APRIL 2015

MAINTENANCE DREDGING AND BULKHEAD REPLACEMENT

US COAST GUARD STATION. MIAMI BEACH MIAMI BEACH, MIAMI-DADE COUNTY, FLORIDA

FINAL ENVIRONMENTAL ASSESSMENT

U.S. COAST GUARD
Civil Engineering Unit Miami

ENVIRONMENTAL ASSESSMENT
ON
MAINTENANCE DREDGING AND BULKHEAD REPLACEMENT
US COAST GUARD STATION. MIAMI BEACH
MIAMI BEACH, MIAMI-DADE COUNTY, FLORIDA

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1 PROJECT PURPOSE AND NEED

1.1 PROJECT AUTHORITY

Authorization for issuance of a permit for the maintenance dredging and bulkhead replacement project is authorized under Section 10 of Rivers and Harbors Act and Section 404 of the Clean Water Act. Additionally, the Coast Guard has a statutory responsibility under the Ports and Waterways Safety Act of 1972 (PWSA), Title 33 USC §1221to ensure the safety and environmental protection of U.S. ports and waterways. The PWSA authorizes the Coast Guard to "...establish, operate and maintain vessel traffic services in ports and waterways subject to congestion".

1.2 PROJECT LOCATION

The U.S. Coast Guard Base (CGB), Miami Beach is located in Miami-Dade County on a man-made island, on the south side of Meloy Channel (Figure 1 and Figure 2) and north of the main entrance to the Port of Miami, Government Cut. Miami-Dade County is located on the southeast coast of Florida between Fort Lauderdale and the Florida Keys. The County is bounded to the north by Broward County and to the south by Monroe County.

Figure 1 - Location of USCG Base Miami Beach

Figure 2 - USCG Base Miami Beach looking east

1.3 PROJECT NEED OR OPPORTUNITY

This Environmental Assessment (EA) covers two important activities that need to be completed for CGB Miami Beach: 1) Maintenance Dredging of the berth of the US Coast Guard Cutter (CGC) HUDSON and 2) replacement of bulkheads along the eastern and southern side (Zone 4 and Zone 5) of the CGB Miami Beach.

1.3.1 CGC HUDSON BERTH MAINTENANCE DREDGING

CGC HUDSON (WLIC-801) (Figure 3) is the second in a series of four of the Coast Guard's most modern inland construction tenders. The primary purpose of the CGC HUDSON and her sister ships is to build, or rebuild if destroyed, those fixed aids to navigation (ATON) used by mariners to safely navigate the inland waters of the United States. CGC HUDSON is responsible for over 1,400 fixed aids to navigation. A fixed ATON is a pile, either wood or steel, that is driven into the bottom, marking the edge of a channel. They can be equipped with a light, day-mark or both.

The CGC HUDSON is homeported in Miami, FL. The normal operating area is from Vero Beach, FL through Biscayne Bay including the Atlantic Intracoastal Waterway south to Key West and continuing on to the Dry Tortugas. She also has responsibility for constructing aids in Lake Okeechobee. CGC HUDSON frequently ventures out of her "home waters" to assist other construction tenders with various projects or if disaster strikes (e.g.: hurricane damage to fixed ATON).

The CGC HUDSON is berthed on the east side of CGB Miami Beach. The berth is 300 feet long by 85 feet wide. The site was last maintained in early 1995 under permits issued in 1992.

Figure 3 - US Coast Guard Cutter HUDSON repairing an ATON at Miami Harbor

1.3.2 BULKHEAD REPLACEMENT

The current bulkhead is steel sheet pile with a concrete cap, which retains the soil backfill around the entire island. The island was constructed in the 1940's and the east and north bulkheads are original. Additional areas were built out in the 1960's and some sections were replaced in the 1980's.

The Coast Guard uses areas along the bulkhead to moor and support Coast Guard Cutters. Sections of bulkhead have reached the end of their service life such that vehicle loading is restricted on the shore side which impacts the operations of the Cutters. Approximately 1,261

linear feet of bulkhead along the east and south section of the island is scheduled for replacement. The scope of this work will be the replacement of two "zones", or lengths of bulkhead separated by era and type of construction. This work will be completed through a commercial contract administered by Coast Guard Civil Engineering Unit Miami. Zones 4 and 5 are shown in Figure 4. Zone 5 depths range from 8 to 22 ft while Zone 4 depths range from 4 to 8 feet at Mean Lower Low Water (MLLW).

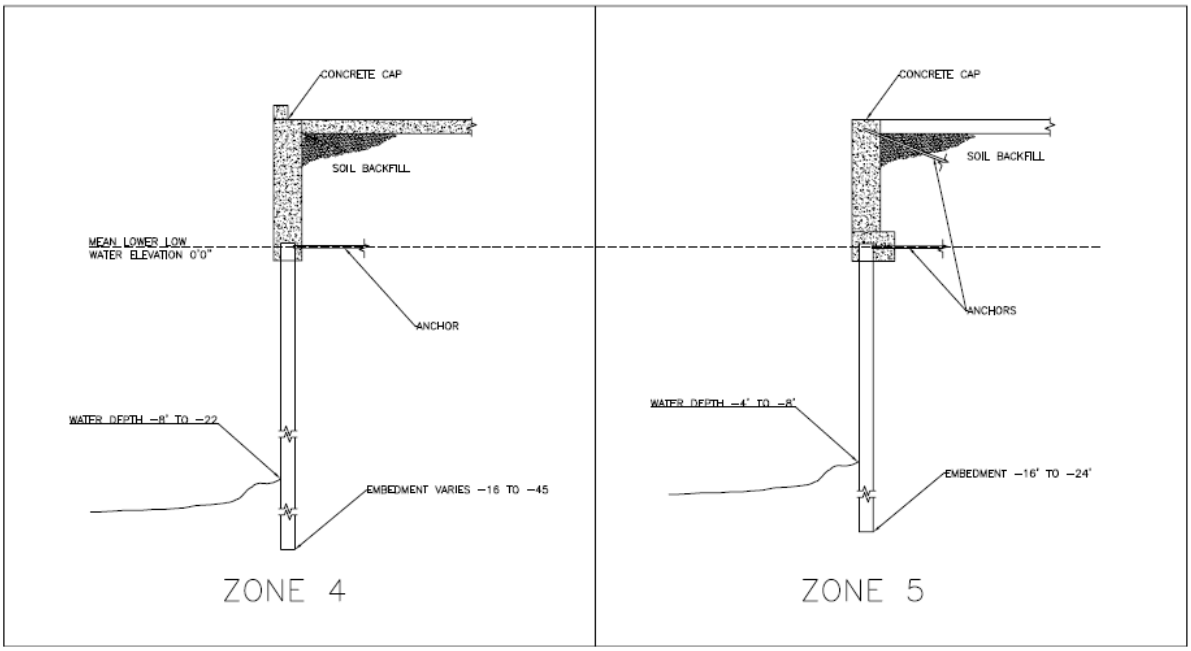


Figure 4 – Typical Existing Condition of Zone 4 & 5 Bulkheads

1.4 RELATED ENVIRONMENTAL DOCUMENTS

- Department of Army Section 10/404 Permit #199231007 (LP-MZ) dated 25 August, 1992 to dredge approximately 2,000 cy of material from the USCG Base Miami Beach to berth the CGC HUDSON.
- Florida Department of Environmental Protection Permit #132191106 dated July 22, 1993 to dredge 25,500 cy at the CGB Miami Beach.

1.5 DECISIONS TO BE MADE

This EA will evaluate whether to conduct maintenance dredging in the CGC HUDSON's berth and to perform bulkhead maintenance and replacement on the southern and eastern sections of CGB Miami Beach's bulkhead.

1.6 SCOPING AND ISSUES

1.6.1 ISSUES EVALUATED IN DETAIL.

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

- Dredging CGC HUDSON's berth: sea grasses; dredged material quality and composition.

- Bulkhead replacement: colonization of the bulkhead by corals and associated organisms; noise impacts associated with bulkhead construction.

1.6.2 IMPACT MEASUREMENT

The following provides the means and rationale for measurement and comparison of impacts of the proposed action and alternatives. For the dredging of the slip, impact assessment will be based on the physical area to be dredged and how much of that area has been colonized with submerged aquatic vegetation, as well as measuring turbidity levels during dredging operations. For bulkhead construction, impact assessment will include potential effects to marine mammals due to construction methods and the number and size of corals on the bulkhead that will need to be relocated to an alternative site prior to bulkhead construction, as well as those corals which do not meet the relocation criteria.

1.7 PERMITS, LICENSES, AND ENTITLEMENTS

Prior to dredging the slip and/or replacing the bulkhead, the USCG must obtain a Section 10/404 permit for the dredging under the Clean Water and the Rivers and Harbors Acts and a Section 103 permit for the disposal of the material in the Ocean Dredged Material Disposal Site (ODMDS) under the Marine Protection, Research and Sanctuaries Act from the US Army Corps of Engineers - Jacksonville District (USACE), Regulatory Division and an Environmental Resource Permit, or applicable exemption from the Florida Department of Environmental Protection (FDEP). The USCG must complete a consultation under Section 7 of the Endangered Species Act, a consultation under the Essential Fish Habitat Provisions of the Magnuson-Stevens Fisheries Act as well as a review under the Coastal Zone Management Act by the State of Florida to determine if the project is consistent with their coastal zone management program. Also please refer also to Section 4.31, Compliance with Environmental Requirements.

2 ALTERNATIVES

The alternatives section is the heart of this EA. This section describes in detail the no-action alternative, the proposed action, and other reasonable alternatives that were studied in detail. Then based on the information and analysis presented in the sections on the Affected Environment and the Probable Impacts, this section presents the beneficial and adverse environmental effects of all alternatives in comparative form, providing a clear basis for choice among the options for the decision maker and the public.

2.1 DESCRIPTION OF ALTERNATIVES

2.1.1 MAINTENANCE DREDGING OF CGC HUDSON'S BERTH (PERFERRED ALTERNATIVE, DREDGING)

The preferred alternative is to dredge the CGC HUDSON's berth to -8 feet MLLW plus up to two feet of allowable overdepth, removing no more than 5,000 cubic yards (CY) of material from the berth and transport the dredged material to the U.S. Environmental Protection Agency (USEPA) designated Ocean dredged Material Disposal Site (ODMDS) located 3.6 miles southeast of the Port of Miami entrance channel. The designated berth is 85 feet wide by 300 feet long and covers 0.59 acres of area (Figure 5). Most of this area consists of a sandy bottom with rock rubble and man-made materials like tires close in to the bulkhead. In the northeast corner of the slip, sea grasses have colonized the slip since it was last maintained in 1995. The sea grasses documented in the slip do not include the threatened Johnson's seagrass.

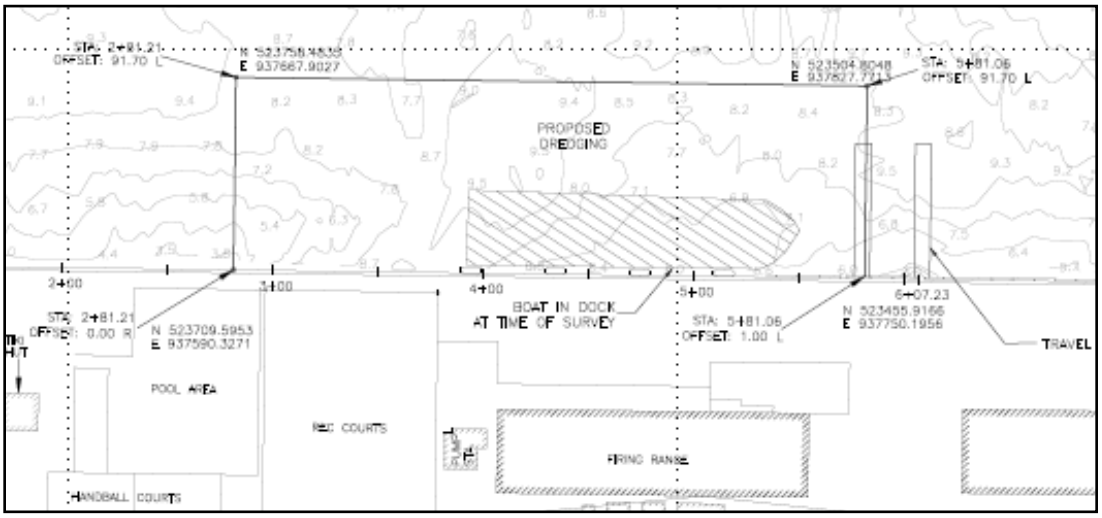


Figure 5 - Schematic Plans showing dredging area for the CGC HUDSON's berth

2.1.2 BULKHEAD REPLACEMENT – ZONE 4 & 5 (PREFERRED ALTERNATIVE, BULKHEAD REPLACEMENT)

The preferred alternative for bulkhead replacement is to replace the sections in the most need of repair, specifically Zone 4 and Zone 5 (Figure 6). "Replacement", in this project, will involve

the building-out of new bulkhead from the existing bulkhead, while leaving the old bulkhead in place to become part of the backfill. Typical profiles of the existing bulkheads were previously shown in Figure 4.

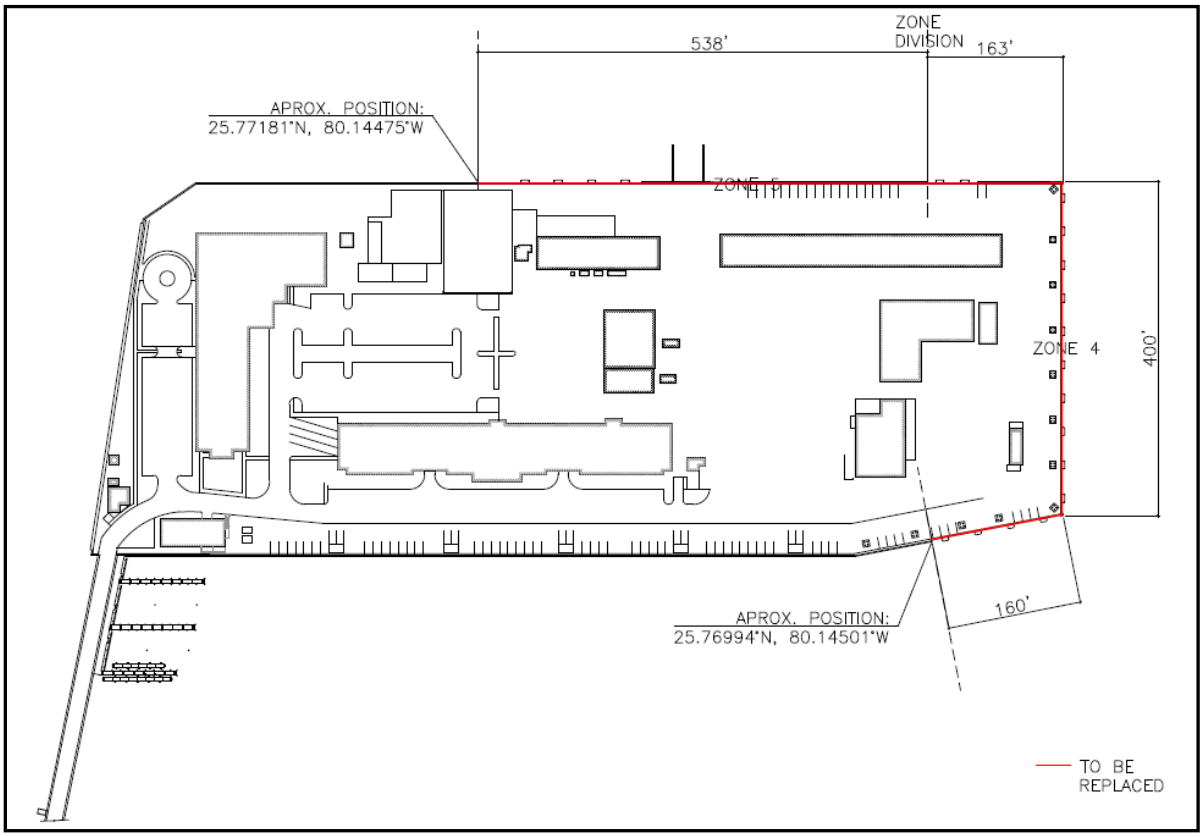


Figure 6 - Plan Sketch of Base Miami Beach with locations of bulkheads to be replaced

The first step in construction will be demolition of the existing concrete cap and the removal of debris and rock toe protection at the foot of the bulkhead (Figure 7, Step 1). Then, new steel sheet pile will be driven in front of the existing sheet pile (Figure 7, Step 2). Total approximate length is approximately 1,260 feet (Figure 6). The new sheet pile will be anchored back to the soil with grouted ground anchors set and tensioned at intervals throughout the zone (Figure 8, Step 3). The area between the new and old bulkhead will be filled with a low psi concrete or other fill material. A new concrete cap will be placed on the new sheet pile. A concrete slab-on-grade on the backfill will be placed, completing the new bulkhead. Sketches and approximate measurements are shown in Figure 8, Step 4.

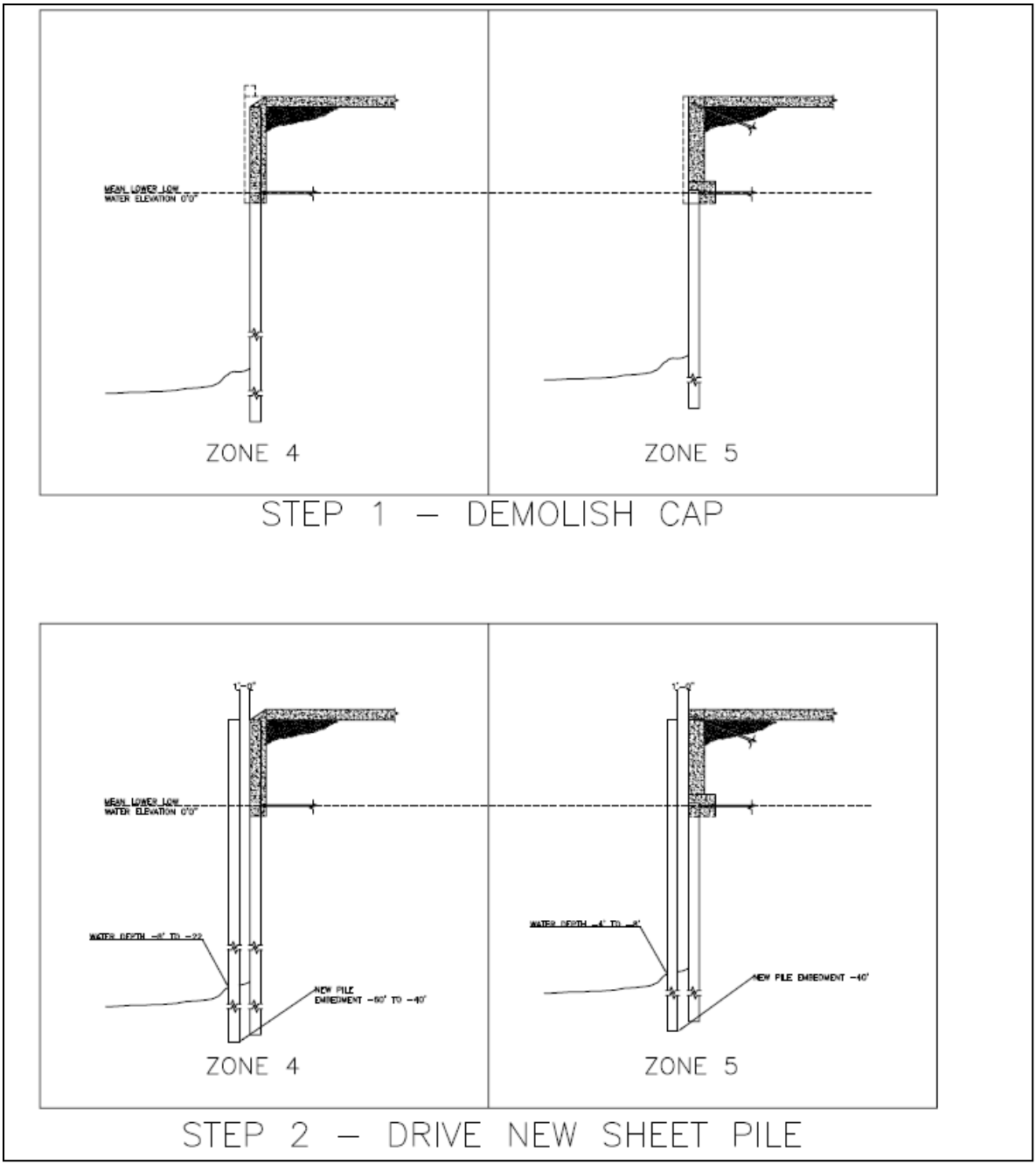


Figure 7 - Construction Steps 1 & 2

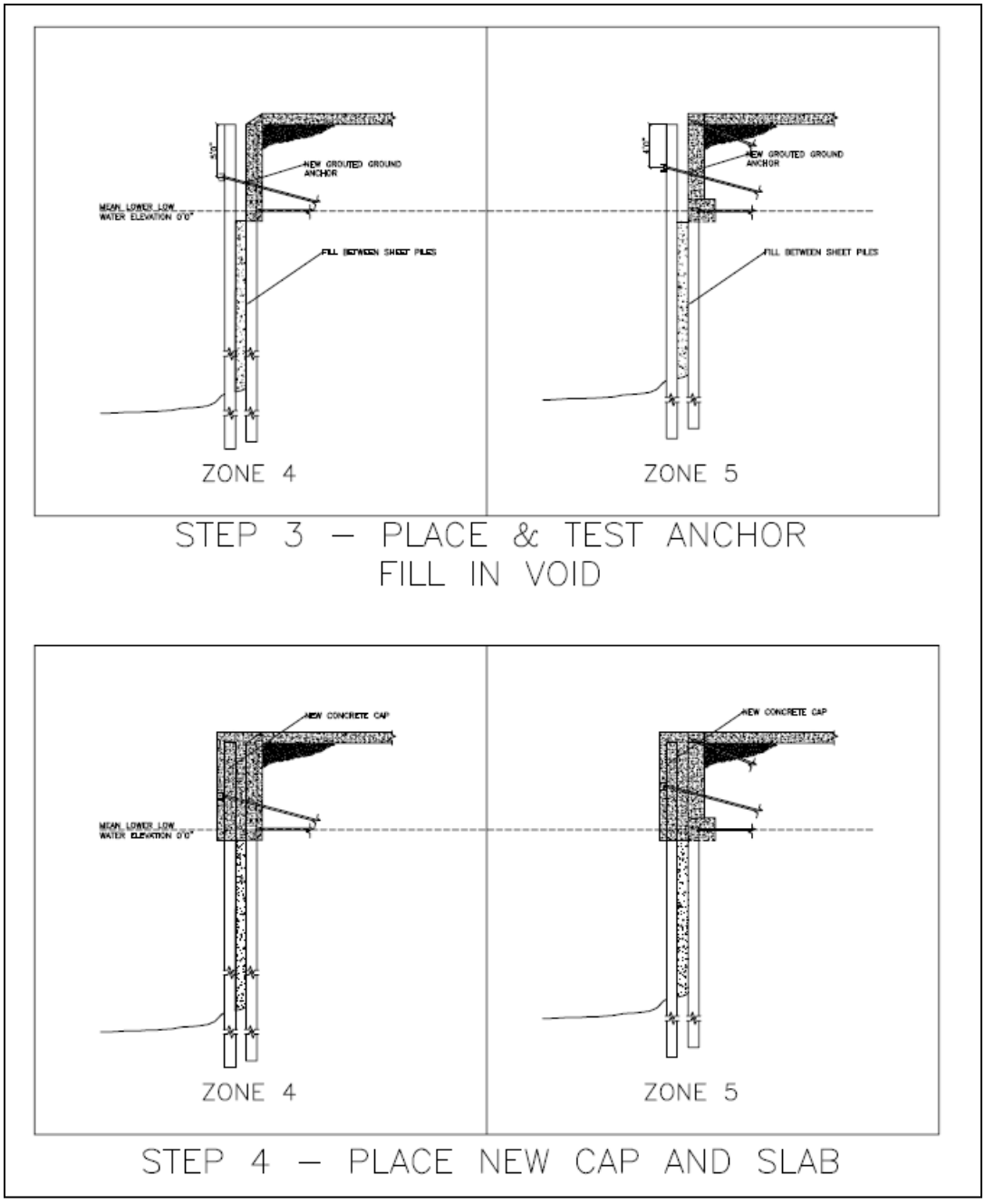


Figure 8 - Construction Steps 3 & 4

Although the government cannot specify the construction method, due to current load restrictions, it is likely that some or all of the pile driving will take place from a work barge with crane and hammer. This barge will likely use spuds or legs placed on the sea bottom to provide stability. Limited utility work will also take place on the shore side to ensure lines and conduit runs are moved if necessary to retain current service with the new bulkhead.

Prior to bulkhead replacement, the USCG will remove healthy stony corals greater than 10 inches in diameter which are able to be removed without breaking the colony, that do not

display bleaching, paling or boring sponge infestation. Depending on the total number of corals taken from the bulkhead will be relocated to an approved artificial reef site managed by Miami-Dade County; the Port of Miami's coral relocation site and/or relocation to the Miami Natural History Museum for educational purposes. Any corals smaller than 10cm in diameter or other organisms remaining on the bulkhead may be made available to other non-federal entities for use in research and education at the expense of those entities, (i.e. local universities, non-profit organizations, etc as approved by Florida Fish and Wildlife Conservation Commission's (FWC) permitting program and NOAA-Fisheries PRD Section 10 permitting program, as applicable) as long as the collection of those smaller corals does not result in delays to the bulkhead construction project.

2.1.3 BULKHEAD REPLACEMENT – ENTIRE FACILITY BULKHEAD

Another alternative is waiting for a complete rebuild of the base bulkhead with a major Acquisition, Construction & Improvement (AC&I) project. Costs for an entire rebuild far exceed projected budget availability. Based on planning discussions, a large project will not happen for 10-15 years and will likely encounter the same problems as not completing the repairs altogether. A major AC&I project will have a similar scope of work as the repairs for the area in question.

2.1.4 NO ACTION ALTERNATIVE – NO BERTH DREDGING

If dredging is not completed in two to five years, the depth will not be adequate for CGC HUDSON to moor in the current berth. The cutter will have to moor at another berth at CGB Miami or other station. With recently acquired vessels filling spots in Miami and Key West, CGC HUDSON may be forced to move outside of their coverage area and expend additional hours and cost for transit each time a patrol is needed. Logistics such as cutter support and Aids to Navigation (ATON) material on-loads will require careful coordination and come at a greater cost.

2.1.5 NO ACTION ALTERNATIVE – NO BULKHEAD REPLACEMENT

One alternative to bulkhead repairs is not completing them. Due to holes in the current sheet pile bulkhead, retained soil will continue to escape, causing further sink holes to form along the edge of the bulkhead. The bulkhead and influence zone within 20 feet will have to be permanently restricted to all vehicles and vessel loads, and will no longer be an operational area. CGC HUDSON will have to moor at another berth at Base Miami or other station and encounter the same issues that not dredging will cause. Other cutters along the south side will also have to be re-located with the same issues as the CGC HUDSON will encounter. Base vehicle traffic patterns will have to be re-routed and the area will have limited to no functionality.

2.2 ISSUES AND BASIS FOR CHOICE

The issues and basis for choice for both alternatives are construction costs, annual budgets for maintenance and operations, construction methodologies and the effects to the missions if the USCG is unable to complete necessary dredging and bulkhead repairs.

2.3 CONSTRUCTION METHODOLOGIES

2.3.1 TYPE OF DREDGING EQUIPMENT

The federal government does not normally specify the type of dredging or construction equipment to be used. This is generally left to contractor to offer the most appropriate and competitive equipment available at the time. Never-the-less, certain types of dredging equipment are normally considered more appropriate depending on the type of material, the depth of the area to be dredged, 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.

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 some form of bucket to excavate and raise the material from the channel bottom. The most common hydraulic dredges include suction, cutter-suction, and hopper dredges and the most common mechanical dredges in the U.S. include clamshells, backhoes, and marine excavator dredges. Public Law 100-329 requires dredges working on U.S. government projects have U.S. built hulls, which can limit the options for equipment types.

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; contaminants; other operating restrictions; and the required completion time. All of these factors impact dredge production and as a result, costs.

The following discussion of dredges and their associated impacts will be limited to potential dredging equipment suitable for the CGC HUDSON slip dredging, based upon historic review of expansion operations elsewhere in South Florida, as well as the expert opinion of the USACE construction and operations staff. The key elements for this project include the following:

- Much of the shoaling material that has moved into the berth since it was last maintained in 1995 is sand. Less than 5% of the material is considered “fines” by the USEPA.
- Significant environmental resources, including corals and associated bulkhead species have colonized the bulkhead adjacent to the berth and sea grasses have colonized the northeast corner of the previously dredged berth.
- The project is located adjacent to a man-made island on a channel with high velocity tidal currents.

The project scale for the CGC HUDSON berth project suggests smaller scale equipment, particularly clamshell or backhoe dredges would likely be used due to the closeness of the bulkhead as well as the finger piers immediately south of the berth which limit access for hopper dredges. Additionally, the berth currently has water depths as shallow as -4 feet MLLW and since Meloy channel is a high traffic area, the dredging cannot hinder vessel navigation along the channel, limiting the action to smaller scale dredges.

The South Atlantic Division of the USACE (which includes the Jacksonville District) completed a regional consultation for the use of all types of dredges throughout the southeast Atlantic from the Virginia-North Carolina state line to Key West, Florida. This consultation resulted in a regional biological opinion (referred to as the "SARBO" (South Atlantic Regional Biological Opinion)) for the use of all dredge types in USACE-maintained or USACE-permitted (as is the case with this maintenance dredging) dredging projects and provided for protective measures USACE was required to reduce the likelihood of turtle entrainment. Appropriate Terms and Conditions from the SARBO will be incorporated into the dredging contract plans and specifications based on the potential dredge types proposed for this work.

2.3.1.1 Mechanical Dredging

Mechanical dredges are classified by how the bucket is connected to the dredge. The three standard classifications are structurally connected (backhoe), wire rope connected (clamshell), and chain and structurally connected (bucket ladder). The advantage of mechanical dredging systems is that very little water is added to the dredged material by the dredging process and the dredging unit is not used to transport the dredged material. This is important when the disposal location is remote from the dredging site. The disadvantage is that mechanical dredges require sufficient dredge cut thickness to fill the bucket to be efficient and greater re-suspended sediment is possible when the bucket impacts the bottom and as fine-grained sediment washes from the bucket as it travels through the water column to the surface. Clamshell or backhoe marine excavators are likely to be employed on the CGC HUDSON berth maintenance dredging.

<u>Clamshell Dredge</u>.

Clamshell dredges (Figure 9) are the most common of the mechanical dredges. Clamshell dredges use a number of different bucket types for mud, gravel, unconsolidated rock, or boulders. The clamshell dredging operation cycle is to lower bucket in open position to bottom surface, close bucket penetrating material with weight of bucket, raise bucket above hopper level, swing, dump, swing, and repeat. The length of the wire to lower the bucket limits the dredging depth and production depends upon the bucket size, dredging depth, and type of material. The dredged material is placed in a scow or on a barge for transport to the disposal site. 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. The dredge requires a tug to move it to and from a location. Potential clamshell dredging environmental impacts in unconsolidated sediments include resuspension of sediments when the clamshell drops on to the bottom and as material washes from the bucket as it rises through the water column. Operational controls such as reducing the bucket speed as it drops to the bottom and as it rises through the water

column may reduce impacts, as well as use of a closed bucket system. An animation showing the operation of a clamshell is located online at http://el.erdc.usace.army.mil/dots/trip.html.

Photo Courtesy of Great Lakes Dredge & Dock Company

Figure 9 - Clamshell Dredge (left) with Scow (right)

Clamshell dredges have commonly been used in areas where manatees are known to congregate, and on rare occasions, manatees have been anecdotally documented as being attracted to water dripping off of the clamshell bucket. To ensure that clamshell dredges do not adversely impact manatees, USCG will implement standard protection conditions should a clamshell dredge be proposed to be utilized during the dredging of the CGC HUDSON's berth. These protections include the following language in the environmental specifications for the project:

> Manatee Monitoring (Clamshell Only): During clamshell dredging operations, a dedicated observer shall monitor for the presence of manatees. The dedicated observer shall have experience in manatee observation and be equipped with polarized sunglasses to aid in observing. Nighttime lighting of waters within and adjacent to the work area shall be illuminated, using shielded or low-pressure sodium-type lights, to a degree that allows the dedicated observer to sight any manatee on the surface within 200 feet of the operation. The dredge operator shall gravity-release the clamshell bucket only at the water surface, and only after confirmation that there are no manatees within the safety distance identified in the standard construction conditions.
>
> Report Submission: The Contractor shall maintain a log detailing sightings, collisions, or injuries to manatees occurring during the contract period. The data shall be recorded on forms provided by the Contracting Officer (sample Daily Manatee Reporting Log is on the first web site indicated in paragraph CONSTRUCTION FORMS AND DETAILS below). All data in original form shall be forwarded directly to: Chief Environmental Management Branch, USCG CEU Miami 15608 SW 117 Ave, Miami FL. 33177, within 10 days of collection and copies of the data shall be supplied to the Contracting Officer. Following project completion, a report summarizing the above incidents and sightings shall be submitted to the appropriate USFWS and FWC offices.

Special Operating Conditions:

(1) All vessels associated with the project shall operate at "no wake/idle" speeds at all times while in waters where the draft of the vessel provides less than a four-foot clearance from the bottom, and vessels shall follow routes of deep water whenever possible. Boats used to transport personnel shall be shallow-draft vessels, preferably of the light-displacement category, where navigational safety permits. Mooring bumpers shall be placed on all barges, tugs, and similar large vessels wherever and whenever there is a potential for manatees to be crushed between two moored vessels. The bumpers shall provide a minimum stand-off distance of four feet.

(2) If a manatee(s) is sighted within 100 yards of the project area, all appropriate precautions shall be implemented by the Contractor to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet of a manatee. If a manatee is closer than 50 feet to moving equipment or the project area, the equipment shall be shut down and all construction activities shall cease within the waterway to ensure protection of the manatee. Construction activities shall not resume until the manatee has departed the project area.

Animation showing how a clamshell operates is located on the following website - http://el.erdc.usace.army.mil/dots/trip.html.

Backhoe Marine Excavator

A backhoe dredge is a *back-acting* excavating machine that is usually mounted on pontoons or a barge (Figure 10). The backhoe digs toward the dredge with the bucket penetrating from the top of the cut face (Figure 11). 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. The dredging depth for backhoe marine excavators is limited to the reach of the excavator arm. The dredge also requires a tug to move to and from a location.

Figure 10 - Backhoe excavator dredge


Figure 11 - Backhoe loading a scow

Potential environmental impacts of backhoe marine excavators dredging unconsolidated sediment are similar to those of a clamshell dredge, as are the operational controls to reduce inadvertent impacts. The key is slowing the movement of the bucket through the water.

Both types of mechanical dredges require transport barges to move the dredged material from the dredge to the disposal site. The type and size of barges will depend upon the distance to the disposal site and the production rate of the dredge. Barges are less expensive than dredges, therefore, the operation is generally designed so that the dredge is always working and does not experience down time waiting for a barge to be available to load. Barges or bottom dump scows may be used to transport dredged material to the ODMDS for disposal.

Potential barge environmental impacts could occur as the barge is loaded if material is allowed to spill over the sides, during transport if the barge leaks material, and during disposal if the material escapes from the disposal area. Operational controls eliminate spilling material during loading by monitoring the dredge operator to make sure that the dredge bucket swings completely over the barge prior to opening the bucket. Requiring barges in good repair with new seals minimizes leaking during transport, and monitoring changes in draft throughout the transport allows for determination of leaking scows for each and every load of material being transported to the disposal site. Operating in compliance with the Site Management and Monitoring plan (SMMP) prepared by USEPA for the ODMDS would minimize environmental impacts during disposal. The barges would be required to use positioning equipment to place dredged material within the designated ODMDS and inspectors may be required to monitor disposal activity.

2.3.1.2 Hydraulic Dredging

Hydraulic dredges mix dredged material into a sediment-water slurry and pump the mixture from the bottom surface to a temporary location such as a barge or re-handling site, or to a permanent location such as a confined or unconfined upland or aquatic site. The advantage of hydraulic dredges is that there is less turbidity (re-suspended sediments) at the dredge than with mechanical dredges. The disadvantage of hydraulic dredges is that a large quantity of water is added to the dredged material and this excess water must be dealt with at the disposal location, or near the dredging location through a dewatering process referred to as “overflow” which increases the amount of dredged material in the scow while reducing the amount of water in the scow during transport to the ODMDS. Examples of hydraulic dredges include hopper dredges and cutter-suction dredges.

<u>Cutter-Suction Dredge</u>

Cutter-suction dredges (Figure 12 and Figure 13), or cutterhead dredges, are mounted on barges. The cutterhead resembles an eggbeater with teeth that mobilizes the dredged material as it rotates. The mobilized material is hydraulically moved into the suction pipe for transport. The cutterhead is located at the end of a ladder structure that raises and lowers it to and from the bottom surface. It moves by means of a series of anchors, wires, and spuds. The cutterhead dredges as it moves across the dredge area in an arc as the dredge barge swings on the anchor wires. One corner of the dredge barge is held in place by a spud and the dredge

rotates around that spud. Typically, the dredge requires workboat or tug assistance to move the anchors and a tug is required to move the dredge to and from a location, however, some cutterhead dredges have spud carriages that allow the dredge to be moved forward without tug assistance. The dredged material is hydraulically pumped from the bottom, through the dredge, and through the discharge pipeline to the disposal area. This is generally an upland site, but can be a barge for transport to a remote location or an in-water site. Dredge pumps are located on the barge with additional pump(s) often located on the ladder, especially for deep water dredging projects. Cutterhead dredges are limited to dredging depths within reach of the ladder. They come in a variety of sizes from very small (8 inches) to very large (36 inches) and are described based on the diameter of the pipeline of the discharge pipeline. For the CGC HUDSON berth project, if a cutterhead dredge is used, it would have to be a very small cutter-suction dredge due to the limitations of the width of Meloy Channel and a requirement for the contractor not to block navigational traffic.

Figure 12 - Hydraulic cutterhead dredge vessel

Photo/drawing: Engineer Research and Development Center 2007

Figure 13 - Cutterhead Dredge Contacting Substrate

Potential environmental impacts from cutterhead dredges include localized suspended sediment along the bottom around the cutterhead and fine-grained sediment turbidity plumes from barge overflow or pipeline leaks. Overflow and leaks can be reduced or eliminated by restricting the amount of overflow time, eliminating barge overflow, and performing regular inspections of the pipeline. Locating barges the furthest possible distance from resources can further reduce environmental impacts. Anchors are placed to both sides of the cutterhead dredge to provide the ability to swing the dredge. The anchors are placed using a crane on a workboat.

Video clips of how cutterhead dredges operate are located on the following website: http://el.erdc.usace.army.mil/dots/trip.html.

2.3.1.3 Dredge Material Transport Vessels

Both types of barges discussed below are typically pushed or pulled to the disposal site by a tug (Figure 14).

Split Hull Barge

A split hull barge (Figure 14 and Figure 15) has two hulls connected with hinges at the front and back. The two-door hinged configuration, allows the hulls to swing apart, opening at the bottom to allow dredged material to fall from the barge. This provides a rapid disposal of dredged material, which, as a result, is placed within a small area. The rapid descent of material through the water column reduces the potential for resuspension of sediments into the water column during disposal. Such a barge may be used for ODMDS disposal. A rubber

seal (similar to a gasket or weather-stripping on a door), is pinched between the two doors, limiting the leakage of water and dredged material from the barge. This seal does not prevent 100% of water and dredged material from leaking; however it minimizes it to the maximum extent practicable. During transport, the barge's draft and ullage are monitored and recorded and this data is reviewed after each load to detect loss of draft, which is assumed to represent loss of material. If a barge has a net loss of more than one foot in draft between the dredge site and disposal site(s) (averaged between the bow and stern monitoring locations), this serves as a "red flag" to conduct an investigation as to why the draft loss occurred. If the draft loss can be determined due to high seas and sloshing of material, no other action is required. However, if the loss is not as a result of high seas and sloshing, the barge is temporarily removed from the rotation and has the seals tested and repaired (if necessary). If a particular barge demonstrates a trend of material loss that does not resolve itself after seal testing and repair, the barge is removed from the dredging operation. The one-foot of loss has been determined by USACE and USEPA to be a good threshold for notification, because all barges have some amount of draft loss through leakage or water sloshing out of the barge due to sea conditions and weather, although the amount is typically minimal.

Bottom Dump Barge

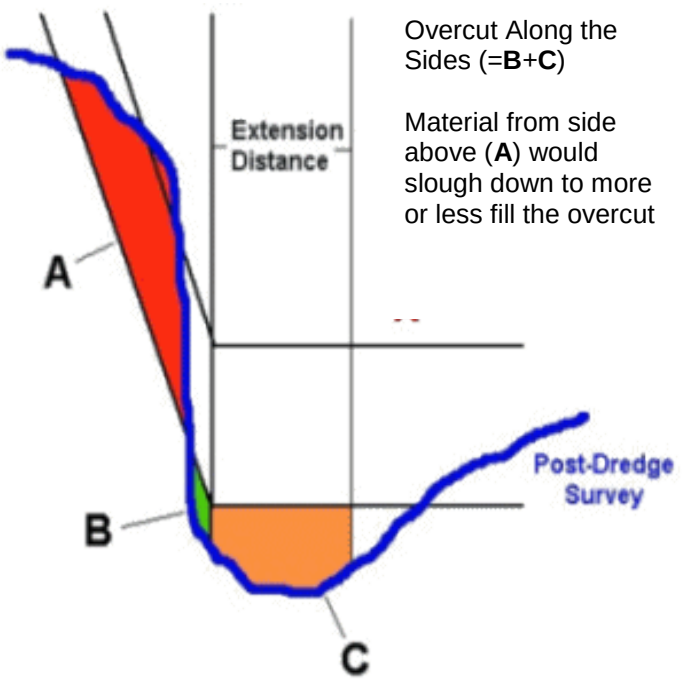
A bottom dump barge has doors on the bottom of the barge hopper, which opens at the disposal site to allow the dredged material to fall to the bottom. This type of barge has slower disposal than split hull dump barges and material spreads over a larger area. This barge may also be used for ODMDS disposal. As with split hull barge, the bottom dump barge has seals around each of the doors to minimize leakage of material and water from the barge. The barge is monitored in the same method as the split hull barge and the same response is taken if the barge loses more than a net foot of draft.

Dredged materials are placed in the bottom dump and split hull barges using a pipeline, a bucket or backhoe dredge, where one is loaded at a time. For split hull and bottom dump barges, the disposal action is triggered remotely from the tug to the barge. The exact time the signal is given to the barge, and when the doors open and close, are recorded in a tracking system for further data analysis and compliance monitoring.

Figure 14 - Split Hull Barge Being Pushed by Tug

Figure 15 - View of Stern of Split-hull Scow

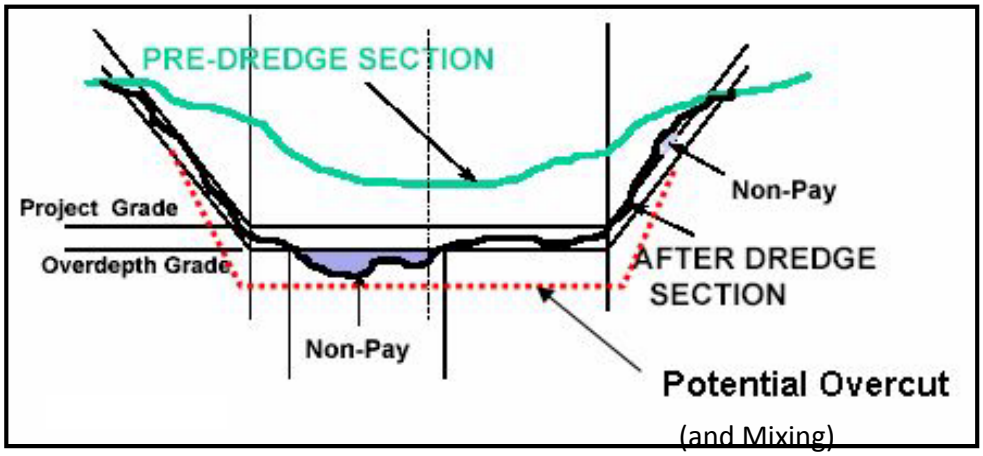
2.3.2 REQUIRED, ALLOWABLE, AND OVER-CUT BEYOND THE PROJECT DEPTH OR WIDTH



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

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

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



2.3.3 POST-DREDGE CLEAN UP OPERATIONS: USE OF A DRAG BAR

Since dredging equipment does not typically result in a perfectly smooth and even bottom (see discussion above); a drag bar, chain, or other item may be drug along the 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 and possibly less hazardous to sea turtles than additional hopper dredging. Figure 16 and Figure 17

show typical dragbar configurations (courtesy Bean Dredging Company and Weeks Marine Incorporated).

Figure 16 - Dual-block Drag Bar


Figure 17 - Davit-mounted Drag Bar

2.3.4 BULKHEAD CONSTRUCTION METHODS

Because sheet pile walls and bulkheads derive their support from the surrounding soil, an investigation of the foundation materials along the wall alignment shall be conducted prior to design of the bulkhead. This investigation shall be a cooperative effort among structural and

geotechnical engineers and shall include an engineering geologist familiar with the area. Based on previous investigations, the soil below CGB Miami Beach is sand on top of limestone. This limits pile driving to those systems able to penetrate rock, typically hammer driven systems. Hammers can generally be divided into two groups, impact and vibratory. Impact hammers may be lifted manually or automatically by steam, air or diesel, and may also be single or double-acting. These hammers are sized by the maximum "rated energy" (foot-pounds) theoretically contained as kinetic energy in the ram just before impact. This rated energy is not necessarily absorbed by the pile. Vibratory hammers are electrically or hydraulically powered, usually have a variable operating frequency range (vibrations per minute), and are generally rated by "eccentric moment" (inch-pounds) and "driving force" (tons) for a specified frequency. A more detailed description of the types of Hammers is available for review in the Corps of Engineers Engineering Manual EM1110-2-2906, Chapter 5 (http://www.publications.usace.army.mil/Portals/76/Publications/EngineerManuals/EM_1110-2-2906.pdf).

Installation of the new bulkhead includes driving new pilings into the seafloor. A pile driving template will be mounted to the crane barge. This allows the crane barge to control the alignment of the piles as they are driven. Once the crane barge is properly aligned, the piles will likely be driven to the appropriate depth using a vibratory hammer similar to that used in other bulkhead installations such as shown in Figure 18. An impact hammer will be a contingency employed only if vibratory methods are inadequate. Pile driving produces underwater noise during construction which will be addressed in the affects discussion later in this assessment.

Figure 18 - Vibratory Installation of Sheet Piles

At present, underwater ambient noise in the project area is likely to be dominated by sounds from normal operations at CGB Miami Beach, as well as vessels moving through Government Cut at the Port of Miami and Meloy channel which are adjacent to the CGB Miami Beach. These noises will be close to the construction source and will continue during and after the proposed action. These sounds are non-impulsive and intermittent, occurring sporadically during normal activities. Noise from vibratory pile driving associated with the proposed action is unlikely to alter the existing ambient noise within the project area because of its relatively low source level (approximately 157 dB re 1 µPa rms at 10 m) and non-impulsive nature. Noise from impact pile driving has higher source levels (approximately 186 dB re 1 µPa at 10m) and is impulsive in nature, with a fast rise time and multiple short-duration (50–100 millisecond; Illingworth & Rodkin 2001) events.

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.

2.5 MITIGATION

Mitigation includes those measures and features that avoid, minimize and/or compensate for unavoidable environmental impacts. For dredging of CGC HUDSON's berth, mitigation includes endangered species protection on the dredge by compliance with the USACE/FWS standard manatee construction protocols and compliance with the NMFS sea turtle and smalltooth sawfish construction protocols. For bulkhead replacement mitigation includes relocation of scleractinian corals greater than 10 cm in diameter from the bulkhead to an alternative location and monitoring for marine mammal presence during bulkhead construction operations with appropriate shutdown criteria should dolphins or manatees approach within 130 feet of the construction area. Compensatory mitigation for unavoidable impacts to seagrasses is planned to occur at the Julia Tuttle Mitigation Area and will consist of planting of up to one acre of the site not previously scheduled for seagrass planting under any other project's mitigation requirements. Additionally, monitoring of turbidity during dredging (and bulkhead work if elevated turbidity levels are observed) will comply with the appropriate water quality standards. This determination is in compliance with 403.813, Florida Statutes and 404(f) of the Clean Water Act.

Table 1- Summary of Impacts by Alterative

ALTERNATIVE ENVIRONMENTAL FACTOR	Maintenance Dredging – CGC HUDSON Berth	Bulkhead Replacement Zones 4 & 5	Bulkhead Replacement – Whole base	No Action Alternative – No Maintenance Dredging USCGC HUDSON Berth	No Action Alternative – No Bulkhead Replacement
PROTECTED SPECIES (sea turtles, sawfish, manatees, corals)	No direct impacts due to compliance with terms and conditions of SARBO, FWS and NMFS in water construction protocols.	No impact to manatees/crocodiles/sea turtles with shutdown zones in place.	No impact to manatees/crocodiles/sea turtles with shutdown zones in place.	No impact to manatees/crocodiles/sea turtles with shutdown zones in place.	No impact to manatees/crocodiles/sea turtles with shutdown zones in place.
FISH AND WILDLIFE RESOURCES	Minimal impact to fishes in the project area due to dredging. Minor increase in turbidity during dredging operations.	Permanent removal of any wildlife attached to the existing bulkhead.	Permanent removal of any wildlife attached to the existing bulkhead.	No impact to fish and wildlife.	No impact to fish and wildlife.
VEGETATION	Removal of up to 0.13 acres of mixed sea grasses associated with sideslope equilibration.	No impact to sea grasses.	No impact to sea grasses.	No impact to sea grasses.	No impact to sea grasses.
WATER QUALITY	Temporary turbidity associated with dredging.	Temporary turbidity associated with pile driving.	Temporary turbidity associated with pile driving.	No effect to water quality	No effect to water quality
HISTORIC PROPERTIES	No historic properties affected.	No historic properties affected.	No historic properties affected.	No historic properties affected.	Possible adverse effects to potentially NRHP eligible historic property if not replaced/repaired.

ALTERNATIVE ENVIRONMENTAL FACTOR	Maintenance Dredging – CGC HUDSON Berth	Bulkhead Replacement Zones 4 & 5	Bulkhead Replacement – Whole base	No Action Alternative – No Maintenance Dredging USCGC HUDSON Berth	No Action Alternative – No Bulkhead Replacement
RECREATION	Potential temporary delays to vessel movements in Meloy channel due to dredging equipment moves	Potential temporary delays to vessel movements in Meloy channel due to dredging equipment moves	Potential temporary delays to vessel movements in Meloy channel due to dredging equipment moves	No effect to recreation	No effect to recreation
AESTHETICS	Potential temporary impacts to aesthetics due in Meloy channel due to dredging equipment being in channel	Potential temporary impacts to aesthetics due in Meloy channel due to bulkhead construction equipment being in channel	Potential temporary impacts to aesthetics due in Meloy channel due to bulkhead construction equipment being in channel	No effect to aesthetics	No effect to aesthetics
NAVIGATION	Potential temporary delays to vessel movements in Meloy channel due to dredging equipment moves	Potential temporary delays to vessel movements in Meloy channel due to dredging equipment moves	Potential temporary delays to vessel movements in Meloy channel due to dredging equipment moves	No effect to navigation	No effect to navigation
ESSENTIAL FISH HABITAT	Direct impacts to seagrass HAPCs.	Direct impacts to coral HAPCs.	Direct impacts to coral HAPCs.	No impact to EFH	No impact to EFH
INVASIVE SPECIES	No impacts to invasive species.	No impacts to invasive species.	No impacts to invasive species.	No impacts to invasive species.	No impacts to invasive species.

3 AFFECTED ENVIRONMENT

The Affected Environment section succinctly describes the existing environmental resources of the areas that would be affected if any of the alternatives were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that would affect or that would be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "no-action" alternative forms the base line conditions for determining the environmental impacts of the proposed action and reasonable alternatives.

3.1 GENERAL ENVIRONMENTAL SETTING

Coast Guard Base Miami Beach lies in the north side of Biscayne Bay, a shallow subtropical lagoon that extends from the City of North Miami (Miami-Dade County, Florida) south to the northern end of Key Largo (at the juncture of Miami-Dade and Monroe Counties). Biscayne Bay is bordered on the west by the mainland of peninsular Florida and on the east by both the Atlantic Ocean and a series of barrier islands consisting of sand and carbonate deposits over limestone bedrock (Hoffmeister 1974).

Tides within the Miami area are semi-diurnal having two high and two low tides each day. The mean range at Miami Beach is 2.5 feet (3.0 feet in spring). The lowest tide is 1.4 feet below mean low water (USACE 1989). Maximum tidal current velocities through Government Cut are approximately 5.5 feet per second on average tide, but occasional velocities of approximately 6.2 feet per second have been recorded during spring tide (USACE 1989). These tides are very prevalent at CGB Miami Beach, resulting in very fast moving water in the channels to the east and south of the base.

The Biscayne Bay area, including CGB Miami Beach is located within State of Florida Class III waters. Class III is the standard designation covering most open marine waters of the state. Biscayne Bay is also classified as Outstanding Florida Waters (OFW) under Section 62-302.700 of the Florida Administrative Code. The OFW designation carries with it the requirement that ambient water quality cannot be degraded below its existing level.

3.2 VEGETATION

Seagrass distribution and occurrence in the project vicinity were determined from the FWC seagrass GIS layers (Figure 19). Although no seagrass was shown in Meloy Channel or in the vicinity of the CCG Base Miami Beach, previous surveys south of the Base conducted for the Miami Harbor expansion documented seagrass in Meloy Channel where it meets Fisherman’s Channel (Figure 20) (USACE 2004). Because there were previously mapped seagrasses in Meloy

Channel, the decision was made to perform an in-situ survey for sea grasses in the berth as well as within 15 feet of the bulkheads surrounding the base.

Figure 19 - FWC Seagrass data in vicinity of Coast Guard Base

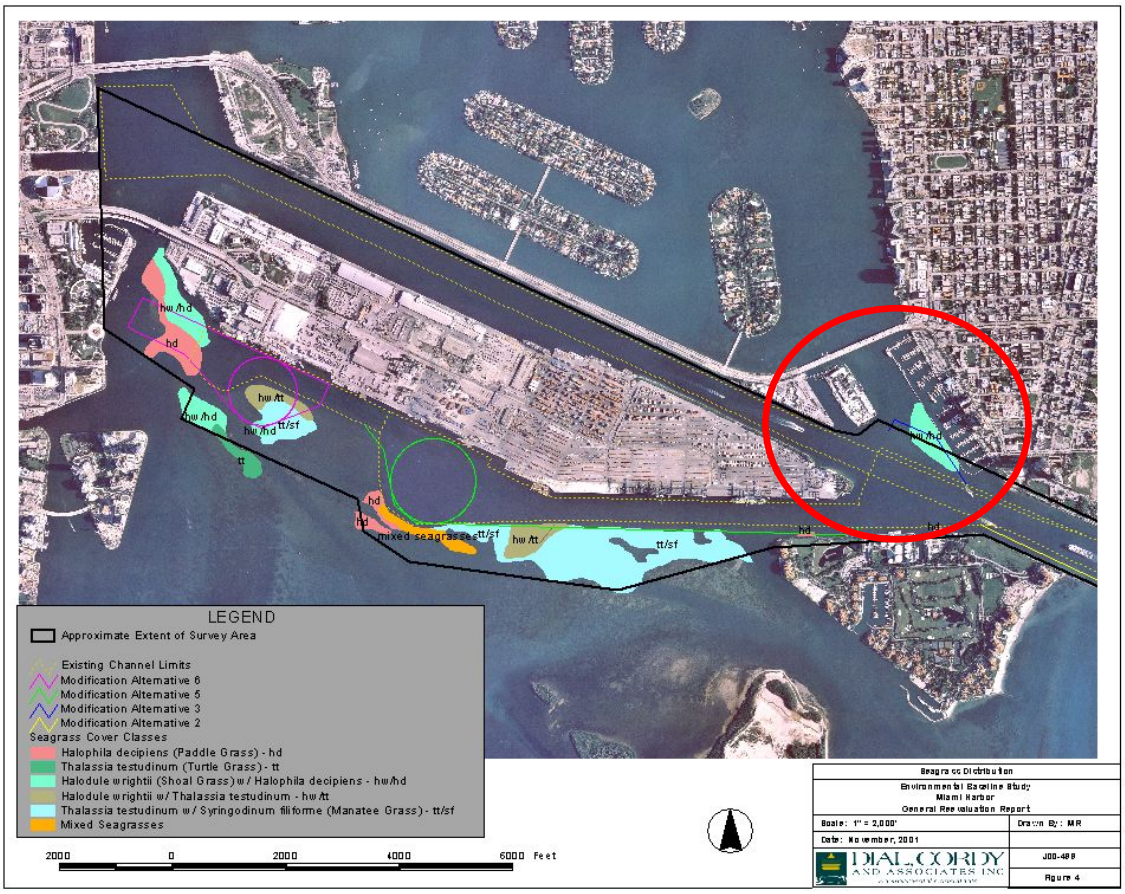


Figure 20 - Mapped seagrass south of USCG Base Miami Beach in Meloy Channel

A seagrass survey was conducted from May 28-30, 2013 including the entire perimeter of the Station within 4.6 meters (m) (15 feet) of the station and a sufficient buffer to account for side slope, with transects spaced 15.2m (50 feet) apart, perpendicular to the bulkhead. The CGC HUDSON's berth was surveyed for seagrasses out to 30m (98 feet) (Figure 21).

Figure 21 - Seagrass Survey Transect Locations

Approximately 0.42 acres of seagrasses were documented within the project area between 16m (52.5 feet) and 30m (98 feet) from the east bulkhead wall adjacent to the CGC HUDSON berth. The predominant seagrasses were *Halophlia decipiens* and *Halodule wrightii*, although *Syringodium filiforme* and *Thalassia testudinum* were also present. No *H. johnsonii* was documented in the survey. Despite surveying seagrass transects around the entire island, no seagrasses were found anywhere else in the project area (Figure 22). A copy of the survey is included in Appendix D.

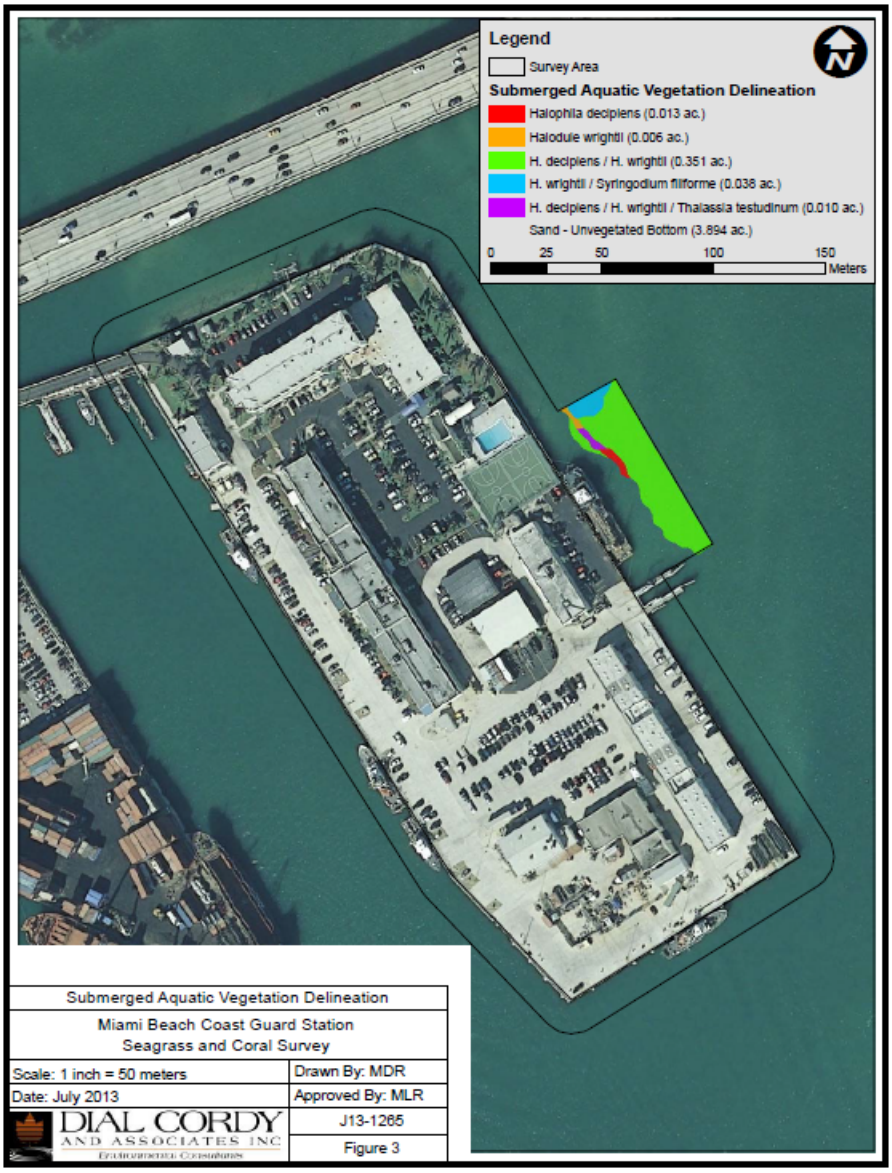


Figure 22 - Seagrass Location in Project Areas

3.3 THREATENED AND ENDANGERED SPECIES

3.3.1 SEA TURTLES

Miami-Dade County is within the normal nesting range of three species of sea turtles; the loggerhead (*Caretta caretta*), the North Atlantic distinct population segment (DPS) of green sea turtle (*Chelonia mydas*) (80 FR 15272), and the leatherback (*Dermochelys coriacea*). The leatherback sea turtle is listed as endangered under the ESA and Chapter 370, F.S. The

loggerhead sea turtle is listed as a threatened species. The North Atlantic DPS of the green sea turtle is currently proposed as a threatened species; previously all green sea turtles found in the U.S. were listed as endangered species.

The waters offshore of Miami-Dade County and those of Biscayne Bay are also used for foraging and shelter for the three species listed above, as well as the hawksbill sea turtle (*Eretmochelys imbricata*) and the possibly Kemp's ridley sea turtle (*Lepidochelys kempii*), and Olive ridley sea turtle (*Lepidochelys oliveacea)* (DC&A 2001; Foley, et al 2003).

In the summer of 2005, between June 25 and 12 August, blasting events took place on the south side of Dodge-Lummus Island in the Port of Miami, extensive monitoring for protected species was conducted which provides additional information concerning species using the area near the port, and thereby give an indication of turtle species that may be in the vicinity of the CGB Miami Beach. Loggerhead sea turtles were the only turtle species that was identified to the species level, however there were some sightings that were unable to be identified to the species level and were noted as "unidentified sea turtle". A total of seven (7) sea turtles were spotted in the construction area during the 40 days of monitoring.

3.3.2 MANATEES

The Florida manatee (*Trichechus manatus latirostris)* is a subspecies of the West Indian manatee (*Trichechus manatus*) has been listed as a protected mammal in Florida since 1893. Federal law, specifically the Marine Mammal Protection Act of 1972 (MMPA) and the Endangered Species Act of 1973 (ESA) protects manatees. Florida provided further protection in 1978 by passing the Florida Marine Sanctuary Act designating the state as a manatee sanctuary and providing signage and speed zones in Florida's waterways.

Within Miami-Dade County there exist both permanent and transient populations of manatees. Surveys show that during the winter months when temperatures drop, manatees from north Florida and also Miami-Dade County will migrate to the Florida Power and Light (FP&L) power plant at Port Everglades (USGS 2000). During the spring months when the water warms, manatees return to the counties to the north and south to forage and reproduce. Telemetry and aerial surveys confirm manatees are present within Miami-Dade County all year (Miami-Dade County 1999a, USGS 2000). The surveys also confirm that they frequent the waters in and adjacent to the study area in the Port, especially in the BSCWA, and near the Miami River and Intracoastal Waterway (ICWW).

All of the waters in Miami-Dade County are designated as critical habitat for the manatee under the ESA in 1976 (50 CFR 17.95(a)). Additionally, the FWC has designated a slow speed zone north of the Coast Guard Base (Figure 23).

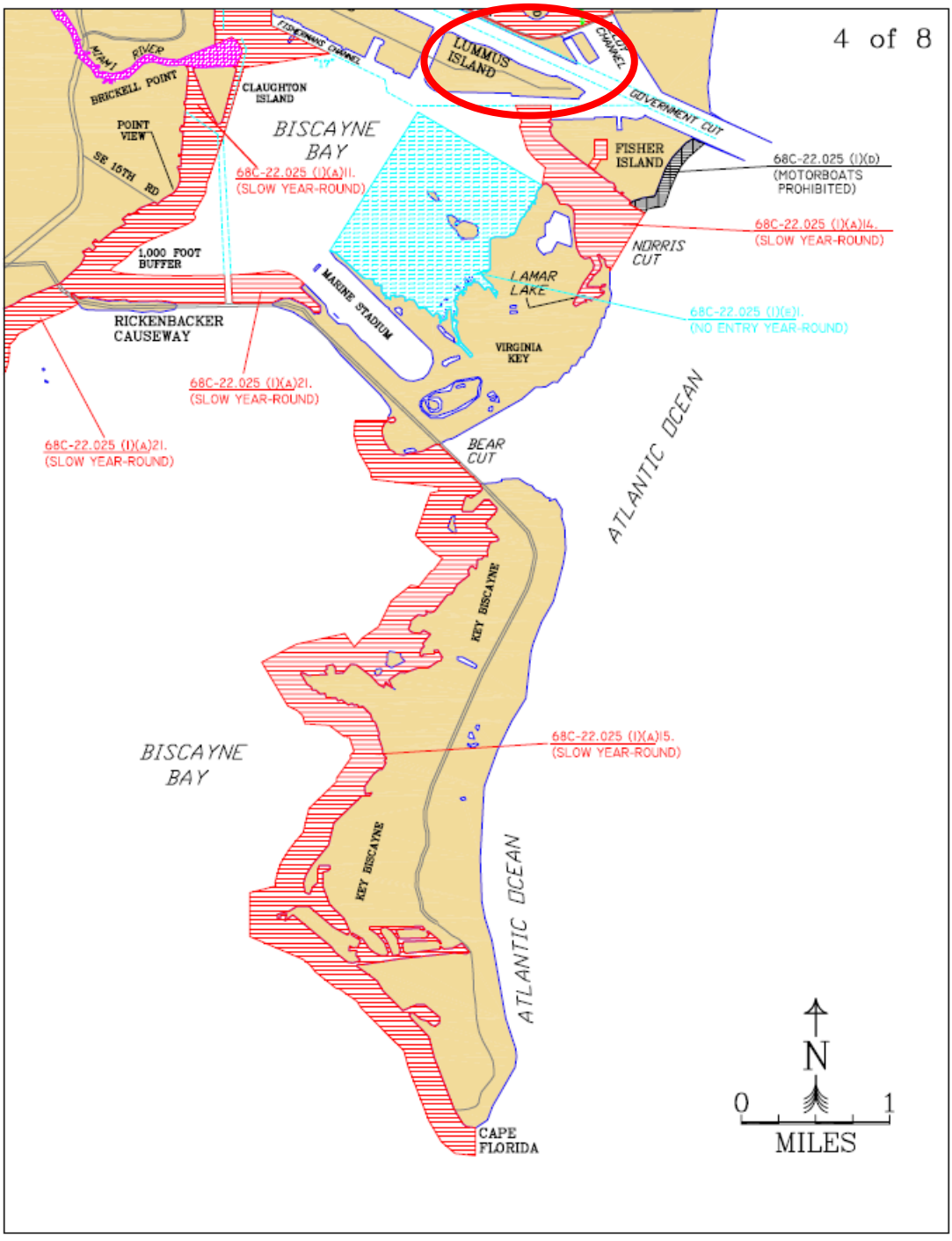


Figure 23 - FWC Manatee Speed Zones Near the Coast Guard Base

3.3.3 JOHNSON'S SEAGRASS

Johnson's seagrass (*H. johnsonii*) was listed as a threatened species by NMFS on September 14, 1998 (63 FR 49035) and a re-proposal to designate critical habitat pursuant to Section 4 of the ESA was published on December 2, 1998 (64 FR 64231). The final rule for critical habitat designation for *H. johnsonii* was published April 5, 2000 (65 FR 17786). Federal navigation channel boundaries existing at the time of designation, including the Port project are excluded from the critical habitat designation. The berthing areas of CGB Miami Beach were not excluded from the critical habitat designation. *H. johnsonii* has one of the most limited geographic ranges of all seagrass species. It is only known to occur between Sebastian Inlet and northern Biscayne Bay on the east coast of Florida (Kenworthy 1997). Although *H. johnsonii* has been reported to occur in north Biscayne Bay, no *H. johnsonii* was encountered within the survey area (Figure 21).

3.3.4 AMERICAN CROCODILE

The American crocodile is a state and federally listed threatened species. It is distributed along coastal and estuarine shores of the extreme southern Florida peninsula. Crocodiles primarily nest from Florida Bay to Turkey Point and on northern Key Largo. In Biscayne Bay they have been observed nesting as far north as Crandon Park, Bill Baggs State Recreation Area and Snapper Creek (USFWS 1999; Mazzotti 2000). Nesting for the crocodile begins in March and extends until late April or early May until the eggs are laid. They build their nests in well-drained soil at sites adjacent to deep-water. Adult crocodiles feed at night on schooling fish in creeks, open water, and deep channels (FP&L 1987). Crocodiles are shy animals and prefer quiet, inland ponds and creeks and protected coves. They also prefer natural, undisturbed areas for nesting, resting and feeding (USFWS 1999). Documentation of American crocodiles north of Miami-Dade County has increased over the last few years with animals being reported in Broward and Palm Beach Counties.

3.3.5 SMALLTOOTH SAWFISH

On April 1, 2003, NMFS published a final rule (68 FR 15674) listing this the DPS of smalltooth sawfish found in the U.S. as an endangered species under the ESA. Smalltooth sawfish, *Pristis pectinata* were once common in Florida as detailed by the "Smallthooth Sawfish Recovery Plan" (NMFS, 2009) and are very rarely reported in southeast Florida. Their core range extends along the Everglades coast from the Ten Thousand Islands to Florida Bay, with moderate occurrence in the Florida Keys and at the mouth of the Caloosahatchee River. Outside of these areas, sawfish are rarely encountered and appear to be relatively rare (Simpfendorfer 2006). It does not appear to be a coincidence that the core range of smalltooth sawfish corresponds to the section of Florida with the smallest amount of coastal habitat modification. USCG requested sighting information from the NMFS smalltooth sawfish sighting database in January 2014 for the "area in and around the Miami Beach Coast Guard Station." In an email response dated January 7, 2014 NMFS staff responded to the data request with Figure 24 attached showing the

sightings from 1999-2013. It appears from the graphic that the closest sightings were in the Miami River and south of Bayside Marina in 2009 and 2010. NMFS released the final recovery plan for the smalltooth sawfish in January 2009 (NMFS, 2009), and designated critical habitat for the species in September 2009 (74 FR 45353). There is no designated critical habitat for smalltooth sawfish in the project area.

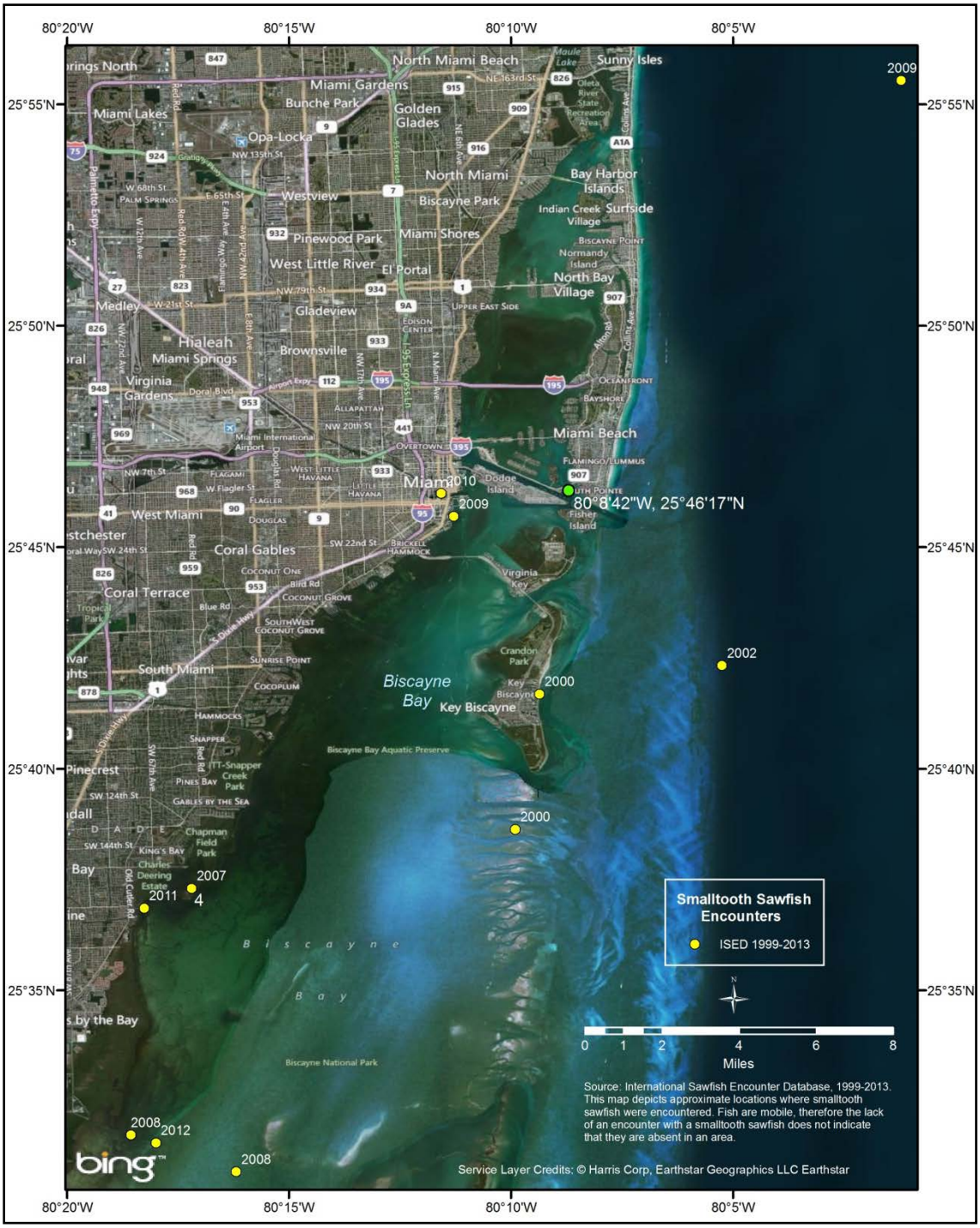


Figure 24 - Sawfish sightings within 5 nm of USCG Miami Beach

3.3.6 SCLERACTINIAN CORALS

A survey for scleractinian corals was conducted along the entire bulkhead, from the base of the bulkhead wall to the mean low water mark. Scleractinian coral data collected included coral species, size, orientation, latitude, longitude and height on the bulkhead wall. Surveys were conducted from May 28-30 and June 12, 2013 in support of the EA for dredging around the station and bulkhead improvements.

3.4 FISH AND WILDLIFE RESOURCES

3.4.1 BOTTLENOSE DOLPHINS

The National Marine Fisheries Service – Southeast Fisheries Science Center-Miami Laboratory (SEFSC) has identified numerous stocks of coastal bottlenose dolphins along the east coast of the United States. The stock of bottlenose dolphins most likely to be in the vicinity of CGB Miami Beach is the Biscayne Bay stock. The Coast Guard is incorporating by reference the most recent stock assessment for the Biscayne Bay stock of bottlenose dolphin that was completed by NMFS in 2014 (Waring *et al*, 2014).

Based on the Waring *et al (*2014), the minimum population that may be in northern Biscayne Bay and have the closest vicinity to the CGB is 69 animals, based upon Litz's (2007) determination that 69 animals in Biscayne Bay have a northern home range (Haulover Inlet to Rickenbacker Causeway). The maximum population of animals that may be in Biscayne Bay is equal to the total number of uniquely identified animals for the entire photo-ID study of Biscayne Bay is 229 animals. The best population estimate for Biscayne Bay is also based on Waring *et al (*2014) at 157 animals during the 2003-2007 photo-ID survey seasons when the most consistent survey effort was in place by SEFSC.

3.4.2 FISHES

Fish species are expected to be near the Coast Guard station bulkheads. This is a common occurrence in south Florida because fish are attracted to vertical structure. Based on blasting conducted at the Port of Miami in 2005 directly adjacent to bulkheads in the port, species that are expected to be close to the bulkheads at the Coast Guard Base include the 24 different genera (30 species) listed in Table 2. The species with the highest abundance were white grunts; scrawled cowfish and pygmy filefish.

Table 2 - Fishes collected near bulkheads at 2005 Port of Miami project

Common Name	Scientific Name	Common Name	Scientific Name
Atlantic thread herring	Opisthonema oglinum	bandtail puffer	Sphoeroides spengleri
bigeye scad	Selar crumenopthalmus	black grouper	Mycteroperca bonaci
blackwing sea robin	Prionotus rubio	bluestriped grunt	Haemulon sciurus
cardinalfish	Astropogon spp	dwarf sand perch	Diplectrum bivittatum
Filefish	Aluterus spp	french grunt	Haemulon flavolineatum
gag grouper	Mycteroperca microlepis	gray angelfish	Pomacanthus arcuatus
gray triggerfish	Balistes capriscus	Hogfish	Lachnolaimus maximus
lane snapper	Lutjanus synagris	Lookdown	Selene vomer
mangrove snapper	Lutjanus griseus	Mojarra	Eucinostomas spp
mutton snapper	Lutjanus analis	Porkfish	Anisotremus virginicus
pygmy filefish	Monocanthus setifer	queen angelfish	Holocanthus ciliaris
red grouper	Epinephelus morio	scrawled cowfish	Lactophrys quadricornis
silver jenny	Eucinostomas gula	spotfin mojarra	Eucinostomas argenteus
tomtate	Haemulon aurolineatum	white grunt	Haemulon plumieri
yellow jack	Caranx bartholomaei	yellowfin mojarra	Gerres cinereus

3.4.3 CORALS AND ASSOCIATED SPECIES

Coral surveys resulted in the documentation of 580 scleractinian coral colonies on all four bulkhead walls (Figure 25). Of these, 197 (33%) exceeded 10cm in their greatest (longest) measured dimension. The total area of wall surface covered by all 580 corals is 50.2 m^2. This is approximately 0.2% of the surface area available for colonization that is below mean low water. In total 18 species of scleractinian coral were identified. These species are commonly identified on the reefs and hardbottom communities of southeast Florida (Jaap 1984; Porter 1987). Of these, *Oculina diffusa* was the most common coral comprising 66% of all coral species present. *O. diffusa* also comprised more than half of all large (>10cm) corals, however, the three largest individual colonies identified were *Porites astreoides*. The density of corals was greatest on the south wall and the south parts of the east and west walls. Coral density decreased on the northern reaches of the east and west walls. The density on the west wall was lower than on the south and east walls.

Additional scleractinian corals were noted at the base of the north, east and south walls, where they have colonized rubble and debris. Although these coral were not quantified under this contract, pre-construction surveys should include this area, as many of these corals were larger than 10cm and would be considered relocatable.

Figure 25 - Coral Locations on the Bulkhead

3.4.4 MIGRATORY BIRDS

Migratory birds may fly through SE Florida and may attempt to rest on the Coast Guard Base's bulkheads. The Base has bird deflectors along the bulkheads to prevent birds from resting on the bulkheads.

3.5 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires federal agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat (EFH). This EA is prepared consistent with guidance provided by the NMFS Southeast Regional Office to USACE, Jacksonville District regarding coordinating EFH consultation requirements with NEPA (NMFS 1999a). EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, or growth to maturity" (SAFMC 1998).

The South Atlantic Fishery Management Council (SAFMC) designated corals, coral reefs, hardbottom, seagrasses and unconsolidated sediments as EFH. Hardbottoms are EFH for coral, red grouper (*Epinephelus morio*), gag grouper (*Mycteroperca microlepis*), gray snapper (*Lutjanus griseus*), mutton snapper (*L. analis*), white grunt (*Haemulon plumieri*), and spiny lobster (*Panulirus argus*). Sand habitats are EFH for cobia (*Rachycentron canadum*), black seabass (*Centropristis striata*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*S. maculates*), spiny lobster, and pink shrimp (*Farfantepenaeus duorarum*). All demersal fish species under SAFMC management that associate with coral habitats are contained within the fishery management plan for snapper-grouper species and include some of the more commercially and recreationally valuable fish of the region. All of these species show an association with coral or hardbottom habitat during their life history. In groupers, the demersal life history of almost all *Epinephelus* species, several *Mycteroperca* species, and all *Centropristis* species, takes place in association with coral habitat (SAFMC 2009). Coral, coral reef, seagrass and hardbottom habitats benefit fishery resources by providing food or shelter (SAFMC 1983). SAFMC also designated corals, coral reefs, seagrasses and hardbottoms as a Habitat Area of Particular Concern (HAPC), which is a subset of EFH that is either rare, particularly susceptible to human-induced degradation, especially important ecologically, or located in an environmentally stressed area. In light of their designation as EFH-HAPC's and Executive Order 13089, NMFS applies greater scrutiny to projects affecting corals and seagrasses as they are HAPCs to ensure practicable measures to avoid and minimize adverse effects to these habitats are fully explored.

3.6 COASTAL BARRIER RESOURCES

There are no designated Coastal Barrier Resource Act Units located in the project area that would be affected by this project.

3.7 WATER QUALITY

CGB Miami Beach is located within the Biscayne Bay Aquatic Preserve. The preserve, which includes all of the waters of Biscayne Bay south to Biscayne National Park, was established in 1980 under Ch. 18-18, F.A.C. and is considered to be State-Owned Submerged Land under the jurisdictional authority of FDEP. All aquatic preserves in Florida are designated OFW. New

construction or other marine activities cannot result in a degradation of water quality outside of specially designated mixing zones (Miami-Dade County 1999b).

Turbidity is the major limiting factor in coastal water quality in South Florida. Turbidity is measured in Nephelometric Turbidity Units (NTU), which is a measure of light-scatter by particulates within the water. This measurement does not address the characteristics of the suspended material that creates turbid conditions. According to Dompe and Haynes (1993), the two major sources of turbidity in coastal areas are very fine organic particulate matter and sediments and sand-sized sediments that become resuspended around the seabed from local waves and currents. Florida state guidelines set to minimize turbidity impacts from beach restoration activities confine turbidity values to less than 29 NTU above ambient levels outside the turbidity mixing zone for Class III waters.

Turbidity values are generally lowest in the summer months and highest in the winter months, corresponding with winter storm events and the rainy season, and are higher closer to shore (Gilliam et al. 2008; Dompe and Haynes, 1993; Coastal Planning & Engineering [CPE], 1989). Moreover, higher turbidity levels can generally be expected around inlet areas, and especially in estuarine areas, where nutrient and entrained sediment levels are higher. Although some colloidal material will remain suspended in the water column upon disturbance, high turbidity episodes usually return to background conditions within several days to several weeks, depending on the duration of the perturbation (storm event or other) and on the amount of suspended fines.

3.8 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

A preliminary site assessment was conducted in May of 2014 of the site of the proposed Miami Harbor U.S. Coast Guard Station. The Hazardous Toxic and Radioactive Waste (HTRW) assessment is required by ER 1165-2-132 and consisted of an aerial photos review and database review. This updated a previous report developed in 1993. As the area considered for this project does not include any upland disposal sites located adjacent to, or nearby the Coast Guard Station, and no excavation of uplands, the task was simplified. The evaluation revealed that the maintenance event is in the vicinity of industrial facilities, ad hoc warehouse or storage areas, and petroleum storage facilities, but none of these areas are to be directly impacted. The database search (http://www.rtknet.org/) extended back to 1982. There was documentation of five small spills between 2002 and 2012, which are not unusual for a busy port area. Likely through actual documented cleanup remedial actions, dilutions and tidal currents pushing out all the residuals, the effects have been weathered and eliminated. It is also of note that the Coast Guard is the lead agency involved in conducting HTRW cleanup activities. The material proposed for dredging will be evaluated for the suitability for ocean disposal in the Miami Ocean Dredged Material Disposal Site and that will be the final test of the contamination of the material (for both the Marine Protection Research and Sanctuaries act and the Clean Water Act). The testing may include sediment chemistry as well as bioassays. It

is very unlikely that any significant contamination lingers, due to the sandy character of the material and the existence of seagrass in and near the area proposed for maintenance dredging.

3.9 AIR QUALITY

Air quality within the project area is good due to the presence of either on or offshore breezes. Miami-Dade County is in attainment with the Florida State Air Quality Implementation Plan for all parameters except for the air pollutant ozone. The County is in attainment for all EPA designated air quality parameters.

3.10 NOISE

Ambient noise is comprised of sounds from natural and manmade sources. Natural sounds include wind, rain, thunder, water movement such as surf, and wildlife. Sound levels from these sources are typically low, but can be pronounced during violent weather events. Sounds from natural sources are generally not considered undesirable. Ambient background noise in urbanized areas typically varies from 60 to 70 dBA, but can be higher; suburban neighborhoods experience ambient noise levels of approximately 45 to 50 dBA (USEPA 1974).

In urbanized and industrialized areas such as the CGB Miami Beach, noise sources may include common construction equipment, such as trucks, cranes, compressors, generators, pumps, and other equipment that might typically be employed along industrial waterfronts (WSDOT 2010a) as well as commercial and recreational vessels. Typical source levels for common industrial noise sources are given in Table 3 and Table 4. Maximum noise levels reach 99 dBA when multiple sources of noise are operating simultaneously, assuming an increase of 3 dB per doubling of sound intensity (WSDOT 2010a). These maximum noise levels are intermittent in nature, may occur sporadically on any given day with construction or other waterfront activity.

Table 3 - Maximum Noise Levels at 50 feet for Common Construction Equipment

Equipment Type	Maximum Noise Levels (dBA)
Impact pile driver	109
Vibratory pile driver	96
Scraper	90
Backhoe	90
Crane	81
Pumps	81
Generator	81
Front Loader	79
Air Compressor	78

Sources: WSDOT 2008; Illingworth & Rodkin 2012

Table 4 - Noise sources associated with project

Noise Source	**Peak Frequency Range (Hz)**	**Underwater Source Level (re 1µPa)**	**Reference**
Small vessels	250-6,000	151 dB rms at 1 m	Lesage et al 1999
Large vessels (underway)	20-1,500	170-180 dB rms at 1m	Richardson et al 1995
Tug docking barge	200-1,000	149 dB rms at 100m	Blackwell and Greene 2002
Vibratory driving of a 24-inch steel pipe pile	50-1,500	159 dB rms at 10m	Illingworth and Rodkin 2012
Impact driving of a 24-inch steel pipe pile	50-1,500	186 dB rms at 10m	WSDOT 2010b

dB = decibel; rms = root mean squared; m=meter

Underwater ambient noise is comprised of sounds produced by a number of natural and anthropogenic sources. Natural noise sources can include wind, waves, precipitation, and biological sources such as shrimp, fish, and cetaceans. These sources produce sound in a wide variety of frequency ranges (Urick 1983; Richardson et al. 1995) and can vary over both long (days to years) and short (seconds to hours) time scales. In shallow waters, precipitation may contribute up to 35 dB to the existing sound level, and increases in wind speed of 5 to 10 knots can cause a 5 dB increase in ambient ocean noise between 20 Hz and 100 kilohertz (kHz) (Urick 1983). High noise levels may also occur in nearshore areas during heavy surf, which may increase low frequency (200 Hz – 2 kHz) underwater noise levels by 20 dB or more within 200 yards of the surf zone (Wilson et al. 1985).

Anthropogenic noise sources also contribute to ambient noise levels, particularly in ports and other high use areas in coastal regions. Normal port activities include vessel traffic (from large ships, support vessels, and security boats), loading and maintenance operations, and other activities (sonar and echo-sounders from commercial and recreational vessels, construction,

etc.) which all generate underwater sound (Urick 1983). Additionally, noise from mechanized equipment on wharves or adjacent shorelines may propagate underwater and contribute to underwater ambient noise levels.

The underwater acoustic environment in the USCG Base Miami Beach is likely to be dominated by noise from day-to-day port and vessel activities. The basin is sheltered from most wave noise, but is a high-use area for Coast Guard cutters, search and rescue and patrol vessels. These sources can create noise between 20 Hz and 16 kHz (Lesage et al. 1999), with broadband noise levels up to 180 dB re 1 µPa root mean squared (rms). During the proposed action, normal port operations, including transits, docking and maintenance of multiple tugboats and ships would continue, and noise contributions from these sources would remain at current levels. Sound levels for noises associated with the project are included in Table 4.

3.11 AESTHETIC RESOURCES

Coast Guard Base Miami Beach is located across Meloy Channel from Miami Beach, and across Government Cut from the Port of Miami. Both of these areas have high aesthetic value with large, graceful cruise ships transiting the channel to and from their berths, and the beach-front sky scrapers on the southern end of Miami Beach being visible from the station.

3.12 RECREATION RESOURCES

Miami-Dade County is a heavily populated county on Florida's Atlantic Coast, which receives a tremendous volume of tourists, particularly during the winter months. Those beaches that can be accessed by the general public are heavily used year round. In the recent past, new developments have been required to build public beach accesses to allow the general public access to beaches which are in front of private condominiums. Additionally, a boadwalk has been built along the Miami-Dade beaches allowing visitors greater access to all the beaches along the county.

Miami Beach has public access and receives heavy use by swimmers and sunbathers. Adjacent to these beaches are many condominiums and hotels used by long term and short-term visitors and residents of the area. Other water related activities within the project area include on-shore and offshore fishing, snorkeling, SCUBA diving, windsurfing and recreational boating. Most of the boating activity in the area originates from either Bakers Haulover Inlet or Government Cut. Both offshore fishing and diving utilize the natural and artificial reefs located within and adjacent to the project area. Commercial enterprises along the beach rent beach chairs, cushions, umbrellas, and jet skis. Food vendors can also be found along the beach areas. T he revenue generated by beachgoers supports a strong Miami Beach business district in the project vicinity.

3.13 NAVIGATION

Coast Guard Base Miami Beach is located at the intersection of Meloy Channel and Government Cut, and is located across Meloy channel from the Miami Beach Marina. This means that there is a high level of recreational navigation taking place along Meloy Channel, as well as commercial navigation occurring in Government Cut.

3.14 HISTORIC PROPERTIES

The earliest widely accepted date of occupation by aboriginal inhabitants of Florida dates from around 12,000 years ago (Milanich 1994). This earliest cultural period, called the Paleo-Indian period, lasted until about 10,000 YBP (years before present). Sea level was lower and the continental shelves were exposed - an area almost twice the width of the current size of the state. Few Paleo-Indian archeological sites are recorded in south Florida.

During the Archaic period (ca. 10,000 YBP - ca. 2500 YBP), a wider range of resources was exploited and may have led to a more sedentary existence. Sea level rose to its present position. Few Archaic period archeological sites, such as the Cutler Ridge site (~9300 YBP) in Miami, are recorded in south Florida. Known sites are clustered along the Atlantic coast and inland waterways.

Regional cultural traditions within Miami-Dade County, known as the Glades culture (historically known as the Tequesta), developed from the Archaic period in south Florida around 2500 YBP. The Glades culture sequence (ca. 2500 YBP-A.D. 1513) produced a large number of sites, predominantly along the coasts, but also in the interior wetlands. Glades site types include shell and earth middens and low sand mounds.

During the early historic period, beginning with the first Spanish colonial period (A.D. 1513-1763), the Tequesta were the main tribal group that controlled southern Florida with a central village located on the Miami River. Their population was decimated by European-introduced diseases, warfare, enslavement, and migration out of Florida.

Present day coastal Miami-Dade County was virtually ignored by the New World explorers like Ponce de Leon until the mid-seventeenth century when it became an important passage way for New World shipping. Many Spanish fleet ships wrecked in the vicinity. The *HMS Fowey*, a British war ship, sank in Biscayne Bay in 1748 on a reef now known as Fowey Rocks.

The Seminole and Miccosukee migrated into this region of Florida in the 18th and 19th centuries from Georgia and Alabama to escape relocation attempts by the US Army. American settlement in south Florida began in earnest in the late 19th century after Florida became a U.S. Territory in 1821 and settlers began moving into the Miami area by the 1830s. Fort Dade was constructed near Miami to protect settlers.

The city of Miami emerged in the late nineteenth century from Henry Flagler's Florida East Coast Railway that was constructed through the area. The Port of Miami boomed in the 1920s. In the 1940s, Miami served as a prominent training area for the US Navy during World War II. By the 1950s, the population of the region had exploded and today Miami-Dade County's industry includes shipping, agriculture, commercial and sport fishing, and tourism.

Coast Guard Base Miami Beach, constructed in the 1940s, is potentially eligible for the for listing on the National Register of Historic Places (NRHP) due to its association with World War II and the Cold War. However, Coast Guard Base Miami Beach has not been evaluated regarding its eligibility for listing on the NRHP.

The entire USCG station was constructed on a man-made island at the mouth of Miami Harbor during World War II for protection of the Port of Miami. The berth for the CGC HUDSON, also on man-made land, was previously dredged in 1995. Many of the buildings on the base were gutted and renovated during the 1990s.

The current bulkhead surrounding USCG Miami Beach is steel sheet pile with a concrete cap, which retains the soil backfill around the entire, man-made island, constructed in the 1940's. Additional areas were built out in the 1960's and some sections were replaced in the 1980's.

The closest known historic properties are located in the Ocean Beach Historic District to the northeast and the William Vanderbilt Jr. Estate to the southeast of the, the Coast Guard Base, properties that are potentially eligible for the NRHP.

3.15 INVASIVE SPECIES

Florida is the #2 state in the nation for invasive species. Three invasive marine animal species have been identified in the "Southern Florida" HUC code (30902) in the offshore areas per the USGS Non-Indigenous Aquatic Species Database (http://nas.er.usgs.gov/queries/default.aspx). Although this database does not list species in specific bays and estuaries in Florida, it is highly likely that invasive species reported in offshore waters may also be inside of bay systems adjacent to offshore waters. With that potential, these three invasive species have been documented offshore of Miami-Dade County, and thus the potential for them to be found within Biscayne Bay exists.

- Lionfish – *Pterois volitans/miles*

The lionfish has been confirmed within the boundaries of Biscayne Bay with documented sightings within a few hundred feet of CGB Miami Beach (Figure 26).

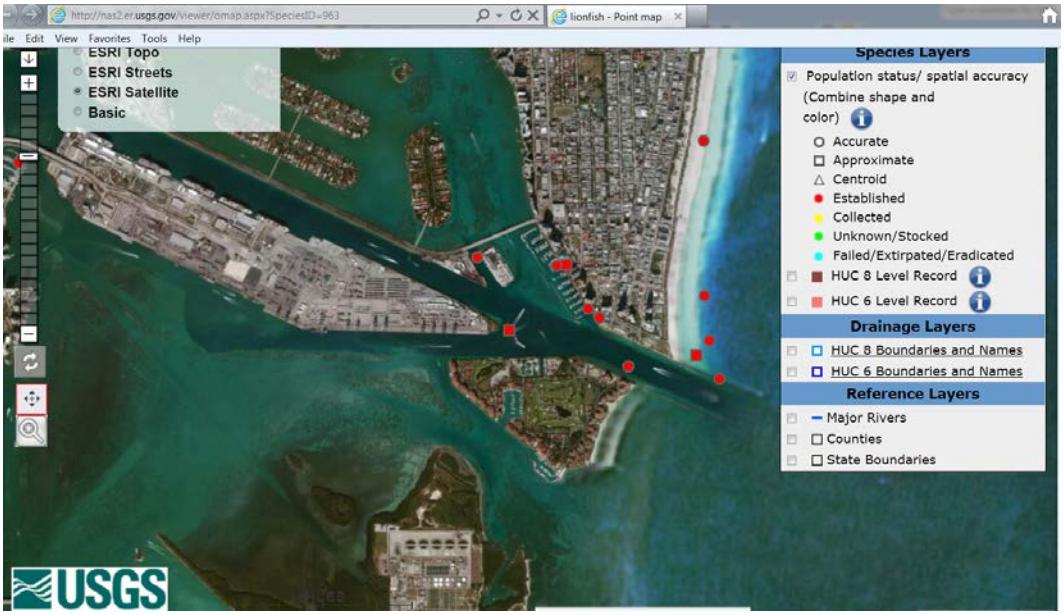


Figure 26 - Reports of lionfish in SE Florida

- Asian Tiger Shrimp - *Penaeus monodon*

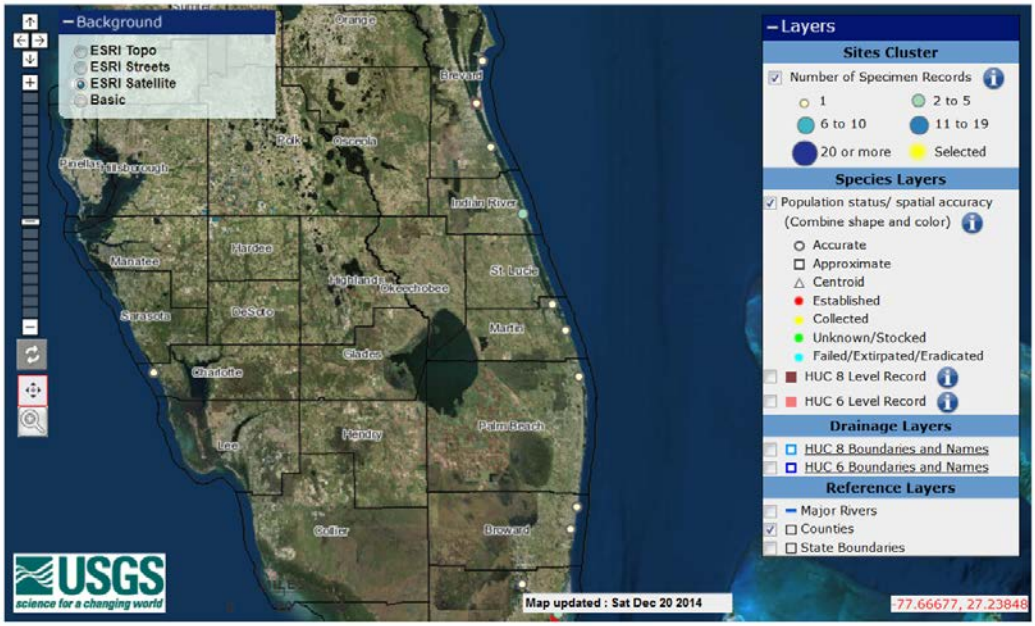


Figure 27 - Reports of Asian Tiger Shrimp in SE Florida

- Fairy Basslet - *Gramma loreto*

  Although the fairy basslet has not be reported in the database from Miami-Dade County, it is very likely to be present as it has been reported south in Monroe County and north in Broward and Palm Beach Counties.

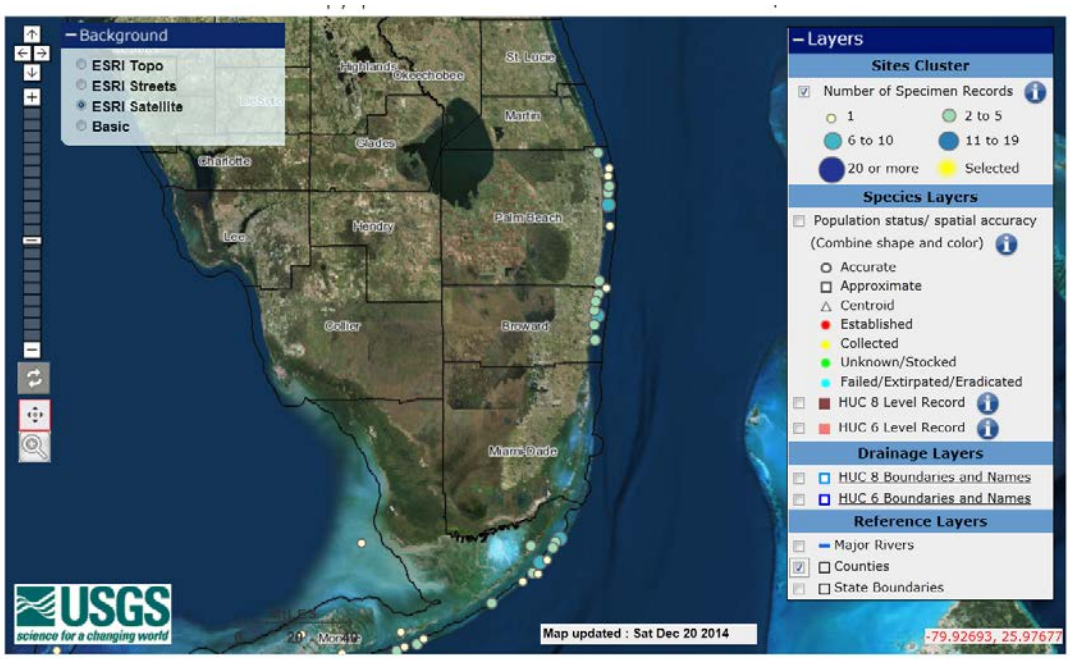


Figure 28 - Reports of Fairy Basslet in SE Florida

4 ENVIRONMENTAL EFFECTS

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

4.1 GENERAL ENVIRONMENTAL EFFECTS

Due to contracting laws requiring open competition, USCG cannot limit which construction methodology may be used for either the dredging or bulkhead construction. For dredging the most efficient pieces of equipment are a small hydraulic cutterhead dredge or a mechanical clamshell or backhoe dredge. For the bulkhead construction either vibratory or impact hammers will be used, and the impact assessment for pile driving associated with bulkhead construction is be based on impact hammer driven piles, as these tend to result in the greatest pressure being released into the water. The vibratory pile driver or hammer would generate lower level of sound or vibration through a series of lower impact blows.

4.2 VEGETATION

4.2.1 PROPOSED ACTION, DREDGING CGC HUDSON BERTH

Of the mapped 0.42 acres of sea grasses within the survey area, approximately 0.13 acres (6,500 square feet) falls within the indirect side-slope equilibration area associated with the dredging and may be impacted by the dredging (Figure 29). No direct impacts (i.e. removal) to seagrasses are expected with the dredging. To compensate for the potential loss of up to 0.13 acres of seagrass through side-slope equilibration, USCG proposes to mitigate through the planting of seagrasses at the Julia Tuttle Seagrass Mitigation Area (JTMA) approximately three miles north of the impact area. The Uniform Mitigation Assessment Method (UMAM) has been used to determine the acreage of seagrasses needed to adequately compensate for the loss of essential manatee habitat. The UMAM results demonstrated the replacement need at less than 0.50 acres. The UMAM is included in Appendix A. The planting will be conducted in conjunction with ongoing seagrass restoration associated with the Miami Harbor expansion project. Five years of post planting monitoring is proposed.

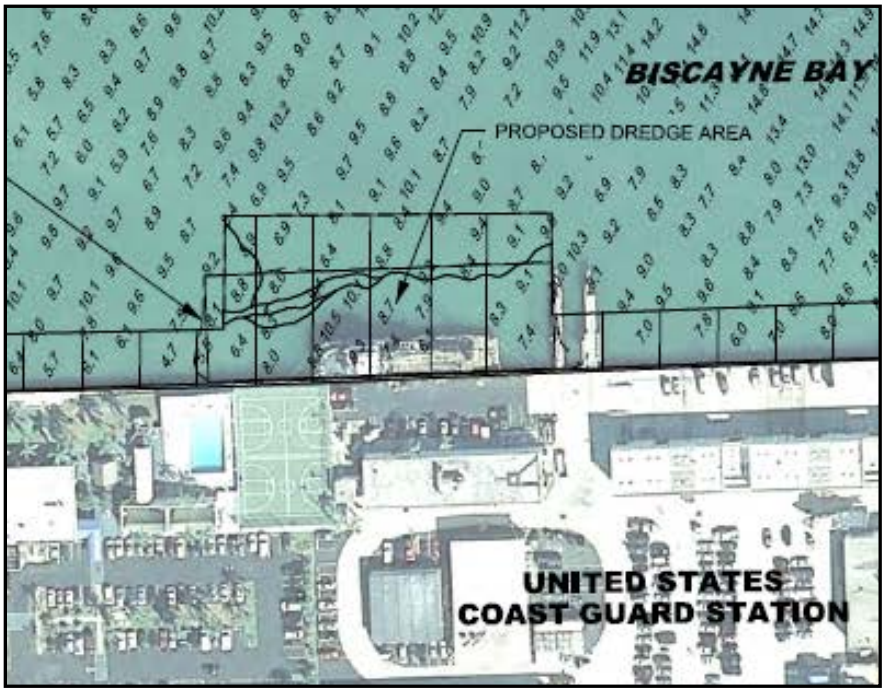


Figure 29 - Seagrass Impact Graphic

4.2.2 BULKHEAD REPLACEMENT – ZONE 4 & 5 (PREFERRED ALTERNATIVE, BULKHEAD REPLACEMENT)

There will be no affect to vegetation by the bulkhead construction as no seagrass was mapped within 15 feet of the current bulkhead and all construction will be within one to 5 feet of the existing bulkhead.

4.2.3 BULKHEAD REPLACEMENT – ENTIRE FACILITY BULKHEAD

There will be no affect to vegetation by the bulkhead construction as no seagrass was mapped within 15 feet of the current bulkhead and all construction will be within one to 5 feet of the existing bulkhead.

4.2.4 NO ACTION ALTERNATIVE – NO BERTH DREDGING

There will be no affect to vegetation by the bulkhead replacement construction is not conducted.

4.2.5 NO ACTION ALTERNATIVE – NO BULKHEAD REPLACEMENT

There will be no affect to vegetation if the bulkheads are not replaced.

4.3 THREATENED AND ENDANGERED SPECIES

4.3.1 SEA TURTLES

4.3.1.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

The impacts of dredging operations on sea turtles have been previously assessed by NMFS (NMFS, 1991; NMFS 1995; NMFS 1997; NMFS 2003) in the various versions of the South Atlantic Regional Biological Opinion and the 2003 (revised in 2005 and 2007) Gulf Regional Biological Opinion. In the SARBO and Gulf Regional Biological Opinion (GRBO), NMFS has discounted the potential take of sea turtles associated with mechanical dredges and hydraulic cutterhead dredges. This EA incorporates those findings. 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).

If the project is dredged with a hopper dredge because of how small the berth is, it will be dredged with the USACE-Wilmington District dredge MURDEN. The MURDEN is a CURRITUCK-class hopper dredge, and NMFS previously consulted on the potential for take of sea turtles by the CURRITUCK or "similar type and size class (under 500 gross tons), with similar dragheads (Brunswick, Brunswick County Type, Brunswick Adjustable, or equivalent), dredge pump horsepower (400 H.P. maximum), and suction and discharge pipe specifications (dredge suction pipes 10-14 inches in diameter, and combined discharge pipe 12-16 inches in diameter) (NMFS, 1999). This EA also incorporates NMFS' findings with regard to the CURRITUCK class dredges.

> "The operation of sidecast dredges FRY, MERRITT and SCHWEIZER and the small capacity, coastal hopper dredge CURRITUCK is not expected to adversely affect listed species of sea turtles because of the slow speed of the vessels, the low suction levels inherent to these small dredges, and the small size of the dragheads. These species should be able to get out of the way of the slow moving dredges, which operate at speeds of 1 to 3 knots when working in inlet channels…. Further, the dragheads have very small openings--3 inches by 5 inches for the CURRITUCK and 5.5 inches by 8 inches for the sidecast dredges."

4.3.1.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement)

Acoustic impacts criteria and thresholds were developed in cooperation with NMFS for sea turtle exposures to various sound sources. Only one criteria applicable to sound produced by pile driving exists for sea turtles. The NMFS threshold value for onset of injury to sea turtles due to both impact pile driving and vibratory pile driving is 190 dB re 1 µPa sound pressure level root mean square. This criteria was developed in cooperation with the NMFS and is not based on experimental evidence of injuries caused to sea turtles by pile driving sound but was adopted from pinniped thresholds as a precautionary measure when addressing impacts from

pile driving to sea turtles. In the absence of reliable in-water density data for sea turtles, this criterion is useful for qualitatively assessing activities that impart sound to water.

Sound levels from pile driving are not expected to reach the 190 dB re 1 µPa sound pressure level root mean square threshold (Table 5).

Table 5 - Source Levels for Pile Driving

Hammer	Pile type	RMS [dB re 1µPa at 10m]	SEL [dB re 1µPa2s at 10m]
Vibratory	24" steel pipe	163	-
	12" timber	153	-
Impact	24" steel pipe	189	179
	12" timber	170	160

Because of this, no injuries associated with sound produced by pile driving are anticipated for any species of sea turtle; however this does not preclude behavioral effects. As a precautionary measure against possible behavioral effects, a sea turtle and manatee shutdown zone of 50 ft (15 m) will be observed. If a sea turtle approaches or enters the shutdown zone, pile driving will cease and will not resume until the animal has moved out of the area. Based on the protective radius around the bulkhead construction activities, and the determination that sound levels are not expected to reach the impactive levels previously set by NMFS, the USCG believes that construction of the bulkhead may affect, but is not likely to adversely affect the threatened and endangered sea turtles as defined by the ESA. NMFS concurred with this determination in their February 10, 2015 biological opinion.

4.3.1.3 Bulkhead Replacement – Entire Facility Bulkhead

The effects of replacing the full bulkhead are the same as part of the bulkhead, however construction would take approximately twice as long, thus the effects would double temporally. The protection efforts for replacement of all bulkheads would be the same as those for replacement of Zones 4 and 5.

4.3.1.4 No Action Alternative – No Berth Dredging

There will be no affect to listed sea turtles if the CGC HUDSON's berth is not dredged.

4.3.1.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to sea turtles if the bulkheads are not replaced.

4.3.2 MANATEES

4.3.2.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

As stated above, as part of the standard plans and specifications for the project, USCG agrees to implement the USFWS "STANDARD MANATEE CONDITIONS FOR IN-WATER WORK" in order to minimize impacts to the species from the dredging. A seagrass survey was conducted from May 28-30, 2013 including the entire perimeter of the Station within 4.6 meters (m) (15 feet) of the station and a sufficient buffer to account for side slope, with transects spaced 15.2m (50 feet) apart, perpendicular to the bulkhead. As previously stated, the CGC HUDSON's berth was surveyed for seagrasses out to 30m (98 feet). Of the 0.42 acres of seagrasses mapped within the survey area, 0.13 acres (6,500 ft^2) falls within the direct dredging footprint and sideslope equilibration area and would be removed by the dredging (Figure 5). Seagrass beds are essential foraging habitat for manatees. Although seagrass habitats will be removed, the loss of seagrass habitats is relatively small with respect to overall seagrass abundance throughout the area. As previously discussed, seagrass planting in the JTMA is proposed to mitigate for the potential loss of seagrass in the project area. Based on this information and the proposed construction techniques, USCG determined that the maintenance dredging of the CGC HUDSON's slip using a cutterhead or mechanical dredge may affect, but is not likely to adversely affect the endangered Florida manatee and USFWS concurred with this determination under the ESA on May 5, 2014.

4.3.2.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement)

Utilization of pile driving to replace the sheet pile bulkhead may have an effect on manatees in the area. Both the pressure and noise associated with pile driving can impact marine mammals.

The two tables below were re-created from USN 2013 (Table 6, Table 7). They detail representative pile driving sound pressure levels measured from 24" steel pipe piles, 24" wide steel sheet piles and 12" timber piles. Sources are indicated by footnotes in the relevant tables.

Table 6 - Underwater Sound Pressure Levels During Vibratory Installation Based on In-situ Monitored Construction Activities

Project and Location	Pile Size and Type	Water Depth	Range to Pile	RMS	Peak	Sediment
Portage Bay, WA[b]	24 inch steel pipe	3-7m	10m	157	170	Unknown
Berth 23 Port of Oakland, CA[c]	24 inch steel sheet pile	6.1m	10m	163	177	Unknown
Berth 30 Port of Oakland, CA[c]	24 inch steel sheet pile	4.9m	10m	162	175	Unknown
Berth 35/37 Port of Oakland, CA[c]	24 inch steel sheet pile	6.1m	10m	163	177	Unknown
Port Townsend Ferry, WA[d]	12 inch timber pile	10m	10m	153	167	Unknown
Sound levels expressed as dB re 1 µPa rms and dB re 1 µPa peak for RMS and Peak SPL measurements, respectively.						

Sources: a – Illingworth & Rodkin 2012; b- Washington Department of Transportation 2010; c- California Department of Transportation 2009; d – Washington Department of Transportation 2010a

Table 7 - Underwater Sound Pressure Levels During Impact Installation Based on In-situ Monitored Construction Activities

Project and Location	Pile Size and Type	Water Depth	RMS	Peak	SEL	Sediment
Friday Harbor Ferry Terminal, WA[a]	24-inch steel sheet pile	12.8m	170	183	180	Sandy silt / clay
		13.4m	186	205	179	
		14.3m	186	204	179	
		10m	194	210	185	Sandy silt / rock
		10m	195	215	187	
		10m	193	212	184	
Typical values, CALTRANS compendium summary table[b]	24-inch steel sheet pile	15m	194	207	178	Unknown
Berth 23 Port of Oakland[b]	24-inch steel sheet pile	12 to 14m	189	205	179	unknown
Sound levels expressed as dB re 1 µPa rms and dB re 1 µPa peak for RMS and Peak SPL measurements, respectively.						

Sources: [a]WSDOT 2005; [b]CALTRANS 2009

The USFWS has not set levels defining harassment of manatees under the MMPA. However, under the MMPA NMFS has defined levels of harassment for marine mammals. Level A harassment is defined as "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild." Level B harassment is defined as "Any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral

patterns, including but not limited to migration, breathing, nursing, breeding, feeding or sheltering." Current NMFS practice regarding exposure of marine mammals to pile driving noise is that cetaceans exposed to impulsive sounds at or above 180 re 1 µPa rms are considered to have been taken by Level A (i.e., injurious) harassment.

Behavioral harassment (Level B) is considered to have occurred when marine mammals are exposed to impulsive noise from impact pile driving at or above 160 dB re 1 µPa rms and for non-impulsive noise from vibratory pile driving at or above 120 dB re 1 µPa rms but below injurious thresholds.

Sound levels from vibratory pile driving are not expected to reach the 180 dB re 1 µPa sound pressure level root mean square threshold; therefore based on the data from NMFS for cetaceans, no injuries to manatees from sound associated with vibratory pile driving are anticipated. However, should manatees be near the project vicinity during pile driving 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.

As a precautionary measure against possible behavioral effects, the USCG will utilize a shutdown zone which will always be a minimum of 15 m (50 ft). For impact pile driving which generates impulsive sound, a larger 40 m (130 ft) shutdown zone shall be implemented for marine mammals only; the standard shutdown zone will continue to be applied for all other protected species. If a protected species approaches or enters a shutdown zone during any in-water work, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal. Based on this information and the proposed construction techniques, USCG determined that the bulkhead construction using vibratory or impact pile driving may affect, but is not likely to adversely affect the endangered Florida manatee and USFWS concurred with this determination under the ESA on May 5, 2014.

4.3.2.3 Bulkhead Replacement – Entire Facility Bulkhead

The effects of replacing the full bulkhead are the same as part of the bulkhead, however construction would take approximately twice as long, thus the effects would double temporally. The protection efforts for replacement of all bulkheads would be the same as those for replacement of Zones 4 and 5.

4.3.2.4 No Action Alternative – No Berth Dredging

There will be no affect to manatees if the CGC HUDSON's berth is not dredged.

4.3.2.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to manatees if the bulkheads are not replaced.

4.3.3 JOHNSON'S SEAGRASS CRITICAL HABITAT

4.3.3.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

Although no Johnson's seagrass was mapped in the project area, or has been identified in the surrounding seagrass beds, the berth is included in the final critical habitat designation that included most of Biscayne Bay. As a result of the surveys conducted, this critical habitat would be considered "unoccupied critical habitat" for the purposes of consultation under Section 7 of the Endangered Species Act. Maintenance dredging of the slip will deepen the sand area from -4 MLLW to approximately -8 MLLW with an allowable -2 feet of overdredge for a total maximum dredge depth of -10 ft MLLW. Johnson's seagrass has been documented in Biscayne Bay in areas with depths of -12 MLLW. This means that maintaining this berth does not prevent Johnson's seagrass from colonizing the area in the future and does not adversely modify the designated critical habitat.

4.3.3.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement)

There will be no affect to Johnson's seagrass critical habitat if the bulkheads are replaced.

4.3.3.3 Bulkhead Replacement – Entire Facility Bulkhead

There will be no affect to Johnson's seagrass critical habitat if the bulkheads are replaced.

4.3.3.4 No Action Alternative – No Berth Dredging

There will be no affect to Johnson's seagrass critical habitat if the CGC HUDSON's berth is not dredged.

4.3.3.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to Johnson's seagrass critical habitat if the bulkheads are not replaced.

4.3.4 AMERICAN CROCODILE

4.3.4.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

The logic set forth about mechanical dredges in the 1991, 1995 and 1997 SARBO by NMFS for sea turtles holds true for American crocodile and dredging of the CGC HUDSON's berth. The impacts of dredging operations on sea turtles have been previously assessed by NMFS (NMFS, 1991; NMFS 1995; NMFS 1997; NMFS 2003) in the various versions of the SARBO and the 2003 (revised in 2005 and 2007) GRBO.

The 1991 SARBO states that "clamshell dredges are the lease 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).

The USCG believes that if this statement holds true for a species that is relatively abundant in south Florida like sea turtles, it should also hold true for a very rare species like crocodile. The probability of a crocodile being taken during the maintenance dredging of the CGC HUDSON's berth is so unlikely as to be discountable. The USCG will incorporate the standard FWS manatee protection construction protocols into the project plans and specifications, adding the crocodile to the protection protocol. Based on this information and the proposed construction techniques, USCG determined that the maintenance dredging of the CGC HUDSON's slip using a cutterhead or mechanical dredge may affect, but is not likely to adversely affect the threatened American crocodile and USFWS concurred with this determination under the ESA on May 5, 2014.

4.3.4.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement)

As with sea turtles, noise and pressure effects on crocodiles have been poorly studied. As such, in the absence of species-specific (or in this case, order-specific) data, USCG is using assumptions regarding effects on sea turtles as proxies for the American crocodile, given their common reptilian morphology and physiology, and for dolphins given the similarity in body size between adult dolphins and crocodiles. If these comparisons are valid, direct impacts to crocodiles could include injury or death associated with physical damage from pressure-related injuries. Both the pressure and noise associated with blasting could injure crocodiles.

Sub-lethal effects could occur within the 130-foot radius, though the degree of risk is uncertain. Crocodilians are known for complex communication behaviors, sometimes involving use of sounds transmitted below the range of frequencies audible to humans. As such, their ears may be susceptible to low-frequency noise. Damage to sensitive ear structures and tissues (though externally covered by a thick flap of skin/scale) could result. If there is any temporary or permanent hearing loss, individuals may not behave normally, but the degree to which this would affect foraging, reproductive success, and other functions is unknown.

Indirect effects. Indirect impacts on crocodiles due to bulkhead construction activities in the project area include alteration of behavior (possibly due to hearing/vibration sensitivity to both dredging and/or blasting). For example, movements of crocodiles may be impeded or altered.

Protection. USCG plans to protect crocodiles in the same manner as manatees and other listed and protected species in the action area. Based on the protective measures proposed for this project, the impacts to crocodiles associated with bulkhead construction should be minimal. Based on this information and the proposed construction techniques, USCG determined that the bulkhead construction using vibratory or impact pile driving may affect, but is not likely to

adversely affect the threatened American crocodile and USFWS concurred with this determination under the ESA on May 5, 2014.

4.3.4.3 Bulkhead Replacement – Entire Facility Bulkhead

The effects of replacing all of the bulkheads would be the same as the effects of replacing Zone 4 and 5, just on a larger scale. The protection efforts for replacement of all bulkheads would be the same as those for replacement of Zones 4 and 5.

4.3.4.4 No Action Alternative – No Berth Dredging

There will be no affect to American crocodile if the CGC HUDSON's berth is not dredged.

4.3.4.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to American crocodile if the bulkheads are not replaced.

4.3.5 SMALLTOOTH SAWFISH

4.3.5.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

The logic set forth about mechanical dredges in the 1991, 1995 and 1997 SARBO by NMFS for sea turtles holds true for sawfish and dredging of the CGC HUDSON's berth. The impacts of dredging operations on sea turtles have been previously assessed by NMFS (NMFS, 1991; NMFS 1995; NMFS 1997; NMFS 2003) in the various versions of the SARBO and the 2003 (revised in 2005 and 2007) GRBO. In the GRBO, NMFS states that "Currently, their distribution has contracted to peninsular Florida and, within that area, they can only be found with any regularity off the extreme southern portion of the state. The current distribution is centered in the Everglades National Park, including Florida Bay. Only hopper dredging of Key West channels would have the potential to impact smalltooth sawfish but those channels are not considered in this Opinion." Per Section 3.3.5, although 11 sightings of sawfish have been made within the boundaries of Dade County within a five mile radius of CGB Miami Beach the likelihood of sawfish being in the project area is minimal, as CGB Miami Beach does not provide optimal habitat for sawfish (Simpendorfer 2006). The proposed maintenance dredging of the slip using a cutterhead or mechanical dredge is not expected to affect the sawfish (NMFS 2003, as amended).

The 1991 SARBO states that "clamshell dredges are the lease 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).

USCG believes that if this statement holds true for a species that is relatively abundant in south Florida like sea turtles, it should also hold true for a very rare species like sawfish. The probability of a sawfish being taken during the dredging of the CGC HUDSON's berth is so unlikely as to be discountable. USCG will incorporate the standard NMFS sawfish protection construction protocols into the project plans and specifications. Based on the information included in the sawfish recovery plan, the census information from NMFS and the proposed construction techniques, the USCG believes that maintenance dredging the CGC HUDSON's berth may affect, but is not likely to adversely affect the endangered smalltooth sawfish as defined by the ESA. NMFS concurred with this determination in their February 10, 2015 biological opinion.

4.3.5.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement)

Review of ichthyologic information and test blast data indicates that fishes with swim bladders are more susceptible to damage from pressure, and some less-tolerant individuals may be killed within 140 feet of a confined blast (USACE 2000). Sawfishes, as chondrichthyans, do not have air bladders, and, therefore, they would be more tolerant of overpressures resulting closer to the blast, possibly even within 70 feet of a blast (Keevin and Hempen 1997). While pile driving is not confined blasting, pressures released into the surrounding water column are similar in nature. Individual fish near the piling replacement work may experience sound intensities that could affect their behavior or damage their hearing ability. Based on the biology of sawfish, the USCG believes that construction of the bulkhead may affect, but is not likely to adversely affect the endangered smalltooth sawfish as defined by the ESA. NMFS concurred with this determination in their February 10, 2015 biological opinion.

4.3.5.3 Bulkhead Replacement – Entire Facility Bulkhead

Effects for replacement of all the bulkheads at the facility will be similar in nature to the effects for Zone 4 and 5, but will take place around the entire facility.

4.3.5.4 No Action Alternative – No Berth Dredging

There will be no affect to smallthooth sawfish if the CGC HUDSON's berth is not dredged.

4.3.5.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to smallthooth sawfish if the bulkheads are not replaced.

4.3.6 SCLERACTINIAN CORALS

4.3.6.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

Maintenance dredging the slip will cause temporary increases in turbidity where dredging is taking place. The State of Florida water quality regulations require that water quality standards not be violated during dredging operations. Various protective measures and monitoring programs will be conducted during construction to ensure compliance with state water quality

standards. Should turbidity exceed state water quality standards during construction, as determined by monitoring, the contractor will be required to cease operations until conditions return to normal. Corals located on the bulkhead adjacent to the dredging area will be exposed to increased turbidity and potential sedimentation during dredging of the slip. This is similar to the sedimentation and turbidity as a result of propeller resuspension of the sediments that have filled in the CGC HUDSON's slip. Due to the short duration of the dredging, because of the low volume of material to be removed from the slip, the effects of this sedimentation and turbidity exposure on the corals on the bulkhead adjacent to the slip is expected to be minimal.

4.3.6.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement)

Removal of existing bulkheads will affect coral species based on findings from the 2013 survey (DCA 2013). Results from the survey show that several listed species are present on the existing bulkheads including: Boulder Star Coral (*Montastraea faveolata);* Mountainous star coral (*Montastraea franksi);* Rough cactus coral (*Mycetophyllia ferox*); and Elliptical Star Coral (*Dichocoenia stokesii*) (Table 8).

Table 8 - Proposed corals located on the bulkheads proposed to be replaced.

Name	**Number of colonies**	**Colonies >10 cm suitable for relocation**	**Colonies <10 cm unsuitable for relocation**
Montastraea faveolata	8	8	0
Montastraea franksi	1	1	0
Mycetophyllia ferox	1	1	0
Dichocoenia stokesii	15	8	7

Prior to initiation of any dredging activities, the USCG will require the contractor to relocate any colonies of proposed to be listed species greater than 10cm located on the bulkheads proposed to be replaced. The 10 cm size was chosen in consultation with coral relocation experts (Dr. Keith Spring, CSA *pers comm.*) who explained that corals smaller than 10cm are often flatter and more easy broken during relocation efforts. The collections will be made by coral experts and trained professionals. Even though these actions involve directed take of listed coral colonies, they constitute a legitimate take reduction method (and NMFS has previously included this as a Reasonable and Prudent Measure on other ESA consultations for coral species) because it reduces the level of potential lethal take of corals and allows the colonies to be collected and relocated out of the impact area where they will have a high likelihood of continued survival. The Consultation Handbook (USFWS and NMFS 1998) expressly authorizes such directed take as an RPM (see page 4-53). Therefore, NMFS should evaluate the expected level of the colonies proposed for relocation as take through transplantation, so that these levels can be included in the evaluation of whether the proposed action will jeopardize the continued existence of the species. The USCG has determined that the project is not likely to jeopardize listed coral species. At the time USCG initiated consultation under the ESA, the species were proposed for listing and USCG and requested a conference opinion from NMFS

per regulations. Since that time, NMFS finalized the listing for five of the proposed corals and completed a biological opinion for the project dated February 10, 2015 (Appendix B).

NMFS has previously stated:

> *"Coral transplantation can successfully relocate colonies that would likely suffer injury or morality if not moved. Provided that colonies are handled with skill, are reattached properly, and the environmental factors at the reattachment site are conducive to their growth (e.g. water quality, substrate type, etc.), many different species of coral have been shown to survive transplantation well (Maragos 1974, Birkeland et al. 1979, Harriott and Fisk 1988, Hudson and Diaz 1988, Guzman 1991, Kaly 1995, Berker and Mueller 1999, Tomlinson and Pratt 1999, Hudson 2000, Lindahl 2003, NCRI 2004). Transplantation of coral colonies less than 10 cm in size is not feasible because detaching such small colonies would likely result in breakage. Survivability of transplanted coral colonies less than 10 cm in size is also very low due to injury and the decrease in the overall surface area of living tissue, which reduces the colony's resilience to stress."* (NMFS, 2009b).

4.3.6.3 Bulkhead Replacement – Entire Facility Bulkhead

The effects of replacing the full bulkhead are the same as part of the bulkhead, however construction would take approximately twice as long, thus the effects would double temporally.

4.3.6.4 No Action Alternative – No Berth Dredging

There will be no affect to listed and proposed scleractinian corals if the CGC HUDSON's berth is not dredged.

4.3.6.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to listed and proposed scleractinian corals if the if the bulkheads are not replaced.

4.4 FISH AND WILDLIFE RESOURCES

4.4.1 BOTTLENOSE DOLPHINS

4.4.1.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

Maintenance dredging of the CGC HUDSON's slip would not affect bottlenose dolphins in the vicinity because these animals, which transit through the Port, are familiar with large vessels operating in a largely urban waterway.

4.4.1.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement)

Utilization of pile driving to replace the sheet pile bulkhead may have an effect on bottlenose dolphins in the area. Both the pressure and noise associated with pile driving can impact marine mammals.

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

Behavioral harassment (Level B) is considered to have occurred when marine mammals are exposed to impulsive noise from impact pile driving at or above 160 dB re 1 µPa rms and for non-impulsive noise from vibratory pile driving at or above 120 dB re 1 µPa rms but below injurious thresholds. Table 6 and Table 7 previously detail representative pile driving sound pressure levels measured from 24" steel pipe piles, 24" wide steel sheet piles and 12" timber piles.

Sound levels from vibratory pile driving are not expected to reach the 180 dB re 1 µPa sound pressure level root mean square threshold; therefore no injuries to dolphins from sound associated with vibratory pile driving are anticipated. However, should dolphins be near the project vicinity during pile driving operations, direct impacts could include alteration of behavior and autecology. For example, daily movements and/or seasonal migrations of dolphins may be impeded or altered.

In attempting to assess the potential impacts to bulkhead replacement to bottlenose dolphins, we first assessed the total area of Biscayne Bay (428 square miles; 1,108,514,911m^2) and the area of Meloy Channel and Government Cut where sound could radiate to during sheet pile driving operations (Figure 30) is 346,464 m^2. This area represents 0.00031% of the total area of Biscayne Bay. The USCG accessed the NMFS-SEFSC Photo-ID survey data from 1990-2004 covering 12 years of survey in the bay via the OBIS-Seamap database (http://seamap.env.duke.edu/) and downloaded the Google Earth overlay of the data. Figure 31 shows the general area of USCG Base Miami Beach (labeled as "Port of Miami") and hotspots of dolphin sightings both north and south of the Port. This sighting frequency data was used to determine if sighting levels across all parts of the bay were equal. Based on the NOAA data, it is clear that sighting levels across throughout Biscayne Bay are not equal, and that area around

the Port, Meloy Channel and Government Cut have low sighting densities (1-3 dolphins per survey).

Figure 30 - Areas of Meloy Channel and Government Cut where sound may radiate due to bulkhead construction

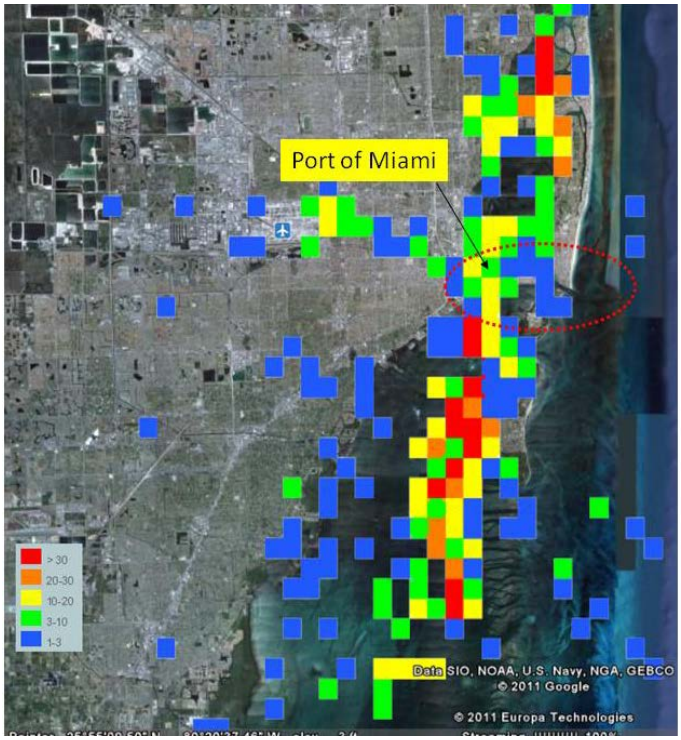


Figure 31 - NOAA Southeast Fisheries Science Center, South Florida Bottlenose Dolphin Photo-identification Cooperative – Dolphin sightings

Although the sighting densities of bottlenose dolphins within the vicinity of CGB Miami Beach are very low, as a precautionary measure against possible behavioral effects, the USCG will utilize a shutdown zone which will always be a minimum of 15 m (50 ft). For impact pile driving which generates impulsive sound, a larger 40 m (130 ft) shutdown zone shall be implemented for marine mammals only; the standard shutdown zone will continue to be applied for all other protected species. If a bottlenose dolphin approaches or enters a shutdown zone during any in-water work, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.

4.4.1.3 Bulkhead Replacement – Entire Facility Bulkhead

Effects for replacement of all the bulkheads at the facility will be similar in nature to the effects for Zone 4 and 5, but will take place around the entire facility.

4.4.1.4 No Action Alternative – No Berth Dredging

There will be no affect to bottlenose dolphins if the CGC HUDSON's berth is not dredged.

4.4.1.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to bottlenose dolphins if the if the bulkheads are not replaced.

4.4.2 FISHES

4.4.2.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

Dredging with mechanical dredges has not been documented as effecting fish, their eggs or their larvae. Dredging with hydraulic dredges usually results in little to no effect on adult fishes due to their size and ability to avoid either the drag head or cutterhead. The same cannot be said of larval fishes and eggs, which lack the ability to avoid the suction near the drag head or cutterhead. Larvae and egg distribution and concentrations in a channel are highly variable on a range of scales (spatially and temporally). Therefore it is important to recognize that not all larvae in a channel like Meloy Channel (adjacent to CGB Miami Beach) would be vulnerable to entrainment. Larvae and eggs are not equally distributed in the channel as the tidal lows in and out of the inlet can show asymmetry. In addition, many larvae exhibit a vertical migration strategy that facilitates tidal stream transport. That is, larvae are up in the water column during flood and descend to near the bottom during ebb; such behavior helps to prevent larvae from being flushed back out Government Cut (Settle 2003).

Settle (2003) discussed NOAA/NOS' National Centers for Coastal Ocean Science report entitled *Assessment of Potential Larval Entrainment Mortality Due to Hydraulic Dredging of Beaufort Inlet*. NOAA found, and USCG agrees that "any larvae entrained in the dredge are likely to be killed; it is likely that the impact at the population level would be insignificant" (Settle 2003). In this assessment, NOAA also determined that the use of a 30-inch hydraulic dredge dredging 24-hours a day in Beaufort Inlet, North Carolina, would result in entrainment mortality "even under the worst case scenario" of 0.1% per day where there are high densities of larval fishes (up to 5 larvae per m^3). This may be informative of potential impacts at CGB Miami Beach, although it is far from Beaufort Inlet. Therefore, USCG assumes that if an inlet such as Beaufort with high densities of larval fishes can be dredged for 24-hours-a-day without significant population level impacts to larval fish densities, that the same would hold true at CGB Miami Beach, where a significant portion of the larval development habitat is in the nearshore and offshore to the north and south of the Government Cut. Additionally the volume of material to be dredged is minimal (approximately 5,000 CY) which also greatly reduces any potential impacts due to the small amount of time needed to complete the dredging.

Although the above may be useful for appreciating the effects of hydraulic dredges, quantitative information on the effects of mechanical dredge types on fish, larvae, or eggs is not available.

4.4.2.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement)

The proposed action includes the replacement of the old bulkhead and associated disturbance of the water column. Highly mobile juvenile or adult fish would be able to move quickly away from the disturbance. However, fish associated with attached macroalgae and sedentary invertebrates on the old bulkhead structures will be displaced until the community is re-

established on the new bulkhead; attached macroalgae EFH are expected to quickly recolonize the bulkhead structures (<1 year). The small area of unconsolidated substrate EFH (e.g., subtidal flats) which surround the existing bulkhead will be minimally disturbed in the replacement of the vertical structures, but highly disturbed by the dredging. However, the dredging impact on subtidal bottom would be very temporary in duration (e.g., altering depth of sand bottom).

Individual fish near the bulkhead replacement work may also experience sound intensities that could affect their behavior or damage their hearing ability. There is an in-depth discussion of underwater noise from pile driving and the modeling methodology in the marine mammals section. Since many fish use their swim bladders for buoyancy, they are susceptible to rapid expansion/decompression due to peak pressure waves from underwater noises (Hastings and Popper 2005). The onset of injury threshold resulting from this rapid expansion/decompression is supported by data presented on selected species in FHWG (2008). Whereas behavioral disturbance criteria for fish are not supported with data, the NMFS and USFWS generally use 150 dB rms as the threshold for ESA-listed species. Criteria for behavioral impacts and onset of injury are provided in Table 9.

The criteria suggest only the most limited mortality of fish, and only when they are very close to an intense sound source (FHWG 2008). There is no population-level impact on unregulated fish anticipated from the sound intensities modeled and only minimum and temporary adverse impacts on water column EFH for all managed species inhabiting the water column. The ESA listed smalltooth sawfish may be affected by the sound intensities, but are not likely to be adversely impacted by them.

Table 9 - Criteria for Fish Behavioral Disturbance and Onset of Injury from the Sound Produced by Vibratory and Impact Hammers

Pile Type	Driving Method	Threshold	Distance (m)[1]	Area (km^2)
Steel (sheet and king piles)	Vibratory	Behavioral (all):150 dB re 1 µPa rms	73.6	0.011
	Impact (contingency)	Injury (all): 206 dB re 1 µPa rms	8.6	0.00058
		Injury (≥ 2g): 187 dB re 1 μPa^2sec SEL	21.6	0.0019
		Injury (< 2g): 183 dB re 1 μPa^2sec SEL	39.9	0.0045
		Behavioral (all):150 dB re 1 µPa rms	3,981	1.37
Polymeric fender piles	Vibratory	Behavioral (all): 150 dB re 1 µPa rms	15.8	0.001

Note: no injury criteria for fish for vibratory driving; all sound levels expressed in dB re 1 µPa rms. dB=decibel; rms=root-mean-square; µPa=microPascal; Practical spreading loss (15 log, or 4.5 dB per doubling of distance) used for calculations; [1]Sound pressure levels used for calculations are given in Tables 3-12 and 3-13.

The primary cause of injury and mortality to aquatic organisms from pile driving for bulkhead replacement in aquatic environments appears to be damage associated with rupture and hemorrhage of air-filled internal organs, in particular, the swim bladder (Wright and Hopky 1998; Keevin and Hempen 1997), which, in many pelagic fishes, plays a role in buoyancy. Demersal species, such as flounder, typically do not have swim bladders and are frequently less susceptible to pressure impacts. Less information is available, but it is generally reported that there is minimal injury and mortality from pressure to mollusks, shellfish, and crustaceans which do not have gas-filled organs similar to the swim bladder in fish (Wright and Hopky 1998). Although the structure of the swim bladder and the mechanism for adjusting gas volume vary among species, generally the process for release of gas from the swim bladder is too slow to compensate for the rapid fluctuations in hydrostatic pressure associated with the pressure shock wave associated with pile driving. This and other physiological considerations are discussed below (Hempen et al 2005):

> "The primary cause of damage in finfish exposed to a pressure shock wave appears to be the outward rupture of the swim bladder as a result of the expansive effect of the negative hydrostatic pressure associated with the reflected air-water surface wave. While the organ may tolerate the compressive portion of the shock wave, the rapid drop to negative hydrostatic gage pressure and expansion of the gas that cannot otherwise be released, causes the rupture of the organ. Vibration, expansion, and rupture of the swim bladder can also cause secondary damage and hemorrhage due to impact with other internal organs in close proximity to the swim bladder. Other organs typically exhibiting damage include the kidney, liver, spleen, and sinus venosus (a structure in the

heart). Extensive tearing of tissue has been observed in species where the swim bladder is closely attached to the visceral cavity. Close attachment to the dorsal cavity wall was typically associated with extensive damage to the kidney. Species with thick-walled swim bladders and cylindrical body shape (e.g., oyster toad fish and catfish) appear to be more resistant to pressure waves than species with laterally compressed bodies such as herring and menhaden (Linton *et al.* 1985, as cited in Keevin and Hempen 1997). Smaller individuals of a species are generally more sensitive than larger fish. Early-stage larvae do not have swim bladders and are more resistant than older larvae after development of the swim bladder. The extent of injury and mortality decreases with distance from the detonation, as the magnitude of the pressure drop declines due to dissipation of the blast impulse (*I*) and energy flux density (*Ef*) with distance. In a review of a number of studies of primarily open water blasting, Keevin and Hempen (1997) concluded that *I* was the best predictor of potential damage for shallow depths (less than 3 m), while *Ef* was the best predictor for deeper conditions."

4.4.2.3 Bulkhead Replacement – Entire Facility Bulkhead

Effects for replacement of all the bulkheads at the facility will be similar in nature to the effects for Zone 4 and 5, but will take place around the entire facility.

4.4.2.4 No Action Alternative – No Berth Dredging

There will be no affect to fishes if the CGC HUDSON's berth is not dredged.

4.4.2.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to fishes if the if the bulkheads are not replaced.

4.4.3 CORALS AND ASSOCIATED SPECIES

4.4.3.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

Maintenance dredging the slip will cause temporary increases in turbidity where dredging is taking place. The State of Florida water quality regulations require that water quality standards not be violated during dredging operations. Various protective measures and monitoring programs will be conducted during construction to ensure compliance with state water quality standards. Should turbidity exceed state water quality standards during construction, as determined by monitoring, the contractor will be required to cease operations until conditions return to normal. Corals located on the bulkhead adjacent to the dredging area will be exposed to increased turbidity and potential sedimentation during dredging of the slip. This is similar to the sedimentation and turbidity as a result of propeller resuspension of the sediments that have filled in the CGC HUDSON's slip. Due to the short duration of the dredging, because of the low volume of material to be removed from the slip, the effects of this sedimentation and turbidity exposure on the corals on the bulkhead adjacent to the slip is expected to be minimal.

4.4.3.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement)

With the replacement of Zones 4 & 5 of the bulkheads, a subset of the mapped 580 corals of 18 different species would be impacted by the bulkhead replacement. The survey of the complete bulkhead around the station identified 197 corals equal to or greater than 10cm in diameter, making them candidates for relocation. The final numbers of corals to be relocated would be determined immediately prior to bulkhead replacement, and some changes to the corals on the bulkhead may be documented due to vessels mooring alongside the bulkheads, natural mortality or other events which may have removed them since the June 2013 survey. Any corals relocated off of the bulkhead may be offered to non-federal parties for education and research purposes and/or may be relocated to a previously permitted relocation site managed by either Miami-Dade County DERM or the Port of Miami. This will leave up to 383 corals documented in the June 2013 survey which were less than 10cm in diameter (too small to ensure successful relocation) which may remain on the bulkhead at the time of construction. There is no guarantee that these smaller corals will be relocated and for the purposes of analysis as assumed to be lost from the ecosystem until sufficient time passes for corals of similar size and species composition to colonize the new bulkhead once replacement is complete.

Prior to initiation of any dredging activities, the USCG will require the contractor to relocate any colonies of proposed to be listed species greater than 10cm located on the bulkheads proposed to be replaced. The 10 cm size was chosen in consultation with coral relocation experts (Dr. Keith Spring, CSA *pers comm*.) who conveyed that corals smaller than 10cm are often flatter and more easy broken during relocation efforts. The collections and relocations will be made by coral experts and trained professionals.

4.4.3.3 Bulkhead Replacement – Entire Facility Bulkhead

If all of the bulkheads were replaced at one time, up to 580 corals of 18 different species would be impacted by the bulkhead replacement. 197 of these colonies are equal to or greater than 10cm in diameter, making them candidates for relocation, leaving 383 as to small to ensure successful relocation. These may be offered to non-federal parties for education and research purposes. There is no guarantee that these corals will be relocated and for the purposes of analysis are assumed to be lost from the ecosystem until sufficient time passes for corals of similar size and species composition to colonize the new bulkhead once replacement is complete.

4.4.3.4 No Action Alternative – No Berth Dredging

There will be no affect to non-listed corals and associated species if the CGC HUDSON's berth is not dredged.

4.4.3.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to non-listed corals and associated species if the if the bulkheads are not replaced.

4.4.4 MIGRATORY BIRDS

4.4.4.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

There will be no affect to migratory birds associated with the dredging of the CGC HUDSON's berth.

4.4.4.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement)

Migratory birds are currently discouraged from resting on the bulkheads at CGB Miami Beach through the use of bird deflectors along the bulkheads. As a result, birds typically do not rest on the bulkheads and are not expected to be effected by the bulkhead replacement in Zones 4 & 5.

4.4.4.3 Bulkhead Replacement – Entire Facility Bulkhead

Migratory birds are not expected to be effected by the bulkhead replacement of all of the bulkheads at CGB Miami Beach for the same reasons as discussed in Section 4.4.4.2.

4.4.4.4 No Action Alternative – No Berth Dredging

There will be no affect to migratory birds if the CGC HUDSON's berth is not dredged.

4.4.4.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to migratory birds if the if the bulkheads are not replaced.

4.5 ESSENTIAL FISH HABITAT ASSESSMENT

The project description is in section 2.3. Mitigation of impacts is in section 2.7. Section 3.6 describes the "existing conditions" of the Essential Fish Habitat (EFH), Federally managed fisheries, and associate species such as major prey species, including affected life history stages. The following subsections describe the individual and cumulative impacts of the proposed action(s) and alternatives on EFH, Federally managed fisheries, and associate species such as major prey species, including affected life history stages.

4.5.1.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

The USCG has determined that maintenance dredging of the CGC HUDSON's slip will result in the permanent removal of 0.13 acres of seagrass from the previously dredged slip, and as discussed in section 4.4.2.1 minimal impacts to fishes is expected to occur as a result of hydraulic dredging.

4.5.1.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement)

The USCG has determined that replacement of the bulkheads in Zones 4 and 5 will result in the permanent removal of a subset of the 197 stony corals greater than 10cm in size. Minimal impact to fish species in Meloy Channel are expected by replacement of the bulkheads in Zones 4 and 5 as previously discussed in section 4.4.2.2.

4.5.1.3 Bulkhead Replacement – Entire Facility Bulkhead

Effects for replacement of all the bulkheads at the facility will be similar in nature to the effects for Zone 4 and 5, but will take place around the entire facility.

4.5.1.4 No Action Alternative – No Berth Dredging

There will be no affect to Essential Fish Habitat if the CGC HUDSON's berth is not dredged.

4.5.1.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to Essential Fish Habitat if the if the bulkheads are not replaced.

4.6 HISTORIC PROPERTIES

All project alternatives, including the no action alternatives, are based within the CGB Miami Beach and its structures, constructed in the 1940s, which are potentially eligible for the for listing on the National Register of Historic Places (NRHP) due to its association with World War II and the Cold War. However, CGB Miami Beach has not undergone investigation with regard to historic properties.

4.6.1.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

The berth for the CGC HUDSON, constructed on man-made land, was previously dredged in 1995. Working as USCG's Agent, USACE determined no effects to historic properties and ODMDS placement of dredged materials for this project on October 30, 2013. The Florida State Historic Preservation Officer (SHPO) concurred with this determination on November 26, 2013 (DHR No.2013-05232). These letters are included in Appendix B.

4.6.1.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement

Since the replacement of the bulkheads will involve the building-out of new bulkheads from the existing bulkhead, while leaving the old bulkhead in place to become part of the backfill, no other structures or elements at CGB Miami Beach that would make this property eligible for the NRHP will be impacted by the construction of the new bulkhead. Working as USCG's Agent, USACE determined on June 23, 2014, that replacing the bulkhead is an in-kind update and will not change any of the visual or functional aspects of the CGB Miami Beach property or its eligibility for listing on the NRHP and has determined no effects to historic properties.

4.6.1.3 Bulkhead Replacement – Entire Facility Bulkhead

Since the replacement of the bulkheads will involve the building-out of new bulkheads from the existing bulkhead, while leaving the old bulkhead in place to become part of the backfill, no other structures or elements at CGB Miami Beach that would make this property eligible for the NRHP will be impacted by the construction of the new bulkhead. Working as USCG's Agent, USACE determined on June 23, 2014, that replacing the bulkhead is an in-kind update and will not change any of the visual or functional aspects of the CGB Miami Beach property or its eligibility for listing on the NRHP and has determined no effects to historic properties.

4.6.1.4 No Action Alternative – No Berth Dredging

No effects to historic properties.

4.6.1.5 No Action Alternative – No Bulkhead Replacement

While typically a no action alternative would not involve any effect to resources, because of the dilapidated state of the bulkhead there is a potential for effects if no action is performed to stabilize the bulkhead. As previously stated, the base itself is potentially eligible for inclusion on the NRHP. If degradation of the bulkhead continues, which is reasonably expected, the collapse of the bulkhead could cause additional harm to the resource.

4.7 SOCIO-ECONOMIC

The proposed actions, maintenance dredging of the CGC HUDSON's slip and replacement of the bulkheads in Zone 4 and 5 are not expected to affect socio-economic conditions in the vicinity of CGB Miami Beach. The project is taking place wholly in the base and in the waters which surround the base and should not hamper any other activities which would result in socio-economic impacts to others.

4.8 AESTHETICS

The proposed actions, maintenance dredging of the CGC HUDSON's slip and replacement of the bulkheads in Zone 4 and 5 are not expected to affect aesthetics in the vicinity of CGB Miami Beach. The project is taking place wholly in the base and in the waters which surround the base and should not hamper any other activities which would result in aesthetic impacts to others.

4.9 RECREATION

The proposed actions, maintenance dredging of the CGC HUDSON's slip and replacement of the bulkheads in Zone 4 and 5 are not expected to affect aesthetics in the vicinity of CGB Miami Beach. The area will remain open for boating and other recreational activities in the vicinity of the CGB Miami Beach.

4.10 WATER QUALITY

All action alternatives would have similar impacts to water quality due to construction activities. A State Water Quality exemption was obtained under Section 401 of the CWA for the maintenance dredging was granted by FDEP via letter dated August 12, 2014 and state water quality standards will be met during construction.

Replacement of the bulkhead shall be conducted under Nationwide Permit #3, which states:

> "(a) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill. This NWP also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays."

Section 33 CFR 330.3 states:

> 330.3 Activities occurring before certain dates. The following activities were permitted by NWPs issued on July 19, 1977, and, unless the activities are modified, they do not require further permitting: (b) Structures or work completed before December 18, 1968, or in waterbodies over which the DE had not asserted jurisdiction at the time the activity occurred, provided in both instances, there is no interference with navigation. Activities completed shoreward of applicable Federal Harbor lines before May 27, 1970 do not require specific authorization. (section 10)."

As original construction of the bulkheads being replaced by this project was constructed in the 1940s, they qualify under Section 33 CFR 330.3 as stated in Nationwide Permit #3.

Both preferred alternatives will cause temporary increases in turbidity where dredging is taking place and where the bulkheads are placed. The State of Florida water quality regulations require that water quality standards not be violated during dredging operations. The standards state that turbidity outside the mixing zone shall not exceed 29 NTU's above background. Various protective measures and monitoring programs will be conducted during construction to ensure compliance with state water quality standards. Should turbidity exceed state water quality standards during construction, as determined by monitoring, the contractor will be required to cease operations until conditions return to normal.

Impacts associated with disposal activities at the USEPA designated and authorized ODMDS have been reviewed and addressed in USEPA's 1995 EIS for the designation of the Miami Harbor ODMDS. The USACE was a cooperating agency on the designation EIS, and hereby incorporates those analyses into this EIS (USEPA 1995).

4.11 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

The proposed actions, maintenance dredging of the CGC HUDSON's slip and replacement of the bulkheads in Zone 4 and 5 are not expected to affect the status of hazardous, toxic and radioactive waste in the vicinity of CGB Miami Beach.

4.12 AIR QUALITY

Pursuant to the General Conformity Rule of the Federal Clean Air Act (CAA) as promulgated by the EPA, a Federal agency must make a General Conformity Determination for all Federal actions in non-attainment or maintenance areas where the total of direct and indirect emissions of a non-attainment pollutant or its precursors exceed levels established by the regulations. The proposed action may result in small, localized, temporary increases in concentrations of nitrogen dioxide (NO_2), SO_2, CO, VOC, and PM. Emissions associated with dredge plant would be the largest contribution to the inventory. However, the total increases are relatively minor in context of the existing point and nonpoint and mobile source emissions in Miami-Dade County. Projected emissions from the proposed action would not adversely impact air quality given the relatively low level of emissions and the likelihood for prevailing offshore winds. Short term impacts from dredge emissions and other construction equipment associated with the Preferred Alternatives would not significantly impact air quality. No air quality permits would be required. The proposed actions, maintenance dredging of the CGC HUDSON's slip and replacement of the bulkheads in Zone 4 and 5 are not expected to affect the status of air quality in the vicinity of CGB Miami Beach.

4.13 NOISE

4.13.1.1 Maintenance Dredging of CGC HUDSON's Berth (Preferred Alternative, Dredging)

Dredging noise can affect marine mammals, sea turtles, and fishes. Possible effects of dredging noise can vary depending on a variety of internal and external factors, and can be divided into masking (obscuring of sounds of interest by interfering sounds, generally at similar frequencies), response, discomfort, hearing loss, and injury (MALSF, 2009). Deeper water operations may propagate sound over greater distances than those in confined nearshore areas (Hildebrandt, 2004).

Dredging to extract sand produces broadband and continuous sound, mainly at lower frequencies. The little available data indicates that dredging is not as noisy as seismic surveys, pile driving, and sonar; however, it is louder than most shipping, operating, offshore wind turbines, and drilling (MALSF, 2009). Noise associated with dredging activities can be placed into five categories:

1. Collection noise – The noise generated from the collection of material from the sea-floor; for example, the scraping of the buckets on a bucket ladder dredge or the operation of the drag head. This noise is dependent on the structure of the sea floor and the type of dredge used.
2. Pump noise – The noise from the pump driving the suction through the pipe.
3. Transport noise – The noise of the material being lifted from the sea floor to the dredge. For trailing suction hopper and cutter suction dredges, this would be the noise of the material as it passes up the suction pipe. For clamshell dredges, it would be the sound of the crane dropping/lifting the bucket.
4. Deposition noise – This noise is associated with the placement of the material within the barge or hopper.
5. Ship/machinery noise – The noise associated with the dredging ship itself. For stationary dredges, the primary source will be the onboard machinery. Mobile dredges will also have propeller and thruster noise (MALSF, 2009).

Field investigations have been undertaken to characterize underwater sounds typical of bucket, hydraulic cutterhead, and hopper dredging operations (Dickerson *et al.,* 2001). Preliminary findings indicate that cutterhead dredging operations are relatively quiet as compared to other dredging operations in aquatic environments. Hopper dredges produce somewhat more intense sounds similar to those generated by vessels of comparable size. Bucket dredges create a more complex spectrum of sounds, very different than either cutterhead or hopper dredges. Hopper dredge noises consist of a combination of sounds emitted from two relatively continuous sources: engine and propeller noise similar to that of large commercial vessels, and sounds of dragheads moving in contact with the substrate.

Reported source levels for dredging operations range from 160 to 180 dB re 1 uPa @ 1 m for 1/3 octave bands with peak intensity between 50 and 500 Hz (Greene and Moore, 1995). The intensity, periodicity, and spectra of emitted sounds differ greatly among dredge types. Components of underwater sounds produced by each type are influenced by a host of factors including substrate type, geomorphology of the waterway, site-specific hydrodynamic conditions, equipment maintenance status, and skill of the dredge.

4.13.1.2 Bulkhead Replacement – Zones 4 & 5 (Preferred Alternative, Bulkhead Replacement

The effect of noise in the marine environment and to protected species has already been discussed in Section 4.4.2.2; 4.4.1.2; 4.3.5.2; 4.2.4.2; 4.5.2.2 and in Table 5, 6 and 7 and are incorporated by reference. The remaining analysis will discuss the potential effects of airborne noise.

The proposed action would result in a temporary increase in airborne noise levels in the project area. Estimated source levels for airborne noise from pile driving are given in Table 10; source levels were selected from published literature. Because there are no available airborne sound pressure level measurements from steel sheet, data from 24 inch diameter steel pipe piles were used to estimate the airborne sound source levels.

Table 10 - Estimated Source Levels for Airborne Pile Driving Noise

Driving Method	Source Level
Vibratory	96 dBA at 15m (50ft)
Impact	100 dBa at 11m (36ft)
Note m=meter dBA = A-weighted decibel scale ft = feet	

The source level selected for impact driving does not represent the maximum measured level for a 24 inch pipe pile (109 dBA; Illingworth & Rodkin 2012), which was obtained during short-term driving of a single pile in rocky sediment during the Navy Test Pile Program in Bangor, Washington in 2011. The selected source level shown in Table 3-7 was obtained during driving of a 24 inch pipe pile for a bridge replacement in Washington (WSDOT 2010b). Because softer sediments (such as those found in the area surrounding CGB Miami Beach) reduce the amount of force needed to drive a pile to desired depth, in turn reducing noise from pile reverberation (Kinsler et al. 1999), the non-maximal source level estimate selected is a reasonable assumption for airborne noise levels from pile driving at CGB Miami Beach.

Estimates of airborne noise propagation from pile driving were based on the assumption that airborne construction noise behaves as a point-source, propagating in a spherical manner, with a 6 dB decrease in sound pressure level per doubling of distance (WSDOT 2008). The hardsite

conditions proposed by WSDOT (2008) apply to both the over-water and over-land (mostly paved or hard surfaces) portions of the in-air project area.

Noise associated with vibratory pile driving is expected to attenuate to 65 dBA within 0.34 miles (550 m) of the source; impact pile driving noise is expected to attenuate to 65 dBA at 0.40 miles (650 m). During both impact and vibratory pile driving, airborne noise levels are expected to exceed 84 dBA (the threshold for hearing protection) within 246 ft (75 m) of the incident pile. These estimates assume a free flowing medium (e.g. over water) without obstructions, which is a reasonable assumption for the majority of the project area. Vegetation and buildings within the land areas of the proposed action may obstruct sound transmission in the project area; however, this model did not include possible attenuation from land-based obstructions (e.g. vegetation and buildings). The ranges given are therefore a conservative estimate of the affected area.

4.13.1.3 Bulkhead Replacement – Entire Facility Bulkhead

Effects for replacement of all the bulkheads at the facility will be similar in nature to the effects for Zone 4 and 5, but will take place around the entire facility.

4.13.1.4 No Action Alternative – No Berth Dredging

There will be no affect to noise in the project area if the CGC HUDSON's berth is not dredged.

4.13.1.5 No Action Alternative – No Bulkhead Replacement

There will be no affect to Essential Fish Habitat if the if the bulkheads are not replaced.

4.14 PUBLIC SAFETY

4.14.1 ALL ALTERNATIVES

Implementation of both preferred alternatives will allow USCG to continue to meet its mission requirements to protect human health and safety. By maintaining sufficient depth of water under the keel for the CGC HUDSON to berth at CGB Miami Beach, the CGC HUDSON can continue to meet her primary purpose to build, or rebuild if destroyed, more than 1,400 fixed ATONs used by mariners to safely navigate the inland waters of the United States within the CGC HUDSON's Area of Operations (AOR). Maintenance of these ATONs minimizes vessel groundings, thus protecting vessel occupants as well as marine resources and animals which are found adjacent to channels.

The Coast Guard uses areas along the existing bulkhead to moor and support Fast Response Cutters at CGB Miami Beach, allowing USCG to continue to meet their missions including Search and Rescue, Drug Interdiction, Migrant Interdiction, Security, and Law Enforcement, all of which are important components of public safety.

4.14.2 NO ACTION ALTERNATIVE

Implementation of the No Action Alternative would prevent the USCG from meetings its congressionally mandated missions by delaying replacement and repair of more than 1,400 fixed ATONs throughout the CGC HUDSON's AOR which would increase the potential for vessel groundings and decrease public safety.

If the bulkhead replacement is not completed, CGB Miami Beach will lose approximately 40% of its mooring capacity for Fast Response Cutters (FRCs). These cutters are new platforms, specifically designed for missions that are required in the Miami AOR including Search and Rescue, Drug Interdiction, Migrant Interdiction, Security, and Law Enforcement. Cutters would likely be relocated to already crowded locations at Key West, St. Petersburg, or Jacksonville or space would be leased from a private entity. Patrol schedules would be elongated to accommodate required presence in the Miami AOR. Casualties to cutter equipment would have strong rippling effects on mission response due to a loss of redundancy. Contingency operations would be further strained. Response times for calls in the Miami AOR would increase and costs associated with Miami AOR missions would increase. All of these factors would result in a decrease to public safety.

4.15 ENERGY REQUIREMENTS AND CONSERVATION

The energy requirements for this construction activity would be confined to fuel for the tugboat, dredge, labor, transportation, and other construction equipment.

4.16 NATURAL OR DEPLETABLE RESOURCES

The gasoline and diesel fuel used by the construction equipment is considered a depletable resource.

4.17 REUSE AND CONSERVATION POTENTIAL

The proposed action would not directly present any reuse or conservation potential.

4.18 SCIENTIFIC RESOURCES

The proposed action would not have any impact on scientific resources, although continued monitoring during and after dredging and beach placement would add to scientific knowledge regarding the effects of dredging on nearshore resources.

4.19 NATIVE AMERICANS

No Native American communities or any tribal lands exist within the project areas. The project will not adversely impact Native Americans or any tribal lands.

4.20 URBAN QUALITY

Neither the dredging of the CGC HUDSON's berth or the replacement of the bulkheads is expected to have any effect on the Urban Quality of Miami Beach.

4.21 DRINKING WATER

Neither the dredging of the CGC HUDSON's berth or the replacement of the bulkheads is expected to have any effect on drinking water for Miami Beach or Miami-Dade County.

4.22 INVASIVE SPECIES

Neither the dredging of the CGC HUDSON's berth or the replacement of the bulkheads is expected to have any effect on invasive species in the vicinity of the project areas.

4.23 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).

An inherent part of the cumulative effects analysis is the uncertainty surrounding actions that have not yet been fully developed. The CEQ (1997) regulations provide for the inclusion of uncertainties in the EA analysis, and state that "(w)hen an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an EIS and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking" (40 CFR Part 1502.22). The CEQ regulations do not say that the analysis cannot be performed if the information is lacking. Consequently, the analysis contained in this section includes what could be reasonably anticipated to occur given the uncertainty created by the lack of detailed investigations to support all cause and effect linkages that may be associated with the Proposed Action.

The geographic areas used for the scope of this analysis varies for each affected resource, For example, air quality is generally evaluated on a county by county basis by USEPA, so the cumulative effects for air quality would be evaluated by this bounding area. Marine resources, however, are affected only within the waters of central Biscayne Bay and the coastal waters off of the Miami-Dade County coastline. Revelevant past, current and future projects have been included in the cumulative impact analysis. However, the uncertainty of future trends and lack of detailed planning documents for the various alternative locations allows for only a general evaluation of future trends.

The proposed action would result in long-term benefits, which should outweigh any short-term environmental losses. The cumulative impact of maintaining the CGC HUDSON's berth and

replacement of the bulkheads at CGB Miami Beach allow for the USCG to continue meeting the mission requirements of protecting human health and safety throughout its AOR by continuing allowing for ATON maintenance and repair, as well as search and rescue operations. Cumulative impacts to EFH and ESA listed species for this project would be minimal. Turbidity and disturbance associated with the dredging and bulkhead replacement will be temporary and no long term impacts are anticipated.

Past Actions in the area of USCCB Miami Beach.

USCGB Miami Beach is located on the eastern side of Biscayne Bay north of Government Cut and the Port of Miami and west of Miami Beach in a very developed urban environment. The base was constructed in the 1940s as part of homeland protection efforts for World War II. The area of Miami Beach and the Port of Miami are significantly developed, and the native mangrove ecosystem which was located along the shores of Biscayne Bay has been entirely removed from the vicinity of CGB Miami Beach. The Port of Miami was created prior to 1902. In the subsequent years numerous expansions have resulted to impacts to the ecosystems in Biscayne Bay as well as offshore of central Miami-Dade County.

Present Actions.

The current expansion of Miami Harbor was Congressionally authorized in 2007, allowing for construction of an outer entrance channel - 50 feet deep and 500 feet wide as well as construction of a 800 ft wide flare at the seaward end of the channel, widening of Fisherman's channel by 100 feet to the south and construction of 9.7 acres of artificial reef mitigation and 16.6 acres of seagrass mitigation. Construction began in December 2013 and is scheduled to continue through August 2015.

Future Actions.

It is expected that Coast Guard Cutters will continue to conduct operations from CGB Miami Beach and that the CGC HUDSON will continue to service ATONS throughout its AOR. In addition, it is expected that vessels will continue to call at the Port of Miami using Government Cut.

4.23.1 POTENTIALLY AFFECTED RESOURCES

The analysis of impacts must focus on specific resources or impact areas. The resources and impact areas that were identified with the potential of such impacts are marine resources including seagrasses and Johnson's seagrass critical habitat, corals and associated hardbottom species that have encrusted on the existing bulkhead, as well as manatees and bottlenose dolphins which may transit through Government Cut and Meloy Channel passing by the CGB Miami Beach.

4.23.1.1 Corals and associated encrusting organisms on the existing bulkhead

Corals which have encrusted man-made structures within Biscayne Bay are lost to the reef system offshore of the County, and the temporary loss of these corals from Zones 4 and 5 of the bulkhead (corals are expected to recolonize the new bulkhead) is not expected to have a cumulative effect of corals and associated organisms in Miami-Dade County.

4.23.1.2 Seagrasses being removed through side-slope equilibration of the berth

Seagrass has been documented in growing in water depths greater than 10 feet in Meloy Channel (Figure 20), it is expected that if grasses are impacted through side-slope equilibration, the grasses will be able to recolonize the slopes of dredged area as the grass did prior to dredging. The total aerial coverage of seagrass in Biscayne Bay is estimated to be 159,363 acres (Yarbo, 2013). The potential loss of seagrass due to side slope equilibration is 0.13 acres, which makes up 0.00000082% of the total mapped seagrass in the bay. Using a worst-case scenario where the entire mapped bed adjacent to the CGC HUDSON's berth would be impacted as a result of the dredging, that would result in a loss of 0.0000026% of the mapped seagrass in the bay. Based on this assessment, the temporary removal of the grasses due to side-slope equilibration is not expected to have a cumulative effect on seagrasses within Biscayne Bay.

4.23.1.3 Johnson's seagrass critical habitat

The northern Biscayne Bay Unit of designated critical habitat contains approximately 57,107,962 m^2 of area. The total area to be dredged within the CGC HUDSON's berth covers 0.59 acres (2,387 m^2). Conducting maintenance dredging within the CGC HUDSON's berth will temporarily impact 0.000042% of the northern Biscayne Bay Unit of designated critical habitat. The dredging is not expected to deepen the berth beyond a depth where Johnson's seagrass is known to be found. As a result, conducting maintenance dredging is not expected to have a cumulative effect on designated critical habitat within the northern Biscayne Bay unit.

4.23.2 RESOURCES NOT LIKELY TO BE CUMULATIVELY AFFECTED

Based on current available information, there are some resources that are not likely to experience measurable cumulative effects, although this EA has addressed the specific effects of the proposed project in accordance with NEPA. Also, as additional information becomes available or as a result of public or agency comments received, the need for cumulative impact analysis for these resources will be addressed. The resource areas and the basis for not including a cumulative impact analysis for these areas at this time are as follows:

- *Land Use*. The project would result in a relatively small change in land use, and there are no additional reasonably foreseeable projects other than those included in this analysis.

- *Geology and Sediments*. The overall effect to the sandy bottom of Meloy channel by the removal of up to 5,000 CY will be minimal. The slip was previously dredged in 1995 and

removal of that material did not adversely affect the remaining bottom of Meloy Channel.

- *Threatened or Endangered Species*. Impacts to listed species were evaluated under the Endangered Species Act and for all species in the project area. For all such species but sea turtles and listed corals, the project "may affect, but is not likely to adversely affect" them. If the USCG utilizes a hopper dredge to excavate the sand from the CGC HUDSON's berth, the potential exists for adverse affect to sea turtles via impingement or entrainment in the draghead. All other dredge types will not result in adverse effects on sea turtles directly. When the USCG replaces the existing bulkhead, listed corals smaller than 10 cm in diameter that have not been removed from the bulkhead will be lethally taken. These corals are not located on the natural reef system offshore of Miami-Dade County and they do not contribute significantly to the genetic pool of the reef system offshore of the County. Additionally, after the new bulkhead is build, larvae of listed coral species are expected to colonize the bare bulkhead face when they are swept into Government Cut due to tidal action. Besides the potential affects to listed sea turtles and corals, no additional incremental cumulative effects on threatened or endangered species are anticipated.

- *Other Fish and Wildlife*. Impacts to non-listed fish and wildlife are minimal and not expected to result in a significant cumulative effect. Corals will be relocated from the bulkhead prior to construction thus reducing impacts to the reproductive population, and construction of the new bulkhead will result in a new area for juvenile corals settle from the water column onto the bulkhead. Losses of fishes associated with dredging have been shown to be minimal and below the population level.

- *Water Quality*. Water quality impacts would only be temporary due to construction activities, and there are no additional reasonably foreseeable projects other than those included in this analysis.

- *Hazardous, Radioactive, and Toxic Wastes*. The project would not result in any a release of any hazardous, toxic, or radioactive waste and there are no additional reasonably foreseeable projects other than those included in this analysis.

- *Air Quality*. Any impacts to air quality would result from dredging of the slip and construction of the replacement bulkheads and would be temporary. The total increases in air pollutants would be relatively minor to the existing point- and mobile-source emissions in Miami-Dade County. Miami-Dade County is in a designated attainment area and a conformity statement would not be required. No foreseeable future actions leading to an increase in emissions would result from this project.

- *Noise*. Noise impacts would be temporary as a result of construction activities and the project will result in only a minor incremental impact due to noise and as a result a minor increase in cumulative impact is expected.

- *Aesthetic Resources*. Only temporary adverse effects to aesthetic resources would occur during construction; therefore, there would be no adverse cumulative effect to aesthetic resources resulting from this project.

- *Recreation*. Only temporary adverse effects to recreation would occur during construction; therefore, there would be no adverse cumulative effect to recreation resulting from this project.
- *Cultural and Historic Resources*. It is anticipated that no cultural or historic resources would be affected by the project. Therefore, no cumulative effect to these resources would result from this project.

- *Native American Resources*. The project would have no effect and would not influence any foreseeable future actions that could adversely affect Native American tribes.

- *Environmental Justice*. The project would have no effect and would not influence any foreseeable future actions that could adversely affect minority and low-income populations.

- *Invasive Species.* The project would have no effect on invasive species and would not influence any forseeable actions that could incrementally increase the impacts of invasive species in Biscayne Bay.

4.23.3 CUMULATIVE EFFECTS ASSESSMENT CONCLUSION

Due to efforts to avoid and minimize the environmental impact of the proposed action within the project area and its vicinity, and due to mitigative actions that will be carried out for the proposed project, and those that are likely to be required for any future actions, the USCG anticipates that any cumulative impacts associated with dredging CGC HUDSON's slip and replacement of the bulkheads at CGB Miami Beach are negligible.

4.24 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.24.1 IRREVERSIBLE

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. One example of an irreversible commitment might be the mining of a mineral resource. The proposed maintenance dredging of the CGC HUDSON's berth would result in the permanent removal of up to 5,000 CY of dredged material due to the deepening of

the berth from the current depth to -10 feet MLLW. The energy and fuel used during construction would also be an irreversible commitment of resources.

4.24.2 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. An example of an irretrievable loss might be where a type of vegetation is lost due to road construction. Replacement of the existing bulkhead on CGB Miami Beach would result in the permanent loss of any stony corals less than 10cm in size and all other encrusting organisms on the bulkhead. These affects would be temporary as the new bulkhead would recolonize over time (based on the level of colonization of the current bulkhead).

4.25 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

There may be a temporary, unavoidable reduction in water clarity, increased turbidity and sedimentation during construction operations. This would be limited to the immediate areas of the proposed dredging and bulkhead construction. This impact would be temporary and should disappear shortly after construction completion.

Those species that are not able to escape the dredging or bulkhead construction are expected to recolonize after project completion. Construction of the new bulkhead will result in unavoidable impacts to hardbottom species which have colonized the existing bulkhead which are not relocated prior to construction due to placement of the new sheet pile in front of the existing bulkhead and filling between the new and existing bulkheads. Relocation of stony corals and offering the opportunity for relocation of other organisms to scientific and educational organizations will minimize these impacts. There will be unavoidable loss of the infaunal community in the dredging area; this loss is expected to last for no more than one year.

4.26 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

The preferred alternative is consistent with the state's Coastal Zone Management plan and with Federal, State and local laws, plans and objectives.

4.27 CONFLICTS AND CONTROVERSY

During required permitting and consultation processes, no significant conflicts or controversy with the proposed project were expressed by any resource or permitting agency.

4.28 UNCERTAIN, UNIQUE, OR UNKNOWN RISKS

Maintenance dredging berthing areas is a long-established practice in Florida, and this berth has been maintenance dredged previously in 1995. That limits the risk of unknown material being the slip from a first-time dredge. The construction method for the bulkheads is to place

the new bulkhead in front of the old one, thus encapsulating the existing bulkhead and not potentially having any fill material from when the island was originally built being released into the surrounding environment. There are no additional uncertain, unique or unknown risks associated with this project. The uncertain and unknown risks associated with sea level rise (SLR) will affect Miami Beach over the next 50 years and has the potential to also impact CGB Miami Beach. The long term impacts of SLR are unknown.

4.29 PRECEDENT AND PRINCIPLE FOR FUTURE ACTIONS

The proposed action would not set any precedent or principle for future actions. USCG will obtain all necessary permits and authorizations prior to all future berth maintenance dredging and bulkhead replacement activities, as well as conduct required NEPA analysis and subsequent consultations under Federal and State law.

4.30 ENVIRONMENTAL COMMITMENTS

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

4.30.1 PROTECTION OF MANATEES DURING ALL IN-WATER CONSTRUCTION ACTIVITIES

The USCG shall incorporate the standard manatee protection construction conditions into the plans and specifications for this project. A copy of the most recent version (dated 2011) are included in Appendix B. Also see 4.30.3 for protection measures associated with bulkhead construction.

4.30.2 PROTECTION OF ALL MARINE MAMMALS (MANATEES AND DOLPHINS) DURING BULKHEAD CONSTRUCTION ACTIVITIES

The USCG will utilize a shutdown zone which will always be a minimum of 15 m (50 ft) around the work area. For impact pile driving which generates impulsive sound, a larger 40 m (130 ft) shutdown zone shall be implemented for marine mammals only; the standard shutdown zone will continue to be applied for all other protected species. If a manatee or bottlenose dolphin approaches or enters a shutdown zone during any in-water work, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.

4.30.3 PROTECTION OF SEA TURTLES AND SMALLTOOTH SAWFISH

The USCG shall incorporate the standard manatee protection construction conditions into the plans and specifications for this project. A copy of the most recent version (dated 2006) are included in Appendix B. The USCG will utilize a shutdown zone which will always be a minimum of 15 m (50 ft) around the work area. If a sea If a sea turtle or smalltooth sawfish is observed approaching or entering a shutdown zone during any in-water work, activity will be halted and

delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.

4.31 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.31.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Environmental information on the project has been compiled and this Environmental Assessment has been prepared. The project is in compliance with the National Environmental Policy Act. The signed FONSI shall be published and noticed by USCG in compliance with their NEPA regulations. This public coordination and environmental assessment complies with the intent of NEPA. The project is in compliance with the National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321, *et seq*. P.L. 91-190.

4.31.2 ENDANGERED SPECIES ACT OF 1973

Consultation was initiated with NMFS on April 16, 2014, and completed on February 10, 2015 (see Section 4.3). Consultation was initiated with USFWS on April 16, 2014, and completed on May 5, 2014 (see Section 4.3). This project was fully coordinated under the Endangered Species Act and is therefore, in full compliance with the Act. Consultation documents for this EA are located in Appendix B.

4.31.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

This project does not require coordination with US Fish and Wildlife Service under this Act.

4.31.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (INTER ALIA)

Consultation with the Florida State Historic Preservation Officer (SHPO) was initiated in October 30, 2013 (DHR No. 2013-05232) and June 23, 2014 and was completed by letters dated November 26, 2013 and August 7. 2014 in accordance with the National Historic Preservation Act of 1966, as amended, and as part of the requirements and consultation processes contained within the NHPA implementing regulations of 36 CFR 800. This project is also in compliance 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. USACE, working as USCG's agent, determined that the proposed actions will not affect any historic properties included in or eligible for inclusion in the National Register of Historic Places. Copies of the letters indicated above have been placed in Appendix B.

4.31.5 CLEAN WATER ACT OF 1972

The project is in compliance with this Act. A Section 401 water quality exemption determination dated August 13, 2014 has been issued by the Florida Department of Environmental Protection (DEP permit #13-0059553-012; Appendix B). All State water quality

standards would be met. A public notice was issued for the project (December 18, 2014) in a manner which satisfies the requirements of Section 404 of the Clean Water Act. And a Section 10/404 permit will be issued to the USCG for dredging of the CGC HUDSON's slip. Prior to construction, USCG will apply for permission to replace the bulkhead under Nationwide Permit #3 and will request an exemption from FDEP for the same.

4.31.6 CLEAN AIR ACT OF 1972

The project area is in attainment and no air quality permits are required for this project.

4.31.7 COASTAL ZONE MANAGEMENT ACT OF 1972

By issuance of an exemption for the O&M dredging, the State of Florida has found the project to be in compliance with their Coastal Zone Management Plan..Additionally, by acceptance of the Nationwide Permit #3, the State of Florida has found the bulkhead replacement to be in compliance with their Coastal Zone Management Plan. No additional consultation with the Florida State Clearinghouse is required.

4.31.8 FARMLAND PROTECTION POLICY ACT OF 1981

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

4.31.9 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.

4.31.10 MARINE MAMMAL PROTECTION ACT OF 1972

The USCG does not anticipate the take of any marine mammal during any activities associated with the project. A trained endangered species observer will be stationed on the clamshell dredge during dredging operations and on the bulkhead adjacent to the bulkhead replacement operations. Appropriate actions will be taken to avoid listed and protected marine mammal species effects during project construction. If a marine mammal is identified within the project boundaries, they will be provided protections equal the ESA species that have had consultations completed, and as a result of this the project is in compliance with the Act.

4.31.11 ESTUARY PROTECTION ACT OF 1968

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

4.31.12 SUBMERGED LANDS ACT OF 1953

The project would occur on submerged lands of the State of Florida. The Coast Guard has Navigational Servitude under the Supremacy Clause of the U.S. Constitution and is not required to obtain a lease or authorization from the State to use State owned lands for projects that

support navigation. By coordination of the project through the permit exemption process, the State has been coordinated with and is in compliance with the Act.

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

There are no designated coastal barrier resources in the project area that would be affected by this project. These Acts are not applicable.

4.31.14 RIVERS AND HARBORS ACT OF 1899

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

4.31.15 ANADROMOUS FISH CONSERVATION ACT

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

4.31.16 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

No migratory birds would be affected by project activities. The project is in compliance with these Acts.

4.31.17 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT

The term "dumping" as defined in the Act (3[33 U.S.C. 1402](f)) does not apply to the disposal of material for beach nourishment or to the placement of material for a purpose other than disposal (i.e. placement of rock material as an artificial reef or the construction of artificial reefs as mitigation). Concurrence from USEPA under Section 103 of the Act is required along with any required testing of the material for suitability for ocean dumping. More information on the ODMDS site can be found in the Final Environmental Impact Statement for the Designation of the Miami Harbor ODMDS' completed in 1995, and the Site Management and Monitoring Plan for the Miami Harbor ODMDS dated September 26, 2011 , both prepared by USEPA. USCG prepared an analysis of the material to be dredged at the CGB Miami Beach and provided it to EPA via letter dated November 4, 2014. USEPA granted concurrence that the material to be dredged and placed in the Miami Harbor ODMDS is consistent with the SMMP via letter dated December 23, 2014.

4.31.18 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

This Act requires preparation of an Essential Fish Habitat (EFH) Assessment and coordination with the NMFS. An independent EFH Assessment may be used for coordination prior to preparation of the NEPA document. The EFH Assessment was prepared independently of this EA, and was provided to NMFS on June 18, 2014. NMFS provided EFH Conservation Recommendations by letter dated July 18, 2014. USCG responded to NMFS EFH Conservation

Recommendations by letter dated August 12, 2014. Copies of this correspondence are located in Appendix B.

4.31.19 UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT OF 1970.

The project does not involve real property acquisition and/or displacement of property owners or tenants. The Act is not applicable to this project.

4.31.20 E.O. 11990, PROTECTION OF WETLANDS

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

4.31.21 E.O. 11988, FLOOD PLAIN MANAGEMENT

Submerged portions of the project area are adjacent to the CGB Miami Beach, which are designated as Zone AE on Flood Insurance Rate Map #12086C0319L panel 319L of 1031. Zone AE is defined to mean that base flood levels have been determined for the mapped area. The project proposes to dredge, but not fill a submerged area. Therefore the project will not contribute to the adverse modification of the floodplain and is hence in accordance with E.O. 11988, Flood Plain Management.

4.31.22 E.O. 12898, ENVIRONMENTAL JUSTICE

This environmental justice assessment recognizes the issues addressed in the Environmental Justice Guidance under NEPA (CEQ 1997), and uses the USEPA Guidance for Incorporating Environmental Justice Concerns in USEPA's NEPA Compliance Analyses (USEPA 1998) as a guide.

An environmental justice assessment requires an analysis of whether minority and low-income populations (i.e., "the populations of concern") would be affected by a proposed federal action and whether they would experience adverse impacts from the proposed action at any of the site alternatives. If there are adverse impacts, the severity and proportionality of these impacts on populations of concern must be assessed in comparison to the larger non-minority or non-low-income populations. At issue is whether such adverse impacts fall disproportionately on minority and/or low-income members of the community and, if so, whether they meet the threshold of "disproportionately high and adverse." If disproportionately high and adverse effects are evident, then the USEPA Guidance advises that it should trigger consideration of alternatives and mitigation actions in coordination with extensive community outreach efforts (USEPA 1998).

The proposed action will not result in adverse human health or environmental affects which would disproportionally impact a particular minority or low-income population. The action will take place on and adjacent to a property of the USCG. The property is restricted access and only employees of the USCG and other authorized individuals are allowed on the property. The

CGB Miami Beach is located adjacent to a major port in a highly urbanized area and there are no private homes on the property. Properties located across from Meloy Channel are a high dollar value private marina and condominiums. Low-income populations and minority populations are not disproportionately located within the region of influence of the proposed action. The proposed activity would not (a) exclude persons from participation in, (b) deny persons the benefits of, or (c) subject persons to discrimination because of their race, color, or national origin, nor would the proposed action adversely impact "subsistence consumption of fish and wildlife." Therefore, the project is in compliance with this Executive Order 12898, Environmental Justice.

4.31.23 E.O. 13089, CORAL REEF PROTECTION

This EO may apply to coastal projects especially those which might directly or indirectly impact coral reefs. Although the project has corals growing on the CGB Miami Beach bulkheads, those bulkheads are not considered coral reefs under the EO and the EO is not applicable to the project. However, the USCG plans to relocate any scleractinian corals greater than 10 cm in size to an alternative location. Additionally, if it can be done without project delays and cost to the USCG, corals smaller than 10cm and other associated organisms may be collected by other entities for research and education purposes.

4.31.24 E.O. 13112, INVASIVE SPECIES

The proposed project would affect the status of invasive species in and around the project area. Potential impacts on invasive species include, but are not limited to:

- Disturbances to the marine environment including in the slip where dredged material will be removed and the excavated dredged material will be placed in the ODMDS and the placement of new bulkheads in front of the existing bulkheads. This removal and placement of material will create areas of uninhabited structure allowing pioneer type species, or rapidly reproducing species, to colonize the area. Invasive species can be considered as pioneer species and when these species are allowed to colonize an uninhabited area they generally create an area of invasive species monoculture and lower species diversity, and prevent successional colonization by native organisms. However, previous history of dredging and recovery of the dredged slip and replacement of bulkhead has not shown this trend of colonization by invasive species. This historic trend is expected to continue into the future.

- Project equipment used (i.e. dredges, tender vessels, dump-trucks, backhoes, etc.) has the potential to introduce invasive species into the project area as the equipment is moved from the previous construction site to the CGC HUDSON's berth project area by the dredging contractor. The path of introduction caused by project equipment is the equipment being transported from one job site to another without equipment undergoing pre and post project de-contamination.

This project will use several methods to ensure compliance with the spirit of E.O. 13112, the CECW-ZA USACE Invasive Species Policy, and the USACE DRAFT CESAJ-SOP for Incorporating Invasive Species Management into the Civil Works Projects. Methods used in this project which allow compliance with E.O. 11312 fall into one of four general methods; preventing invasive introduction or spread, detecting and responding to invasive introduction or spread, restoring native species, and promoting public education. This project will utilize a specific method to comply with E.O. 13112 including:

- The topic of invasive species introductions from ballast water is a complex issue that, while it impacts this project, is an issue of such magnitude that it cannot be fully addressed in respect to any single project. Instead there is legislation dictating that ballast water be exchanged 200 miles off-shore (USCODE-2011-title16-chap67-subchapII-sec 4712) to reduce the number of invasive organisms introduced into a port. Also there is research being done into methods to treat ballast water to ensure that any invasive ballast hitch-hiker species are eradicated prior to releasing the ballast water (Gregg *et al.* 2009) this research expands from treating ballast water to investigating new ship designs that don't have ballasts but instead continually pump in local water to balance the ships without transporting invasive species around the globe (Parsons and Kotonis 2007).

4.31.25 E.O. 13186, MIGRATORY BIRDS.

This Executive Order requires, among other things, a Memorandum of Understanding (MOU) between the Federal Agency and the U.S. Fish and Wildlife Service concerning migratory birds. The Coast Guard has completed a MOU with USFWS for migratory bird protection dated October 10, 2014. USCG shall abide by the requirements of the MOU.

4.31.26 E.O. 13045, DISPARATE RISKS INVOLVING CHILDREN

On April 21, 1997, the President of the United States issued Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. The Executive Order mandates that each Federal agency make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

As the proposed action does not affect children disproportionately from other members of the population, the proposed action would not increase any environmental health or safety risks to children.

5 LIST OF PREPARERS

5.1 PREPARERS

This Environmental Assessment was prepared by the following personnel:

Primary Authors	Organization	Discipline	Role
Terri Jordan-Sellers	Environmental Branch, Planning Division, Jacksonville District, U.S. Army Corps of Engineers	Marine Biology	Primary Author

5.2 REVIEWERS

This Environmental Assessment was reviewed by the following personnel:

Reviewers	Organization	Discipline	Role
Jason Spinning	Environmental Branch, Planning Division, Jacksonville District, U.S. Army Corps of Engineers	Chief, Coastal Section, Environmental. Policy compliance	Reviewer
Andrew Bobick	United States Coast Guard, District Seven…	Biology, NEPA review	Reviewer
Lt. George Hall	United States Coast Guard, District Seven…	Engineering, NEPA review	Reviewer
Matthew Miller	Environmental Branch, Planning Division, Jacksonville District, U.S. Army Corps of Engineers	Environmental Engineer	Reviewer

6 PUBLIC INVOLVEMENT

6.1 PUBLIC NOTICE AND FINAL EA

USCG applied for a permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. A public Notice for this permit was announced by the USACE on December 18, 2014 and was open for 15 days. USCG will provide a Notice of Availability of the final EA/FONSI, consistent with USCG NEPA regulations and guidance.

6.2 AGENCY COORDINATION

The proposed project has been and will continue to be coordinated with the following agencies: U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, Florida State Clearinghouse, Florida State Historic Preservation Officer, Florida Fish and Wildlife Conservation Commission, and the Florida Department of Environmental Protection. All agency coordination letters are in Appendix B, and details concerning coordination with applicable agencies (NMFS, FWS, FLDEP, SHPO, USEPA) is found in Section 4.31 of this EA.

6.3 LIST OF RECIPIENTS

A complete mailing list for the FONSI is included Appendix B.

6.4 COMMENTS RECEIVED AND RESPONSES

No comments were received on the USACE public notice for the dredging of the CGC HUDSON's slip (M. Clouser, pers comm. 2015). No comments were received from USFWS during their review of the project. NMFS did not provide project specific comments beyond the reasonable and prudent measure included in the biological opinion.

NMFS - EFH

Under the EFH consultation requirements of the Magnuson-Stevens Act, NMFS provided three consultation recommendations. 1) The project shall include a compensatory mitigation plan describing how seagrass and coral impacts will be appropriately offset. 2) The project shall include a coral relocation plan that, at a minimum, describes relocation of scleractinian corals greater than or equal to 10 centimeters in diameter and octocorals from the genera *Gorgonia, Eunicea, Plexaurella, Muricea* and *Pterogorgi*a. The plan shall describe the suitability of the receiving site in terms of water depths and physical conditions similar to those at the removal site and the absence of threats from development. The coral relocation plan shall describe methods for the relocation, monitoring of the relocated corals for a period of three years and assessment of relocation success with respect to acceptable performance measures. 3) The project shall include best management practices to avoid and minimize impacts to corals and seagrass habitats, including the use of staked turbidity curtains around the work areas and

prohibiting staging, anchoring, mooring, and spudding of working barges and other associated vessels over seagrasses.

Reponses to NMFS were provided as required by the EFH regulations and are included in Appendix B. In Summary: 1) Compensatory mitigation for seagrasses was included in the EFH consultation and is construction of 0.50 acres of seagrasses at the Julia Tuttle Mitigation Area, as requested by Miami-Dade County DERM. Mitigation for corals smaller than 10cm in diameter, as well as all other associated species is not proposed for the project. 2) Scleractinian corals greater than or equal to 10cm in diameter will be relocated to the Miami Science Center. Currently there are no in water artificial reefs available with capacity to absorb the corals, and the Port of Miami has requested that the corals not be moved to their rip rap to ensure sufficient space remains for future port projects that may require coral relocation. 3) The project will use appropriate best management practices when operating near seagrasses, however the use of staked turbidity curtains is not feasible due to the strong tidal currents in Meloy Channel.

REFERENCES

Blackwell, S. B., and Greene, C. R. (2002). *Acoustic measurements in Cook Inlet, Alaska, during August 2001*: Greeneridge Sciences, Incorporated.

California Department of Transportation (CALTRANS). (2009). Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish, Appendix 1: Compendium of Pile Driving Sound Data. Prepared by: ICF Jones & Stokes and Illingworth & Rodkin, Inc. February 2009.

Coastal Planning and Engineering, Inc (CP&E). August (1989). North Boca Raton Beach Restoration Project Preconstruction Environmental Monitoring. Vols. I and II. Prepared for City of Boca Raton, Florida. Coastal Planning & Engineering: Boca Raton, Florida.

Council on Environmental Quality (CEQ). (1997). Considering cumulative effects under the National Environmental Policy Act. Washington, D.C. DEP File # 0271815-001-EE.

Dial Cordy and Associates Inc. (DC&A). (2001). Environmental Baseline Study Impact Assessment for Miami Harbor, General Reevaluation Report to United States Army Corps of Engineers, Jacksonville District, Jacksonville, FL. 56 pages.

Dial Cordy and Associates Inc. (DC&A). (2013). Miami Beach Coast Guard Station Seagrass and Coral Survey. August 2013.

Dickerson, C., K.J. Reine, and D.G. Clarke. (2001). Characterization of underwater sounds produced by bucket dredging operations, DOER Technical Notes Collection (ERDC TN-DOER-E14), U.S. Army Engineer Research and Development Center, Vicksburg, MS. www.wes.army.mil/el/dots/doer

Dompe, P. E. and D. M. Haynes. (1993). "Turbidity Data: Hollywood Beach, Florida, January 1990 to April 1992." Coastal & Oceanographic Engineering Department, University of Florida: Gainsville, Fla. UFL/COEL -93/002.

FHWG (Fisheries Hydroacoustic Working Group). (2008). Memorandum of Agreement in Principle for Interim Criteria for Injury to Fish from Pile Driving. California Department of Transportation (CALTRANS) in coordination with the Federal Highway Administration (FHWA). http://www.wsdot.wa.gov/NR/rdonlyres/4019ED62-B403-489C-AF055F4713D663C9/0/InterimCriteriaAgreement.pdf

Foley, A.M., P.H. Dutton, K.E. Singel, A.E. Redlow and W.G Teas. (2003). The First Records of Olive Ridleys in Florida, USA. Marine Turtle Newsletter No.101, 2003. Page 23.

Florida Power & Light Company (FP&L). (1987). Florida Alligators and Crocodiles. 41 pp.

Gilliam, D.S. 2008. Southeast Florida Coral Reef Evaluation and Monitoring Project (2007) Year 5 Final Report. Prepared for: Florida Fish and Wildlife Conservation Commission, Fish & Wildlife Research Institute, Florida Department of Environmental Protection. 35 pp.

Greene, C.R.J. and S.E. Moore. (1995). Man-made noise. Pp 101-158 in Marine Mammals and Noise. W.J. Richardson, C.R.J. Greene, C.I. Malme and D.H. Thomson (ed.), Academic Press, San Diego.

Hastings, M.C. and A.N. Popper. (2005). *Effects of Sound on Fish*. California Department of Transportation Con-tract 43A0139, Task Order 1. Available from URL: http://www.dot.ca.gov/hq/env/bio/files/Effects_of_Sound_on_Fish23Aug05.pdf

Hempen, G. L., T. M. Keevin, and H. J. Reuben. (2005). Underwater blast pressures from confined rock removal shots: The Kill Van Kull Deepening Project. Pp. 91-100. In *Proceedings of the Thirty-first Annual Conference on Explosives and Blasting Technique*, Orlando, Florida. International Society of Explosive Engineers, Cleveland, OH.

Hildebrand, J. (2004). Sources of anthropogenic sound in the marine environment. In E. Vos and R.R. Reeves (eds.) Report of an International Workshop: Policy on Sound and Marine Mammals, 28–30 September 2004, London, England 23 December 2005. U.S. Marine Mammal Commission, London, England.

Illingworth & Rodkin, Inc. (2012). *Naval Base Kitsap at Bangor Test Pile Program Acoustic Monitoring Report, Bangor, Washington.* Prepared for the U.S. Navy. 17 April 2012.

Illingworth and Rodkin, Inc. (2001). *Noise and Vibration Measurements Associated with the Pile Installation Demonstration Project for the San Francisco-Oakland Bay Bridge East Span, Chapter 4*. Prepared by Illingworth and Rodkin, Petaluma, CA. Prepared for the California Department of Transportation, Sacramento, CA.

Keevin, T.M., and G.L. Hempen. (1997). The environmental effects of underwater explosions with methods to mitigate impacts. U.S. Army Corps of Engineers St. Louis District, St. Louis, Missouri.

Kenworthy, W.J. (1997). An updated status review and summary of the proceedings of a workshop to review the biological status of the seagrass *Halophila johnsonii* Eisemon. Report to Office of Protected Species, NMFS, NOAA. 23pp.

Kinsler, L. E., Frey, A. R., Coppens, A.B., and Sanders, J.V. (1999). *Fundamentals of Acoustics*. New York, NY, Wiley.

Lesage, V., Barrette, C., M. C. S. Kingsley, and B. Sjare. (1999). The effect of vessel noise on the vocal behavior of belugas in the St. Lawrence River estuary, Canada. *Marine Mammal Science, 15*(1), 65-84.

Litz, J.A. (2007). Social structure, genetic structure, and persistent organohalogen pollutants in bottlenose dolphins (*Tursiops truncatus*) in Biscayne Bay, Florida. Ph.D. dissertation from University of Miami., 140 pp.

Marine Aggregate Levy Sustainability Fund (MALSF). (2009). A generic investigation into noise profiles of marine dredging in relation to the acoustic sensitivity of the marine fauna in UK waters with particular emphasis on aggregate dredging: PHASE I Scoping and review of key issues. MEPF Ref No: MEPF 08/P21. Cefas contract report C3312. Accessed online at http://www.cefas.co.uk/media/462318/mepf-08-p21%20final%20report%20published.pdf

Mazzotti, F. J. (Personal Communication). University of Florida Everglades Research and Education Center. 2000. In USACE 2004.

Miami-Dade County. (1999a). Aerial Manatee Sightings 1990-1999. Department of Environmental Resources Management. Miami, Florida.

Miami-Dade County. (1999b). Port of Miami Master Development Plan. 164 pages.

Milanich, J.T. (1994) Archaeology of Precolumbian Florida. University Press of Florida, Gainesville.

National Marine Fisheries Service (NMFS). (1991). Biological Opinion – Dredge of channels in the southeastern United States from North Carolina through Cape Canaveral, Florida. Signed November 25, 1991.

National Marine Fisheries Service (NMFS). (1995). Endangered Species Act Section 7 Consultation with the U.S. Army Corps of Engineers, South Atlantic Division on Hopper Dredging of Channels and Borrow Areas in the Southeastern U.S. from North Carolina through Florida East Coast. Signed August 25, 1995.

National Marine Fisheries Service (NMFS). (1997). Endangered Species Act Section 7 Consultation with the U.S. Army Corps of Engineers, South Atlantic Division on the Continued Hopper dredging channels and borrow areas in the southeastern United States. Signed September 25, 1997.

National Marine Fisheries Service (NMFS). (1999). Letter from Andrew Kemmerer, Regional Administrator to Mr. C.E. Shuford, Jr. Chief, Technical Services Division, Wilmington District, USACE. Use of "U.S. Army Corps of Engineers (COE) sidecast dredges FRY, MERRITT and SCHWEIZER, and the split-hull hopper dredge CURRITUCK in United States coastal waters." March 9, 1999.

National Marine Fisheries Service (NMFS). (2003). Endangered Species Act Section 7 Consultation with the U.S. Army Corps of Engineers for Dredging of Gulf of Mexico Navigation channels and San Mining "borrow" areas using hopper dredges by COE Galveston, New Orleans, Mobile and Jacksonville Districts. Consultation Number

F/SER/2000/01287. Signed November 19, 2003, revised June 24, 2005 and January 9, 2007.

National Marine Fisheries Service (NMFS). (2009). Recovery Plan for Smalltooth Sawfish (*Pristis pectinata*). Prepared by the Smalltooth Sawfish Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland.

Parsons, M., and M. Kotonis. (2007). Hydrodynamic optimization testing of ballastfree ship design. Department of Naval Architecture and Marine Engineering.University of Michigan, USA.

Richardson, W. J., Greene, C. R., Malme, C. I., and Thomson, D. H. (1995). *Marine Mammals and Noise*: Academic Press.

Settle, L. (2003). NOAA/NOS National Centers for Coastal Ocean Science. Assessment of potential larval entrainment mortality to hydraulic dredging of Beaufort Inlet. Assessment prepared for USACE-Wilmington District for the Morehead City Harbor Environmental Assessment.

Simpfendorfer, C.A. (2006). Movement and habitat use of smalltooth sawfish. Final Report. Mote Marine Laboratory Technical Report 1070. NOAA Purchase Order WC133F-04-SE-1543. January 2006.

South Atlantic Fishery Management Council (SAFMC). (2009). Fishery Ecosystem Plan of the South Atlantic Region. www.safmc.net/ecosystem/Home/EcosystemHome/tabid/435/Default.aspx

South Atlantic Fishery Management Council (SAFMC). (1998). Final Habitat Plan for the South Atlantic Region: Essential Fish Habitat Requirements for Fishery Management Plans of the South Atlantic Fishery Management Council. Charleston, SC. 408 pp.

South Atlantic Fishery Management Council (SAFMC). (1983). Fishery Management Plan, Regulatory Impact Review and Final Environmental Impact Statement for the Snapper-Grouper Fishery of the South Atlantic Region. March 1983 Charleston, SC. 303 pp.

U.S. Army Corps of Engineers (USACE). (1989). Navigation Study for Miami Harbor Channel, Fl. Feasibility Report and Environmental Impact Statement - 10140. 85 pp.

U.S. Army Corps of Engineers (USACE). (2000). Analysis of Test Blast Results, Wilmington Harbor, NC. (February 2000). 13 pp.

U.S. Army Corps of Engineers (USACE). (2004). Miami Harbor Navigation Study, Miami-Dade County, Florida. Final General Reevaluation Report and Environmental Impact Statement. February 2004.

U.S. Environmental Protection Agency (USEPA). (1995). Final Environmental Impact Statement for the Designation of an Ocean Dredged Disposal Site Located offshore Miami, Florida. August 1995.

U.S. Environmental Protection Agency (USEPA). (1998). Final Guidance For Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses. April 1998. Accessed 2/15/2015 from http://www.epa.gov/region1/ej/pdfs/ej_guidance_nepa_epa0498.pdf

U.S. Environmental Protection Agency (USEPA). (1974). USEPA (U.S. Environmental Protection Agency). (1974). *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. Washington, DC.

U.S. Fish and Wildlife Service (USFWS). (1999). South Florida Field Office Multi-Species Recovery Plan. http://ecos.fws.gov/docs/recovery_plan/990518_1.pdf.

USFWS and NMFS (1998). Endangered Species Consultation Handbook. Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act. March 1998.

U.S. Geologic Survey (USGS). (2000). Sirenia Project, Florida Caribbean Science Center. Gainesville, Florida.

U.S. Navy. (2013). Draft Environmental Assessment. Wharf C-2 Recapitalization at Naval Station Mayport, FL .August 2013.

Urick, R. J. (1983). *Principles of Underwater Sound*. Los Altos, CA: Peninsula Publishing

Waring, G. T., E. Josephson, K. Maze-Foley, and P. E. Rosel (2014). U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2013. NOAA Technical Memorandum NMFS-NE-228

Washington State Department of Transportation (WSDOT). (2010a). Keystone Ferry Terminal – vibratory pile monitoring technical memorandum. May 2010.

Washington State Department of Transportation (WSDOT). (2010b). Underwater Sound Levels Associated with Driving Steel Piles for the State Route 520 Bridge Replacement and HOV Project Pile Installation Test Program. March 2010.

Washington State Department of Transportation (WSDOT). (2008). Advanced Training Manual, Biological Assessment Preparation for Transportation Projects. Version 7. Washington State Department of Transportation, Environmental Affairs Office, Olympia, WA.

Washington State Department of Transportation (WSDOT). (2005). Underwater sound levels associated with restoration of the Friday Harbor Ferry Terminal. Prepared by: Jim Laughlin, WSDOT. May 2005.

Wilson, O. B., Jr., S.N. Wolf, and F. Ingenito. (1985). Measurements of acoustic ambient noise in shallow water due to breaking surf. The Journal of the Acoustical Society of America, 78(1), 190-195.

Wright, D.G. and G.E. Hopky. (1998). Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters. Canadian Technical Report of Fisheries and Aquatic Sciences 2107.

Yarbo, L.A. (2013). Seagrass Integrated Mapping and Monitoring Programs. Mapping and Monitoring Report No. 1. Florida Fish and Wildlife Conservation Commission FWRI Technical Report TR-17. 135 pp.

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