

# **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**

# Executive Summary

The U.S. Fish and Wildlife Service (Service) evaluated potential natural resource impacts resulting from a proposed deepening and widening of the Federal navigation channels within San Juan Harbor located in San Juan, Puerto Rico. The evaluation included habitats within the Federal navigation channel, potential dredged material placement sites, review of the affected areas and mitigation for expected impacts to jurisdictional wetlands and submerged aquatic vegetation, and additional natural resource recommendations.

The preliminary results of ecological modeling conducted by the U.S. Army Corps of Engineers (Corps) indicates that the project alternatives outlined in the Review Plan may result in additional impacts to submerged aquatic vegetation and marine habitats and only minor effects on mangrove wetlands, fish, and marine mammals.

Threatened and endangered species under the Service jurisdiction occurring in the area include Antillean manatee and possible nesting sea turtles. Endangered species avoidance and minimization measures are included in this Draft Coordination Act Report as indicated in the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

There are various alternatives for the proposed placement of dredged material. These include the creation of un-vegetated flats in Puerto Nuevo, additional restoration in Condado Lagoon, and engineered mangrove wetlands along the Cataño waterfront. The Service has reviewed information provided with the proposed project as well as other sources, and does not object to the beneficial use of dredged material placement and/or proposed dredged material placement sites.

The Service recommends that any future consideration given to hardened revetments in the project area be restricted to the refurbishment of existing revetments and that other methods, such as the creation or extension of a un-vegetated flats or mangrove fringe, be considered in other areas whenever practicable.

There are no designated units of the Coastal Barrier Resources System, as defined by the Coastal Barrier Resources Act of 1982, as amended (CBRA), with the project area.

At this stage of project planning the Service does not object to the project as proposed provided the following recommendations are addressed during the planning process and incorporated into the Corps Feasibility Study:

1. Engineering details regarding construction techniques, disposed material quality and quantities, and additional impacts from induced wake-erosion and potential slumping should be provided to the Service and other natural resource agencies in a timely manner to ensure conservation measures can be fully developed and incorporated into our final report and the Corps Feasibility Study. Concurrent with those planning investigations, the Corps needs to provide up to date survey information for all marine habitat to ensure equal consideration of fish

and wildlife resources during project planning, until such information is provided the Service may not be able to complete our impact reporting requirements.

2. The Service recommends that completion of the previously authorized mitigation associated with past dredging should be pursued immediately in conjunction with any future construction/maintenance activities.
3. The Service recommends that mitigation be implemented at the Condado Lagoon Depressions and the Puerto Nuevo Mudflats and that the mitigation be implemented concurrent with project construction. In addition, the Service recommends that replanting of *Halophila* as appropriate.
4. Based upon current project information the Service has, we do not recommend the use of the Nearshore/Beach Placement Area, the DMMA2 North of Cataño, or the Cataño Living Shoreline as mitigation for the proposed project.
5. The Corps should consult with the Service and other natural resource agencies to develop mitigation monitoring and success criteria, report requirements, and an adaptive management plan for such mitigation.
6. The Corps should include the Service's Manatee Conservation Measures (Standard Manatee Construction Conditions) and Blasting Specifications as part of the proposed plan.
7. The Corps should coordinate with the Service and other natural resource agencies during future planning and construction efforts.
8. The Corps should examine opportunities to implement an ESA Section 7(a)(1) project to determine manatee usage in the project area to ensure future and ongoing construction and maintenance do not unintentionally result in unforeseen impacts to manatees.

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## **1.0 Introduction**

The information contained in this document is based on the Corps April 2016 Review Plan for San Juan Harbor Improvement Study. The San Juan Harbor is located on the north coast of Puerto Rico and is the island's principal port. The majority of the Commonwealth's waterborne cargo and cruise ship traffic pass through the harbor, handling more than 75 percent of the Commonwealth's non-petroleum waterborne commerce. To meet increasing demands of the growing global economy, the shipping and cruise industry continues to progress to larger, more efficient vessels. The completion of the Panama Canal expansion in 2016 will allow mega cruise ships to transit the canal. The new Panama Canal will soon be able to handle vessels with a maximum length of 1,200 feet, width of 160 feet, and draft of 50 feet. The San Juan Harbor currently suffers from known shipping inefficiencies due to limited channel width and restrictions that don't allow two-way traffic. Certain sizes of container and cargo vessels cannot exit the port through the Graving Dock channel due to limited depth and width, and have to turn and transit near the Army Terminal channel, which creates delays with incoming ships using the same channels. Cruise ship docking has also reached its full capacity. This Draft Coordination Act Report (DCAR) was prepared following the guidance contained in "Policy and Guidance on Fulfillment of the Fish and Wildlife Coordination Act Responsibilities in the Corps of Engineers Water Resources Development Program," dated November 2004 and the information contained in the San Juan Harbor Navigation Study, prepared by the USACE, as required by of the Fish and Wildlife Coordination Act.

## **2.0 Authorization**

House Report 109-738, 109th Congress (2005-2006) December 29, 2006, as reported by the Transportation and Infrastructure Committee contains the authority for the San Juan Harbor Improvements Study. This DCAR presents updated evaluations of fish, wildlife, and habitat impacts from the proposed project, and discusses mitigation alternatives. The submission of this Draft CAR is in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). However, this draft report does not constitute the official report of the Secretary of Interior as required by Section 2(b) of the Act.

## **3.0 Project Description**

The San Juan Harbor study area encompasses the bar (entrance) channel, offshore and inland beneficial use dredged material disposal sites, inner harbor channels, and any extension of the water bodies and shorelines that could be impacted by proposed improvements (Figure 1). Navigation concerns include three main types of problems: difficult wind and wave conditions, limited channel and turning basin widths, and insufficient Federal channel depths. Alternative



Harbor deepening and widening impact areas will include the existing channels, designated anchorage areas, Puerto Nuevo turning basin, Army Terminal turning basin, the dredged material placement, and the dredged material placement sites. The work would be performed with various dredges, and the use of explosives may be required for some rock removal (Figure 2). If it is determined that the use of explosives is necessary for certain portions of the channel improvements, additional conservation and mitigation measures may be required to avoid impacts to listed species and sensitive habitats (e.g. manatee conservation measures).





Figure 2, Proposed San Juan Harbor improvements.

Estimates of the quantity and quality of the dredged material will depend on the final project design. For this project, several Dredge Material Management Areas (DMMA) within the San Juan Harbor are being proposed. Another alternative for the disposal of the dredged material is



the use of the San Juan Ocean Dredged Material Disposal Site (ODMDS) located a few miles north of the harbor. The U.S. Environmental Protection Agency (EPA) will have to be consulted for the use of this site. The use of the San Juan ODMDS is not discussed further in this DCAR since additional coordination with EPA is required. The following locations are being considered by the Corps for DMMA and are further evaluated in this DCAR:

- Condado Lagoon (fill holes)
- Use of Beach Quality Material
- DMMA 1 Marsh Restoration Central Triangle
- DMMA 2 Cataño Shoreline Protection
- Cataño Living Shoreline

The proposed use of the DMMA 1 the central triangle formed by the Graving Dock, Puerto Nuevo, and Army Terminal channel was previously reviewed in the 1994 San Juan Bay Navigation Project. At that time the Corps proposed to create 3.4 acres of shallows and mangrove islands. This proposal was eventually discarded due to possible conflicts with line of sight navigation. The current CAR report will not evaluate this site since it had been previously discarded.

## **4.0 Description and Discussion of the Effected Environment**

The proposed project is located in the San Juan Harbor, within the city limits of Municipalities of San Juan, Cataño, and Guaynabo. The various navigation channels will be widened an additional 50 feet and channels will also be deepened to a depth in excess of 40 feet. The remaining four possible dredged material placement sites proposed by the Corps are located within or immediately adjacent to the harbor.

### **4.1 Dredging Areas**

The proposed dredging of the Federal channel extends from the Anegado Channel into the Graving Dock, Puerto Nuevo and Army Terminal channels. It also includes Anchorage Areas F and E, and the turning basins for the Graving Dock, Puerto Nuevo and Army Terminal. Habitats associated with these segments include areas dominated by red algae, sea vine, mixed sand and shell shallows, the Puerto Nuevo River estuary and mud bottoms. Sand and silt comprise a substantial portion of the benthic sediments. Based on the Corps' surveys, the Service believes that the proposed widening of the channels will impact new areas in Anchorage F and along the various navigation channels. Any blasting may have immediate and long term impacts, such as stunning and killing fish, and converting the benthic community from one associated with consolidated rather than unconsolidated bottom substrate. Indirect effects may include the intensification of wake-induced erosion along the shores in the Municipalities of Guaynabo and Cataño as the vessels will transit closer to these because of the channel widening.

The only information regarding wildlife resources in the existing channels is from the February 2016 National Marine Fishery Service report (Rivera, 2016). In the vicinity of the Bar Channel section 51 limestone crevices and ledges were reported along the channel sides. This provided habitat for marine invertebrates in addition, at depths of 53 to 54 feet algae over limestone was reported. The transect in the Puerto Nuevo turning basin channel segment 36 & 39. Results in this area report some *Halophila* at a depth of 5 feet. Regarding Federally protected species, the endangered Antillean manatee (*Trichechus manatus manatus*) occurs within the San Juan Bay. There is also the potential for the threatened green (*Chelonia mydas*), and hawksbill (*Eretmochelys imbricata*) sea turtles to use portions of the bay and estuary. There are no known sea turtle nesting beach areas within the San Juan Bay, however the sand beach of the Esperanza peninsula could provide suitable nesting habitat for sea turtles.

#### **4.1.1 Anegado Channel**

There is no widening being proposed for this segment. However, deepening is being proposed from the current 40 foot depth to 41-45 feet. There is no information regarding the marine habitat currently found at these depths, but the constant ship traffic and sediment resuspension caused by vessels would rule out substantial habitat or habitat value.

This channel is a transit area for the Antillean manatee. Any proposed blasting in this channel should follow the cautionary measures developed in Florida and outlined in Appendix A “Blasting Specifications.” In addition, work to be done in this area should follow the cautionary measures outlined in Appendix B “Standard Manatee Construction Conditions.

#### **4.1.2 Anchorage Areas E and F**

These anchorage areas are located on either side of the Anegado Channel. Anchorage E is proposed to be deepened from 36 feet to 37-45 feet. This is an existing deep draft anchorage which has been previously impacted by harbor development. Anchorage F is currently approximately 58 acres in size; however, anchored vessels can intrude into Anegado Channel. An expansion and deepening is being proposed for Anchorage F. An estimated additional 36 acres will be dredged to allow better anchorage. This additional dredging will impact areas not previously dredged. The results of the towed sonar and video surveys indicate it has the most habitat diversity of the surveyed areas. It is estimated that of the 36 acres of new dredging about 18 acres have some form of submerged aquatic vegetation (SAV) consisting of the sea vine *Halophila dicipiens*, and various algae species. *Strombus pugilis* the fighting conch was also identified in this area indicating the relatively undisturbed nature of the site. Although not as commercially important as the Queen Conch *Strombus gigas*, the fighting conch is consumed locally by subsistence fishers.

In addition, the San Juan pilots are recommending a new anchorage be established south of the existing Anchorage F. This would impact an additional 50 acres of bay bottom not previously

impacted by navigation projects. Total impacts for the expansion of the Anchorage F are approximately 86 acres of bay bottom.

The proposed expansion areas are also identified on the NOAA charts as a “cable area”. Therefore, additional research by the Corps needs to be carried out to determine if the proposed Anchorage F expansion would impact existing marine cables or pipelines.

This area is within the habitat for the Antillean manatee. Any proposed blasting should follow the cautionary measures outlined in Appendix A “Blasting Specifications.” Work to be done in this area should follow the cautionary measures outlined in Appendix B “Standard Manatee Construction Conditions”.

### **4.1.3 Graving Dock Channel and Turning Basin**

The work proposed for the Graving Dock Channel consists of an additional 50 foot widening along the northern side of the channel and deepening from 36 feet to 39-45 feet. The Graving Dock Turning Basin is also being proposed for deepening from 30 feet to 39-45 feet. The Puerto Nuevo River discharges into these areas and the sediments are fine unconsolidated silts. The flood control work on the Puerto Nuevo may increase discharge volumes and sediment load, the Corps should take this into consideration.

These areas are habitat for the Manatee. Manatees have been observed entering the Puerto Nuevo River. Work to be done in this area should follow the cautionary measures outlined in Appendix B “Standard Manatee Construction Conditions.”

### **4.1.4 Puerto Nuevo Channel and Turning Basin**

The Puerto Nuevo Turning Basin which is adjacent to the Graving Dock Basin, it is being proposed for deepening from 39 feet to 40-45 feet and widening an additional 50 feet. This basin is immediately adjacent to the Puerto Nuevo River mouth. As stated above, there may be issues with sedimentation due to the flood control work. The Puerto Nuevo Channel runs along the existing cargo docks and is being proposed for deepening 40-45 feet and widening by 50 feet. Also the Corps proposed to increase the turn of the channel as it enters the Army Terminal Turning Basin. The Puerto Nuevo Channel has a natural shoal area along its north side. The shoal area is shown on the nautical charts as Escollo Mojiganga. This shoal was previously identified by the Service as having SAV. The recent COE surveys indicate that SAV areas are outside of the proposed expansion areas; however, these can be indirectly impacted by the dredging operations through sedimentation, shading, and turbidity.

This area is habitat for the Manatee. Work to be done in this area should follow the cautionary measures outlined in Appendix B “Standard Manatee Construction Conditions.”

#### 4.1.5 Army Terminal Channel and Turning Basin

The Army Terminal Turning Basin is being proposed for expansion and deepening to 40-45 feet. This is to accommodate larger ships and a proposed LNG vessel for the Puerto Nuevo power plant. Final design of the LNG berth is pending. The Sabana Approach will also be deepened from 34 to 45 feet. The Sabana Approach may be expanded by a private developer proposing to bring in compressed gas liquid (Guaynabo Gas Port). This project was presented in a San Juan COE October 2016 Interagency Meeting. While this is not part of the San Juan Harbor Project, the Corps should remain aware of this since it represents additional dredging and may conflict with the project dredging schedules. The Army Terminal Channel is being proposed to be expanded 50 feet on both sides of the channel for a total of 100 feet. The eastern side of the channel faces Punta Cataño, a shoal area known as Escollo Grande which is only 1-2 feet deep and was reported to have SAV in the Service's 1993 CAR for the previous San Juan Harbor project. According to the nautical chart this bottom is marked as "foul" with submerged obstacles. The proposed 50 foot expansion in this area may indirectly impact the Escollo Grande shoal due to dredging activities, slumping and increased erosion from ship wakes.

### 4.2 Proposed Dredged Material Placement Sites

Four proposed dredged material placement sites are being considered by the Corps for this project and an additional site is being proposed by the Service. Each site has unique characteristics that must be presented individually. The following is a brief description of each existing/proposed dredged material placement site and a discussion of the effected environment (Figure 3).



Figure 3, Proposed locations of beneficial dredge spoil use areas.



#### **4.2.1 Condado Lagoon Depressions**

While the restoration of dredged pits or holes in Condado Lagoon is tied to the 1993 San Juan Harbor dredging project, it is still pending and will be included in the upcoming San Juan Harbor maintenance dredging. The Condado Lagoon has about 32 acres below the depth of 15feet, some areas reaching 35feet in depth, the result of past dredging activities for the development of the Condado area. The currently pending mitigation will not be able to restore the entire impacted area. However, if additional material is used from the proposed San Juan Harbor dredging and expansion, there may be additional mitigation benefits to Condado Lagoon from an increase in shallow water habitat. The new dredging being proposed in Anchorage F and the proposed expansion of Anchorage F to the south, may provide sufficient suitable material for this restoration depending on the material analysis. Provided dredged material placement is appropriately monitored for migration and resuspension, impacts to marine organisms like crustaceans, mollusks, and other invertebrates that use these depressional areas are expected to be temporary. The Service continues to prefer the beneficial use of dredge spoil in this area over ocean disposal since it will result in a net environmental gain in habitat.

#### **4.2.2 Nearshore/Beach Placement Area**

The Nearshore/Beach Placement Area consists of using dredged beach quality sand as a source material for restoring currently eroding beaches in the San Juan area. The alternative mentions the use of the Esperanza (Palo Seco) Peninsula area as a source. We do not recommend the use of the Esperanza Peninsula as a sand source for this type of beach restoration. Beach quality sand from the shoals associated with the peninsula and from additional dredging may not be of sufficient quality or quantity to make it economically viable to transport for beach nourishment. There is no data as to the amount of beach quality sand that these areas can produce. We recommend that this alternative be dropped.

**La Esperanza Peninsula:** In 1963 the La Esperanza (Palo Seco) Peninsula was created using dredge spoil from a Corps navigation project in the bay. Over the past 54 years, this 30 acre sand spit has changed its shape and position, migrating and changing due to the prevailing winds, tides, wave action, and annual swells produced by northern cold fronts. Over the years it formed a semi open lagoon behind the peninsula. A small park was built on this unstable land by the Municipality of Cataño which has armored the shore in an effort to avoid further movement. During its 54 year existence, this area has been colonized and overgrown with red, black and white mangroves, Australian pine, maho, and a variety of other plants. Although intended to protect the Bay View residential area from coastal erosion, this peninsula rapidly became a primary wildlife area. Numerous gulls, terns, pelicans, and frigate birds use the peninsula and sheltered waters behind it for roosting and feeding. Once considered a Primary Wildlife Area (DNER 1979, 1988) it was not included in the 2005 DNER revision because of perceived habitat degradation due to development, human access and the constant migration of sand towards the south. However, it remains an important green area in the heavily developed San Juan Bay and continues to be an important area for both resident and migratory birds. In 2005, the La

Esperanza Peninsula was dredged by the Corps under the authority of Section 1135 of WRDA of 1986 as amended, to restore water quality of the Esperanza Cove and wildlife habitat on the Esperanza Peninsula. However, due to the littoral drift and wave action, the La Esperanza Peninsula is now in need of a maintenance dredging, the tip of the Peninsula is currently nearing the existing western shoreline and could meld into the shore, closing circulation in that area. The Corps is proposing additional dredging of the Peninsula to correct this drift along with the beneficial use and placement of suitable dredged material from La Esperanza Peninsula Section 1135 project footprint (Corps 2015) into an artificial depression of approximately 4 acres within the Condado Lagoon (See Section 4.2.1). Provided that removal of excess sandy material is kept to the minimum required to stabilize the Peninsula, we believe that this proposal is a good start at restoring the bathymetric profile of Condado Lagoon.

### **4.2.3 DMMA 2 North of Cataño**

This proposal consists of building up about 100 acres of bay bottom to serve as a containment area and breakwater to protect the Cataño shoreline. It is proposed that this area can be built up further in future dredging projects. There are no additional details of this plan, however, the nautical chart shows this area to be fairly shallow at 10-12 feet, and it may have extensive SAV cover. While this proposal may solve the need to transport dredge material great distances for disposal, it may interfere with local small boat traffic, the Cataño ferry navigation, impact a large area of relatively unimpeded bay bottom, change the circulation patterns in the bay and supplant marine habitat for shallow or vegetated estuarine habitat. We recommend that this option be dropped from further consideration.

### **4.2.4 Cataño Living Shoreline**

This proposal consists of several near shore breakwaters, parallel to the Cataño shoreline (Figure 4), designed to have a central area planted with appropriate vegetation. Although the Corps proposal includes seagrass or mangroves we believe that using red mangroves will be more beneficial in attenuating waves and creating wildlife habitat. The Corps concept is based on the 2015 NOAA Guidance for Living Shorelines (NOAA 2015). These type of structures to a certain extent help replace the coastal mangroves of San Juan Bay that were lost to development. Geotubes could be used in conjunction with the rock breakwaters to help contain sediment and serve as planting substrate. We do not recommend that the living shorelines be connected to the existing shoreline, or made part of the current shoreline. Past efforts by NGO groups to re-establish the mangrove fringe along the shore in Cataño failed in the past due to vandalism.



Figure 4, Cataño shoreline. This area is subject to coastal erosion and wave action. Off shore living breakwaters are being proposed as a mitigation option to help protect the existing shoreline and recreate the former mangrove fringe.

#### **4.2.5 Puerto Nuevo Mudflats**

The Puerto Nuevo mudflats are being proposed by the Service as an additional location within SJB to create emergent wetland habitat. These mudflats were a series of shoals created at the mouth of the Rio Puerto Nuevo as it discharged into San Juan Bay. This area was once considered a Critical Wildlife Area by DNER. However, navigation projects, flood control projects and port development have all but eliminated this tidal flat area. Prior efforts to partially restore the area resulted in the deposition of excess material, mangroves colonized the site and it is not available to wading birds. With the proposed deepening and expansion of the Puerto Nuevo Turning Basin and Graving Dock area, there exists the possibility of using the dredge spoil to create shallow flat areas in front of the existing mangrove fringe. This could be an efficient way of disposing the soft sediments found in the dredging area while at the same time help to re-establish an important habitat for the bay's sea bird and wading bird population, provided that proper intertidal depths can be achieved. About 3-6 acres of tidal flats can be created in the area between the mouth of the Puerto Nuevo and the San Juan Maritime Center (Figure 5).



Figure 5, Proposed mudflat creation area. Looking south from the Puerto Nuevo Turning Basin is the entrance of the Rio Puerto Nuevo is to the right. This quiet cove can be used to deposit dredge material from the nearby Graving dock and Puerto Nuevo Turning basin to create a tidal flat.

## 5.0 Natural Resource Impacts

The San Juan Bay has approximately 6.5 miles (10.5 km) of coastline and is highly developed. San Juan Bay was described by early settlers as one of the most magnificent harbors of the New World. Today, the area surrounding the harbor is highly urbanized, with office buildings, residential areas, parks and recreation areas, cargo and cruise line terminals, and an extensive and sophisticated transportation network. San Juan Bay is connected to the Atlantic Ocean by the Boca del Morro and to the Condado Lagoon by the San Antonio Channel. The San Antonio Channel is 1.2 miles (2 km) long and has a number of port-related facilities as well as two marinas on the eastern end. Centuries of development has severely altered the natural ecosystems of the bay. Most of the shoreline is now hardened and developed, but coastal mangrove wetland habitats are still found along the Esperanza peninsula, and mouth of the Puerto Nuevo River.

According to the Puerto Rico Breeding Bird Atlas

(<http://www.aosbirds.org/prbba/Puerto%20Rico%20Status.html>), about 58 species of birds are



found within the San Juan Bay area, 44 of which are sea birds, waterfowl or wading birds that still utilize the shallows, wetlands and open water of San Juan Bay. The brown pelican (*Pelecanus occidentalis*) is a permanent resident in the bay. Pelicans feed throughout the bay but prefer the calm waters behind the Esperanza Peninsula and mangrove lined shores. Antillean manatees and sea turtles also use the bay habitats. Manatees can be found as far into the bay as the Puerto Nuevo River.

In addition to direct impacts to the bay that will be caused by the widening of the navigation channels, there will be indirect impacts since the buoys and channel markers will also have to be moved to the new channel dimensions and alignments. These will have to be relocated and occupy new bay bottom in a permanent fashion. Excess turbidity due not only to the dredging but from some of the proposed mitigation actions also needs to be considered. While these impacts are temporary in nature, they should be taken into account when discussing water quality impacts in the project's NEPA Compliance.

### **Benthic Habitats**

A preliminary survey of submerged aquatic resources was conducted by NMFS (Rivera, 2016). No stony corals were identified in this preliminary survey, but soft corals were found in the outer channel segments (51), which according to the Corps will not be dredged. Limestone hardgrounds was also found in the entrance channel area. Limestone hardgrounds have an association of sponges, soft corals, two species of seagrass were identified; *Halophila decipiens* and *Thalassia testudinum*. In addition to seagrass beds, several algae beds were also identified associated with the limestone hardgrounds. The areas where seagrasses were found coincide with Anchorage Area F expansion and the Puerto Nuevo Turning Basin.

The Corps conducted side scan sonar and underwater video surveys between May 2016 to May 2017 of the proposed expansion and dredge areas (Figure 6). The survey report (USACE 2017) corroborates the previous NMFS survey for Anchorage Area F and Puerto Nuevo. An estimated 18 acres of SAV (*H. decipiens* and macro-algae) would be eliminated by the proposed expansion of the Anchorage Area F. In addition, hardbottom habitat (rocks with SAV, sponges, colonial tunicates) was found along the proposed Catano living shoreline site, which would occupy bay bottom. Additional benthic surveys along the Catano living shoreline site are needed before direct impacts to hardbottom and SAV can be quantified. Finally, impacts to SAV from channel expansion in the other areas are not well quantified but the possibility exists for indirect impacts to some areas. Based on these two surveys, the only areas with direct SAV impacts are the Anchorage F expansion and the Catano living shoreline site.

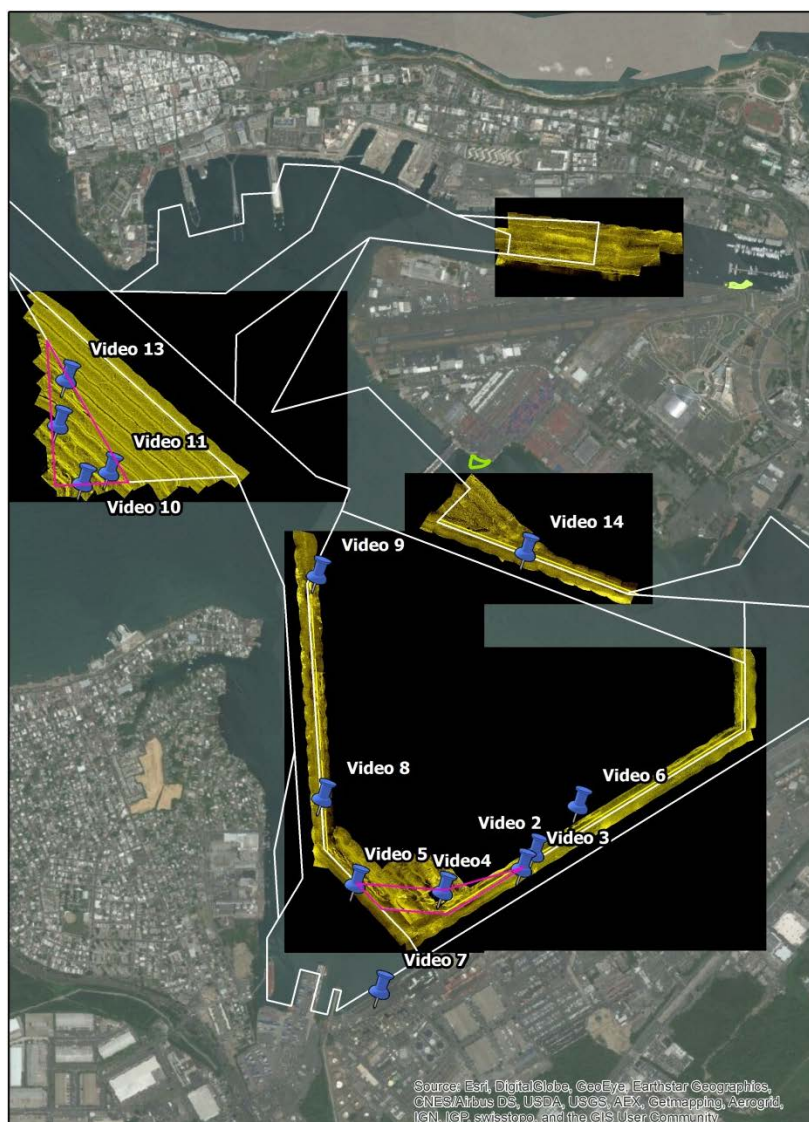


Figure 6, COE side scan sonar and underwater video tracks.

## Water Quality

Potential environmental changes due to channel deepening may include alteration of salinity and water circulation in San Juan Bay, including potential effects of the proposed action on four ecological communities; fishes, benthic macroinvertebrates, submerged aquatic vegetation (SAV), and wetlands.

The San Juan Bay Estuary Program (SJBEP) has several water quality monitoring stations within San Juan Bay. They have water quality data for the area starting in 2008. Over the years water quality in the bay has actually increased. The elimination of sewage discharges, stricter regulations regarding disposal of waste by ships, and increased regulations have resulted in that the overall water quality for the bay has been classified as good, with oil and grease being the one parameter that falls below the set standards (Bauzá-Ortega, J (Ed). 2013). The data from these water quality monitoring stations could serve as the background data for Corps' water

quality monitoring program during and after the proposed San Juan Harbor Improvements. The existence of these water quality monitoring stations presents an opportunity for the Corps to partner with the SJBEP to assure that water quality standards are not being violated during the dredging operations. (Figure 7).

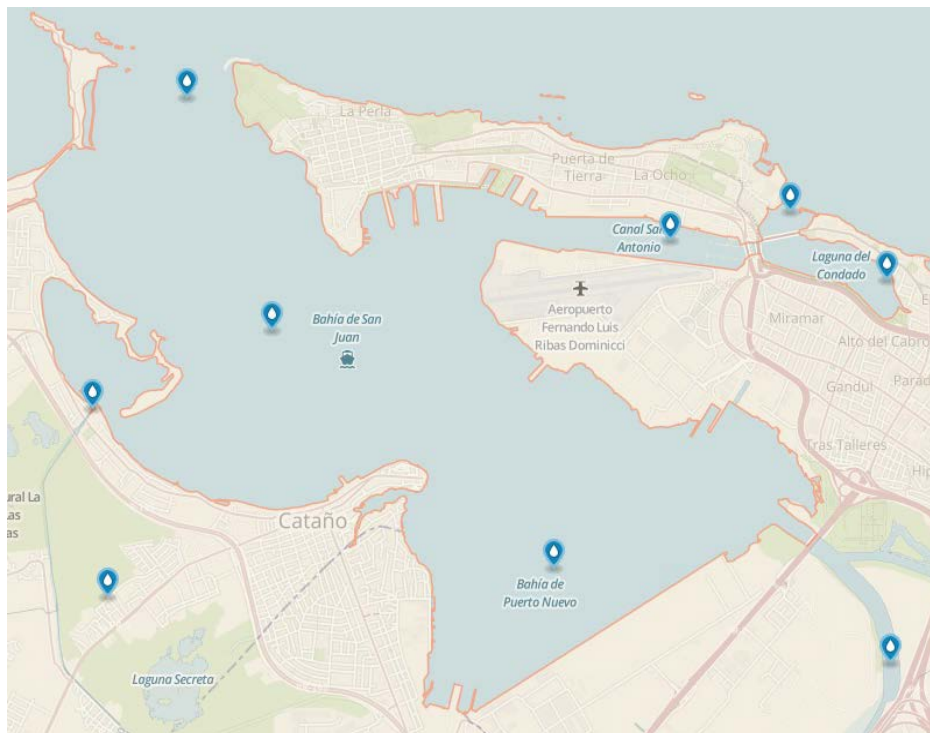


Figure 7: Location of water quality monitoring stations maintained by the SJBEP.

SJBEP has also conducted sea level rise modeling of San Juan Bay which may be of help to the Corps in their modeling efforts.

### Fishery Resources

Although highly developed and having lost much of its shoreline nursery habitat, fishery resources in the bay continue to be present. The bay, for purposes of local regulations, is considered to be “oceanic” and thus not restricted to recreational fishing. Recreational and subsistence fishing occurs in numerous areas around the bay. Licensed commercial fishing with nets and traps as well as spearfishing is also allowed. The following commercially important fish species were reported for San Juan Bay (Ojeda et al, 2007, Reef fish Spawning Aggregations of the Puerto Rican Shelf).

Species Name	Common Name
<i>Scomberomorus regalis</i>	Cero mackerel
<i>Epinephelus guttatus</i>	Red hind
<i>Lutjanus griseus</i>	Mangrove snapper

<i>Lutjanus synagris</i>	Lane snapper
<i>Caranx bartholomaei</i>	Yellow jack
<i>Caranx crysos</i>	Blue runner
<i>Centropomus undecimalis</i>	Common snook
<i>Cephalopholis fulva</i>	Coney
<i>Ocyurus chrysurus</i>	Yellowtail snapper
<i>Epinephelus itajara</i>	Goliath grouper

In addition, several fish spawning aggregation were reported by Ojeda et al 2007 at the Bar Channel entrance to San Juan Bay and in the vicinity of the Puerto Nuevo area. Fishermen catch bait fish in the Puerto Nuevo area and Esperanza Peninsula lagoon. (See Figure 8)

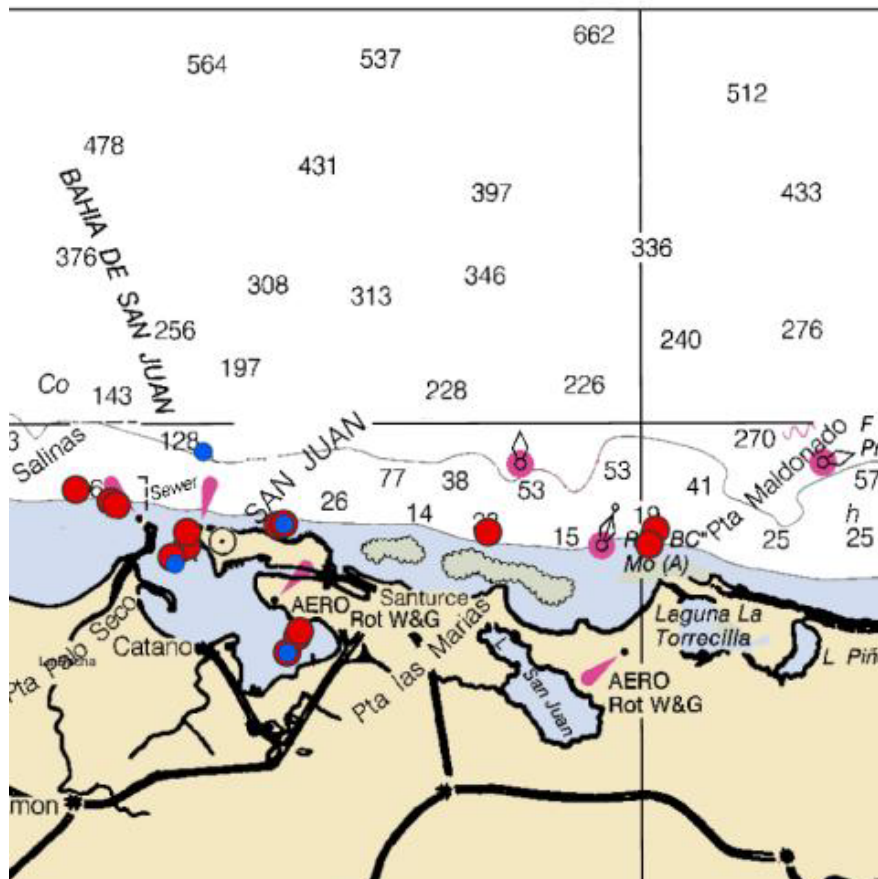


Figure 8: Ojeda et al 2007, the red dots identify reported spawning aggregations, and the blue dots represent past or historical areas.

## Threatened and Endangered Species

Federally listed species that can be found within the San Juan Bay project area are:



Green sea turtle ( <i>Chelonia mydas</i> ) in the water	NOAA	Threatened
Hawksbill sea turtle ( <i>Eretmochelys imbricata</i> ) in the water	NOAA	Endangered
Antillean manatee ( <i>Trichechus manatus manatus</i> )	USFWS	Endangered

## Corals

There are 7 listed coral species for the Caribbean although Critical Habitat has been designated for only the two *Acropora* species. Some listed corals are found outside the project area, these areas will not be impacted by the proposed project. Dredging and widening will start beyond the Bar Channel where listed corals may be found. Critical habitat for *Acropora* corals is seaward of the project. Once inside the Anegado Channel, suitable substrate for corals is not found.

Although NOAA has designated Critical Habitat for *Acropora* coral species, pursuant to ESA section 3(5)(A)(i), all areas containing existing (already constructed) federally authorized or permitted man-made structures such as aids-to-navigation (ATONs), artificial reefs, boat ramps, docks, pilings, maintained channels, marinas and federally authorized channels and harbors, are not included in the Critical habitat designation. Any final determination regarding possible effects to listed species and designated critical habitat is under NOAA's jurisdiction needs to be coordinated by the Corps with NOAA-NMFS.

## Listed Sea Turtles

Sea turtles enter into San Juan Bay and although there are not documented records of sea turtle nesting, hatchlings have been found in the bay, and there are several sand beach areas in Esperanza, Isla Cabra and other small pocket beaches that are suitable habitat for nesting. The sea turtle species most likely to be found in San Juan Bay are the hawksbill sea turtle (*Eretmochelys imbricata*) and the green sea turtle (*Chelonia mydas*).

### Green Sea Turtle

The green sea turtle was federally listed on July 28, 1978 (43 FR 32800). Breeding populations of the green sea turtle in the Caribbean are listed as threatened. The green sea turtle has a worldwide distribution in tropical and subtropical waters.

The green sea turtle grows to a maximum size of about 4 feet and a weight of 440 pounds. It has a heart-shaped shell, small head, and single-clawed flippers. The carapace is smooth and colored gray, green, brown, and black. Hatchlings are black on top and white on the bottom (NMFS 2009b). Hatchling green sea turtles eat a variety of plants and animals, but adults feed almost exclusively on seagrasses and marine algae.

Within the U.S., green sea turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico. Green sea turtles are generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. The green sea turtle is attracted to lagoons and shoals with an abundance of marine grass and algae. Open beaches with a sloping platform and minimal disturbance are required for nesting.

## **Hawksbill Sea Turtle**

The hawksbill sea turtle was federally listed as an endangered species on June 2, 1970 (35 FR 8491). The hawksbill is found in tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean. In the Wider Caribbean, adult hawksbills have been reported as typically weighing around 176 pounds or less; hatchlings average about 1.6 inches straight length and range in weight from 0.5 to 0.7 ounces. The carapace is heart shaped in young turtles, and becomes more elongated or egg-shaped with maturity. The top scutes are often richly patterned with irregularly radiating streaks of brown or black on an amber background. The head is elongated and tapers sharply to a point.

In the U.S. Caribbean, hawksbill nesting occurs on beaches throughout Puerto Rico and the U.S. Virgin Islands.

## **Antillean manatee**

The Antillean manatee is currently considered as a threatened species (82 FR 16668). The Antillean manatee is also protected under the U.S. Marine Mammal Protection Act (16 USC § 1361 et seq. 1976 & supp. V 1981) and listed as endangered by the International Union for Conservation of Natural Resources (Self-Sullivan and Mignucci 2008). The species is also listed as endangered by the PRDNER (2004).

While the Antillean manatee has been reported to occur in Puerto Rico since Spanish exploration (Powel et al. 1981), except for anecdotal descriptions, the historical population size is unknown. 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 are obligate herbivores (Bonde et al. 2004) and are efficient in the gathering and consumption of submerged aquatic vegetation (Marshall et al. 2000). Antillean manatees in Puerto Rico primarily feed on seagrass and require freshwater sources, neither of which is considered a limited resource in Puerto Rico (Drew et al. 2012). The Antillean manatee performs most activities (i.e., feeding, drinking, resting, calving) within shallow coves and bays characterized by low-energy waves (Lefebvre et al. 2000), but also travel through open, deep marine waters. Local movement patterns show alternating use between seagrass beds for feeding and freshwater sources for drinking (Slone et al. 2006). During a manatee expert elicitation process (Drew *et al.* 2012), manatees were described to regularly traverse deep water when moving between local sites or resources, do not feed or rest in waters deeper than 13 m (42.7 ft), and spend the majority of their time in waters less than 5 m (16.4 ft) deep (Drew et al. 2012).

The SJB is located within the range of the Antillean manatee in Puerto Rico. Drew et al. (2012) identified areas in Puerto Rico which include the three key ecological attributes (i.e. seagrass, freshwater, shelter) necessary to support manatee populations and identified areas where take can be reduced from watercraft related threats. Waters within San Juan were described to provide a high shelter value for manatees and a high motorized watercraft threat. Waters within San Juan were not associated with having a significant source of seagrass, but have at least one or more freshwater sources for manatees to drink from. The SJB may also have other potential feeding sources besides seagrass, for example, certain algae or freshwater plants.

The number of manatees that transit or reside within the SJB is unknown. Due to the high turbidity waters of the SJB, manatee counts during aerial surveys are low. However, we know that manatees are found within the SJB from Isla de Cabras to the Rio Puerto Nuevo channel mostly from public reports, dredging and construction project monitoring reports, USCG anecdotal reports from their dock area, and mortality reports.

For example, 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.

The specific use of the SJB by manatees has not been studied with the detail that other areas like Ceiba and Guayanilla have done so, where manatees have been captured and released with radio tracking devices (Slone et al. 2006). Together with the PR-DNER and the PR Manatee Conservation Center, the Service has proposed to capture manatees in the SJB area, conduct health assessments tests, and release and follow them with the use of satellite tracking devices. There is currently one rehabilitated and released sub-adult male manatee (Aramaná) that is using the SJB and is being tracked with satellite technology, which will further contribute to our understanding of manatee use within the SJB area.



Figure 9: Satellite and visual tracking of the manatee Aramaná, Data provided by the Puerto Rico Manatee Conservation Center.



## **Manatee Conservation Measures**

Both the Service and the Corps have developed manatee conservation measures to avoid and minimize potential in-water project effects on the manatee. In-water project effects may include, but not limited to: vessel and construction equipment strikes with manatees; manatee harassment by construction activities; seagrass habitat impacts; possibility of a spill; post-construction increase in commercial boat traffic; blasting impacts and noise. These technical assistance measures can be used for the proposed project as appropriate. Some example measures include: minimize vessel speeds, minimize work in shallow areas close to the shore, manatee observers before and during construction, manatee awareness, appropriate signage, blasting exclusion zones, bubble curtains, among others. However, in the specific case of the SJB, water turbidity minimizes an observer's detection of a manatee. It is critical that the conservation measures account for this limitation. For example, conservation measures can be adjusted to increase the amount of observers, provide high observation points, and potentially use innovative measures such as drones. Please see Appendix A and Appendix B for manatee standard conditions.

In addition there exist opportunities under Section 7(a)(1) of the Endangered Species Act for the Corps to help further the conservation of the manatee. These measures can be offsite or even out of the project area as long as these measures increase or protect the population or threatened habitat.

- Develop and implement navigational aids (manatee speed buoys) for SJB focused on avoiding and minimizing watercraft threats to the manatees.
- Support ongoing efforts to study manatee use within the SJB. The Service has a project with the PR Manatee Conservation Center and the DNER to assess the health of manatees within the SJB and track manatees to study movement patterns and habitat use within the SJB.
- Develop a manatee specific education campaign using existing and new alternatives and media sources.

Once a Tentatively Selected Plan is chosen by the Corps the consultation process under Section 7 of the Endangered Species Act can commence. Recommendations made in this DCAR can be considered technical assistance under the ESA to help the Corps in making their plan selection. In order to facilitate the consultation process, we recommend that species conservation measures be included in the documentation for the Tentatively Selected Plan.

### **5.1 Mitigation for Environmental Effects**

The various mitigation measures using dredge spoil were discussed above. The Corps has not yet developed a comprehensive mitigation plan, for all aspects of this project. Additional mitigation in the form of transplanting impacted SAV in the expansion of Anchorage F should also be considered. A transplant technique for *Halophila* has been developed in the U.S. Virgin

Islands by a local consultant consisting of “raking” up the sea vine, placing it in netting and transporting it to a recipient site. This plus the removal of the upper six to 12 inches of sediment (possible seed bank) for a cap in the Condado Lagoon restoration should be considered since it will speed up the colonization of the material by SAV.

A comprehensive Environmental Monitoring and Corrective Action Plan also needs to be developed in conjunction with the proposed mitigation plan. This plan should be developed in coordination with other agencies, in order to determine whether the effects assessment has accurately predicted the effects. Monitoring data will be used to evaluate whether the proposed mitigation sufficiently offsets the predicted effects. The results of these monitoring and analyses will be available to agencies and stakeholders. The Corrective Action Plan would provide a methodology to evaluate whether project effects exceed those already mitigated for in the base mitigation plan. The Corrective Action Plan specifies the methodology for how additional compensatory mitigation will be determined and implemented.

## **6.0 No Action Alternative**

Based on the Corps documentation, if no action is taken to deepen the San Juan Harbor, the most probable future condition is continued utilization of the harbor under present conditions. Deep draft vessel traffic in the harbor is likely to continue to increase. The ability of the San Juan Harbor to be used by the larger ships now able to pass through the Panama Canal will remain very limited if the harbor is not deepened. This in turn would have negative economic effects on the shipping and cruise ship industry and the San Juan area in general. Under this alternative fish and wildlife resources would not be impacted.

## **7.0 Summary of Fish and Wildlife Service Position**

The Service carried out a site visit to the various areas within the harbor on September 26, 2016. Use of the Esperanza Peninsula by migratory birds was confirmed and one osprey was sighted perched atop an Australian pine. Impacts to the forested areas by sand extraction for mitigation of the peninsula should be avoided. The boat operators stated that brown pelicans regularly feed in the lagoon created behind the peninsula and that fisherman catch bait fish in the area. North of the Puerto Nuevo River mouth is a cove where fishermen also catch shrimp and baitfish with hand nets. This is the general area where the Service is proposing the creation of a tidal flat using dredged spoil from the Puerto Nuevo and Graving Dock improvements.

An estimated 18 acres of SAV would be impacted by the expansion of Anchorage F; these impacts may increase if the new southern anchorage is also built. However the extent of the impacts to SAV and other marine habitats still unknown. Additional sonar surveys still pending and are required to fully know the extent impacts to SAV and other marine habitats.

There exists the possibility of additional restoration of the Condado Lagoon and transplant of SAV to the completed Condado Lagoon restoration from SJB dredging sites. This would greatly speed up the stabilization of deposited sediments and increase the habitat quality of the lagoon.

The proposed living shoreline would replace lost coastal mangrove habitat and provide shoreline protection to the Cataño shoreline. Although this type of shoreline protection is favored over traditional rip-rap, there exists the possibility of additional impacts to marine existing habitats from this alternative. Therefore a careful evaluation of the net environmental benefits needs to be made prior to implementing this mitigation option.

This Report is presented as a Draft since the Corps has not yet determined its Tentatively Approved Plan. Further coordination with the Service to review project specifics will be required prior to the completion of the final CAR. At this stage of project planning the Service does not object to the project as proposed provided the recommendations in our report are addressed during the planning process and incorporated into the Corps Feasibility Study.

## **8.0 Coastal Barrier Resource Act**

The Coastal Barrier Resources Act (CBRA), first enacted in 1982 (16 U.S.C. 3502 et seq.), was reauthorized and amended by the Coastal Barrier Improvement Act (CD3A) of 1990 (16 U.S.C. 3501). Its purpose, as stated in section 2(b), is "...to minimize the loss of human life, wasteful expenditure of Federal revenues, and the damage to fish, wildlife, and other natural resources associated with the coastal barriers..." CBRA established the Coastal Barrier Resources System, (CBRS) a mapped series of undeveloped coastal barriers on the Atlantic and Gulf coasts,

including the Great Lakes Region, Virgin Islands, and Puerto Rico. Areas within the system are designated as either "units" or "otherwise protected areas" (OPA's). Section 5(a) prohibits all new Federal expenditures and financial assistance within unit boundaries, with some exceptions as determined through a process of consultation.

There are no designated CBRA units within the project area. The closest CBRA units are PR-86 Punta Salinas to the east and PR-87 Piñones to the west.

## 9.0 References

Bauzá-Ortega, J (Ed). 2013. Tercer informe de la Condición Ambiental del Estuario de la Bahía de San Juan, Edición 2013.

Bonde, R.K., A.A. Aguirre, J.A. Powell. 2004. Manatees as sentinels of marine ecosystem health: are they the 2,000-pound canaries. *Eco Health* 1, 25 -262.

Deutsc , C.J., Self-Sullivan, C. and A.A. Mignucci-Giannoni. 2008. *Trichechus manatus*. The IUCN Red List of Threatened Species. Version 2014.3.  
<http://www.iucnredlist.org/details/22103/0>

Drew, C. A., L. B. Alexander-Vaughn, and J. A. Collazo. 2012. Science Summary in Support of Manatee Protection Area (MPA) Design in Puerto Rico. U.S. Department of Interior, Fish and Wildlife Service, Cooperator Science Series FWS/CSS-101, Washington, D.C. 63pp. Available online: <http://digitalmedia.fws.gov/cdm/ref/collection/document/id/1907>

National Oceanic and Atmospheric Administration (NOAA). 2015. NOAA Guidance for Considering the Use of Living Shorelines.

Ojeda-Serrano, R. Appeldoorn, and I. Ruiz-Valentin. "Reef fish spawning aggregations of the Puerto Rican shelf." *Proceedings of the Gulf and Caribbean Fisheries Institute*. Vol. 59. 2007.

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.

Powell J.A., D.W. Belitsky, and G.B. Rathbun. 1981. Status of the West Indian manatee (*Trichechus manatus*) in Puerto Rico. *J. of Mammalogy* 62(3): 642-646.

Rivera, Jose. 2016. San Juan Harbor Project, Puerto Rico: Quick Look Video Survey Report of the Benthic Communities of San Juan Bay Adjacent to Navigation Channels. NOAA Habitat Conservation Division.

Slone, .H., J.P. Reid, R.K. Bonde, S.M. Butler, B.M. Stith. 2006. Summary of West Indian manatee (*Trichechus manatus*) tracking by USGS-FISC Sirenia Project i Puerto Rico with additional information on aerial surveys, car ass recovery, and genetics research. Report to the USFWS, 14 July 2006, 9 pp.

United States Army Corps of Engineers. 1993. San Juan Harbor Deepening Project, Final Environmental Impact Statement.

United States Army Corps of Engineers. 2015. San Juan Harbor, Puerto Rico Submerged Aquatic Vegetation Mitigation Environmental Assessment.



United States Army Corps of Engineers. 2016 Review Plan for San Juan Harbor Improvement Study.

United States Army Corps of Engineers. 2017. San Juan Harbor Expansion Project, Puerto Rico: Side-scan Sonar and Towed Video Survey Report of the Benthic Communities of San Juan Bay Within and Adjacent to Proposed Navigation Channel Management Measures.

United States Fish and Wildlife Service. <http://www.fws.gov>

United States Fish and Wildlife Service. National Wetlands Inventory. <http://wetlands.fws.gov>

United States Fish and Wildlife Service and National Marine Fisheries Service. 1998. Endangered Species Consultation Handbook - Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act.

United States Fish and Wildlife Service. 2004. Water Resources Development Under the Fish and Wildlife Coordination Act – an update and expansion of Issues in Fish and Wildlife Planning: Water Resources Development Under the Fish and Wildlife Coordination Act and Policy and Guidance on Fulfillment of the Fish and Wildlife Coordination Act Responsibilities in the Corps of Engineers Water Resources Development Program.

# **Appendix A**

## **Blasting Specifications**

# **Appendix B**

## **Standard Manatee Construction Conditions**