DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
701 San Marco Boulevard
JACKSONVILLE, FLORIDA 32207-8175

AUG 0 1 2017

Planning and Policy Division

Mr. Edwin E. Muñiz
U.S. Fish and Wildlife Service
Post Office Box 491
Boquerón, Puerto Rico 00622-0491

Dear Mr. Muñiz:

The U.S. Army Corps of Engineers, Jacksonville District (Corps), proposes to widen, deepen and maintain the San Juan Harbor Federal navigation project. This project is currently being evaluated in a Draft Feasibility Study and Environmental Assessment. Completion of the dredging project may employ a hopper dredge, clamshell dredge, or cutterhead dredge. The dredging will remove approximately 2.1 million cubic yards of material. The Tentatively Selected Plan consists of deepening Entrance Channel Cut-6 to 46 feet, widening the Army Terminal Channel by 100 feet and deepening Anegado and Army Terminal Channels and the Army Terminal Turning Basin to 44-feet. Lesser increments of widening and deepening were also evaluated. In addition, the San Antonio Channel would be deepened to 36-feet. The dredged material is expected to be suitable for placement in the Ocean Dredged Material Disposal Site but some material may be suitable for placement in dredged holes and for other beneficial purposes.

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

Enclosed please find the Corps' biological assessment of the effects of the proposed project on listed species under USFWS purview in the action area. We request initiation of informal consultation under section 7 of the Endangered Species Act of 1973, as amended, concerning potential effects of the proposed activities on the Antillean manatee.

After reviewing the status of the species in the action area and the special conditions placed in our specifications, the Corps determines that the widening and deepening of the San Juan Harbor may affect, but is not likely to adversely affect, the

Antillean manatee. The Corps requests written concurrence of our determination within 60 days of the date of this letter.

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

Sincerely,

Gina Paduano Ralph
Chief, Environmental Branch

Enclosure

ENDANGERED SPECIES ACT
BIOLOGICAL ASSESSMENT
SAN JUAN HARBOR, PUERTO RICO
EXPANSION AND MAINTENANCE DREDGING

PREPARED FOR THE U.S. FISH AND WILDLIFE SERVICE

US Army Corps
of Engineers ®
Jacksonville District

JULY 2017

Table of Contents

List of Figures

1 BACKGROUND/HISTORY

The purpose of this Biological Assessment (BA) is to address the potential effects of the construction and operations and maintenance (O&M) dredging of the San Juan Harbor Federal navigation project on species listed as threatened or endangered under the Endangered Species Act (ESA) of 1973, as amended and their designated critical habitat. The U.S. Army Corps of Engineers, Jacksonville District (Corps) is seeking authorization for the expansion of the Federal project, however, O&M of the existing federal navigation channel is was authorized by Section 301 of WRDA of 1996.

The project includes construction and maintenance dredging with material placement in the ocean dredged material disposal site (ODMDS). Some of the construction material may be suitable for placement in dredged holes and for other beneficial purposes. Because of the nature of the project, it has the potential to affect the following ESA-listed species under the purview of the U.S. Fish and Wildlife Service (USFWS): Antillean manatee (*Trichechus manatus manatus*).

Currently there are navigational constraints within the existing channel and harbor, which cause loading inefficiencies, in-port delays and increased maneuvering times. For example, existing cargo shippers experience increased operation costs due to light loading, vessel size limitations, and congestion delays. The Puerto Rico Electric Power Authority (PREPA) experiences increased power generation costs in northern power plants due to inability to reliably bring Liquefied Natural Gas (LNG) by ship to its proposed San Juan Harbor terminal given the world fleet of available LNG tankers. Existing cruise vessel operators experience increased in-port maneuvering costs due to channel and turning basin width and depth constraints. Existing Liquefied Petroleum Gas (LPG) importers on the island of Puerto Rico experience increased operating costs due to transporting LPG to San Juan from the southern coast by truck rather than by ship direct to San Juan Harbor.

Therefore, petroleum tankers and LNG tankers transiting the Army Terminal Channel and cruise vessels utilizing the cruise docks north of the San Antonio Approach Channel are the main sources of project benefits (See Figure 1). Measures considered in the Draft Feasibility Study and Environmental Assessment allow larger tanker and LNG vessels to call San Juan Harbor, allow these larger vessels to use San Juan Harbor more efficiently through increased vessel loading, allow existing medium ranger (MR) tanker vessels to use San Juan Harbor more efficiently through increased vessel loading, reduce cruise vessel transit times within the port, and allow use of waterway transportation of LPG direct to San Juan rather than trucking of the product from the island's southern coast.

1.1 Project Authority

A list of authorizations and authorizing documents for San Juan Harbor is provided below.

ACTS	WORK AUTHORIZED	DOCUMENTS
8 Aug 1917	Anchorage (inner harbor) area of 206 acres and San Antonio Channel to 30-foot.	House Document 865/63/2
22 Sep 1922	Substitution of a 68-acre area 30 feet deep, along south-easterly side of anchorage area, for one 25 acres in extent and of same depth extending easterly from eastern end of the San Antonio project channel.	Specified in Act
3 Jul 1930	Modified conditions of local cooperation.	House Document 45/71/2
30 Aug 1935	Entrance channel across outer bar 38 feet deep and 800 feet wide, and thence across bay to Harbors anchorage area (Anegado Reach Channel) 30 feet deep and 700 feet wide and increasing anchorage area to 239 acres to a 30-foot depth.	Rivers & Harbors Comm. Doc. 38/74/1
26 Aug 1937	Widening Anegado Reach Channel and increasing anchorage area to 329 acres.	Rivers & Harbors Comm. Doc. 42/75/1
17 Oct 1940	Removal to 8-foot depth of Anegado, Largo, and Capitanejo Shoals, and dredging to a 30-foot depth the entrance channel and turning basin to the Graving Dock.	House Document 364/76/1
2 Mar 1945	Maintenance of the 30-foot depth entrance channel and turning basin to the Army Terminal.	Specified in Act
3 Jul 1958	Deepening portions of the entrance, the approach channels, and basins to Army Terminal and San Antonio Pier area to 35-45 feet; new 32-foot depth Puerto Nuevo Channel; and new 36-foot depth anchorage.	House Document 38/85/1
17 Nov 1986	Centerline shifted 350 feet west and Bar Channel deepened to 48 feet over maximum width of 800 feet; deepened Anegado Channel to 46, 43, and 40 feet from the Bar Channel over a bottom width of 800 feet; deepen Army Terminal and Puerto Nuevo Channels to 40 feet and widen to 450 feet; Deepen Graving Dock Channel to 36 feet and widen to 450 feet; extend San Antonio Channel 1500 feet and deepen to 36 feet over minimum width of 500 feet; deepen Cruise Ship Basin to 36 feet; provide Sabana Approach Channel with depth of 32 feet over width of 250 feet; deepen Anchorage Area E to 38 feet and	Public Law 99-662

ACTS	WORK AUTHORIZED	DOCUMENTS
	provide six mooring dolphins; provide 22 acres of shallow bay bottom for mitigation.	

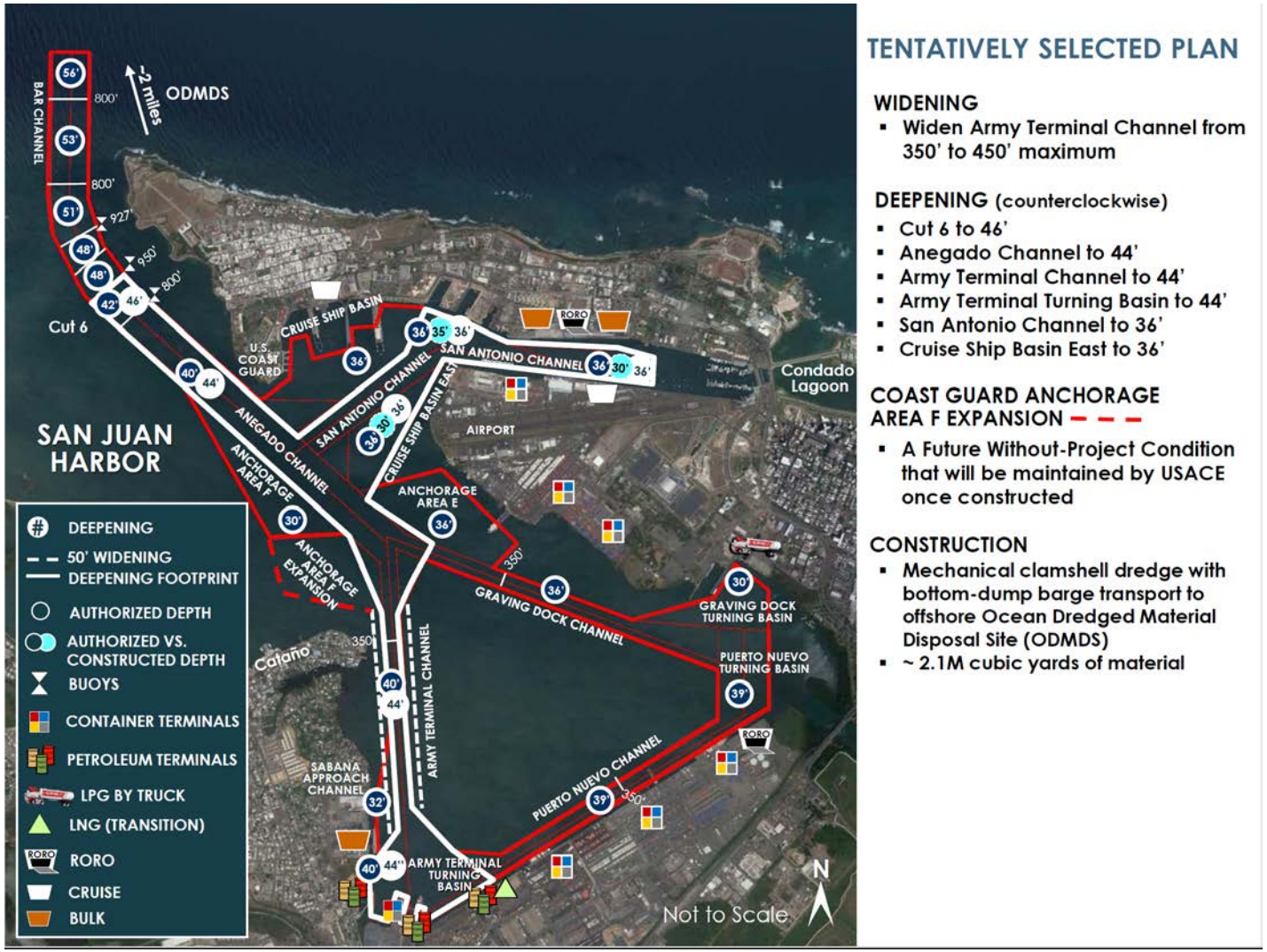
In addition, the Corps initiated the feasibility study at the request of the Puerto Rico Ports Authority (PRPA), the project's non-Federal Sponsor (NFS), under the authorization provided by House Report 109-738 - 109th Congress (2005-2006) December 29, 2006, As Reported by the Transportation and Infrastructure Committee documents the resolution approving the navigation study.

"WATER RESOURCES SURVEY RESOLUTIONS APPROVED BY THE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE Mr. Fortuno: San Juan Harbor, PR, Docket number: 2764, Date filed: February 23, 2006 (navigation project). September 20, 2006. Resolution adopted by the Committee on Transportation and Infrastructure."

2 DESCRIPTION OF PROPOSED ACTION & ACTION AREA

San Juan Harbor is located on the north coast of Puerto Rico and is the island's principal port (Figure 1). The majority of the commonwealth's waterborne cargo and cruise ships pass through the harbor, handling more than 60 percent of the Commonwealth's non-petroleum waterborne commerce. San Juan Harbor provides the only natural harbor offering all-weather protection to shipping along the entire north coast of Puerto Rico.

This BA addresses the potential environmental effects on Antillean manatee associated with expansion, maintenance dredging and placement of dredged material either within the ODMDS as well as beneficial placement of materials (Condado lagoon) from the widening and deepening of the San Juan Harbor Federal Navigation Channel. The proposed project consists of deepening Entrance Channel Cut-6 to 46 feet, widening the Army Terminal Channel by 100 feet and deepening Anegado and Army Terminal Channels and the Army Terminal Turning Basin to 44-feet. In addition, the San Antonio Channel would be deepened to 36-feet (Figure 1). The dredging will remove approximately 2.1 million cubic yards of material which is expected to be suitable for placement in the ODMDS. However, some material may be suitable for placement in dredged holes and for other beneficial purposes.



TENTATIVELY SELECTED PLAN

WIDENING

- Widen Army Terminal Channel from 350' to 450' maximum

DEEPENING (counterclockwise)

- Cut 6 to 46'
- Anegado Channel to 44'
- Army Terminal Channel to 44'
- Army Terminal Turning Basin to 44'
- San Antonio Channel to 36'
- Cruise Ship Basin East to 36'

COAST GUARD ANCHORAGE AREA F EXPANSION – – –

- A Future Without-Project Condition that will be maintained by USACE once constructed

CONSTRUCTION

- Mechanical clamshell dredge with bottom-dump barge transport to offshore Ocean Dredged Material Disposal Site (ODMDS)
- ~ 2.1M cubic yards of material

Figure 1: Map showing the proposed improvements to the San Juan Harbor Federal Project.

2.1 Dredging Techniques

The Corps does not normally specify the type of dredging equipment to be used due to restrictions associated with the Competition in Contracting Act (10 US Code 2304 and 41 US Code 253). The decision regarding equipment used during construction is generally left to the dredging industry contractors, allowing them to offer the most appropriate and competitive equipment available at the time. Nevertheless, certain types of dredging equipment are considered more appropriate depending on the type of material, the depth of the channel, the depth of access to the disposal or placement site, the amount of material, the distance to the disposal or placement site, the wave-energy environment, etc. A more detailed description of types of dredging equipment and their characteristics can be found in Engineer Manual, EM 1110-2-5025, "Engineering and Design – Dredging and Dredged Material Disposal."

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

Various project elements influence the selection of the dredge type and size. These factors include the type of material to be dredged (rock, clay, sand, silt, or combination); the water depth; the dredge cut thickness, length, and width; the sea or wave conditions; vessel traffic conditions; environmental restrictions; other operating restrictions; and the required completion time. In addition, all of these factors impact dredge production and, as a result, costs. Multiple dredges of the same or different types may be used to expedite work or to accommodate varying conditions within the dredging areas. Finally, regardless of the type of dredge, operations would continue 24 hours per day.

2.1.1 Hopper Dredge

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

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

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

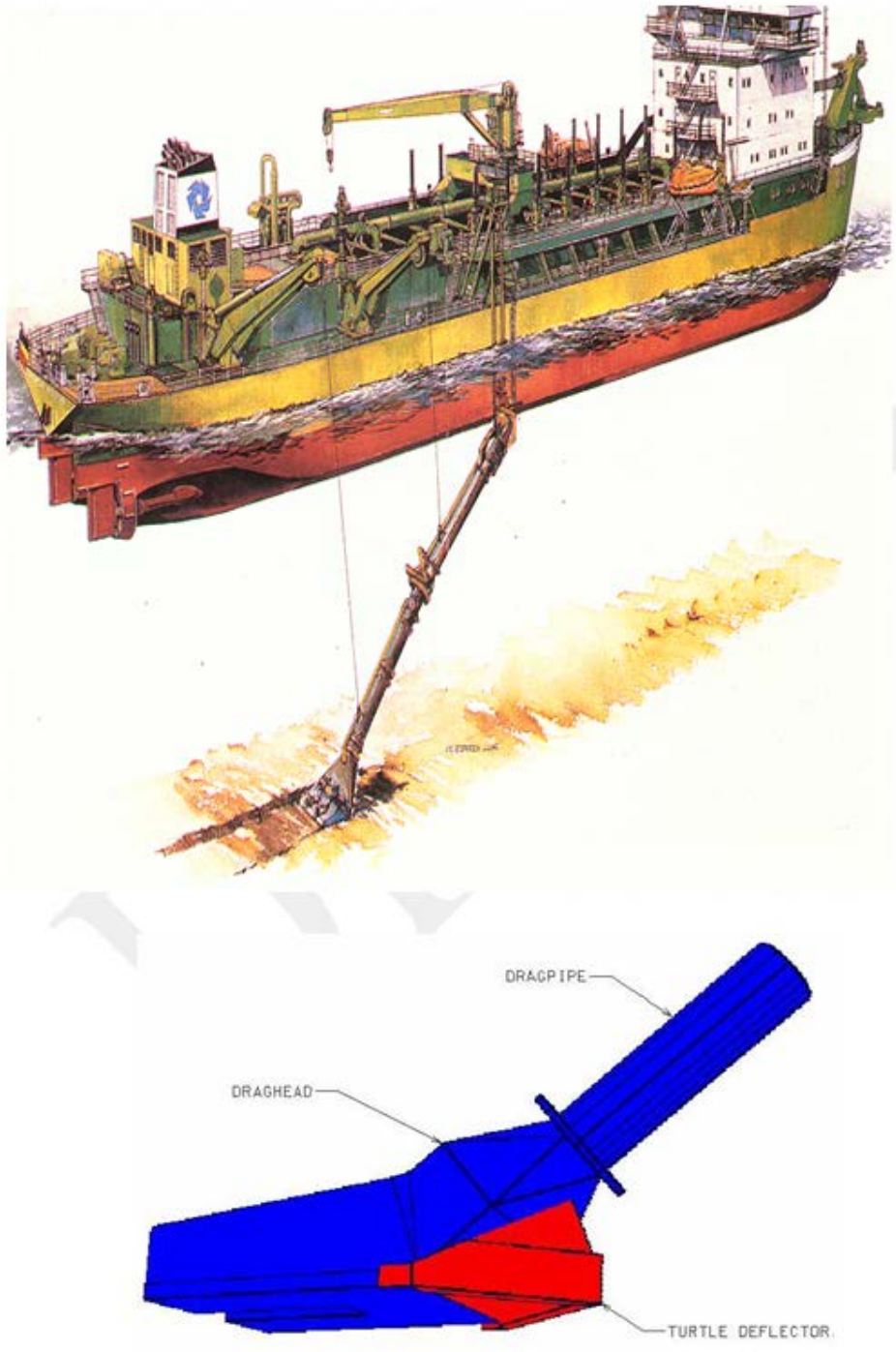


Figure 2: Hopper dredge and turtle deflecting draghead schematics

2.1.2 Pipeline and Cutter Suction Dredge

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

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

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

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

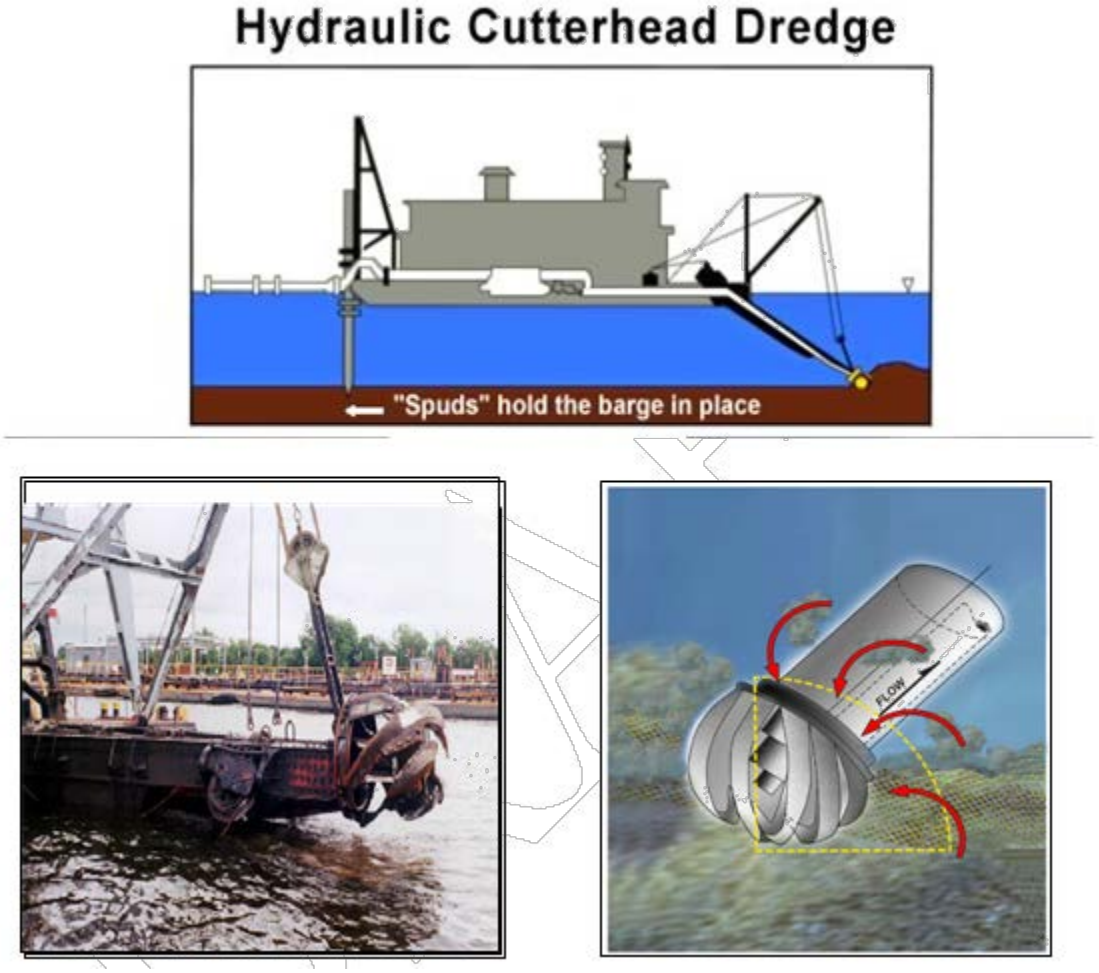


Figure 3: Cutterhead pipeline dredge schematic and representative close-up photographs

2.1.3 Clamshell Dredges

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

Clamshell dredges require a tug to move to and from the dredge and disposal locations. In unconsolidated sediments, the primary environmental impact of clamshell dredges is increased turbidity due to the re-suspension of sediments as the bucket moves through the water column. Operational controls such as a reduction in bucket speed may reduce impacts, as would the use of a closed bucket system. Silt curtains may be deployed around the dredge if water quality standards cannot be met using operational controls. The reduction in bucket speed would also reduce potential impacts to swimming animals (sea turtles, manatees, dolphins) which could be in the construction area and possibly be missed by the required observers. Mechanical dredges require dedicated and qualified marine animal observers during operations to prevent impacts to these species. In addition, for nighttime dredging lighting must illuminate the water's surface sufficiently for observation of the bucket's entry and exit from the water. In addition, the dredge lighting must be sufficient for the observers to monitor a 50-foot radius for manatees.

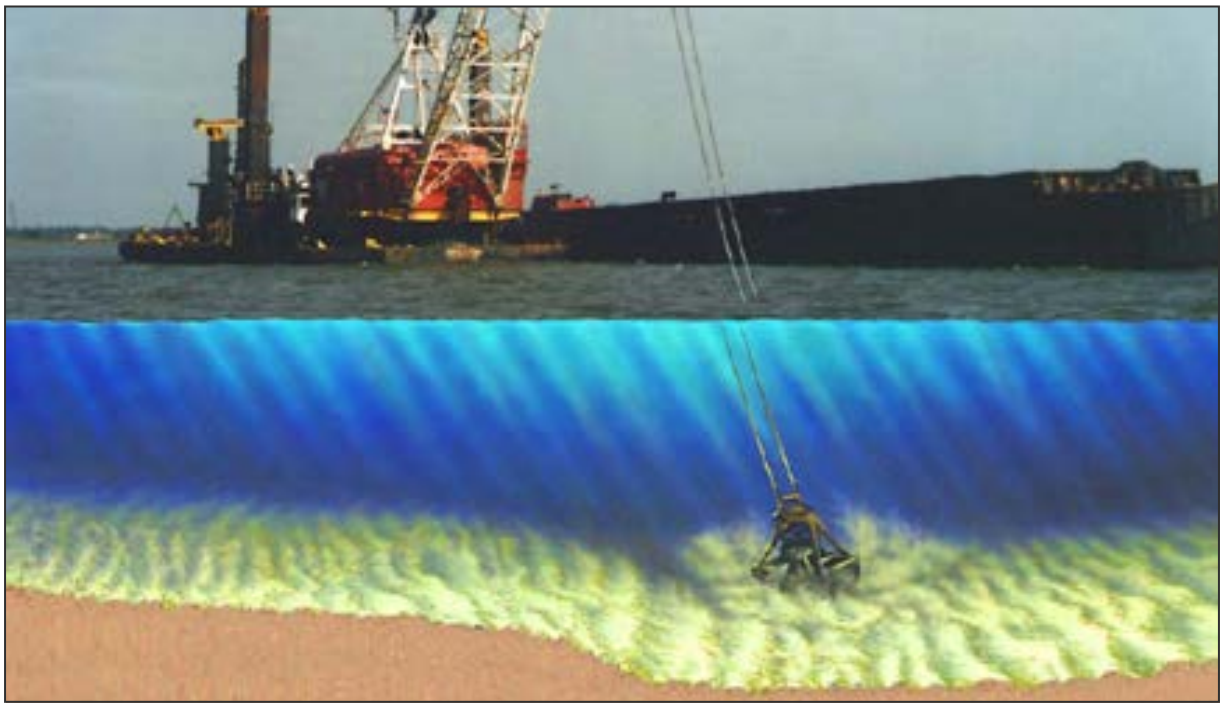


Figure 4: Mechanical Dredging with Clamshell.

2.1.4 Backhoe Marine Excavator

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

fractured rock, and possibly some unfractured rock. The dredge requires a tug to move the dredge to and from a location and to move the dredged material scow to and from the disposal location.

Environmental impacts from backhoe marine excavator dredging in unconsolidated sediment are similar to those of a clamshell dredge, as are the operational controls to reduce that impact. Slowing the movement of the bucket through the water is an example of an operational control. Environmental impacts are significantly less for a backhoe marine excavator dredge removing fractured (blasted) rock as the volume of fine-grained sediment is significantly less in fractured rock than unconsolidated sediment and as a result the potential for sediment re-suspension is reduced. The same operational controls can be applied to fractured rock as to unconsolidated sediment, such as slowing the bucket speed in the water. Finally, as for clamshell dredges, dedicated and qualified marine animal observers are required during operations to prevent impacts to swimming animals (sea turtles, manatees, dolphins) and the dredge lighting requirements are also the same as discussed above for clamshell dredges.

3 LISTED SPECIES & CRITICAL HABITAT IN THE ACTION AREA

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

4 ENVIRONMENTAL BASELINE CONDITIONS

4.1 Antillean Manatee

The Antillean manatee (*Trichechus manatus manatus*) is a subspecies of the West Indian manatee (*Trichechus manatus*) and can be found throughout the Caribbean, including in the project area. The Antillean manatee inhabits the coastal waters of Puerto Rico, and has been documented both feeding and traveling in the San Juan Bay and Harbor. Seagrass and other submerged aquatic vegetation (SAV) in the Bay provide suitable foraging habitat for the species. Furthermore, the location of the Condado lagoon provides suitable shelter for the species (SJBEP, 2011). The USFWS has jurisdiction for protection of the manatee under ESA, and has jurisdiction under the Marine Mammal Protection Act. This species is also protected by Law Number 241 (Wildlife Law of the Commonwealth of Puerto Rico) and Regulation Number 6766, which regulates the management of threatened and endangered species in Puerto Rico.

The existing literature suggests that manatees in Puerto Rico are more commonly observed in coastal areas from San Juan, eastward to the east coast, (and including Culebra and Vieques Islands) and then south and west, past Jobos Bay, to the west coast, and then about as far to the northwest as Rincon. Manatees are concentrated in several “hot spots” including Ceiba, Vieques Island, Jobos Bay and Boquerón Bay, and are less abundant along the north coast, between Rincón and Dorado (West of San Juan). Aerial surveys to estimate the population size have been completed and current preliminary results estimate a mean population size of 532 individuals with a 95% confidence interval of 342 to 802 (Pollock et al. 2013). The Antillean manatee population in Puerto Rico is considered stable (USFWS 2016).

Manatees have been reported within the SJB from Isla de Cabras (at the mouth of SJH) to the Rio Puerto Nuevo channel (upstream of the port) mostly from public reports, dredging and construction project monitoring reports, USCG anecdotal reports from their dock area, and mortality reports. From August 16 to August 18, 2006, four males and one female adult Antillean manatees were found dead in the SJB area. The cause of death for these animals was determined to be human related due to a large boat impact. Dead manatees showed signs of blunt trauma and large boat propeller scars. When a single female is associated to a group of males, they are forming a mating herd and the manatees are extremely active and thus making themselves more visible. This event, although unfortunate, serves as part of the evidence that manatees do use the San Juan Bay area. This accident may have been prevented by following idle speed zones within the San Juan Bay and/or by having an observer on board while transiting in that area (USFWS 2017).

5 EFFECTS OF THE ACTION

5.1 West Indian Manatee

5.1.1 Effects of Dredging and Disposal

The USACE has determined that dredging and disposal operations for the proposed project would not directly affect existing mangrove wetlands or SAV. In addition, temporary indirect effects from elevated turbidity levels during construction are also not anticipated since these resources are greater than 150m from the deepening and widening footprint. Therefore, the proposed San Juan Harbor expansion would have negligible effects on manatee foraging habitat.

In addition, the channel improvements would allow for the current shipping fleet to fully load their vessels and/or for fewer, larger ships to call on the port, both of which would reduce the number of port calls and reduce the potential for vessel strikes to manatees. During dredged material disposal operations in the ODMDS or Condado lagoon, observers would be required to monitor for the presence of Antillean manatees. Per section 6 below, operations would be shutdown should a manatee come within 50-feet or closer to in-water operations.

Therefore, expansion and maintenance dredging, including ODMDS dumps and Condado lagoon pipeline discharge, is not likely to adversely affect the manatee. This determination is consistent with prior consultation for the maintenance dredging of SJH with Condado lagoon placement (FWS/R4/CESFO/72127-002, May 5, 2014) and is contingent upon the implementation of appropriate conservation measures. Therefore, to insure manatees are not harmed by construction equipment during dredging and disposal operations, the USFWS Standard Manatee Protection Measures for In-Water Work will be incorporated into the plans and specifications for the project (see below).

6 ENVIRONMENTAL COMMITMENTS

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

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

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

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

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

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

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

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

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

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

In addition to these standard conditions, for mechanical dredging these additional measures would be implemented:

j. Two dedicated, qualified manatee observers will be present during mechanical dredging work.

k. To reduce the risk of a vessel crushing a manatee, the Permittee shall install and maintain the proposed wharf fenders to provide sufficient standoff space of at least four (4) feet under maximum designed compression. Fenders or buoys providing a minimum standoff space of at least four (4) feet under maximum designed compression shall also be utilized between two vessels that are moored together such as, but not limited to, the mooring of the scow and dredge barges.

l. During clamshell operations, the dredge operator shall gravity-release the clamshell bucket only at the water's surface, and only after confirmation that there are no manatees within the 50-foot safety distance during the day or the 75- foot distance during nighttime operations. The observers shall notify the dredge operator if manatees enter within the designated safety distances.

7 CONCLUSIONS

In conclusion, due to the inclusion of USFWS Standard Manatee Protection Measures the Corps has determined that the proposed action may affect, but is not likely to adversely affect, Antillean manatee. Based on this determination, the USACE requests that the USFWS concur with our determination for the Antillean manatee.

8 REFERENCES

Ackerman, B.B. 1995. Aerial surveys of manatees: a summary and progress report. Pages 13–33. In: O' Shea, T. J., B. B. Ackerman, and H. F. Percival, editors. Population biology of the Florida manatee. National Biological Service, Information and Technical Report 1. Washington, D.C., USA.

Pollock, K.H., J.A Collazo, and M.J. Krachey. 2013. Design and analysis of manatee aerial surveys in Puerto Rico. Report to the U.S. Fish and Wildlife Service, Caribbean Ecological Services Field Office, Boquerón, Puerto Rico. 18 pp.

Reynolds, J.E. 2003. Mysterious Manatees. University of Florida Press. ISBN 0-8130-2637-7.

U.S. Army Corps of Engineers. 1985. Beach Erosion control and Hurricane Protection, Dade County, Florida, North of Haulover Beach Park - Design Memorandum (CP&E).

U.S. Army Corps of Engineers. 1995. Draft Environmental Assessment for the second periodic nourishment of Sunny Isles and Miami Beach Segments, Beach Erosion Control and Hurricane Protection Project, Dade County, Florida. 34 pp.

U.S. Fish and Wildlife Service. 2001. Florida Manatee Recovery Plan, (*Trichechus manatus latirostris*), Third Revision. U.S. Fish and Wildlife Service. Atlanta, Georgia. 144 pp. + appendices.

U.S. Fish and Wildlife Service. 2007. West Indian Manatee (*Trichechus manatus*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Ecological Services Office, Jacksonville, Florida, Caribbean Field Office, Boquerón, Puerto Rico. 79 pp.

U.S. Fish and Wildlife Service. 2017. Draft Fish and Wildlife Coordination Act Report For San Juan Harbor Improvement Study, San Juan, Puerto Rico. U.S. Fish and Wildlife Service, Caribbean Ecological Services Field Office, Boquerón, Puerto Rico.