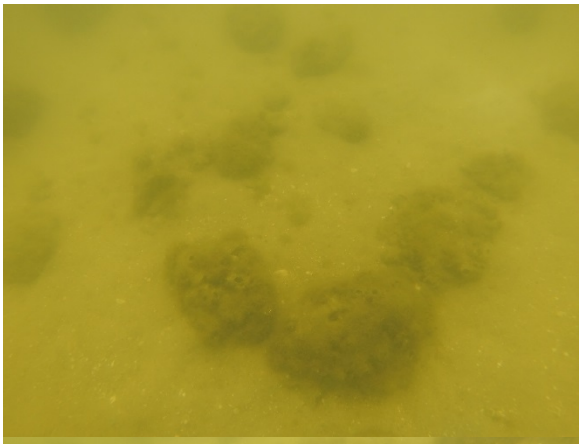
SITE 4: North-side of eastern portion of channel:
Target: 27°48'30.19"N, 82°25'3.41"W; visibility was poor; water was *too deep to investigate via snorkel*. However, this area has previously contained seagrass (2008 SWFWMD shapefile).

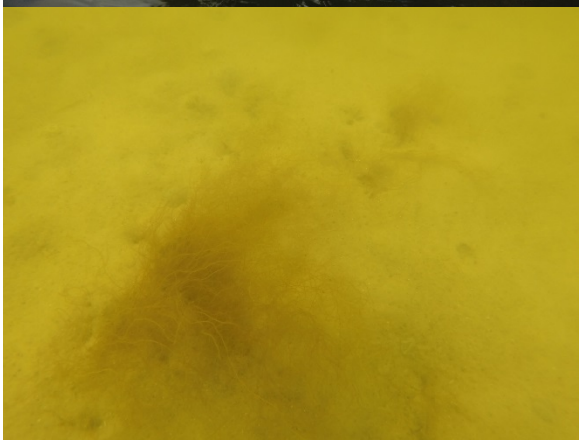
SITE 5: North-side of western portion of channel, southern edge of potential resources
Approximate location: 27º 48' 39.11" N, 82º 26' 36.13" W
Sand-flat with echinoderms (starfish, sand dollar, etc…). Some moderate sized shells were covered with algae, which could explain signature picked up by SWFWMD. Sand waves were present in one of the shallower areas.

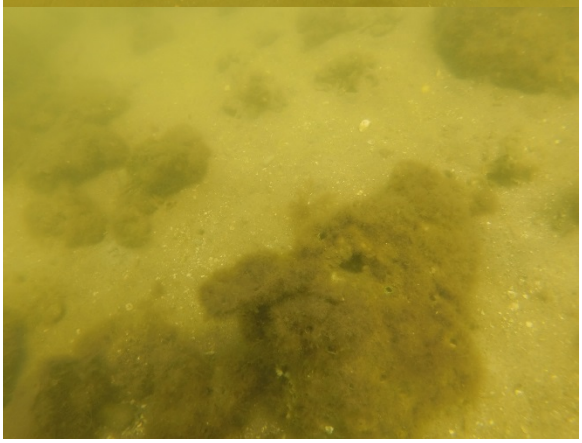
Site map with approximate locations

Site 1: Near seawall, oyster clumps and shell hash

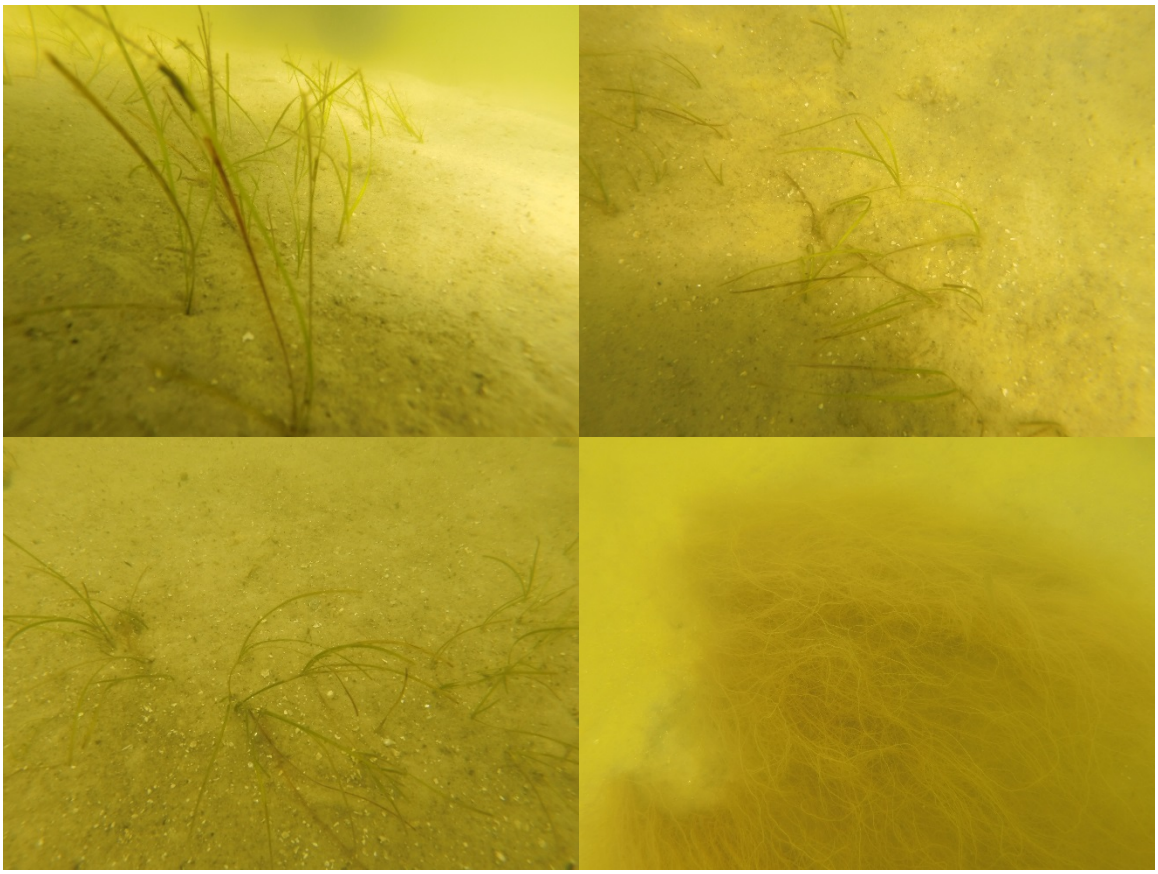
Site 2 West: Rubble and oyster clumps with red algae



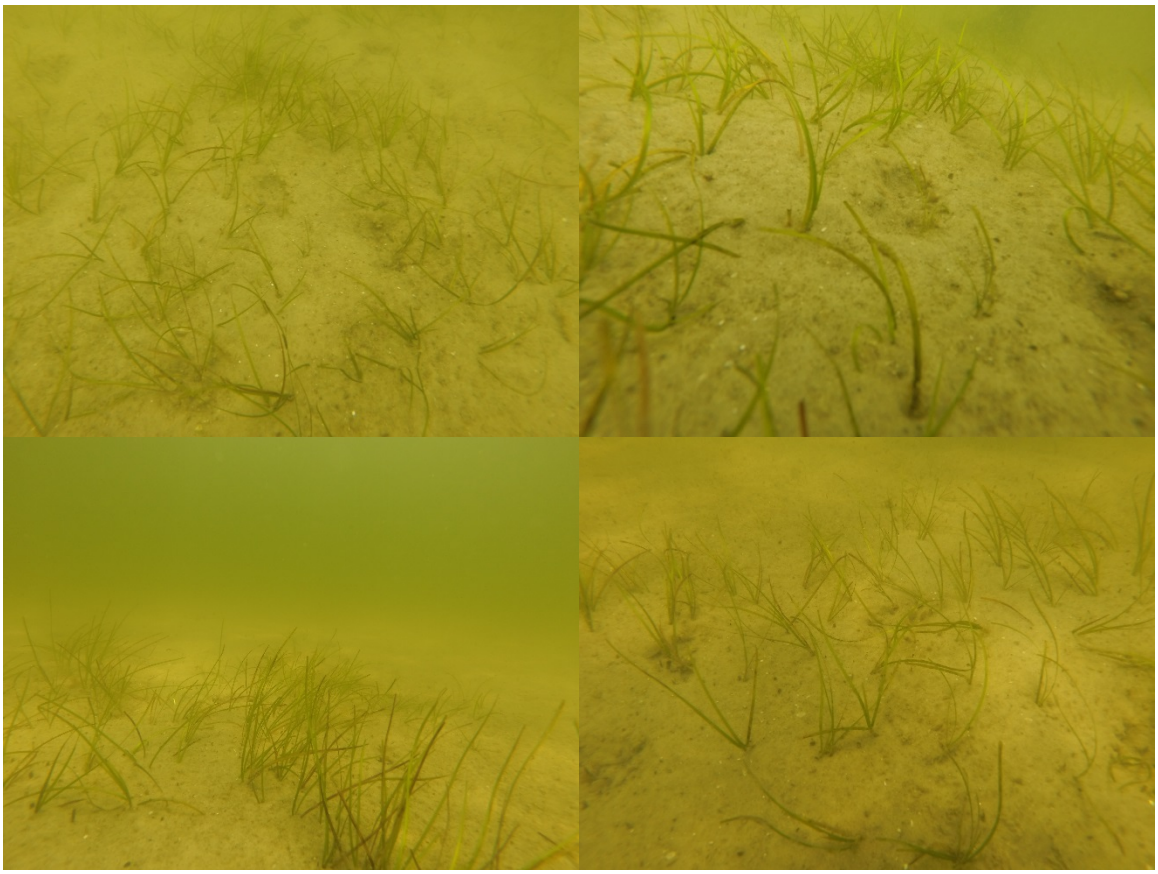




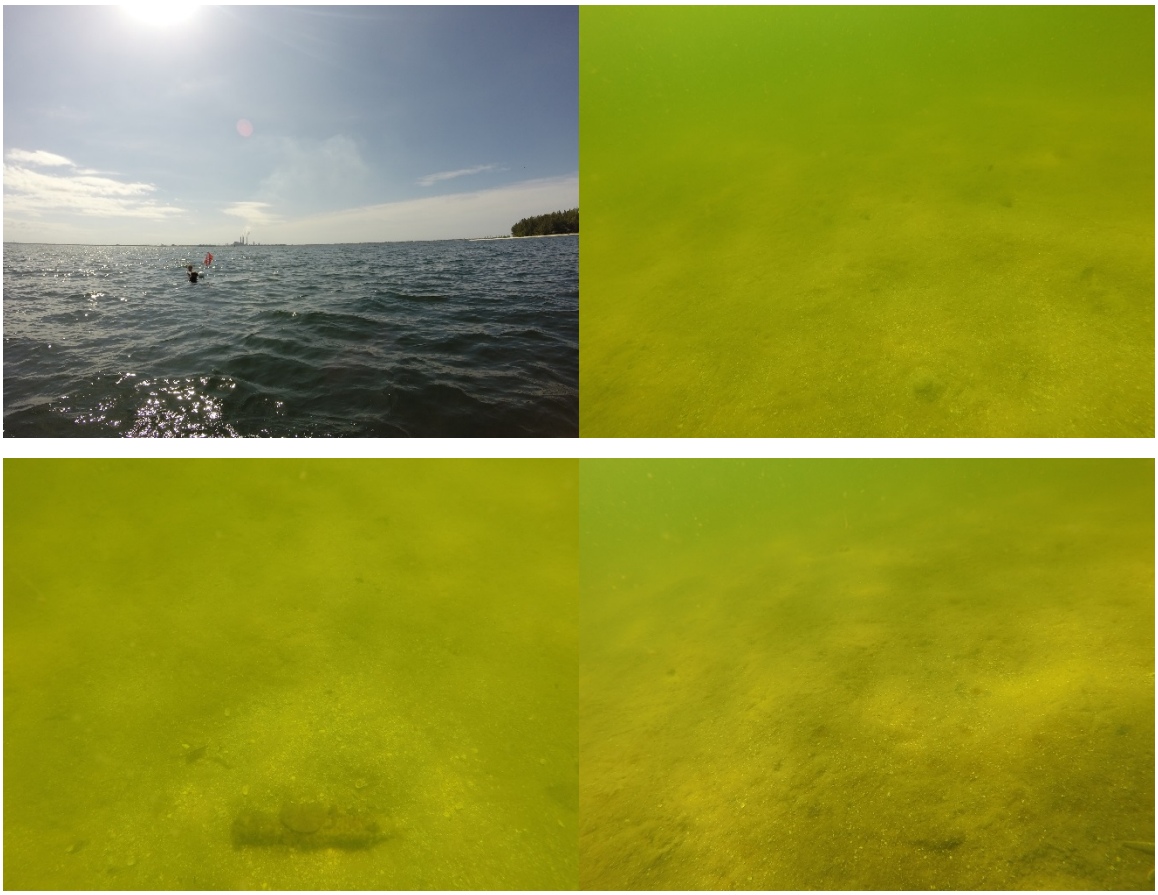
Site 2 North: Sparse *Halodule wrightii* and red algae



Site 2 South: *Halodule wrightii*



Site 5: Sand flat with echinoderms



From:	Mark Sramek - NOAA Federal
To:	DeMarco, Paul M SAJ
Subject:	Re: [EXTERNAL] Fwd: Tampa Big Bend Channel Site Visit (UNCLASSIFIED)
Date:	Thursday, July 10, 2014 3:59:24 PM

NOAA's National Marine Fisheries Service, Southeast Region, Habitat Conservation Division, has reviewed the proposed Department of the Army activity listed below. Based upon the results of Florida Department of Environmental Protection's seagrass survey conducted within portions of and areas adjacent to the project site on June 4, 2014, we anticipate any adverse effects that might occur on marine and anadromous fishery resources would be minimal and, therefore, do not object to the proposed activities.

On Thu, Jun 19, 2014 at 2:44 PM, DeMarco, Paul M SAJ <Paul.M.DeMarco@usace.army.mil> wrote:

> Thank you Kristina for the report. Attached is the overlay with the project footprint. Thanks, Paul DeMarco
>
> ---
>
> **From:** Mark Sramek - NOAA Federal [mailto:mark.sramek@noaa.gov]
> **Sent:** Thursday, June 19, 2014 11:53 AM
> **To:** May, Kristina
> **Cc:** Karch, Paul J SAJ; DeMarco, Paul M SAJ; Peter Plage; Klemm, Dennis
> **Subject:** [EXTERNAL] Fwd: Tampa Big Bend Channel Site Visit (UNCLASSIFIED)
>
> Hi Kristina,
>
> Thank you for your attached field report; have you or the USACE overlaid the proposed dredging footprint relative to the areas containing seagrasses and oyster habitats?
>
> This information would be helpful to quantify seagrass/oyster impacts, develop avoidance/minimization measures, and identify mitigation/contingency plans for unavoidable resource impacts.
>
> Thanks for your assistance.
> Mark
>
> On
>
> ---------- Forwarded message ----------
> From: Mark Sramek - NOAA Federal <mark.sramek@noaa.gov>
> Date: Thursday, June 19, 2014
> Subject: RE: Tampa Big Bend Channel Site Visit (UNCLASSIFIED)
> To: Kristina.May@dep.state.fl.us
>
> Automated reply: Thank you for your email. I will be out of the office beginning

Thursday, June 5 through Friday, June 20. I will respond to your message when I return to the office on Monday, June 23.

United States Department of the Interior

U. S. FISH AND WILDLIFE SERVICE

7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:
FWS Log No. 41910-2014-I-0144

August 22, 2014

Eric P. Summa
Chief, Environmental Branch
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Summa:

The U.S. Fish and Wildlife Service (Service) has reviewed the U.S. Army, Corps of Engineers' (Corps') April 2014 biological assessment (BA) for the proposed Tampa Harbor, Big Bend Channel Expansion and Maintenance Dredging Project (project), Hillsborough County, Florida, and its effects on the West Indian (Florida) manatee (*Trichechus manatus latirostris).* Your April 4, 2014, letter requested Service concurrence with the Corps' determination that the proposed project "may affect, but is not likely to adversely affect" the manatee. This response is provided in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*), and the Marine Mammal Protection Act of 1972 (MMPA), as amended (16 U.S.C. 1361 *et seq.*).

In addition to the April 2014 BA, we have also reviewed the Corps' March 2014 Supplemental Environmental Assessment for the proposed project and the associated Public Notice. The project was further discussed in an August 4, 2014, conference call between the Corps and Service. In subsequent emails of August 8, 2014, and August 19, 2014, the Corps provided the Service with a spreadsheet summarizing the measures that would be employed to avoid potential effects to the manatee and confirmation of additional measures agreed upon.

The proposed project would widen, deepen, and maintain the Big Bend Channel portion of the Tampa Harbor Federal Navigation Project. The Big Bend Channel is located along the eastern shore of Hillsborough Bay (Figure attached). The BA states that the existing channel does not allow shippers the optimal use of the current vessel fleet or allow for safe and economic transport of commodities. The proposed project would bring the Big Bend Channel to its 1999 authorized dimensions, 250-feet wide and 41-feet deep, plus 2 feet of allowable over-depth and 2 feet of advanced maintenance, a depth of 45 feet at mean low low water (MLLW). An additional 1 foot allowable over-depth due to presence of hard materials would increase the dredged depth to 46 feet at MLLW. The dredging may employ a hopper dredge, clamshell dredge, cutterhead dredge, and rock pretreatment.

Dredging would remove approximately 4.0 million cubic yards of material, of which approximately 500,000 cubic yards consists of consolidated rock. Widening would occur along the channel's northern edge over the channel length of 10,200 feet. Also included in the project would be the widening of the southwestern edge of the turning basin; the widening of the southeastern corner of the intersection of the turning basin and the east channel; and the deepening of these areas, the existing east channel, and inner channel to 46 feet. In addition, non-federal berthing areas north, south, and east of the east channel, and at the south end of the south channel would be deepened to 46 feet at 100 percent non-federal cost. Material removed by the dredging operation would be placed in either dredged material management area

that the annual shoaling rate of the Big Bend Channel would be 80,000 cubic yards per year, requiring maintenance dredging of approximately 720,000 cubic yards every 9 years.

Type of dredging equipment that would be used has not been determined, though use of a hydraulic cutterhead dredge seems likely. Pretreatment to break up rock prior to its removal by dredging may be required. This may include punchbarging (repeatedly dropping a chisel or spud from a barge onto the rock to cause fractures) or blasting. Should blasting be used, the Corps would work with agencies and non-governmental organizations to address concerns and potential impacts associated with blasting. A test blast program would be implemented, with results incorporated into procedures for a construction blasting plan.

The Florida manatee may be present year-round throughout the project area. Most of the project area is within the designated Apollo Beach/ Tampa Electric Company (TECO) Important Manatee Area (IMA). During cold weather large numbers of manatees congregate at the nearby outfall of the TECO Big Bend Power Plant. A designated manatee Warm Water Aggregation Area (WWAA) includes the east channel, inner channel, turning basin, and the non-federal berthing slips.

The Corps has agreed to conservation measures to be included in the plans and specifications for the proposed project. They include:

- Standard Manatee Conditions for In-water Work will be followed.
- No blasting or rock pre-treatment will occur November 1 through March 31.
- Two dedicated, qualified manatee observers will be present for dredging work conducted November 1 through March 31.
- No nighttime (dusk to dawn) clamshell dredging will be conducted.
- Qualified observers will be present for any clamshell dredging within the IMA/WWAA year round.
- A Blast and Watch Plan will be developed prior to any blasting activities and submitted to the Service and other agencies for review at least 30 days prior to blasting. The Blast and Watch Plan will be followed during blasting.
- Fendering shall be employed between large vessels when moored together or when moored to wharves or bulkheads to reduce the possibility of crushing a manatee.
- A log will be maintained detailing work activities and sightings, collisions, or injuries to protected marine species during the contract period.

The Corps has agreed to include the measures outlined above and further detailed in the April 2014 BA, and in August 8 and August 19 emails, to reduce the potential for impacts to the Florida manatee. Provided that all proposed measures are implemented, it is our position that the likelihood of take of a manatee or its habitat will be insignificant or discountable. As a result, we concur with the Corps' determination that the proposed project "may affect, but is not likely to adversely affect" the manatee. In addition, because no incidental take of manatees is anticipated, no such authorizations under the MMPA will be needed.

In September 2013, the rufa red knot (*Calidris canutus rufa*) was proposed for listing under the Act. The rufa red knot winters along the central Gulf Coast of Florida. In addition, red knots wintering south to as far as Tierra del Fuego migrate through the area. All Tampa Bay shorelines may, over time, support feeding or roosting red knot. As a proposed species under the Act, the Corps' responsibility is limited to assuring that its actions will not jeopardize the continued existence of the species. However, a final listing determination may occur and provisions of the Act may be in effect prior to project completion. While red knot have been reported from DMMAs 2D and 3D, we are not aware of their regular

occurrence. Based on the nature of the project and the limited information that is available on red knot use of beaches and shorelines in the immediate project area and nearby, we do not anticipate that the project will affect the red knot. We will revisit this conclusion as needed should the red knot be listed prior to project completion.

Although this does not represent a biological opinion as described in Section 7 of the Act, it does fulfill the requirements of the Act and no further action is required. Reinitiation of consultation is required if new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation; the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat not considered in this consultation; if unauthorized take of manatees occur during construction; or a new species is listed or critical habitat designated that may be affected by the action.

MIGRATORY BIRD TREATY ACT

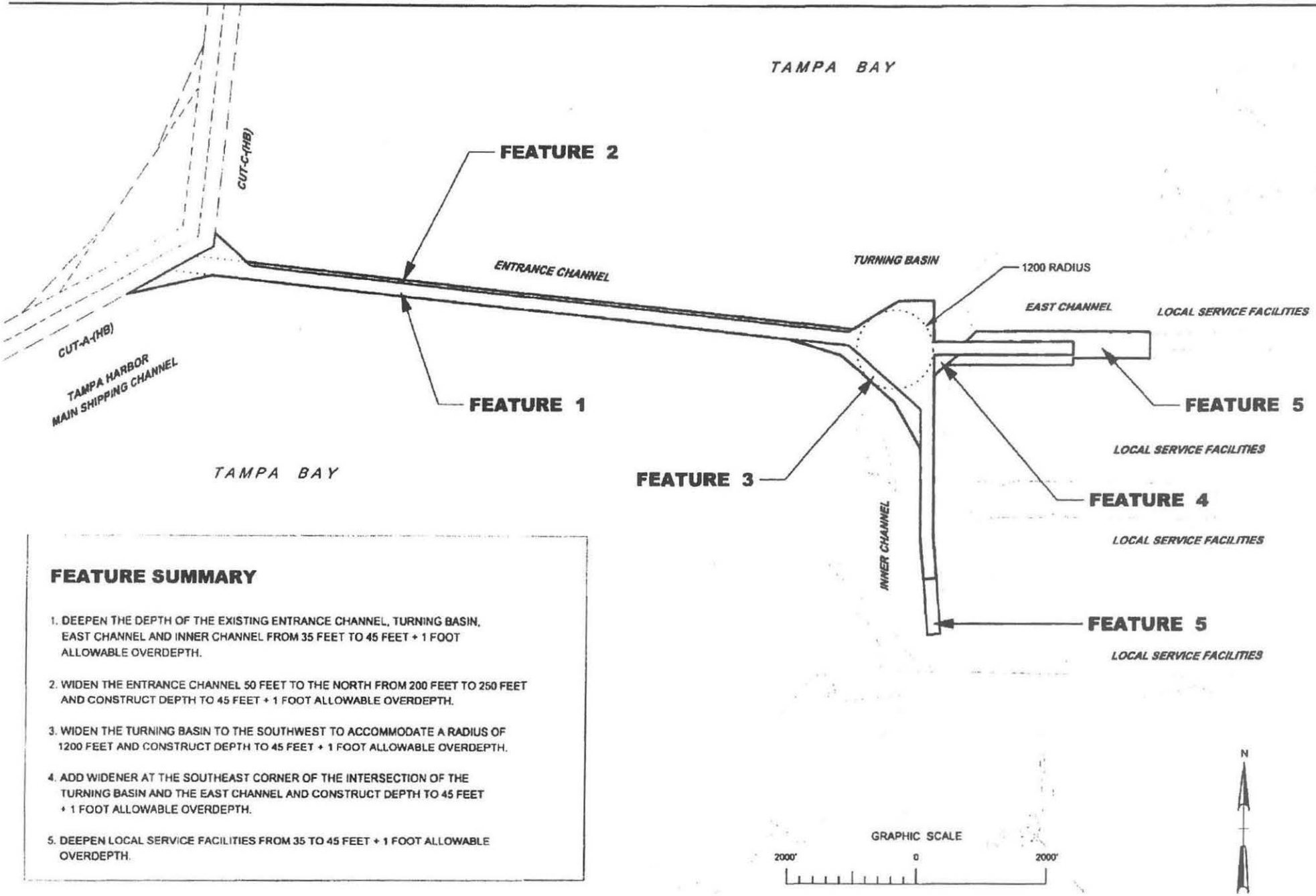
The proposed locations for dredged spoil disposal, DMMAs 2-D and 3-D, are significant migratory bird nesting sites. In order to comply with the Migratory Bird Treaty Act (16 U.S.C. 701 *et seq.*), if dredge material placement is to occur during the nesting season, April 1 through August 31, the DMMA will be flooded prior to prior to March 15 to prevent nesting within the active disposal area prior to use. In addition, the Corps will require nest monitoring weekly starting March 1 and daily April 1 through August 31 in accordance with its standard Migratory Bird Protection Plan specifications. Any nesting observed in advance of April 1 will prompt the initiation of daily monitoring. To ensure compliance with the MBTA, the Service further recommends that the Corps adhere to the additional guidance provided by the Florida Fish and Wildlife Conservation Commission (2014). Close coordination with the Audubon of Florida's Coastal Islands Sanctuaries' staff is also recommended, due to their extensive involvement and expertise with bird issues in this area.

Thank you for your cooperation in the effort to conserve fish and wildlife resources. Should you have additional questions or require clarification regarding this letter, please contact Peter Plage of my staff at 904-731-3085 or peter_plage@fws.gov.

Sincerely,

for Jay B. Herrington
Field Supervisor

cc: FWS, Havana, FL (Cindy Fury)
FWC, Tallahassee, Florida (Mary Duncan)
FWC, Lakeland, Florida (Nancy Douglas)



FEATURE SUMMARY

1. DEEPEN THE DEPTH OF THE EXISTING ENTRANCE CHANNEL, TURNING BASIN, EAST CHANNEL AND INNER CHANNEL FROM 35 FEET TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.
2. WIDEN THE ENTRANCE CHANNEL 50 FEET TO THE NORTH FROM 200 FEET TO 250 FEET AND CONSTRUCT DEPTH TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.
3. WIDEN THE TURNING BASIN TO THE SOUTHWEST TO ACCOMMODATE A RADIUS OF 1200 FEET AND CONSTRUCT DEPTH TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.
4. ADD WIDENER AT THE SOUTHEAST CORNER OF THE INTERSECTION OF THE TURNING BASIN AND THE EAST CHANNEL AND CONSTRUCT DEPTH TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.
5. DEEPEN LOCAL SERVICE FACILITIES FROM 35 TO 45 FEET + 1 FOOT ALLOWABLE OVERDEPTH.

US Army Corps of Engineers

WQC PERMIT PLATE
NOT FOR CONSTRUCTION

DEPARTMENT OF THE ARMY

Dsn by: SRC
Dwn by: MR2
Ckd by: LRP
Dated:

TAMPA HARBOR, FLORIDA
BIG BEND CONSTRUCTION AND MAINTENANCE DREDGING
WQC PERMIT PLATE

DEEPENING PROJECT FEATURES OVERVIEW

PLATE
G-03

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

BOB MARTINEZ CENTER
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
LT. GOVERNOR

JONATHAN P. STEVERSON
SECRETARY

ENVIRONMENTAL RESOURCE PERMIT

PERMITTEE:
U.S. Army Corps of Engineers
Jacksonville District
Attn: Eric P. Summa, Chief
Planning Environmental Branch
701 San Marco Boulevard
Jacksonville, FL 32207

PERMIT INFORMATION:
Permit Number: 0157891-017-BI

Project Name: Tampa Harbor, Big Bend Channel Expansion

County: Hillsborough

Issuance Date: April 8, 2015

Expiration Date of Construction Phase: April 8, 2020

REGULATORY AUTHORIZATION:

This permit is issued under the authority of Part IV of Chapter 373, Florida Statutes (F.S.), and Title 62, Florida Administrative Code (F.A.C.). Pursuant to Operating Agreements executed between the Department of Environmental Protection (Department) and the water management districts, as referenced in Chapter 62-113, F.A.C., the Department is responsible for reviewing and taking final agency action on this activity.

PROJECT DESCRIPTION:

The project is to deepen and/or widen and then maintain the Big Bend portion of the Tampa Harbor Federal Navigation Project including the Big Bend entrance channel, turning basin, inner channel and east channel, and deepen two non-federal berths located in the inner channel and east channel. The entire project will be deepened to -45 feet mean lower low water (MLLW) with a one-foot allowable overdepth for a maximum dredge depth of -46 feet MLLW. The bottom of the Big Bend entrance channel will be widened 50 feet to the north, and the turning basin will be widened to accommodate a turning circle with a radius of 1,200 feet. A widener will be added between the inner channel and east channel. Approximately 4 million cubic yards of material will be dredged and deposited at Spoil Island 3D.

PROJECT LOCATION:

The dredging activities are located in the Big Bend entrance channel, turning basin, inner channel and east channel in Port Tampa Bay, Sections 03 and 09, Township 31 South, Range 19 East. Spoil Island 3D is located in Section 31, Township 30 South, Range 19 East. Both the dredging and disposal activities are located on the east side of Tampa Bay, Class III Florida Waters in Hillsborough County, not sovereign submerged lands.

PROPRIETARY AUTHORIZATION:

As staff to the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees), the Department has determined that the activity is not located on submerged lands owned by the State of Florida. Therefore, your project is not subject to the requirements of Chapter 253, F.S. or Chapter 18-21, F.A.C.

COASTAL ZONE MANAGEMENT:

This permit constitutes a finding of consistency with Florida's Coastal Zone Management Program, as required by Section 307 of the Coastal Zone Management Act.

WATER QUALITY CERTIFICATION:

This permit constitutes certification of compliance with state water quality standards pursuant to Section 401 of the Clean Water Act, 33 United States Code (U.S.C.) § 1341.

AGENCY ACTION:

The above-named Permittee is hereby authorized to construct the work outlined in the Project Description and Project Location of this permit, and as shown on the approved permit drawings, plans and other documents attached hereto. This agency action is based on the information submitted to the Department as part of the permit application, and adherence with the final details of that proposal shall be a requirement of the permit. **This permit is subject to both the General and Specific Conditions, which are a binding part of this permit.** Both the Permittee and their Contractor are responsible for reading and understanding this permit (including the permit conditions and the approved permit drawings) prior to commencing the authorized activities, and for ensuring that the work is conducted in conformance with all the terms, conditions and drawings.

GENERAL CONDITIONS:

1. This permit, including its general and specific conditions, must be construed in light of the February 28, 2006 Interagency Coordination Agreement for Civil Works Projects (ICA) between the Department and the U.S. Army Corps of Engineers (Corps). As recognized in the ICA, the Department has the authority to include reasonable conditions in this permit. All of the conditions in this permit, both general and specific, are enforceable to the extent sovereign immunity has been waived under 33 U.S.C. §§ 1323 and 1344(t). The ICA is incorporated herein by reference.
2. All activities approved shall be implemented as set forth in the drawings incorporated by reference and in compliance with the conditions and requirements of this document. The Corps shall notify the Department in writing of any anticipated changes in:

    a) operational plans;
    b) project dimensions, size or location;
    c) ability to adhere to permit conditions;

d) project description included in the permit;
e) monitoring plans.

If the Department determines that a modification to the permit is required then the Corps shall apply for and obtain the modification. Department approval of the modification shall be obtained prior to implementing the change, unless the change is determined by the Department to reduce the scope of work from that authorized under the original permit, and will not affect compliance with permit conditions or monitoring requirements.

3. If, for any reason, the Corps does not comply with any condition or limitation specified herein, the Corps shall immediately provide the Department with a written report containing the following information:

a) a description of and cause of noncompliance;
b) the period of noncompliance, including dates and times;
c) impacts resulting or likely to result from the non-compliance;
d) steps being taken to correct the non-compliance; and
e) the steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

Compliance with the provisions of this condition shall not preclude the Department from taking any enforcement action allowed under state law with respect to any non-compliance.

4. The Corps shall obtain any applicable licenses, permits, or other authorizations which may be required by federal, state, local or special district laws and regulations. Nothing herein constitutes a waiver or approval of other Department permits or authorizations that may be required for other aspects of the total project.

5. Nothing herein conveys to the Corps or creates in the Corps any property right, any interest in real property, any title to land or water, constitutes State recognition or acknowledgment of title, or constitutes authority for the use of Florida's sovereign submerged lands seaward of the mean high-water line or an established erosion control line, unless herein provided, and the necessary title, lease, easement, or other form of consent authorizing the proposed use has been obtained from the State.

6. Any delineation of the extent of a wetland or other surface water submitted as part of the application, including plans or other supporting documentation, shall not be considered specifically approved unless a specific condition of this authorization or a formal determination under section 373.421(2), F.S., provides otherwise.

7. Nothing herein authorizes any entrance upon or activities on property which is not owned or controlled by the Corps or local sponsor, or conveys any vested rights or any exclusive privileges.

8. This document or a copy thereof, complete with all conditions, attachments, modifications, and time extensions shall be kept at the work site of the authorized activity. The Corps shall require the contractor to review this document prior to commencement of the authorized activity.

9. The Corps specifically agrees to allow Department personnel with proper identification, at reasonable times and in compliance with Corps specified safety standards access to the premises where the authorized activity is located or conducted for the purpose of ascertaining compliance with the terms of this document and with the rules of the Department and to have access to and copy any records that must be kept; to inspect the facility, equipment, practices, or operations regulated or required; and to sample or monitor any substances or parameters at any location reasonably necessary to assure compliance. Reasonable time may depend on the nature of the concern being investigated.

10. At least forty-eight (48) hours prior to the commencement of authorized activity, the Corps shall submit to the Department a written notice of commencement of activities indicating the anticipated start date and the anticipated completion date.

11. If historic or archaeological artifacts such as, but not limited to, Indian canoes, arrow heads, pottery or physical remains, are discovered at any time on the project site, the Corps shall immediately stop all activities in the immediate area which disturb the soil and notify the Department and the State Historic Preservation Officer. In the event that unmarked human remains are encountered during permitted activities, all work shall stop in the immediate area and the proper authorities notified in accordance with Section 872.05, *Florida Statutes*.

12. Within a reasonable time after completion of construction activities authorized by this permit, the Corps shall submit to the Department a written statement of completion. This statement shall notify the Department that the work has been completed as authorized and shall include a description of the actual work completed. The Department shall be provided, if requested, a copy of any as-built drawings required of the contractor or survey performed by the Corps.

SPECIFIC CONDITIONS:

1. All reports, notices or other submittals relating to this permit shall be electronically submitted to the Department's JCP Compliance Officer (e-mail address: JCPCompliance@dep.state.fl.us), unless otherwise specified in the specific conditions.

All submittals shall clearly indicate the project name (Tampa Harbor, Big Bend Channel Expansion) and the permit number (0157891-017-BI).

2. **Pre-Construction Conference.** The Permittee shall conduct a pre-construction conference prior to construction to review the specific conditions and monitoring requirements of this permit with the Permittee's contractors, the engineer of record, those responsible for turbidity monitoring, the JCP Compliance Officer (or designated alternate), and a representative from the Florida Fish and Wildlife Conservation Commission (FWC) (phone: (850) 922-4330, email: imperiledspecies@myfwc.com). The Permittee is advised to contact the JCP Compliance Officer to schedule the pre-construction conference at least fourteen days prior to the construction commencement date in order to ensure that appropriate representatives are available.

   The Permittee is also advised to schedule the pre-construction conference at least a week prior to the construction commencement date. At least seven days in advance of the pre-construction conference, the Permittee shall provide notification, advising the participants of the agreed-upon date, time and location of the meeting, a meeting agenda and a teleconference number.

3. **Pre-Construction Submittals.** The Permittee shall not commence construction until the Permittee has received written acknowledgement from the Department. At least **10 business days** prior to the date of the pre-construction conference, the Permittee shall submit the following items for review and confirmation by the Department:

   a. **Final Plans and Specifications**, which shall be consistent with the project description of this permit and the approved permit drawings. The Permittee shall point out any deviations from the project description or the approved permit drawings. Any significant changes shall require a permit modification. The final plans and specifications submitted under this condition shall comply with all conditions set forth in this permit. The final plans and specifications shall be certified by an engineer duly-registered pursuant to the Interagency Coordination Agreement of February 28, 2006, and Chapter 471, F.S.

   b. A **Signed and Certified Report** from a project engineer on the suitability of Spoil Island 3D, based on a site inspection conducted within 60 days prior to construction. The report shall state that the integrity of the dikes has been verified, weirs and associated outfall structures are functional, and that the dredge disposal site will adequately contain and treat the sediment-laden water generated by the dredging activities authorized by this permit. The report shall include a brief summary of the engineer’s site inspection addressing, as applicable, the capacity of the disposal site, the visual condition of the dikes, and the status of the inlet/outfall pipes and weir structures.

c. A copy of the contractor's **Environmental Protection Plan** (EPP), or equivalent, which provides project-specific details for monitoring fish and wildlife during construction, as well as steps that will be followed to address any unavoidable listed species Take that may occur. A list of dedicated protected marine species observers, their contact information and qualifications shall also be included in the EPP.

d. Anticipated construction schedule, a detailed description of the proposed construction methods including the specific type of dredge equipment to be used, and a map that clearly shows all of the proposed work spaces (i.e., anchoring areas, pipeline corridors, staging areas, boat access corridors, etc.).

e. The names, credentials and contact information for the individuals who will conduct the turbidity monitoring. The turbidity monitor(s) shall have both formal training in turbidity monitoring and professional experience in monitoring turbidity for navigation projects in Florida. The turbidity monitor(s) shall also be independent of both the design engineer and the construction contractor.

4. At least 48 hours prior to the commencement of construction, the Permittee shall submit a completed Construction Commencement Notice (Exhibit 2) to the JCP Compliance Officer via email at JCPCompliance@dep.state.fl.us, and shall copy FWC at imperiledspecies@myfwc.com.

5. **Dredge Disposal site inspections** (including dikes, weirs and associated outfall structures) shall be conducted on each day that the site is in use during dredging. Additional inspections are required 30 days and 12 months after final placement of dredged material in the disposal area(s). Corrective actions to stabilize the disposal area shall be taken immediately if at any time the integrity of the disposal area dikes or other structures appears compromised. The Permittee shall obtain written approval from the Department prior to any adjustments or alterations to the disposal area unless the adjustment is necessary to prevent an immanent breach, in which case the details of the adjustment shall be reported to the Department immediately following the corrective action. A summary of the inspections required in this paragraph and any required corrective actions shall be submitted to the Department in a final report, signed and sealed by a project engineer, within 60 days of the final inspection.

6. **Pipeline Inspection and Maintenance.** If hydraulic dredging is used, material may be transported to Spoil Island 3D via pipeline. A visual inspection of the pipeline from the dredge area to the discharge point shall be conducted twice daily during all dredge disposal operations. If any leaks, cuts, breaks or discharges of any type are detected, the inspector shall radio the dredge immediately to order shutdown of the dredge. Turbidity within any visible plumes shall be measured as soon as possible in the densest part of the plume, and continue hourly until water quality standards are met (i.e., less than 29 Nephelometric Turbidity Units (NTUs) above background) in comparison to an

appropriate background location at least 100 meters upcurrent of the source. The dredge shall remain shut down until such time that leaks, breaks, abrasions or discharges of any kind are repaired. Upon completion of repairs, the inspector shall remain in the area of the repair in constant radio communication with the dredge during the recommencement of dredging. If the inspector observes any discharge or other repair failure, he shall radio the dredge immediately to order shutdown of the dredge, and repairs shall commence again. The inspector or a substitute of equivalent status and experience shall remain at the site of the repair failure until successful repair is verified. Once repairs are completed and verified, the inspector shall notify the Permittee and the Department's JCP Compliance Officer with a written summary of the incident, including the results of any turbidity measurements.

7. The maximum **mixing zone** for turbidity shall be a circle with a radius of 150 meters, originating from the dredge or from the outfall pipe at Spoil Island 3D. Beyond the mixing zone, the turbidity standard shall be met during all project-related activities, including dredging, transport, transfer of dredged material from a barge into the disposal site, and discharge of return water from disposal site. Monitoring shall be conducted as follows:

a. Dredge Site:

Frequency: Three times daily, approximately four hours apart, during all dredging activities. Sampling shall be conducted **while the highest project-related turbidity levels are crossing the edge of the mixing zone**. Since turbidity levels can be related to pumping rates, the dredge pumping rates shall be recorded, and provided to the Department upon request. The compliance samples and the corresponding background samples shall be collected at approximately the same time, i.e., one shall immediately follow the other.

Location: **Background:** Samples shall be collected at surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above the bottom, at least 300 meters upcurrent from the source of turbidity at the dredge site, clearly outside the influence of any artificially-generated turbidity plume.

Compliance: Samples shall be collected at surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above the bottom, no more than 150 meters downcurrent from the source of turbidity at the dredge or at the edge of the closest downcurrent seagrass bed, whichever is closest, within the densest portion of any visible turbidity plume. If no plume is visible, follow the likely direction of flow.

b. Outfall from Spoil Island 3D:

Frequency: Three times daily and at least four hours apart during discharge, starting approximately 30 minutes following commencement of discharge.

Location: **Background:** Mid-depth, at a point at least 500 meters upcurrent from the nearest discharge point, where turbidity levels would be comparable to the outfall site in the absence of this project, clearly outside of any turbidity generated by the project or other obvious plume.

Compliance: Mid-depth, no more than 100 meters down current from the discharge point at Spoil Island 3D, within the densest portion of the turbidity plume.

Calibration: The instruments used to measure turbidity shall be fully calibrated with primary standards within one month of commencement of the project, and at least once a month throughout the project. Calibration with secondary standards shall be verified each morning prior to use, after each time the instrument is turned on, and after field sampling using two secondary turbidity "standards" that bracket the anticipated turbidity samples. If the post-sampling calibration value deviates more than 8% from the previous calibration value, results shall be reported as estimated and a description of the problem shall be included in the field notes.

Analysis of turbidity samples shall be performed in compliance with DEP-SOP-001/01 FT 1600 Field Measurement of Turbidity:
http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/2008sops/ft1600.pdf

If the turbidity monitoring protocol specified above prevents the collection of accurate data, the person in charge of the turbidity monitoring shall contact the JCP Compliance Officer to establish a more appropriate protocol. Once approved in writing by the Department, the new protocol shall be implemented through an administrative permit modification.

8. The **compliance** locations given above shall be considered the limits of the temporary mixing zone for turbidity allowed during construction. If monitoring reveals that turbidity levels at the **compliance** sites are greater than 29 NTUs above the corresponding background turbidity levels, construction activities shall **cease immediately** and shall not resume until corrective measures have been taken and turbidity has returned to acceptable levels. Any such occurrence shall also be immediately reported to the JCP Compliance Officer via email at JCPCompliance@dep.state.fl.us and include in the subject line, "TURBIDITY EXCEEDANCE", and the project name and permit number.

Any project-related turbidity source other than dredging or decant water discharging from the dredge disposal site outfall structure (e.g., scow or pipeline leakage) shall be monitored as close to the source as possible. If the turbidity level exceeds 29 NTUs above background, the construction activities related to the exceedance shall **cease immediately** and not resume until corrective measures have been taken and turbidity has returned to acceptable levels. This turbidity monitoring shall continue every hour until background turbidity levels are restored or until otherwise directed by the Department. The Permittee shall notify the Department, by separate email to the JCP Compliance Officer, of such an event within 24 hours of the time the Permittee first becomes aware of the discharge. The subject line of the email shall state "OTHER PROJECT-RELATED DISCHARGE, TURBIDITY EXCEEDANCE".

When reporting a turbidity exceedance, the following information shall also be included:

a. Project name;

b. Permit number;

c. Location and level (NTUs above background) of the turbidity exceedance;

d. Time and date that the exceedance occurred; and

e. Time and date that construction ceased.

Prior to re-commencing construction, a report shall be emailed to the JCP Compliance Officer with the same information that was included in the "Exceedance Report", plus the following information:

a. Turbidity monitoring data collected during the shutdown documenting the decline in turbidity levels and achievement of acceptable levels;

b. Corrective measures that were taken; and

c. Cause of the exceedance.

9. **Turbidity Reports:** All turbidity monitoring data shall be submitted within one week of collection. The data shall be presented in tabular format, indicating the measured turbidity levels at the compliance sites for each depth, the corresponding background levels at each depth, and the number of NTUs above background at each depth. Any exceedances of the turbidity standard (29 NTUs above background) shall be highlighted in the table. In addition to the raw and processed data, the reports shall also contain the following information:

a. Time of day samples were taken;

b. Dates of sampling and analysis;

c. GPS location of sample;

d. Depth of water body;

e. Depth of each sample;

f. Antecedent weather conditions, including wind direction and velocity;

g. Tidal stage and direction of flow;

h. Water temperature;

i. A map, overlaid on an aerial photograph, indicating the sampling locations, dredging and discharge locations, and direction of flow. A sample map shall reviewed and approved by the Department prior to construction;

j. Statement describing the methods used in collection, handling, storage and analysis of the samples; and a

k. Statement by the individual responsible for implementation of the sampling program concerning the authenticity, precision, limits of detection, calibration of the meter, accuracy of the data and precision of the GPS measurements.

l. When samples cannot be collected, include an explanation in the report. If unable to collect samples due to severe weather conditions, include a copy of a current report from a reliable, independent source, such as an online weather service.

Manatee and Marine Turtle Protection Conditions for Dredging Activities:

10. All personnel associated with the project shall be instructed about the presence of marine turtles, manatees and manatee speed zones, and the need to avoid collisions with (and injury to) these protected marine species. The Permittee shall advise all construction personnel 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.

11. 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 shall follow routes of deep water whenever possible.

12. Siltation or turbidity barriers (if used) shall be made of material in which manatees and marine turtles cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid entanglement or entrapment. Barriers shall not impede manatee or marine turtle movement.

13. All on-site project personnel are responsible for observing water-related activities for the presence of marine turtles and manatees. **All in-water activities, including vessel operations, shall be shut down if a marine turtle or manatee comes within 50 feet of the activity.** Activities shall not resume until the animal(s) has moved beyond a 50-foot radius of the project operation, or until 30 minutes elapses if the animal(s) has not reappeared within 50 feet of the operation. Animals shall not be herded away or harassed into leaving.

14. Any collision with or injury to a manatee shall be reported immediately to the FWC Hotline at 1-888-404-3922, and to FWC at imperiledspecies@myfwc.com.

15. Any collision with and/or injury to a marine turtle shall be reported immediately to the Sea Turtle Stranding and Salvage Network (STSSN) at SeaTurtleStranding@myfwc.com. Care shall be taken when handling sick or injured marine turtle specimens to ensure effective treatment and care, and when handling dead marine turtle specimens to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

16. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs shall be removed by the Permittee upon completion of the project. Temporary signs that have already been approved for this use by FWC shall be used. One sign that reads *Caution Boaters: Watch for Manatees* shall 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 shall be posted in a location prominently visible to all personnel engaged in water-related activities. Questions concerning these signs can be sent to FWC at imperiledSpecies@myfwc.com.

17. Between November 15 and March 31, at least two dedicated protected marine species observers shall be on the dredge when in-water work is being performed. The observers shall perform no other duties that may interfere with their ability to observe for protected marine species (such as manatees, marine turtles, dolphins, etc.) during dredging activities. That person shall have significant prior on-the-job experience observing for protected marine species (including manatees) during previous dredging events where the activities were similar in nature to this project. Observers shall be equipped with polarized sunglasses to aid in observation during the daytime.

18. A log detailing work activities, sightings, collisions, or injuries to protected marine species during the contract period shall be maintained. Observer logs and a report summarizing incidents and sightings shall be submitted to FWC at imperiledspecies@myfwc.com. Logs and a report shall be submitted within 30 days following each event, which is defined as the time period between when mobilization of equipment begins and when demobilization of equipment ends, or submitted on an annual basis, for multi-year projects.

19. **Clamshell dredging is prohibited at night (dusk to dawn) year round.**

Hopper Dredging Conditions (if utilized):

20. Handling of marine turtles captured during hopper dredging activities shall be conducted only by persons with prior experience and training in these activities and who is duly authorized to conduct such activities through a valid permit issued by FWC, pursuant to Chapter 68E-1, F.A.C.

21. Any activity involving the use of nets to harass and/or to capture and handle marine turtles in Florida waters requires a marine turtle permit from FWC. Permits may be obtained by contacting FWC's Imperiled Species Management Section at MTP@myfwc.com.

22. The Permittee or their contractor shall e-mail FWC at MTP@myfwc.com weekly reports on Friday each week that trawling is conducted in Florida waters. These weekly reports shall include the species and number of marine turtles captured in Florida waters, their general health, and release information. A summary (FWC provided Excel spreadsheet) of all trawling activity shall be submitted to MTP@myfwc.com by January 15 of the following year or at the end of the project. The summary shall include trawling, all marine turtles captured in Florida waters, measurements of the turtles, the latitude and longitude (in decimal degrees) of captures and tow start-stop points, and times for the start-stop points of the tows, including those tows in which no marine turtles are captured.

23. The Permittee shall notify the STSSN Coordinator at 904-573-3930 or via e-mail at Allen.Foley@myfwc.com of the start-up and completion of hopper dredging operations. In the event of capturing or recovering marine turtles or marine turtle parts, the Permittee shall contact the STSSN at seaturtlestranding@myfwc.com.

Manatee and Marine Turtle Protection Conditions for Blasting Activities (if utilized):

24. Blasting activities shall only occur during daylight hours and are prohibited between November 15 and March 31 of any year.

25. A **Blast and Watch Plan** (BWP) shall be developed and submitted to FWC at imperiledspecies@myfwc.com and Allen.Foley@myfwc.com at least 30 days prior to any blasting activities. The BWP shall specify protected marine species (such as manatees, marine turtles, dolphins, etc.) and protection measures employed, before, during and after each blast. The BWP shall adequately incorporate all protection requirements for a blast and watch program and shall be followed during all blasting events (including testing). Any modifications to the plan shall be coordinated with these entities prior to implementation. These entities and the JCP Compliance Officer shall also be notified at the initiation and completion of all in-water blasting events.

26. The following elements of a blast program shall be incorporated into the BWP: The amount of explosive charge proposed, the explosive charge's equivalency in TNT, how it will be executed (depth of drilling, stemming, amount of time between delays, etc.), a drawing depicting the placement of the charges, size of the safety radius and how it will be marked (also depicted on a map), tide tables for each blasting event, and estimates of times and days for blasting events (with an understanding this is an estimate, and may change due to weather, equipment, etc). This information shall be recorded by the protected marine species observer lead for each blasting event, and shall be included in a final report to FWC. For each explosive charge placed, three zones shall be calculated, denoted on monitoring reports, and provided to protected species observers before each blast for incorporation in the watch plan for each planned detonation.

    These zones are:

    a. Danger/Exclusion Zone: The distance in feet from blast (radius) = ($260\ w^{1/3}$) + 500 feet. The "w" is the maximum charge weight (in tetryl or TNT pounds) per delay of an individual confined shot. Detonation shall not occur if a marine animal is known to be (or based on previous sightings, may be) within this circular area around the detonation site.

    b. Safety Zone: The distance in feet from blast (radius) = ($520\ w^{1/3}$). The "w" is the maximum charge weight (in tetryl or TNT pounds) per delay of an individual confined shot. Any marine animal within this circular area around the Danger/Exclusion Zone shall be monitored continuously. Detonation shall not occur if a marine animal appears to be traveling towards and nears the Danger/Exclusion Zone and detonation site during countdown.

    c. Watch Zone: Three times the radius of the Danger/Exclusion Zone. This is the minimum watch distance to ensure that marine animals entering or traveling close to the exclusion and safety zones are spotted and appropriate actions can be implemented before or as the animal enters the exclusion zone (i.e., a delay in blasting activities).

27. The following shall be included in the BWP: a list of the observers and their contact information; detailed information regarding their qualifications; and the proposed positions for the watch, including a map depicting the proposed locations for boat or land-based observers. Qualified observers shall have significant, prior, on the job experience observing for protected marine species during previous in-water blasting events where the blasting activities were similar in nature to this project. Each observer's past experience shall: 1) be in the same observer position proposed for this project; 2) include experience working as part of an observation team during an in-water blasting project; and 3) have extensive manatee or sea turtle observation experience during previous dredging or blasting projects and/or during manatee or sea turtle research studies.

28. A formal coordination meeting shall be held at least two days prior to the first blast event. Attendees shall include the observers in the watch program, construction contractors, demolition subcontractors, and other interested parties, such as FWC. The construction contractors, demolition subcontractors and observers shall present the protocol and logistics of the project.

29. The watch program shall consist of a minimum of six observers and one coordinator. There shall be a minimum of one aerial survey observer, with the other observers elevated in positions on boats or on land, depending upon the specific project. Each observer shall be equipped with a two-way radio that shall be dedicated exclusively to the watch. Extra radios shall be available in case of failures. All of the observers shall be in close communication with the blasting subcontractor in order to halt the blast event if the need arises. If all observers do not have working radios and cannot contact the primary observer and the blasting subcontractor during the pre-blast watch, the blast shall be postponed until all observers are in radio contact. Observers shall also be equipped with polarized sunglasses, binoculars, a red flag for backup visual communication, and a sighting log with a map to record sightings. All blasting events shall be weather dependent. Climatic conditions shall be suitable for optimal viewing conditions, as determined by the observers.

30. The watch program shall include a continuous aerial survey to be conducted by aircraft, as approved by the Federal Aviation Administration. The event shall be halted if an animal(s) is spotted within the Danger/Exclusion Zone. An "all-clear" signal shall be obtained from the aerial observer before detonation can occur. The blasting event shall be halted immediately upon request of any of the observers. If animals are sighted in the Danger/Exclusion Zone, the blast event shall not take place until the animal(s) moves out of the area under its own volition. Animals shall not be herded away or harassed into leaving. Specifically, the animals shall not be intentionally approached by project watercraft. If the animal(s) is not sighted a second time, the event may resume 30 minutes after the last sighting.

31. The watch program shall begin at least one hour prior to the scheduled start of blasting to identify the possible presence of manatees, dolphins, or marine turtles. The watch program shall continue until at least one half-hour after detonations are complete.

32. If any one of the blast or watch conditions is not met prior to or during the blasting, the watch observers shall have the authority to terminate the blasting event, until resolution can be reached with the Contracting Officer. The Contracting Officer or their representative shall contact FWC, as appropriate.

33. If an injured or dead marine mammal or marine turtle is sighted after the blast event, the observers shall maintain contact with the injured or dead animal until authorities arrive. The observer coordinator shall contact the Contracting Officer, or their representative, who will contact FWC.

34. After each blasting event, the observers and contractors shall evaluate any problems encountered during blasting events and logistical solutions shall be presented to the Contracting Officer. Corrections to the watch or blast programs and BWP shall be made prior to the next blasting event.

    a. If an injured or dead marine mammal or marine turtle is sighted after the blast event, blasting shall be postponed until consultations are completed and determinations can be made of the cause of injury or mortality. If blasting injuries are documented, all demolition activities shall cease until a revised plan addressing the likely cause of injury or death is agreed upon by the Permittee and FWC. In the event of an injury or death, the Permittee shall contact FWC at the FWC Hotline: 1-888-404-FWCC and 850-922-4330 (manatees and marine turtles).

    b. Within 30 days after completion of all blasting events, the observer coordinator shall submit a report to FWC providing a description of the event, the number and location of animals seen and what actions were taken when animals were seen. Any problems associated with the event, and suggestions for improvements, shall also be documented in the report.

Nesting Seabird and Shorebird Conditions:

35. **Pre-Construction Meeting.** A meeting between representatives of the contractor, FWC, and Bird Monitors as appropriate, shall be held prior to commencement of construction. Notification of the proposed meeting to FWC shall be at least ten business days before the date of that meeting. The FWC Regional Species Conservation Biologist shall be invited (see Exhibit 3 for contact information). The purpose of this meeting is to ensure that the Permittee fully understands the wildlife protection measures and site-specific measures that need to be taken before, during, and after construction. This meeting may

be combined with the pre-construction conference that is required in Specific Condition 2.

36. Nesting seabird and shorebird (i.e., shorebird) surveys shall be conducted by trained, dedicated individuals (Bird Monitor) with proven shorebird identification skills and avian survey experience. A list of candidate Bird Monitors with their contact information, summary of qualifications, including bird identification skills, and avian survey experience, shall be provided to FWC. This information shall be submitted to the FWC Regional Species Conservation Biologist prior to any construction or hiring for shorebird surveys. Bird Monitors shall use the following survey protocols:

a. Bird Monitors shall review and become familiar with the general information, employ the data collection protocol, and implement data entry procedures outlined on the FWC's Florida Shorebird Database (FSD) website (www.FLShorebirdDatabase.org). An outline of data to be collected, including downloadable field data sheets, is available on the website.

b. Breeding season varies by species. Most species have completed the breeding cycle by September 1, but flightless young may be present through September. The following dates are based on the best available information regarding ranges and habitat use by species around the state:

Spoil Islands in Hillsborough County: March 1 - September 1

On the dredge disposal islands in Hillsborough Bay, weekly surveys shall be conducted by a qualified Bird Monitor beginning no later than March 1 to determine the onset of nesting. Once nesting is documented, the Migratory Bird Protection Plan shall be implemented and daily monitoring shall begin. If no nesting is observed prior to April 1, daily surveys shall be initiated on that date or ten days prior to project commencement (including surveying activities and other pre-construction presence on the site), whichever is later. Surveys shall be conducted until all breeding activity has concluded for the season, as determined by the Bird Monitor.

c. Breeding season surveys shall be conducted in all potential beach-nesting bird habitats within the project boundaries that may be impacted by construction or pre-construction activities. One or more shorebird survey routes shall be established in the FSD website to cover these areas.

d. During the pre-construction and construction phases of the project, surveys for detecting breeding activity and the presence of flightless chicks shall be completed on a daily basis (once nesting has initiated, or beginning April 1, whichever is later) prior to movement of equipment, operation of vehicles, or

other activities that could potentially disrupt breeding behavior or cause harm to the birds or their eggs or young.

e. Surveys shall be conducted by walking or driving the project area (and/or boating along the shoreline) and visually surveying for the presence of shorebirds exhibiting breeding behavior, shorebird chicks, or shorebird juveniles as outlined in the FSD *Breeding Bird Protocol for Shorebirds and Seabirds*. Use of binoculars is required. If an ATV or other vehicle is needed to cover large project areas, operators shall adhere to FWC's *Best Management Practices for Operating Vehicles on the Beach* located at: http://myfwc.com/conservation/youconserve/wildlife/beach-driving/. Specifically, the vehicle shall be operated at a speed <6 mph and when operating on beaches run at or below the high-tide line. The Bird Monitor shall stop at no greater than 200-meter intervals to visually inspect for breeding activity.

f. Once breeding is confirmed by the presence of a scrape, eggs, or young, the Bird Monitor shall notify the FWC Regional Species Conservation Biologist within 24 hours. All breeding activity shall be reported to the FSD website within one week of data collection.

37. **Notification.** If shorebird breeding occurs within the project area, a bulletin board shall be placed and maintained in the construction staging area. The bulletin board shall include a location map of the construction site showing the bird breeding areas, and a clearly-visible warning that states: “NESTING BIRDS ARE PROTECTED BY LAW INCLUDING THE FLORIDA ENDANGERED AND THREATENED SPECIES ACT AND THE STATE and FEDERAL MIGRATORY BIRD ACTS”.

38. **Equipment Storage and Placement.** Staging areas for construction equipment shall be located off the shoreline whenever possible. Nighttime storage of construction equipment not in use shall be located off the shoreline to minimize disturbance to shorebird nesting activities. In addition, all construction pipes that are placed on the shoreline shall be located as far landward as possible. Temporary storage of pipes shall be off the shoreline to the maximum extent possible. If it will be necessary to extend construction pipes past a known shorebird nesting site or over-wintering area for piping plovers, then whenever possible those pipes shall be placed landward of the site before birds are active in that area. No pipe or sand shall be placed seaward of a shorebird nesting site during the shorebird nesting season.

Executed in Leon County, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Martin K. Seeling, Administrator
Beaches, Inlets and Ports Program

Attachments:
Exhibit 1, Project Drawings and Design Specs., (18 pages)
Exhibit 2, Construction Commencement Notice (1 page)
Exhibit 3, FWC Regional Species Biologist – Contact for Shorebird Issues Map

cc: Paul Karch, U.S. Army Corps of Engineers
Bruce Laurion, P.E., Port Tampa Bay
Kristina May, DEP Division of Water Resource Management (DWRM)
Roxane Dow, DWRM
JCP Compliance Officer, DWRM
FWCconservationPlanningServices@myfwc.com
FCMPmail@myfwc.com
Mike Sommers, Florida Fish and Wildlife Conservation Commission

FILING AND ACKNOWLEDGMENT

FILED, on this date, under 120.52(7) of the Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

_____ 04/08/15_____
Clerk Date

Milan A. Mora
Coastal Navigation & Antilles Branch
Programs & Project Management Division
US Army Corps of Engineers
701 San Marco Boulvevard
Jacksonville, FL 32207

September 30, 2015

Mr Mora,

It was good to talk with you on September 9, 2015 regarding our utilization of the Big Bend channel and the potential for federalization. During our discussion you asked for an estimate of Tampa Electric Company's bulk material moves through the channel over the next few years. The company transports primarily coal and petcoke though the channel but also transports smaller quantities of gypsum and limestone. Typically, the company transports 50% to 60% of its coal and petcoke tonnage through the Big Bend channel. The company's current forecast of coal and petcoke consumption is in the Tampa Electric 2015 Ten Year Site Plan filed annually every April with the Florida Public Service Commission. The annual year by year consumption for 2017-2024 is listed in the table below. Also listed is the company's Fuel Adjustment Filing with the Florida Public Service Commission on September 1, 2015 for coal and petcoke consumption for 2016. Although the 2015 Ten Year Site Plan included projections for 2016 coal and petcoke consumption, these values were reduced in our recent Fuel Adjustment Filing to reflect the company's 2016 planned testing of new natural gas ignition and co-firing capabilities added to the our coal burning generation this year.

Tampa Electric Company Forecasted Coal and Petcoke Consumption

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024
kTons	4,095	5,404	5,172	5,233	4,989	4,952	5,023	5,044	4,920

It is important to note that the values presented do not include any impact from the recently released Clean Power Plan (CPP) finalized by the EPA on August 3, 2015. The plan is implemented on a state by state basis and each state will submit their final plans or an extension to the EPA by September 6, 2016. The implementation of these rules could change Tampa Electric emission profile as early as 2022 and there is currently a large uncertainty regarding the company's compliance plans given the rule complexities, state plan implementation and potential legal issues associated with the CPP. This uncertainty could result in significant changes to the company's forecasted coal and petcoke consumption.

Please let me know if you have any questions.

Thomas L. Hernandez
Vice President, Energy Supply
Tampa Electric Company

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

F/SER31: KR

Chief, Planning and Policy Division
Environmental Branch
Jacksonville District Corps of Engineers
Department of the Army
P.O. Box 4970
Jacksonville, Florida 32232-0019

OCT 13 2015

Dear Sir or Madam:

This letter responds to your request for consultation with us, the National Marine Fisheries Service (NMFS), pursuant to Section 7 of the Endangered Species Act (ESA) for the following action.

Permit Number(s)	Applicant(s)	SER Number	Project Type(s)
N/A	U.S. Army Corps of Engineers (USACE)	SER-2014-13872	Dredging

Consultation History
We received your letter requesting consultation on April 4, 2014. On August 15 and December 1, 2014, we requested additional information about the proposed blasting aspect of the project and hopper dredging use, respectively. We received responses to those requests on August 15 and December 1, 2014, and we initiated consultation December 1, 2014.

Project Location

Address	Latitude/Longitude	Water body
Big Bend channel	27.807096°N, 82.413395°W[1] (North American Datum 1983)	Tampa Bay

[1] Lattitude/Longitude is taken at the mouth of Berthing area.

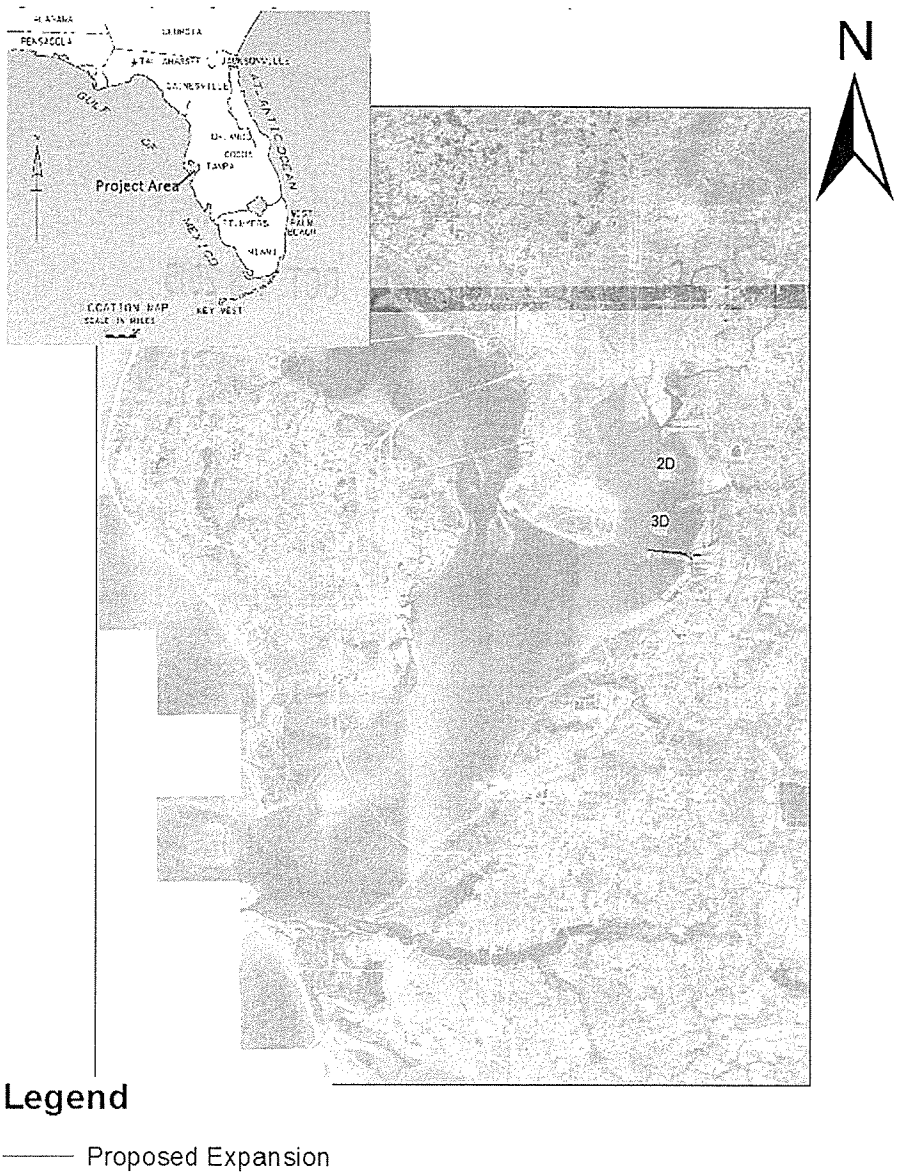

Figure 1. Tampa Bay – Big Bend Channel location (in purple) map with the disposal areas (2D and 3D) (Image source: USACE Biological Assessment, April 2014)

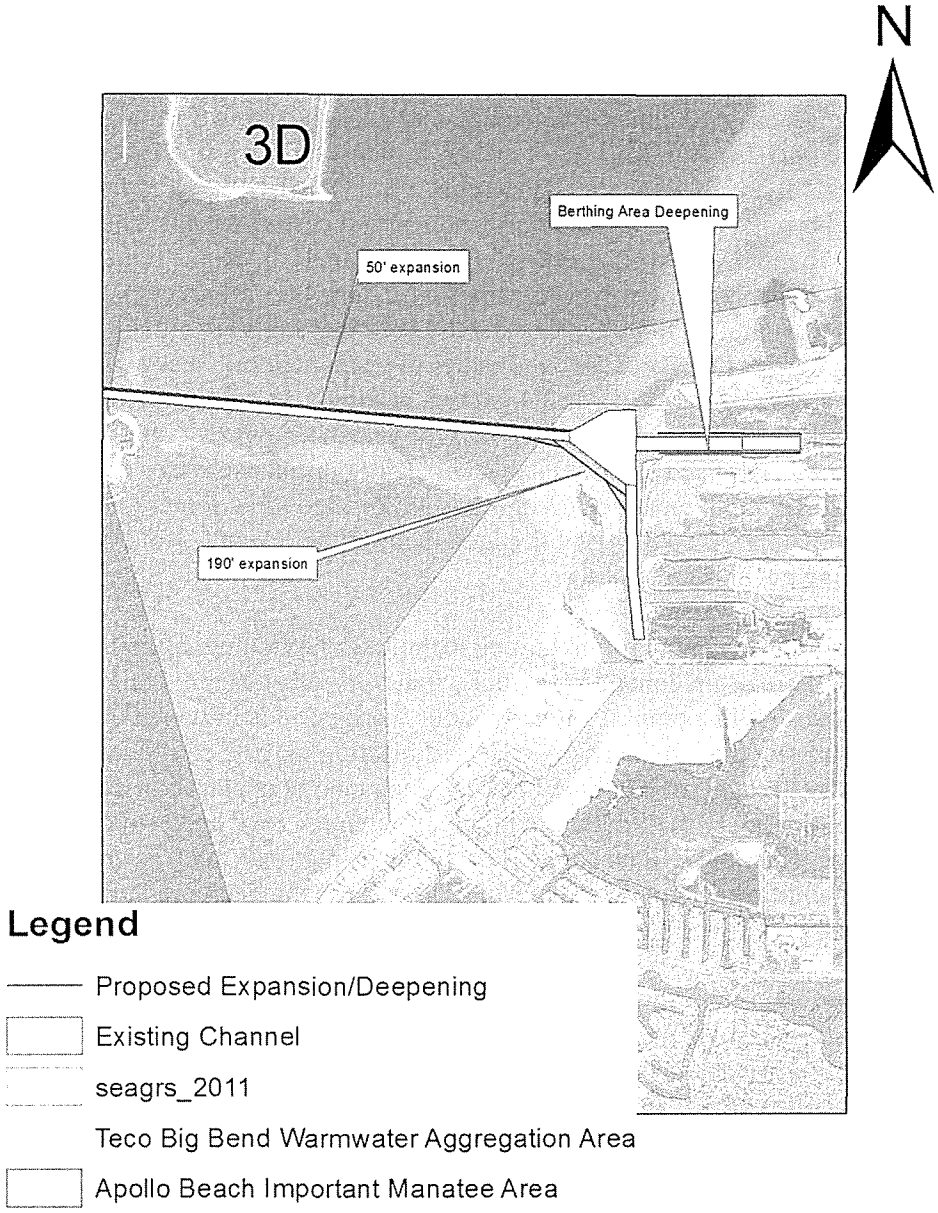

Figure 2. Big Bend Channel detail (Image source: USACE Biological Assessment, April 2014)

Existing Site Conditions
The existing channel bottom is underlain by unconsolidated materials consisting of sand, silt, clay, shell, and limestone. Very hard limestone is located in the Entrance Channel just adjacent to the Turning Basin. Limestone rock is located in the East Channel. No seagrasses, corals, or mangroves are located in the areas to be dredged.

Project Description
The Tampa Harbor Federal Navigation Project consists of about 70 miles of channels from the mouth of the Tampa Bay to the city of Tampa. Included in this action are both the widening and the deepening of the Big Bend channel portion of the Tampa Harbor Federal Navigation Channel (Figures 1 and 2). The USACE proposes to widen the north side of the entrance channel by 50 feet

(ft) and deepen it from 35 ft to 41 ft, plus 2 ft advanced maintenance, plus 2 ft allowable overdepth (AO) mean lower low water (MLLW). It also plans to expand the turning basin approximately 190 ft to the southwest to provide a 1,200-ft turning radius, add a widener at the southeast corner of the intersection of the turning basin and the east channel, and deepen it from 35 ft to 41 ft plus 2 ft advanced maintenance plus 2 ft AO, MLLW. Further, it plans to deepen the inner and east channels from 35 ft to 41 ft plus 2 ft advanced maintenance plus 2 ft AO, MLLW. In addition, local service facilities (non-federal berthing areas) located north, south, and east of the east channel and at the south end of the inner channel would be deepened from 35 ft to 41 ft, plus 2 ft advanced maintenance plus 2 ft AO, MLLW. This plan would generate approximately 4.0 million cubic yards (yd^3) of dredge material. Approximately 500,000 yd^3 of the dredged materials are anticipated to be consolidated rock. The project includes dredged material placement in either existing dredged material management areas (DMMA) 2D or 3D (shown in Figure 1), which are upland areas confined by elevated dikes. All expansion dredging will be carried out by either hydraulic (cutterhead suction) or mechanical (clamshells, backhoes, or marine excavator dredges) means. Subsequent to the expansion, maintenance dredging is anticipated to be required every 9 years and would remove approximately 720,000 yd^3 of dredged material per event.[2] No dredging or disposal activities will occur between dusk and dawn.

The USACE will employ mechanical pre-treatment techniques (spudding, hydrohammer, punch-barging, rigging, etc.) to break-up consolidated rocky materials prior to removal of the material by dredge. These techniques will be employed for 12-hour work periods in which the rock will be struck once every 30-60 seconds. In addition, confined blasting may be employed to pre-treat hard rock prior to removal by dredge. In confined blasting, each charge is placed in a hole drilled in the rock to a depth of approximately 5-10 ft, depending on how much rock needs to be broken and the intended project depth. The hole will be capped with an inert material, such as crushed rock, a technique known as stemming. Stemming the drill hole reduces the blast pressure entering the water, thus confining the blast pressure in the substrate.[3]

Construction Conditions

As part of the protective measures that will be employed, USACE will develop 4 safety radii based on the use of an unconfined blast. The use of unconfined blast criteria to develop safety radii for a confined blast is very conservative and 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 4 zones are referred to as: the "Danger Zone," which is the innermost zone located closest to the blast; the "Exclusion Zone," which is the "Danger Zone" plus 500ft; the "Safety Zone," which is outside the Exclusion Zone; and the "Watch Zone," which is the outermost zone and 3 times the radius of the Danger Zone. The "Danger Zone" radius will be calculated to determine the maximum distance from the blast at which mortality or injury to protected marine species is likely to occur. The "Danger Zone" is determined by the maximum amount of explosives used in an individual borehole in an array of multiple bore-holes separated by delays. An explosive delay is the division of a larger charge into a chain of smaller charges with more than 8 milliseconds of delay between each charge detonation. This delay between individual charges breaks up the total pressure of the larger

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[2] Maintenance dredging (including hopper dredging) for navigation projects are covered under NMFS's Gulf of Mexico Regional Biological Opinion on Hopper Dredging (GRBO) consultation.

[3] Hempen G. L., T. M. Keevin, and T.L. Jordan. 2007. Underwater Blast Pressures from a Confined Rock Removal During the Miami Harbor Deepening Project. In: Proceedings of the Twenty-first Annual Conference on Explosives and blasting Technique (Volume 1), Nashville, Tennessee. International Society of Explosive Engineers, Cleveland, OH.

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,[4,5] 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.[6,7] The applicant believes that the reduction of impact by confining the shots would more than compensate for the presumed higher sensitivity of marine species.[8] No blasting is allowed during the period of 1 November through 31 March.

Additional protections within the 4 safety radii include boat and aerial-based observers. Boat-based observers will be placed on two vessels, both of which have attached platforms that place the observer's eyes at least 10 ft above the water surface enabling optimal visibility of the water from the vessels. The boat observers cover the 4 safety radii where waters are deep enough to safely operate the boats without any impacts to seagrass resources. Aerial-based observers will fly at an average height of 500 ft, dropping lower if needed to identify something in the water. The watch begins at least one hour prior to the scheduled blast and is continuous throughout the blast and for at least 30 minutes post blast. Detonation will not occur if a marine mammal or reptile is known to be within the Exclusion Zone. If a marine mammal or reptile is spotted inside the Safety Zone and not re-acquired, no blasting is authorized until at least 30 minutes has elapsed since the last sighting of that animal.

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[4] Yelverton, J. T., D. R. Richmond, E. R. Fletcher, and R. K. Jones. 1973. Safe Distances from Underwater Explosions for Mammals and Birds. Department of Defense, editor. Defense Nuclear Agency, Washington, D.C.
[5] Richmond, D. R., J. T. Yelverton, and E. R. Fletcher. 1973. Far-Field Underwater-Blast Injuries Produced by Small Charges. Department of Defense, editor. Defense Nuclear Agency, Washington, D.C.
[6] Young, G. A. 1991. Concise Methods for Predictions the Effects of Underwater Explosions on Marine Life. R. a. T. Department, editor. Naval Surface Warfare Center.
[7] O'Keeffe, D. J., and G. A. Young. 1984. Handbook on the Environmental Effects of Underwater Explosions. Naval Surface Weapons Center, Dahlgren, VA & Silver Spring, MD.
[8] Jordan, T. L., K. R. Hollingshead, and M. J. Barkaszi. 2007. Port of Miami Project – Protecting Marine Species During Underwater Blasting. International Society of Explosives Engineers:10.

Effects Determination(s) for Species the Action Agency or NMFS Believes May Be Affected by the Proposed Action

Species	ESA Listing Status	Action Agency Effect Determination	NMFS Effect Determination
Sea Turtles			
Green	E/T[9]	NLAA	NLAA
Kemp's ridley	E	NLAA	NLAA
Leatherback	E	NLAA	NE
Loggerhead (Northwest Atlantic Ocean distinct population segment [DPS])	T	NLAA	NLAA
Hawksbill	E	NLAA	NE
Fish			
Smalltooth sawfish (U.S. DPS)	E	NLAA	NLAA
Gulf sturgeon (Atlantic sturgeon, Gulf subspecies)	T	NLAA	NE
E = endangered; T = threatened; NLAA = may affect, not likely to adversely affect; NE = no effect			

We believe the project will have no effect on hawksbill and leatherback sea turtles, due to the species' very specific life history strategies, which are not supported at the project site. Leatherback sea turtles have pelagic, deepwater life history, where they forage primarily on jellyfish. Hawksbill sea turtles typically inhabit inshore reef and hard bottom areas where they forage primarily on encrusting sponges. We also believe there will be no effect on Gulf Sturgeon because this project is located outside their known range.

Critical Habitat

The project is not located in designated critical habitat, and there are no potential routes of effect to any designated critical habitat.

Analysis of Potential Routes of Effects to Species

Physical Impacts

NMFS has previously determined in a dredging Biological Opinion that, while oceangoing hopper-type dredges may overtake and lethally entrain protected species, non-hopper type dredging methods are stationary or much slower (e.g., clamshell or bucket dredging, cutterhead dredging, pipeline dredging, sidecast dredging) and present only a discountable risk of physical impacts to the species.

Dredging

A hydraulic dredge (cutterhead) may be used to excavate material from the project area and a pipeline would disperse the material within the disposal site. Risk of injury from dredging will be discountable due to the type of dredge used (clamshell type), the low probability that a sea turtle or smalltooth sawfish would be directly in the area dredged, and the species' ability to move away from

[9] Green turtles are listed as threatened except for the Florida and Pacific coast of Mexico breeding populations, which are listed as endangered.

the construction area. NMFS has previously determined in Biological Opinions[10] that, while hopper dredges may lethally entrain protected species, non-hopper type dredging methods (e.g., clamshell or bucket dredging, cutterhead dredging, pipeline dredging, sidecast dredging) are unlikely to adversely affect motile listed species. Therefore, NMFS deems the risk of interactions with motile protected species to be discountable. Despite rare reports of cold-stunned turtles (i.e., torpid, moribund, or previously dead) being taken by cutterhead dredges in the Laguna Madre, Texas,[11] NMFS has no new information that would change the basis of our conclusion that the risk of these effects on sea turtles and sawfish is discountable.

Material Disposal
Material dredged from the project will be deposited in either of 2 DMMA disposal areas shown in Figure 1, DMMA 2D or 3D. NMFS believes dredged material disposal will have no effect on sea turtles and sawfish because the disposal areas are confined uplands and dredged material will be placed in either disposal area behind elevated dikes.

Rock Pre-treatment: Spudding or Punch-barging
Effects to listed species as a result of noise created by construction activities can physically injure animals in the affected areas or change animal behavior in the affected areas. Injurious effects can occur in 2 ways. First, effects can result from a single noise event exceeding the threshold for direct physical injury to animals, and these constitute an immediate adverse effect on these animals. Second, effects can result from prolonged exposure to noise levels that exceed the daily cumulative exposure threshold for the animals, and these can constitute adverse effects if animals are exposed to the noise levels for sufficient periods. Behavioral effects can be adverse if such effects prevent animals from migrating, feeding, resting, or reproducing, for example. Our evaluation of effects to listed species as a result of noise created by construction activities is based on the analysis prepared in support of the Opinion for SAJ-82.[12] The noise analysis in this consultation evaluates effects to ESA-listed fish and sea turtles identified by NMFS as potentially affected in the table above. Rock pre-treatments including spudding and punch-barging would produce in-water construction noise similar to those analyzed in SAJ-82 for augering or drop-punch to create a pilot hole for pile placement. Based on our noise calculations, the use of an auger/drop punch to create a pilot hole would not result in injurious noise effects or behavioral noise effects to these species. Accordingly, we do not believe that the proposed rock pre-treatments, including spudding and punch-barging, will result in injurious or behavioral noise effects to ESA-listed species.

Rock Pre-treatment: Blasting
Blasting and the associated procedures to mitigate that action as proposed by the USACE and detailed in the project description above provide sufficient protections to sea turtles and sawfish such that the effects from confined blasting are discountable. These procedures have been successfully used with no observed impacts to listed species or other animals in several recent USACE projects (i.e., San Juan Harbor, Puerto Rico in 1994; Miami Harbor in 2005; and Wilmington Harbor in 2012). Studies have shown that confined blasts using stemming have up to a 60-90% decrease in the

[10] NMFS. 2007. ESA Section 7 consultation on Gulfport Harbor Navigation Project maintenance dredging and disposal. Biological Opinion.
[11] Robert Hauch, Galveston USACE, personal communication with Eric Hawk, NMFS PRD, March 6, 2012
[12] NMFS. Biological Opinion on Regional General Permit SAJ-82 (SAJ-2007-01590), Florida Keys, Monroe County, Florida. June 10, 2014.

strength of the pressure wave released, compared to open water blasts of the same charge weight.[13, 14, 15] Still, unlike open water blasts, very little documentation exists on the effects that confined blasting can have on marine animals near the blast.[16] Behavioral reactions to the sound produced from explosions may be important if they occur in biologically important areas such as foraging areas, migratory corridors, near nesting beaches during nesting season, or in developmental juvenile habitats. In this case, the project location has none of these habitats. In addition, sea turtle and sawfish presence are expected to be low.

Conclusion

Because all potential project effects to listed species were found to be discountable, insignificant, or beneficial, we conclude that the proposed action is not likely to adversely affect listed species under NMFS's purview. This concludes your consultation responsibilities under the ESA for species under NMFS's purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. NMFS's findings on the project's potential effects are based on the project description in this response. Any changes to the proposed action may negate the findings of this consultation and may require reinitiation of consultation with NMFS.

We have enclosed additional relevant information for your review. We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions on this consultation, please contact Karla Reece, Consultation Biologist, at (727) 824-5312, or by email at karla.reece@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enc.: 1. *PCTS Access and Additional Considerations for ESA Section 7 Consultations* (Revised March 10, 2015)

File: 1514-22.F.4

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[13] Hempen, G. L., T. M. Keevin, and T. L. Jordan. 2007. Underwater Blast Pressures from a Confinded Rock Removal During the Miami Harbor Deepening Project. International Society of Explosives Engineers 1:12.

[14] Hempen, G. L., T. M. Keevin, and H. J. Ruben. 2005. Underwater blast pressures from confined rock removal shots: The Kill Van Kull Deepening Project. Pages 91-100 in Proceedings of the Thirty-first Annual Conference on Explosives and Blasting Technique. International Society of Explosive Engineers, Orlando, Florida.

[15] Nedwell, J. R., and T. S. Thandavamoorthy. 1992. The waterborne pressure wave from buried explosive charges: An experimental ivnestigation. Applied Acoustics 37(1):1-14.

[16] Keevin, T. M., J. B. Gaspin, G. R. Gitschlag, G. L. Hempen, T. Linton, M. Smith, and D. G. Wright. 1999. Underwater explosions: natural resource concerns, uncertainty of effects, and data needs International Society of Explosive Engineers.

APPENDIX D

MAILING LIST

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MAILING LIST

Tampa Harbor - Big Bend Channel, Florida
Navigation Improvements

Hillsborough County, Florida
(Sent by email or hard copy as appropriate.)

Federal Agencies

Advisory Council on Historic Preservation

- Executive Director

Chassahowitzka National Wildlife Refuge Complex

- Keith Ramos – Project Leader

Gulf of Mexico Fishery Management Council

- Chairman

National Marine Fisheries Service

- Habitat Conservation Division
    - Mark Sramek
- Protected Resources Division
    - Southeast Regional Office

National Wildlife Federation

- Director

Tampa Bay National Estuary Program

Office of Environmental Services – Protected Species Management

- Robbin N. Trindell

Office of Federal Activities: Ariel Rios Building

- Director of Environmental Protection Agency

Regional Environmental Officer of Housing and Urban Development

United States Department of Agriculture

United States Department of Commerce

- Scott Gudes

United States Department of the Interior

- Office of Environmental Project Review Director

United States Environmental Protection Agency (Region IV)

- Paul Gagliano – Environmental Policy Section

United States Fish and Wildlife Service

- Ann Marie Lauritsen
- David Hankla – Field Supervisor
- Mike Oetker – Regional Director

United States House of Representatives

- Honorable C. W. Bill Young – District 10
- Honorable Kathy Castor – District 11
- Honorable Vern Buchanan – District 13

United States Senate

- Honorable Bill Nelson
- Honorable Marco Rubio

Tribal Nations

Miccosukee Tribe of Indians

- Mr. Fred Dayhoff – NAGPRA and Section 109 Representative

Seminole Nation of Oklahoma

- Ms. Jennifer Johnson (THPO)

State Agencies

Audubon of Florida

- Ann B. Hodgson, PHD
- Dr. Mark Kraus

Florida Audubon Society

Florida Cooperative Extension

- John Stevely – Marine Extension Agent

Florida Department Division of State Lands

- Jim Stevenson

Florida Department of Environmental Protection

- Beach and Coastal Systems Director
- Mr. Mark Latch – Assistant Bureau Chief
- Office of Intergovernmental Programs
    - Mrs. Sally B. Mann – Director
- Southwest District

Florida Department of Public Works

- Board of County Commissioners – Pinellas County

Florida Fish and Wildlife Conservation Commission

- Nancy Douglass – Migratory Bird Coordinator
- Thomas Graef – Regional Director of Southeast Division

Florida House of Representatives

- Honorable Betty Reed – District 59
- Honorable Dana D. Young – District 57
- Honorable Ed Hooper – District 50
- Honorable James C. Frische – District 54
- Honorable James W. Grant – District 47
- Honorable Jim Boyd – District 68
- Honorable Kenneth Roberson – District 71
- Honorable Larry Ahern – District 51
- Honorable Rachel Burgin – District 56
- Honorable Ray Pilon – District 69
- Honorable Richard Corcoran – District 45
- Honorable Richard Glorioso – District 62
- Honorable Rick Kriseman – District 53
- Honorable Seth McKeel – District 63
- Honorable Shawn Harrison – District 60

Florida State Senate

- Honorable Arthenia L. Joyner – District 18
- Honorable Dennis L. Jones – District 13
- Honorable Michael S. Bennett – District 21
- Honorable Ronda Storms – District 10
- Honorable Victor D. Crist – District 12

Florida Marine Patrol

Florida Wildlife Federation

Southwest Florida Water Management District

- Executive Director

State Historic Preservation Office – Division of Historical Resources

- Scott Stroh – State Historic Preservation Officer

Tampa Bay Watch, Inc.

- Peter Clark – Director

Tampa Bay Partnership

- Stuart Rogelm –Executive Director

Tampa Bay Regional Planning Council

City/County Agencies

City Managers of:

- Anna Maria
- Bradenton
- Palmetto

Manatee County Administrator

Manatee County Board of County Commissioners

Manatee County Environmental Projects Coordinator

- Jack Gorzeman

Mayor of Bradenton, Florida

- Wayne H. Poston

Mayor of Clearwater, Florida

- George Cretekos

Sarasota County Chamber of Commerce

Non-Governmental Organizations

American Littoral Society

- Chairman

Egmont Key Alliance

- Richard Johnson

Manatee County Public Library

- Reference Librarian

Mote Marine Laboratory

Sarasota Audubon Society

Surfrider Foundation – Suncoast Chapter

Tropical Audubon Society

- Cynthia Guerra – Director

Private Organizations

Ah Tha Thi Ki Museum

- Mr. William Steele

Eckerd College

- Dr. Linda Lucas

Sand Key Civic Association

- Cynthia L. Remley – Director and Beach Advocate

West Coast Inland Navigation District

- Mr. C. W. Listowski

WBTP

Property Owners Adjacent to Project

Available upon request.