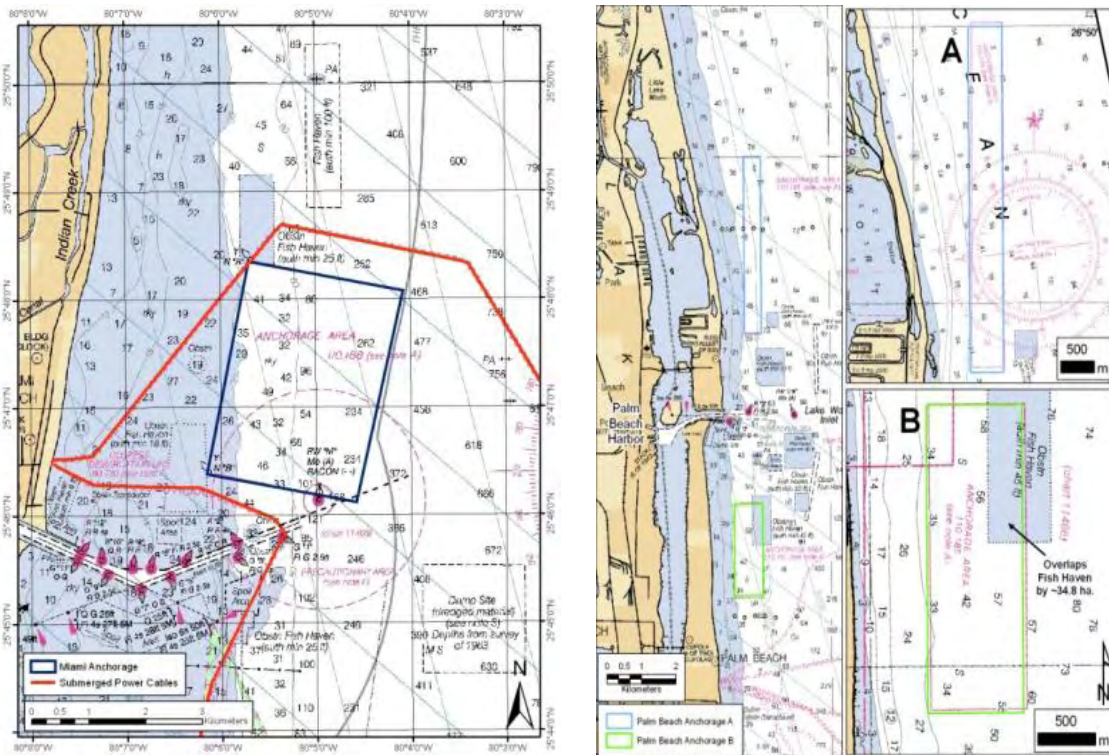


# A Study to Minimize or Eliminate Hardbottom and Reef Impacts from Anchoring Activities in Designated Anchorages at the Ports of Miami and Palm Beach



Southeast Florida Coral Reef Initiative  
Maritime Industry and Coastal Construction Impacts  
Local Action Strategy Project 8



Southeast  
Florida  
Coral Reef  
Initiative

*Acting above to protect what's below.*

# **A Study to Minimize or Eliminate Hardbottom and Reef Impacts from Anchoring Activities in Designated Anchorages at the Ports of Miami and Palm Beach**

## **Final Report**

Prepared By:

Brian K. Walker

Nova Southeastern University Oceanographic Center

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## INTRODUCTION

Both the US federal government and the state of Florida have recently passed legislation with the intent to protect coral reef resources in US waters. On May 9, 2006, the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) listed the elkhorn coral, *Acropora palmata*, and the staghorn coral, *A. cervicornis*, as threatened under the Endangered Species Act (ESA) of 1973, as amended. On November 26, 2008 the Endangered and Threatened Species Critical Habitat for Threatened Elkhorn and Staghorn Corals Final Rule was published in the Federal Registry. Included in this rule was approximately 3,442 square kilometers (km<sup>2</sup>) [1,329 square miles (mi<sup>2</sup>)] of marine habitat in Florida identified as “essential to the conservation of the species” (National Marine Fisheries Service, 2008 ). In 2009, the State of Florida enacted the Coral Reef Protection Act (CRPA) which authorizes the Florida Department of Environmental Protection (FDEP) to protect coral reefs, in the State waters of Monroe, Miami-Dade, Broward, Palm Beach, and Martin counties, through the assessment and recovery of vessel damages (e.g. commercial and recreational groundings and anchor drags) to coral reefs. It provides Florida with the ability to recover monetary damages by establishing a civil penalty schedule for those violating the law.

Presently, coral reefs and hardbottom communities are threatened by ship anchoring and groundings in southeast Florida. The shore-parallel southeast Florida reef tract, from Miami-Dade to Martin County, has extensive nearshore coral resources in close proximity to three major ship anchorages: Port of Miami, Port Everglades, and Port of Palm Beach (Figure 1). As a consequence, large ships are brought to anchor in waters adjacent to, or directly on, coral reef and hardbottom habitats. This practice has led to a number of vessel groundings and anchor impacts on these reefs, causing damage to natural resources and ships.

In Broward County, ten (10) known ship groundings and six (6) known ship anchor drags occurred between 1994 and 2006 on the coral communities adjacent to the designated Port Everglades anchorage areas, directly impacting almost 11 acres of reef (Collier et al., 2008). These events spurred a wave of resource management activity that evaluated the anchorage configuration in order to look at possible alternatives. The United States Coast Guard (USCG) led a group of local, state, and federal agencies, port personnel, and local stakeholders in an effort to modify the anchorage configuration to avoid reef impacts. This was a long process that culminated in an emergency rule change in the Federal Register by the USCG to modify the anchorage requiring ships to anchor further offshore and limiting the amount of time a vessel may remain in the anchorage.

During this time, as part of compensatory mitigation for a geo-technical survey in Broward County, Calypso U.S. Pipeline, LLC completed a feasibility study of potential

alternatives for the existing anchorage for Port Everglades in Broward County, FL (Moffatt & Nichol International, 2006). Anchorage user needs and a review of applicable technologies to support potential offshore moorings or other anchorage alternatives near Port Everglades were evaluated, providing valuable information to address potential alternatives for other port anchorages in southeast Florida.

Although groundings are usually more extreme events, the chronic occurrence of anchoring impacts is also devastating to reef habitats. While investigating reef injuries associated with anchoring near Port Everglades, it had been noted that the reef has been impacted, possibly from the occurrence of anchor or anchor chain impacts on the reefs surrounding the anchorage. Because these injuries have been observed on the reefs near the Port Everglades anchorage, other anchorages in a similar proximity to coral reefs could be causing similar impacts violating the CRPA and damaging critical habitat for threatened coral species. Therefore, a comprehensive spatial evaluation was performed to study the proximity of other southeast Florida anchorages to coral reef communities and evaluate alternate suitable anchorage configurations using the outcomes of the Moffatt and Nichol Int. (2006) study and the most recent seafloor spatial data with the specific objective of minimizing future impacts to coral reef communities by large vessel anchors and anchor chains.

## **METHODS**

The “Offshore Anchorage Feasibility Study Final Report” prepared for Calypso U.S. Pipeline, LLC by Moffatt and Nichol Int. (2006) was reviewed to determine if the evaluation and potential alternatives for Port Everglades, FL applied to the other port anchorages in southeast Florida. Since the physical conditions and coastal morphologies are similar throughout southeast FL, their basic conclusion that reconfiguring the anchorage to avoid sensitive habitats was a viable alternative solution for all stakeholders applied to the anchorages in Miami-Dade and Palm Beach counties. Therefore the anchorages were spatially evaluated to provide alternate configurations.

The spatial evaluation of the Miami-Dade and Palm Beach anchorages was conducted by a geographic information systems (GIS) analysis, which allowed the layering of many spatial data sets in a computer framework in which spatial analyses between the different data could be performed.

A comprehensive database was assembled in GIS of previous work at the local, state, and federal level for both the Miami-Dade and Palm Beach anchorages to aid in seafloor feature identification and to determine how these features spatially relate to the designated anchorage areas. High-resolution hill-shaded images of the seafloor using Light Detection and Ranging (LIDAR) bathymetry acquired by Miami-Dade and Palm Beach counties and NOAA were created by Nova Southeastern University Oceanographic Center and the National Coral Reef Institute (NSUOC-NCRI) and

imported into a GIS. These data were accompanied by many datasets from multiple agencies including NSUOC-NCRI benthic habitat mapping data, NOAA electronic nautical charts, the United States Geological Survey (USGS) aerial photography, NSUOC-NCRI acoustic ground discrimination data (Palm Beach only), Fish and Wildlife Research Institute (FWRI) contour data, FWRI south Florida benthic habitat mapping data, Southeast Florida Coral Reef Evaluation and Monitoring Project (SECREMP) monitoring data, and FWRI artificial reef location data. Recent very high resolution aerial photography for the entire south half of Miami-Dade County was shared by FWRI for habitat mapping. These data were collected by Florida Fish and Wildlife Conservation Commission (FWC) and the National Park Service (NPS) to complete benthic habitat mapping of Biscayne National Park. The United States Army Corps of Engineers (USACE) supplied a DVD of GIS data pertaining to their activities with the Port of Miami Government Cut expansion project. Finally, reports, maps, and vibrocore data were downloaded from the Reconnaissance Offshore Sand Search Oracle database (<http://ross.urs-tally.com/database.asp>) to help identify sand areas.

Although all compiled data were useful in the evaluation, the following data were the basis upon which the alternate anchorage configurations were created, warranting more detailed descriptions:

#### **BENTHIC HABITAT MAPS**

Existing benthic habitat maps for Miami-Dade and Palm Beach counties were used. Habitat map creation involved a combined-technique approach incorporating LIDAR bathymetry, aerial photography, acoustic ground discrimination (AGD), video groundtruthing, limited sub-bottom profiling, and expert knowledge (Riegl et al., 2005, Walker, 2009, Walker et al., 2008). The maps were produced by outlining the features in the high resolution LIDAR bathymetric data at a 1:6000 scale with a one acre minimum mapping unit and classifying the features based on their geomorphology and benthic fauna. *In situ* data, video camera groundtruthing, and acoustic ground discrimination were used to help substantiate the classification of the habitats. Accuracy assessment of the maps showed high levels of accuracy (>89%) which were comparable to that of using aerial photography in clear water (Walker, 2009, Walker et al., 2008).

#### **LIDAR BATHYMETRY**

Bathymetric LIDAR surveys were conducted in 2002 by Tenix LADS Corporation of Australia (now Fugro LADS), using the LADS (Light And Depth Sounder) MK II system with a sounding rate of 900 hertz (Hz) (3.24 million soundings per hour), a position accuracy of 95 percent (%) at 5 meter (m) circular error probable, a horizontal sounding density of 4 m X 4 m, a swath width of 240 m, area coverage of 64 km<sup>2</sup> per hour, and a depth range of 70 m, depending on water clarity. The surveys encompassed most of southeast Florida from southern Martin County (27° 0' N) to southern Miami-Dade County (25° 35' N), approximately 160 km linear north-south distance, and from



the shore eastward to depths of 40 m. The entire survey area covered approximately 600 km<sup>2</sup> of marine seafloor (Banks et al., 2007, Banks et al., 2008). The data were gridded by triangulation with linear interpolation, sun shaded at a 45° angle and azimuth. This final image was used for the identification of smaller features below the minimum mapping unit of the benthic habitat maps.

### **FWC AERIAL PHOTOGRAPHY**

Aerial photography was flown by PhotoScience Inc. to cover Biscayne Bay in May of 2005. Funding was provided to FWC by South Florida Water Management District (SFWMD) to acquire and process the data. Imagery from the Digital Mapping Camera (DMC) consisted of 316 individual scenes on 9 flight lines at a spatial resolution of 0.3048 m and 5 spectral bands (R,G,B,NIR,Pan). The data were delivered to FWRI to undergo orthorectification and mosaicking. Orthorectification and georeferencing was completed to the North American Datum 83 (NAD83) Universal Transverse Mercator (UTM) Zone 17 meters coordinate reference system. Mosaicking was completed at three spatial resolutions (2 m, 10 m, and 50 m) with varying color balancing and enhancements, as well as the addition of a 30 m Landsat satellite image. Also, 54 digital orthophoto quarter-quadrangles (DOQQs) were produced at the full 0.3048 m resolution. The 2 m mosaic was used in this effort.

### **NOAA BATHYMETRY**

NOAA's Office of Coast Survey Hydrographic Division supplied recent bathymetry for a large portion of the sea floor around Government Cut, Miami. These data were collected for the purpose of updating nautical charts thus the processing was different from the LADS LIDAR bathymetry. The original data were binned to 3 m and the shallowest depth within the 3 m bin was selected. XYZ's were extracted from an interpolated surface of these data at regular intervals (50 cm, 1 m, and 4 m). Digital elevation models and hill-shaded images were created from the xyz's using a nearest neighbor algorithm. These data were very useful in depicting small objects on the sea floor as well as possible coral habitat. An added benefit of the NOAA bathymetry is that they could be used to ensure any new anchorage areas were free of seafloor obstructions.

### **GIS EVALUATION**

The evaluation process for each anchorage area entailed layering all GIS files appropriately so they were all visible with raster layers on the bottom and polygons, lines, and points on top. The location for each anchorage node was taken from the US Coast Pilot 4 2007 and plotted in ArcGIS 9.3 software. The nodes were then connected to create a polygon shapefile. The benthic habitat polygons were clipped using the anchorage polygons to determine the amount of each habitat within the anchorages. The measurement tool was used to measure the distance between the anchorage edges

and the nearest non-sand habitat and other features such as submerged cables and artificial reefs.

The USCG 7-Rule for safe anchoring was adopted to determine appropriately safe anchoring distances away from sea floor obstructions and non-sand habitats (Figure 2). The USCG recommends a vessel lay out 7 times the water depth in chain to allow for sufficient scope for bad weather conditions to keep the vessel stationary. The 7-Rule was used to determine the minimum distance a vessel should anchor from an object or habitat so that neither the anchor nor the chain comes in contact with it. To apply the 7-Rule, the depth was noted at the location of the nearest object or habitat edge and was multiplied by 6 to obtain the minimum safe buffer distance. This distance was then measured from the original anchorage edge to obtain the new edge.

Potential new anchorage areas were determined by spatially analyzing all data in GIS. The only areas considered were those free of all other uses or obstructions including submerged cables, artificial reefs, coral reef habitat, sea grass habitat, sewage outfalls, permitted fish havens, permitted dump sites, potential impediment to vessel traffic, proximity to excessively shallow water, etc. New sites were buffered from all features by the lesser of either the 7-Rule or 1000 feet (ft) with the exception of the Deep Ridge habitat in Miami-Dade proposed anchorages A & C.

## **STAKEHOLDER INPUT**

Stakeholders have a vested interest in the outcomes of this study, thus they were informed, consulted, and involved in every step of the process. However, at the time of completion of this report, the Miami-Dade anchorage proposals B & C were modified since the last stakeholder meeting and have not been reviewed by all parties.

Project information was presented at the Southeast Florida Coral Reef Initiative (SEFCRI) Maritime Industry and Coastal Construction Impacts (MICCI) focus team meetings on October 8, 2008, October 7, 2009, and November 9, 2010. A 20 minute presentation was given at each meeting by Dr. Brian K. Walker and discussions ensued with the MICCI focus team about the issues regarding the project including the identification of stakeholders.

On November 13, 2008 the Port of Miami Harbor Safety Committee (HSC) Anchorage Working Group (AWG) met for the first time to discuss the issues regarding the preliminary analysis of the Miami-Dade anchorage and to outline a plan for proceeding with the formal analysis. A presentation was given to the AWG outlining the current state of the Miami anchorage. Then a discussion ensued on possible approaches to take when analyzing the area for anchorage reconfiguration.

Representatives from the following agencies attended either in person or by phone: Port of Miami, USCG, Miami Pilots, Miami-Dade Department of Environmental Resource

Management (DERM), USACE- Miami-Dade & Jacksonville districts, FDEP Coral Reef Conservation Program (CRCP), NSUOC-NCRI, NOAA NMFS, FWC and FWRI, and NOAA-Navigation Services. A meeting summary was prepared, by FDEP CRCP Assistant Manager and MICCI Project Coordinator Joanna Walczak, and vetted through all participants.

On February 20, 2009, a brief update was given to the Port of Miami HSC which reviewed the accounts of the first AWG meeting, outlined the planned timeline, and emphasized the involvement of Miami River boat interest in the process.

On May 29, 2009 the project was presented by Dr. Walker at the 34<sup>th</sup> Association of Marine Laboratories of the Caribbean conference in Roseau, Commonwealth of Dominica for a broader scientific input from Caribbean scientists.

On October 16, 2009 Dr. Walker gave an update presentation to the Port of Miami HSC.

On January 13, 2010 the Port of Miami HSC AWG met to discuss the outcomes of the analyses and give further guidance for final, workable configurations. A meeting summary was prepared, vetted through all participants, and shared with the Port of Miami HSC. See Appendix 3.

Future meetings will be scheduled, as needed, to discuss this final proposal with the Port of Miami HSC AWG and the Port of Palm Beach stakeholders. Meetings will continue until the anchorages are modified satisfactorily.

## **RESULTS & DISCUSSION**

It should be noted that anchorage modifications and final sizes were driven by the amount of available suitable substrate (sand) free of sea floor debris for safe anchoring near each port, the location of coral reef hardbottom communities, and the present anchorage size. Very little information exists on the vessel use of the anchorages (e.g. visit frequency, visit duration, vessel types, and vessel size). Determining the appropriate size of the anchorage due to its present or potential future use was outside the scope of this effort. It was assumed that the present amount of anchorage area was adequate for each port's needs.

As a guide to help conceptualize the size and scale, each proposed solution contained an estimated number of ships it could hold. These numbers were based on reported Automatic Identification System (AIS) ship tracking data obtained by monitoring the Port of Miami anchorage on the website [www.marinetraffic.com](http://www.marinetraffic.com) for five days between Jan 14 and Feb 4, 2010. During the 5 monitoring days, seven different vessels were observed anchored at the Port of Miami Anchorage ranging in size from 63 m to 84 m length and 3 m to 4.7 m draught. The average vessel size (75 m) was used to determine the number of concurrently anchored vessels at each shallow anchorage (<30 m) proposal and 150 m length for the deep anchorage proposals (>30 m). The actual number of vessels each anchorage will hold concurrently depends on sea conditions, the size of the anchoring vessel, and the location and size of vessels already in the anchorage.

### **FEASIBILITY STUDY REVIEW**

In 2006, Moffatt and Nichol International prepared a study entitled "Offshore Anchorage Feasibility Study Final Report" for Calypso U.S. Pipeline, LLC to evaluate anchoring alternatives for Port Everglades, FL. This study evaluated alternatives for the previous Port Everglades anchorage configuration by identifying technical issues and presently available alternative anchoring and mooring technologies. The main issues identified were that an unacceptable amount of recurring resource and vessel damages had occurred over a twelve year period; there was a lack of effective anchorage oversight, management, and enforcement; and the original anchorage configuration was of poor design being too close to the coral reefs and a large portion being too deep for safe anchoring. Thus any new anchorage configurations needed to take these factors into account.

Moffatt and Nichol International (2006) evaluated the possibility of using five proven anchoring methods: conventional ship anchor (present method employed), conventional buoy moorings, all buoy moorings, catenary anchor leg moorings, and single anchor leg moorings. They found that seafloor morphology and metocean conditions precluded all methods except conventional ship anchors and single anchor leg moorings. Since Moffatt and Nichol International estimated capital investment costs

of \$8.5 million for five single anchor leg mooring buoys and chains and operation and maintenance of an additional \$2,445,000 per year, conventional ship anchors were the most viable option.

Using conventional ship anchoring can be reliable, if implemented responsibly. It is important that anchorage designs are constructed based on lessons from the past. Any new anchorage designs must be a sufficient distance away from shallow water to give vessel captains time to take action in an emergency, must not contain seafloor obstructions that would impede the anchoring process, and must be a sufficient distance from coral reef and hardbottom habitats as to not violate the State of Florida's CRPA.

### **Palm Beach County**

There are two anchorages in Palm Beach County. Anchorage A is located north of Lake Worth Inlet and Anchorage B is south of the inlet. The evaluation of these anchorages showed that potential anchoring hazards presently exist and although they did not contain significant reef resources, there were some areas of artificial and coral reef habitats near the eastern borders. A set of proposed solutions was sent to the USCG for initial review. The issues and proposed solutions were also forwarded to the Palm Beach Harbor Pilots Association and Palm Beach County Department of Environmental Resources Management (PBC ERM) for evaluation and comments. This final report documents the second (revised) anchorage GIS evaluation based on those comments. The issues and solutions for each anchorage are resolved separately below.

#### **ANCHORAGE A**

##### ***Issues***

A potential anchoring hazard exists very near the northern anchorage in Palm Beach (Figure 3). This was identified as an apparent artificial reef located approximately 10 m from the eastern border of Anchorage A. This feature, located at 26 49.304 N, 80 01.186 W, was not part of FWRI's statewide artificial reef database located on the Florida Geographic Data Library (FDGL) although it had approximately 2 m relief and the appearance of a ship in the LIDAR data. This feature was identified as "*Jimmy's Barge*" by the PBC ERM. The barge was not part of the artificial reef program and the timing and responsible party for its sinking remains a mystery.

*Jimmy's Barge* poses a danger to vessel anchoring activity as a seafloor obstruction. A vessel anchoring near this feature could get their anchor or chain hung up on the structure creating a hazardous condition and should thus be avoided. Other features nearby Anchorage A included Deep Ridge coral reef habitat 61 m away from the northeast corner and some large piles of artificial reef (bridge spans) 128 m east near the southern end associated with a small fish haven on the nautical charts (Figure 4).

### *Solutions*

In the northern portion of Anchorage A, two features, *Jimmy's Barge* and Deep Ridge coral reef habitat, were found to be within anchoring distance in 22.5 m and 26.2 m water depth, respectively. At 26.2 m depth, the 7-Rule gave a safe distance of 157.2 m (6 x 26.2), therefore the northeastern edge of Anchorage A was proposed to be moved 157.2 m west to avoid any interactions with ship chains on the Deep Ridge habitat (Figure 3 - dark blue dotted line). Similarly, the 7-Rule determined that 135 m buffer was a safe distance from *Jimmy's Barge*, thus the eastern anchorage boundary was adjusted accordingly. In order to maintain deep water in the anchorage, a request from the Palm Beach Harbor Pilots, the original anchorage's eastern boundary was preserved 135 m south of *Jimmy's Barge*.

This change in the northeast quadrant allowed for a 135 m buffer from *Jimmy's Barge* and a 149 m buffer from the nearest coral reef habitat.

The southern portion of Anchorage A was in close proximity to a fish haven (about 165 m) (Figure 3). The benthic habitat maps showed a portion of artificial reef material extending 36.5 m outside the western boundary of this fish haven in 22.5 m depth. The eastern boundary of Anchorage A was 128 m from this feature. The 7-Rule at this depth required a 135 m buffer from the artificial reef material thus the recommendation for the southern end of Anchorage A was to move the eastern boundary 7 m west.

The proposed change decreases the area of Anchorage A 9.1% from 21.31 hectare (ha) to 19.37 ha.

## ANCHORAGE B

### *Issues*

A potential anchoring hazard exists within Anchorage B, the southernmost anchorage, in Palm Beach. The location of Anchorage B conflicted with a charted fish haven on the NOAA nautical charts. Approximately 34.8 ha of Anchorage B overlapped with a fish haven (Artificial Reef Site 2) in the NE quadrant (Figures 4 & 5). The fish haven has an authorized minimum depth of 13.7 m for safe navigation, yet it is permitted to contain obstructions on the seafloor as these are areas designated for artificial reef deployment. This overlap directly conflicts with the objective of having a safe, obstruction-free designated anchorage for large ships. It was also noted that the eastern edge of Anchorage B was approximately 48 m from a large patch of coral reef habitat to the east in 20.5 m depth, 75 m inside the 7-Rule safe distance of 123 m.

NOAA charting provided research on the inception of the two areas (Appendices 1 & 2). The USCG announced its intention to establish the anchorage areas in the Federal Register on April 7, 1986 (Appendix 1). The Discussion of Comments section stated that "the Palm Beach County Health Department [now PBC ERM], the local administrator

for the State's Artificial Reef Program, initially requested the deletion of Anchorage B because of the suitability of this area for offshore artificial reefs." It then stated that "two tenants of the Port of Palm Beach requested the proposed southern anchorage area be retained because of projections for increased vessel traffic at their facilities in the future." The Palm Beach Bar Pilots' Association supported keeping Anchorage B because of "easy access to Lake Worth Inlet, greater protection than the proposed northern anchorage, deeper water closer to the beach and a sand bottom not endangering any natural reef areas." The USACE had no objections "from the standpoint of their Federal Navigation Project, Harbor Project, or local artificial reefs and disposal areas." FDEP supported the comments made by the Palm Beach County Health Department. The Port of Palm Beach submitted a revised anchorage design on Nov. 27, 1985 that moved the northern boundary approximately a half mile south. This version was accepted by all parties and is the configuration described in the Final Rule and printed on the charts in 1989.

The fish haven (labeled Palm Beach Site #2 in the paperwork) was established during the same period of time (Appendix 2). Its permit history showed a FDEP permit issued in August 1985, a USACE permit issued in September 1986, and a Department of Natural Resources (DNR) permit issued in July 1990 (Note: DNR was later split into FDEP and FWC). Its site development history shows 6,124 tons of concrete were dumped there between 1989 and 1992. An August 14, 2001 memo describes it as being an "active reef site since 1989 and has an authorized minimum clearance of 45 feet." It appeared as if the fish haven was designed and permitted without consideration for the new southern anchorage. None of the planning maps showed the anchorage in relation to the proposed fish haven and though the fish haven was started in 1989 it was not charted until 2001.

FDEP research has uncovered paperwork from 1986 (Appendix 3) of revised coordinates for Artificial Reef Site #2 because of the realized overlap with the anchorage. Unfortunately, for unknown reasons, the revisions did not make it onto the NOAA charts. The paperwork showed a Continental Shelf Associates' request to the USACE to revise the original site and the USACE's subsequent permit approval. The revised coordinates in this document were plotted on the NOAA nautical charts in the attached map (Figure 6). Although the center point plotted incorrectly, the four corners of the revised coordinates matched the diagram provided in Appendix 3, thus suggesting that Artificial Reef Site #2 is currently not properly depicted on the NOAA nautical charts.

In light of this new information, it appears that the Artificial Reef Site #2 fish haven and the Anchorage B do not overlap. Furthermore, the LADS bathymetry indicate a large artificial reef in the center of the Artificial Reef Site #2 polygon which could be the 6,124 tons of concrete originally reported to be deployed in Artificial Reef Site #2 (Figure 6). This alleviates concerns both about whether the artificial reef material was placed in the

proper location and about issues conflicting with Anchorage B. This information has been passed to NOAA nautical charting to make corrections to the fish haven in the nautical charts. Because NOAA charting has not yet officially decided if this information is sufficient to change the charts, two proposals for Anchorage B modifications were created; one that modifies the anchorage to not overlap with the charted fish haven (Proposal 1) and one that modifies the anchorage solely to avoid a small patch of coral habitat to the east (Proposal 2).

### ***Solutions***

#### **PROPOSAL 1**

The 7-Rule was applied from the western boundary of the charted fish haven in 16.8 m depth to ensure the avoidance of any seafloor obstructions. This gave a 101 m buffer from that edge which encroached on the anchorage by 299 m, thus the total safe anchoring buffer from the original Anchorage B eastern edge was 400 m (Figure 4 & 5 - dark green dotted line). The final configuration allowed for a 101 m buffer from the charted fish haven's western and southern borders.

The southeastern edge of Anchorage B was also determined to be too close to a large patch of coral reef habitat in the benthic habitat maps and was adjusted 123 m to the west to avoid anchor or chain impacts to the coral habitat (Figure 4).

The proposed change decreased the area of Anchorage B 27.5% from 18.48 ha to 13.40 ha.

#### **PROPOSAL 2**

Only the southeastern edge of Anchorage B was modified due to a large patch of coral reef habitat in the benthic habitat maps. It was adjusted 123 m to the north, west, and south to avoid anchor or chain impacts to the coral habitat (Figure 4 & 5 dark - green dotted line). In this proposal, the modified anchorage would remain overlapped with the charted fish haven by 34.8 ha in the NE quadrant, unless the USACE permitted fish haven modifications are acceptable and made to the NOAA chart.

The proposed change decreased the area of Anchorage B 1% from 18.48 ha to 18.29 ha.

### **SUMMARY**

If the proposed changes for Anchorages A and B Proposal 1 are implemented in Palm Beach the total anchorage area, 39.79 ha, will decrease by 17.6% to 32.77 ha. If the proposed changes for Anchorages A and B Proposal 2 are implemented in Palm Beach the total anchorage area, 39.79 ha, will decrease by 5.4% to 37.66 ha. If the USACE permit paperwork is sufficient to modify the charted fish haven, Proposal 2 is a better option to maximize the size of the anchorage while avoiding any potential seafloor obstructions and coral reef habitats. Implementation of Proposal 1 is recommended if



the USACE permit paperwork is not sufficient. Regardless, PBC ERM, the fish haven permit holders, indicated their support to not use the charted fish haven as an artificial reef site.

After the anchorage modifications, the overall remaining area is still very large and maintains large areas of deeper water further from shore. The proposed eastern edge of Anchorage A is in 21 m depth which yields a swing circle for a 150 m long vessel of 552 m diameter using the 7-Rule  $((21 \times 6) + 150) * 2$ . The approximate dimensions of the proposed Anchorage A area is 4600 m by 425 m, therefore the reconfigured anchorage would allow for approximately eight  $(4600 / 552)$  150 m long vessels to be safely anchored at one time.

The northern section in Anchorage B Proposal 1 is 1158 m by 427 m in a maximum depth of 16.2 m. With a swing circle diameter of 494.4 m, the northern section of Anchorage B can hold two 150 m ships simultaneously. The southern section is larger at 746.8 m width and 1219 m length in 18.9 m maximum depth. Using a swing circle diameter of 526.8 m, the southern section of Anchorage B has enough space to hold two ships concurrently.

In total, the proposed reconfigurations of Palm Beach Anchorage A and B will have enough space to conservatively accommodate about twelve 150 m long concurrently-anchored vessels. This number would increase in calm weather, with smaller vessels, and with vessels using less scope of chain.

The swing circle examples show that the width of the present anchorage configuration is smaller than the recommended swing circle in the deepest portions for a 150 m vessel, thus presently limiting the number of large vessels that can anchor in the area. Therefore, reducing the width of the anchorage will not affect how many large ships can concurrently anchor at a given time. Since the north-south length of the anchorages was not reduced, none of the proposed changes for Anchorage A and Anchorage B Proposal 2 will significantly affect the number of large vessels that can simultaneously anchor at Palm Beach. However, Anchorage B Proposal 1 could affect the number of smaller vessels anchored due to the decreased width in the northern portion.

In summary, the proposed reconfiguration of Palm Beach anchorages A and B Proposals 1 and 2 will minimize potential complications of seafloor obstructions and ship anchoring, and minimize the potential harm to nearby coral reef resources, while not affecting the number of concurrently anchored large ships. If the USACE Artificial Reef Site #2 amendment paperwork is sufficient and the charted fish haven can be modified to be outside the current anchorage, then Proposal 2 is recommended for implementation in Palm Beach County.

## Miami-Dade County

The Miami anchorage evaluation indicated it requires immediate attention to avoid, potential anchoring hazards, potential navigation hazards, and further impacts to coral reef habitats conflicting with the State of Florida's CRPA and the Endangered Species Act of 1973 (Figures 7 & 8). An initial set of proposed solutions was presented to the Port of Miami HSC AWG in January 2010. The NOAA bathymetry (processed after the meeting) revealed evidence of Deep Ridge habitat and large artificial reefs within the proposed areas. This report documents the second Miami-Dade anchorage GIS evaluation based on the findings in the NOAA data.

### *Issues*

Several issues were identified with the present Miami anchorage configuration pertaining to potential anchoring and navigation hazards. On the 2008 NOAA nautical charts, the NW corner of the anchorage overlaps with a fish haven by 5,600 square meters (m<sup>2</sup>). This fish haven has an authorized minimum depth of 7.6 m for safe navigation and it is permitted to contain obstructions on the seafloor as these areas are designated for artificial reef deployment. This overlap directly conflicts with the objective of having a safe, obstruction-free designated anchorage. The NW anchorage corner also intersects with a line of submerged power cables (Figure 7). These cables are advised to be avoided by mariners when anchoring and thus should have a buffer between their location and the designated anchorage.

A potential navigation hazard was also found on the SE corner of the anchorage. This area is in close proximity to the sea buoy where ships are directed upon approach into Government Cut to line up their vessel with the inlet channel. The SE anchorage corner overlaps with this operation by 1.34 ha. In Figure 7, the northern portion of the channel has been extended (black dotted line) to help illustrate the problem. A ship anchored in the SW corner could impede other vessels attempting to enter Government Cut. Rule 110.188 of the US Coast Pilot 4 states that "Whenever the maritime or commercial interests of the United States so require, the Captain of the Port, U.S. Coast Guard, Miami, Fla., is hereby empowered to shift the position of any vessel anchored on the anchorage ground or outside thereof, or of any vessel moored or anchored so as to impede or obstruct vessel movements or obstruct or interfere with range lights." Thus a ship impeding navigation could be relocated; however, if the area cannot practically be used, it should not be part of the anchorage. A buffer between the anchorage and the sea buoy would help alleviate this concern.

Major issues were also found regarding the proximity to coral reef habitats with the anchorage in Miami. A GIS analysis of the Miami-Dade County benthic habitat layer found that approximately 35.1% of the anchorage seafloor was composed of coral reef or colonized hard-bottom, yielding a total of 2.83 km<sup>2</sup> (699 acres) (Table 1). 99.7% of these coral reef habitats were located in depths less than 30 m and occupied 55.1% of the

shallow anchorage area (5.14 km<sup>2</sup> shallower than 30 m). It can be presumed that anchoring is more common in this shallower part since anchoring is a quicker operation in shallower water and some smaller vessels may not have enough chain to anchor deeper than 30 m. Therefore, the depth and location of the coral habitats in the anchorage makes them vulnerable to constant anchoring impacts.

Recent 2009 NOAA hydrographic surveys showed some higher-sloped areas in deep water indicative of Deep Ridge habitat. Although not confirmed, the discovery of these features warranted modifying the eastern boundary of the anchorage to avoid potential resource impacts. This shift would also help avoid numerous artificial reefs, which could pose as anchoring hazards, in the southeastern portion of the current anchorage. The FWC September 2008 statewide artificial reef database identified four artificial reef sites in the present anchorage configuration and nine others in close proximity (<200 m) to the eastern anchorage boundary. The proposed western shift avoided all but two of these features; the "I Beams" site (6-90 ft long I-beam girders and a 57 ft ferro-cement ship hull) and the "Steel storage tanks" site (236 tons of concrete pipe and 30 steel tanks with holes).

The existence of coral reef habitat inside the Miami anchorage creates an interesting conflict between the designated anchorage and the critical habitat for two threatened species of corals. Under the ESA of 1973, as amended in 2006, the coral reef habitats within the Miami anchorage were designated as critical habitat for elkhorn and staghorn corals. Miami-Dade DERM recently found 52 colonies of the threatened species, *A. cervicornis*, as close as ½ mile south of the anchorage on the same reef, making it very likely that the species also occurs inside the anchorage. Therefore, under the present anchorage configuration, large vessels are being directed by NOAA nautical charts to anchor on, and potentially directly impact, NOAA designated critical habitat for these threatened species. The present configuration is also directing vessels to break current Florida State natural resource protection laws (e.g. CRPA). In order to comply with the new laws and avoid further impacts to this critical habitat, the anchorage must be modified.

### *Solutions*

Initial evaluation of the Miami area yielded a reconfiguration of the present anchorage and two potential alternate anchorage areas (Figure 9). These solutions were a starting point for further stakeholder discussion. They were presented to the Port of Miami AWG on January 13, 2010 to facilitate discussions for an anchorage design that meets the needs of all users.

#### PROPOSED RECONFIGURATION OF ANCHORAGE A

The proposed Anchorage A is a modification of the existing anchorage to avoid the identified issues. The large diagonal square configuration was modified into a linear north-south rectangle to avoid the issues found with the current configuration (Figure

10). Using the 7-Rule as a feature buffer, it was determined that the only way to avoid coral reef habitat impacts was to move the western boundary of the anchorage into deeper water. The Aggregated Patch Reef habitat's eastern edge occurs along the 30.5 m depth contour, thus a 183 m buffer was applied to this habitat to create a safe distance between it and the anchorage edge. Next, the southern portion of the anchorage was moved 304.8 m north of the sea buoy and shipping channel alignment to avoid any potential navigational hazards near the Port of Miami approach. Then the eastern border was made straight and shifted west 150 m east of the suspected newly identified Deep Ridge in the 2009 NOAA bathymetry.

The proposed Anchorage A modifications would reduce the area by 83.6% from 10.09 km<sup>2</sup> to 1.65 km<sup>2</sup>. It would eliminate all anchoring in water shallower than 36 m and deeper than 65 m. The loss of the deep water (>65 m) portion isn't significant because it couldn't practically be used by most ships; however, due to the significant loss of shallow anchorage area, other nearby locations were evaluated for their potential as a new anchorage. This proposal for the modified Anchorage A would be able to accommodate 4 - 150 m vessels.

Several artificial reefs still exist within the modified configuration. Two of these, the "I Beams" site and the "Steel storage tanks" site were not evident in the NOAA 2009 hydrographic data at the FWC reported locations. It is unknown if the locations were wrong or if the artificial reefs were not picked up in the present survey. Two other areas of obvious artificial reef material were identified in the modified anchorage that were not associated with nearby locations in the FWC artificial reef site database. One, located at 25° 46.6' N, 80° 04.908' W, was 450 m north of the southern border. The other, located at 25° 48.082' N, 80° 04.844' W, was 230 m south of the northern border. There are currently no plans to visually confirm the material placed in these sites. Since they are within the current anchorage, and have not resulted in any reported incidents, they were included in this proposal. Excluding these two sites would lessen the proposed modification area significantly. If further discussions result in them being considered as anchoring hazards, this proposal will be modified.

#### PROPOSED ANCHORAGE B

An area 4,300 m south of the present anchorage was identified as a potential site for shallow-water ship anchoring (Figure 11). This site is bounded to the east by two Deep Colonized Pavement patches and to the west, north, and south by coral reef habitats. The 7-Rule buffers were used from the reef habitat edges and around the artificial reef "Captain Henry" to determine the area.

The proposed Anchorage B is 0.53 km<sup>2</sup> in depths ranging from 13 m to 36 m. Combined with the proposed Anchorage A modifications, a total of 2.2 km<sup>2</sup> would be available for vessel anchoring. The combination equates to a 78.4% decrease in area from the present

anchorage configuration. This proposal would accommodate 5 - 75 m long vessels (3 shallow and 2 deep).

This anchorage is intended for smaller vessel use that cannot anchor in the deeper anchorage areas. It is recommended to restrict larger vessels from using this area. The proposed anchorage's western edge is approximately 82 m from shallow (13 m deep) coral reef habitat and NOAA nautical charts indicate depths of 4.3 m (14 ft) approximately 600 m away. Larger, deeper draft, vessels anchoring during an easterly wind might come too close to this reef on their approach to the shallow portion of the anchorage. For these reasons, it is recommended to restrict anchoring in this area to vessels drafting 4m or less.

#### PROPOSED ANCHORAGE C

A third potential anchoring site was identified approximately 5 km north of the present anchorage (Figure 12). This site was bordered by a fish haven to the north, reef habitats to the east and west, and artificial reefs to the south and east. A 220 m buffer was used from the reef habitats and a 250 m buffer was used from the outfall. A 300 m buffer was used from the fish haven and a 120 m buffer from the "Crane Boom" artificial reef which consists of a 30 m steel crane boom. The buffers from the coral reef habitat limited anchoring in this area to greater than 47 m. The eastern border roughly followed the 61 m depth contour to avoid potential Deep Ridge habitat 150 m to the east.

The proposed Anchorage C is approximately 1.03 km<sup>2</sup> in area. Combined with the proposed reconfigured Anchorage A and proposed Anchorage B, a total of 3.21 km<sup>2</sup> would be available for large ship anchoring. This is 68.2% less area than the present configuration, but would allow for an additional 4 -150 m vessels to anchor (all deep).

#### **SUMMARY**

The seafloor in Miami-Dade County is heavily used. The amount of submerged cables, permitted artificial reef sites (fish havens), coral reef habitats, and seagrasses leaves very little available space for a large-vessel anchorage reconfiguration, especially in shallow water. The three proposed configurations have the greatest amount of area available for anchoring while minimizing impacts to coral reef resources and avoiding sea floor obstructions. Of the three proposed options, the modification of Anchorage A and the addition of Anchorage B would be the best alternative to minimize coral reef habitat impacts and maintain a suitable anchoring area.

The biggest challenge was finding a shallow-water (<30 m) area large enough to anchor without impacting coral habitats or guiding ships dangerously close to shallow water. The Port of Miami Harbor Pilots estimate that two to three ships use the anchorage daily, but up to ten have been observed on rare occasions. Many of the stakeholders have expressed concerns about having a large enough shallow-water portion for many

of the smaller vessels doing business up the Miami River. It was speculated that these vessels cannot safely anchor in water deeper than 36.5 m (120 ft). The problem is that the seafloor morphology is not conducive to a large shallow water anchorage design that doesn't impact critical coral reef habitat. The Inner Reef south of Government Cut crests at 4 m in some locations thus blocking any available westward sandy features. Furthermore, when anchoring, it is preferred that the vessel is pointed into the direction of energy that will be forced upon it while stopped. In south Florida, most of the wind and wave energy has an easterly component (Banks et al., 2007), thus vessels usually approach their final anchoring spot from the west. Because the Inner Reef crests in 4 m, this shallow feature precludes anchoring in any sandy areas immediately east as well.

The proposed anchorage modifications with the addition of the newly proposed areas offer ample space for vessel anchoring in Miami-Dade. Although the total anchorage area would be reduced by 68.2%, most of that current anchorage space is not currently used because of depth. 44.9% of the current anchorage is deeper than 30 m. Regardless of this fact, anchoring in SE Florida doesn't necessarily require a large area. A linear configuration of a smaller area can be just as effective. The key is to optimize the number of vessels that can be anchored concurrently.

The proposed eastern edge of Miami-Dade Anchorage A proposal is in 36.5 m depth which yields a swing circle for a 150 m long vessel of 738 m diameter using the 7-Rule  $((36.5 \times 6) + 150) * 2$ . The approximate dimensions of the proposed Anchorage A area is 3,450 m by 500 m, therefore the reconfigured anchorage would allow for approximately 4  $(3,450 / 738)$  150 m long vessels to be safely anchored at one time.

The Miami-Dade proposed shallow-water Anchorage B varied over a wide depth range (13 - 36 m), but includes a linear north-south shallow-water (~13 m) extension 1000 m long and 200 m wide. If this area is restricted to smaller vessels ( $\leq 75$  m), it could accommodate three 75 m long vessels concurrently  $(1,000 / (((13 \times 6) + 75) * 2))$  (Figure 13). The deeper portion was 760 m wide and varied in length from 250 m to 625 m. This could concurrently accommodate two 75 m long vessels or more depending on their arrangement. Thus the estimated total number of 75 m vessels that could be concurrently anchored in proposal B is at least 5.

The Miami-Dade proposed Anchorage C is between 120 m and 300 m wide by 3,900 m long. The eastern edge is approximately 45 m depth. Using a swing circle diameter of 840 m  $((45 \times 6) + 150) * 2$ , this area can hold four 150 m ships simultaneously.

In total, the proposed reconfigurations for Miami-Dade Anchorage A and creation of Anchorages B and/or C will have enough space to conservatively accommodate approximately eight 150 m and five 75 m long concurrently anchored vessels. This number would increase in calm weather, with smaller vessels, and with vessels using less scope of chain. This is more than any current use of the present anchorage.

Any new anchorage configuration will have to be hydrographically surveyed before it can be implemented. NOAA's Office of Coast Survey Hydrographic Branch has conducted recent (2009) bathymetry for a large portion of the sea floor around Government Cut for the purpose of updating nautical charts. These data meet the criteria to ensure any new anchorage areas are free of seafloor obstructions. Presumably any new configurations within the NOAA hydrographic survey footprint will be easier to certify than those requiring separate surveys.

Further considerations in the anchorage modification are the present buoy markers and Hawkeye camera system. Currently, the western border of the anchorage is marked by 2 yellow buoys (alpha and beta). These will need to be relocated appropriately if a new anchorage(s) is designated. Also, the USCG monitors the anchorage via the Hawkeye system. The USCG will need to move or reposition the cameras to visualize the anchorages beyond the field of the existing cameras.

## CONCLUSIONS

The anchorages in both Palm Beach and Miami-Dade counties are in need of modification to avoid potential impacts to coral reef communities and dangerous anchoring situations.

In Palm Beach, investigations uncovered a potential land use conflict with the overlap of a fish haven and anchorage, which turned out to be a mistake on the NOAA charts. Before an anchorage modification proposal can be chosen, decisions must be made on the location of Artificial Reef Site #2. If the USACE permit letter and 2009 NOAA hydrographic data are sufficient documentation to change the fish haven location on the NOAA charts, then anchorage modification proposal B is recommended to maximize the amount of anchorage space while avoiding sensitive habitats. The proposed modifications to Anchorage A and B (proposal B) will not affect the number of vessels able to anchor in Palm Beach.

In Miami-Dade, immediate action must be taken to avoid further degradation of critical coral reef habitat and breaking new Florida law. Many issues were discovered with the Miami-Dade configuration including a small overlap with a fish haven and submerged cables, potential blocking of port vessel traffic, numerous seafloor obstructions, and 699 acres of coral reef habitat. Evaluation yielded little available safe shallow-water (>30 m) anchoring area. Three proposals were drafted; one within the existing anchorage and two outside. A swing circle analysis showed that modified Anchorage A could accommodate 4 - 150 m vessels, proposal B could accommodate 5 - 75 m long vessels (3 shallow and 2 deep), and proposal C would add 4 more 150 m vessels (all deep) for a total of 13 concurrently anchored vessels. This is more than any previous use of the present anchorage. It is recommended that Anchorage A modifications and proposal B

be considered for the new configuration. Proposal C is also viable if more deep water anchoring space is needed.

### **NEXT STEPS**

Ultimately, it will be up to the agencies and stakeholders to find agreeable solutions to the anchorage reconfigurations in Palm Beach and Miami-Dade. The proposed configurations herein are a starting point for further discussions and refinement. Once an agreeable configuration has been reached for each county, it will be presented to the respective Port of Miami HSC and Palm Beach County stakeholders for support. Once support is obtained, it will be given to the USCG to start the emergency rule change public process.



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Table 1. Port of Miami anchorage benthic habitat polygon areas (km<sup>2</sup>) from the Miami-Dade benthic habitat map.

Hierarchical habitats are nested within broader categories to the left. The total area in km<sup>2</sup> and percentages of the entire anchorage (not the mapped area) are given for each category in all three hierarchical levels. \*Type and Habitat totals and percentages have been adjusted for more precise estimates of hardbottom in the patch reef classes.

Habitat	Type	Modifier	Modifier Area (km <sup>2</sup> )	Type Area (km <sup>2</sup> )	Habitat Area (km <sup>2</sup> )
Coral Reef and Colonized Hardbottom	Colonized Pavement	Deep	0.18 ; 1.82%	0.18 ; 1.82%	2.83* ; 28.06%*
	Linear Reef	Inner	0.67 ; 6.63%	1.75 ; 17.32%	
		Middle	0.22 ; 2.14%		
		Outer	0.86 ; 8.54%		
	Patch Reef	Aggregated-Deep	0.69 ; 6.83%	0.35* ; 3.43%*	
		Aggregated-Shallow	0.00 ; 0.02%		
	Ridge	Deep	0.01 ; 0.10%	0.55 ; 5.49%	
		Shallow	0.54 ; 5.39%		
Unconsolidated Sediment	Sand	Deep	1.87 ; 18.50%	3.95* ; 39.18%*	3.95* ; 39.18%*
		Shallow	1.74 ; 17.25%		
Other Delineations	Artificial		0.00 ; 0.01%	0.00 ; 0.01%	0.14 ; 1.37%
	Sand Borrow Area		0.14 ; 1.36%	0.14 ; 1.36%	
Total Mapped Area (km <sup>2</sup> )					6.92 ; 68.60%
Total Anchorage Area (km <sup>2</sup> )					10.09 ; 100.00%

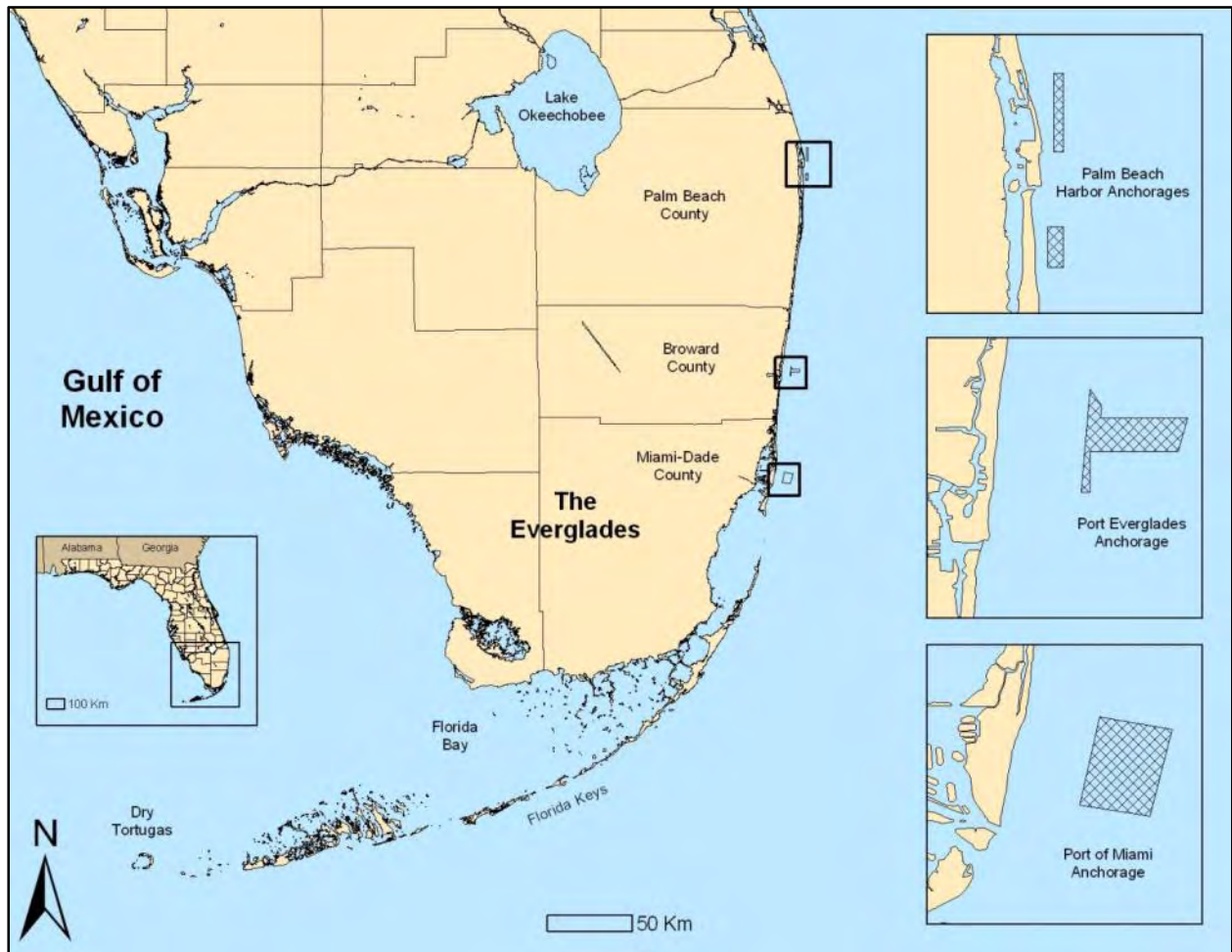


Figure 1. Present configuration and location of the major large vessel anchorages in SE Florida. Port Everglades was reconfigured in March 2007. Palm Beach and Miami-Dade are considered in this report.

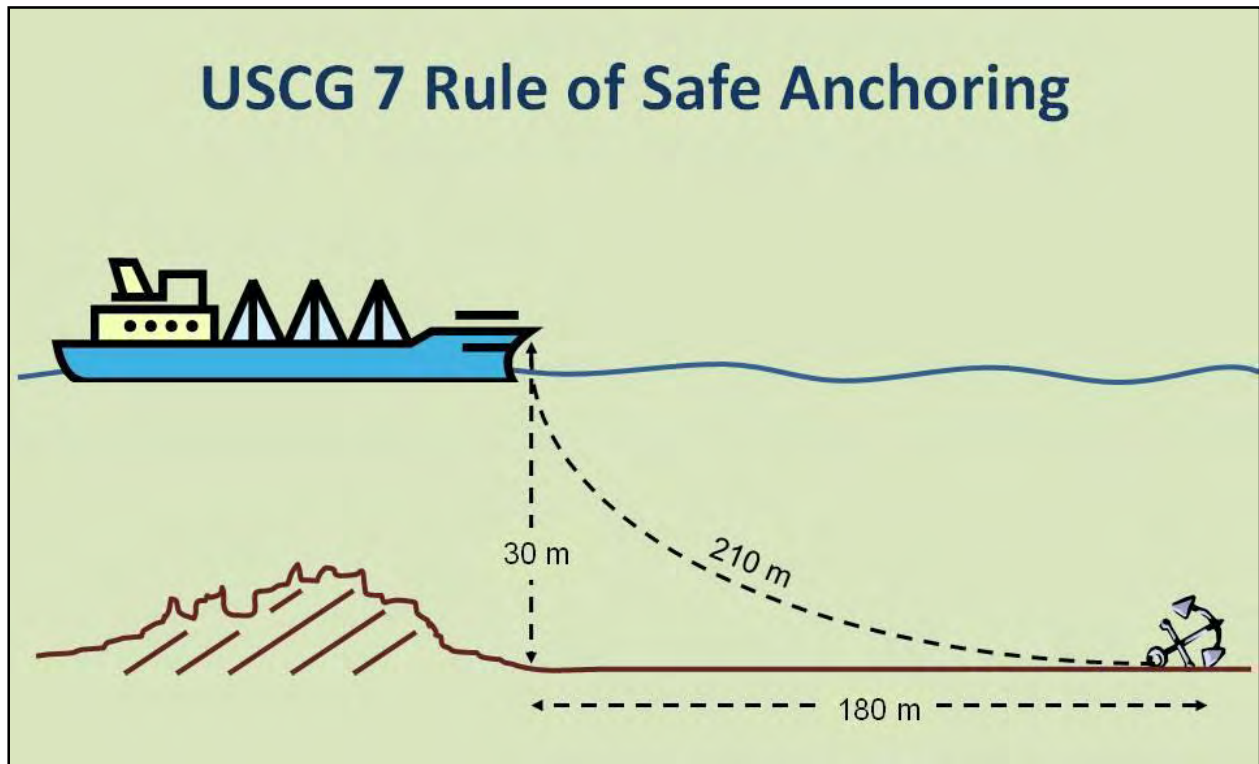


Figure 2. The buffer distance from all features was determined by applying the U.S. Coast Guard's 7-Rule for safe anchoring. Depth was determined at the feature's edge and multiplied by 6 to determine buffer distance.

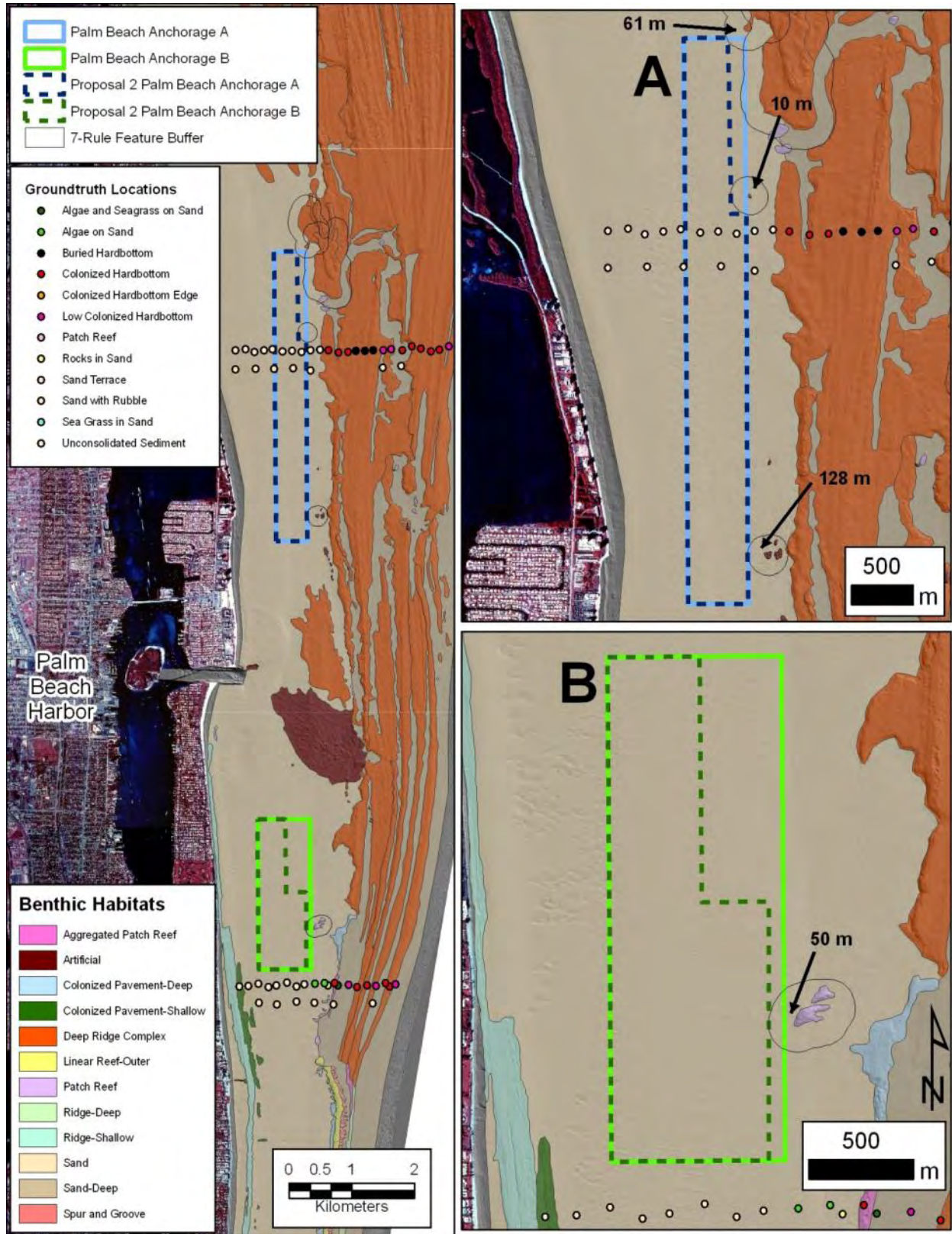


Figure 3. Map of Palm Beach anchorages overlain on benthic habitat map and LADS bathymetry. Map indicates that coral reef resources are not present inside the anchorages; however, there are resources nearby. Dashed lines are the 1<sup>st</sup> proposed reconfigurations to deter future coral habitat impacts and avoid any hazardous seafloor obstructions.

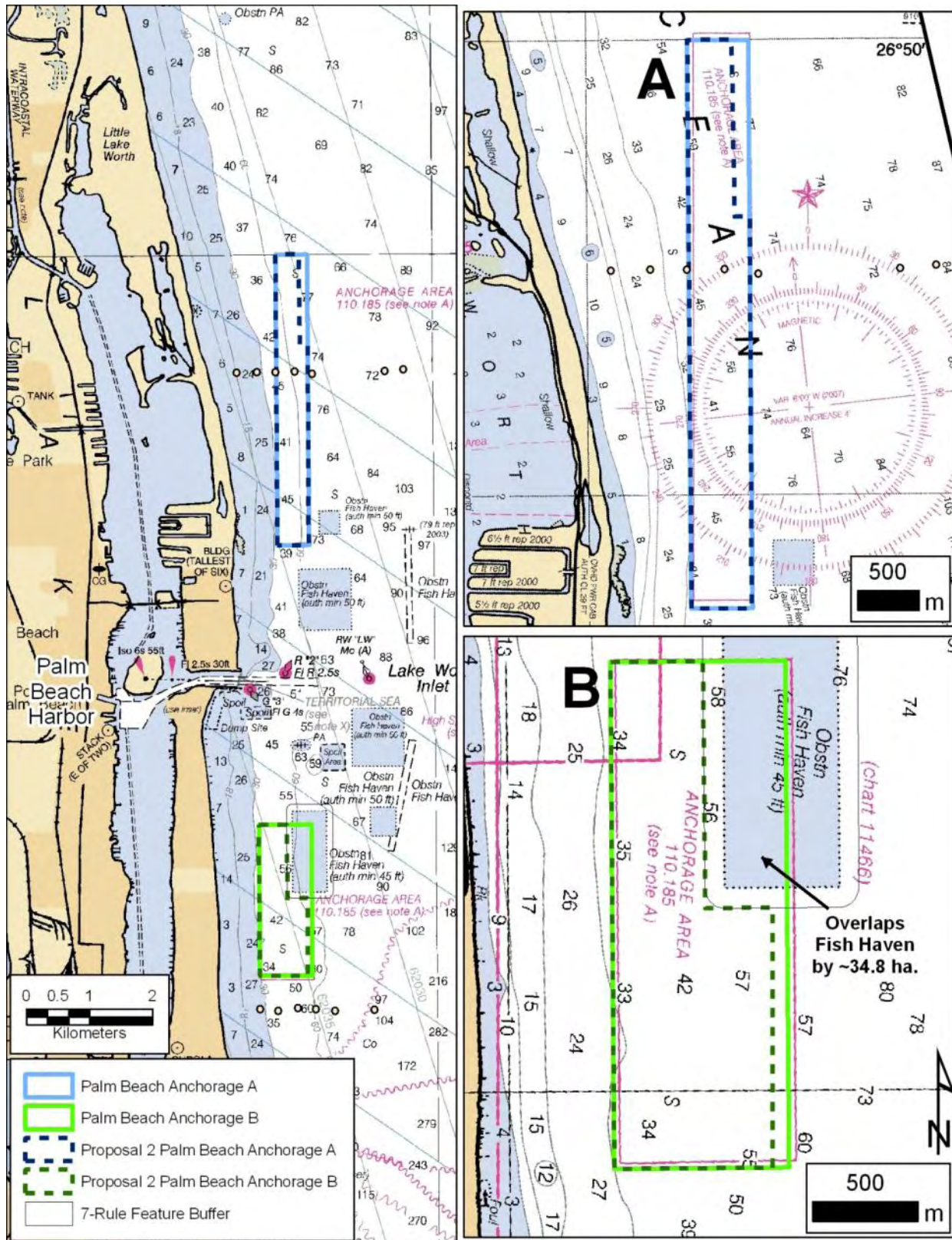


Figure 4. Map of Palm Beach anchorages overlain on the 2008 NOAA electronic nautical chart. Map indicates that Anchorage B (southernmost) overlaps with a fish haven by 34.8 hectares in the NE quadrant. Dashed lines are Proposal 1 reconfigurations to deter future coral habitat impacts and avoid any hazardous seafloor obstructions.

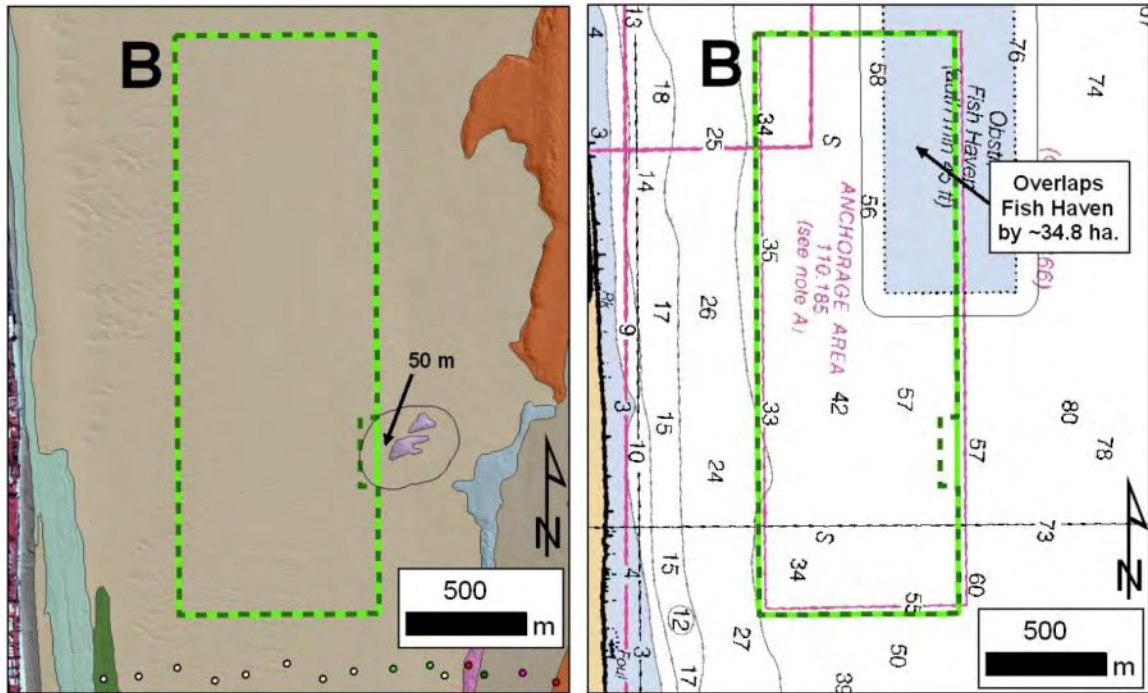


Figure 5. Map of Palm Beach Anchorage B in association with the benthic habitats (left) and the 2008 NOAA electronic nautical chart (right). Solid light green is the original and the dashed dark green lines are the Proposal 2 reconfiguration to avoid future coral habitat impacts with the small patch of coral reef habitat to the east. In this proposal, the modified anchorage would remain overlapped with a fish haven by 34.8 hectares in the NE quadrant.

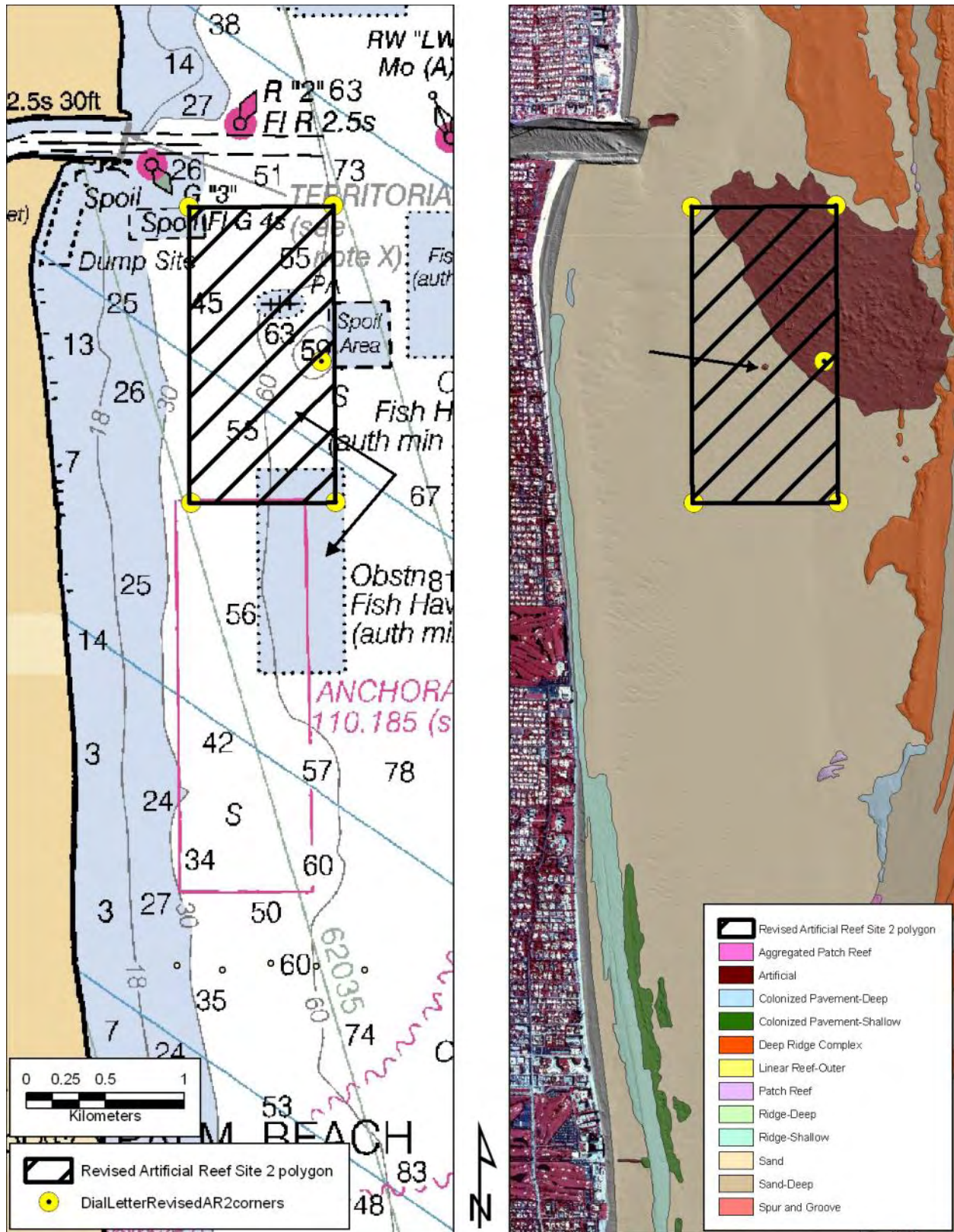


Figure 6. Map of the Palm Beach Artificial Reef Site #2 amendment (hatched area) on the NOAA nautical chart and benthic habitat map. The nautical chart shows the original fish haven site (shaded in blue) overlapping the anchorage (pink box). The habitat map shows the suspected 6,124 tons of concrete (arrow).



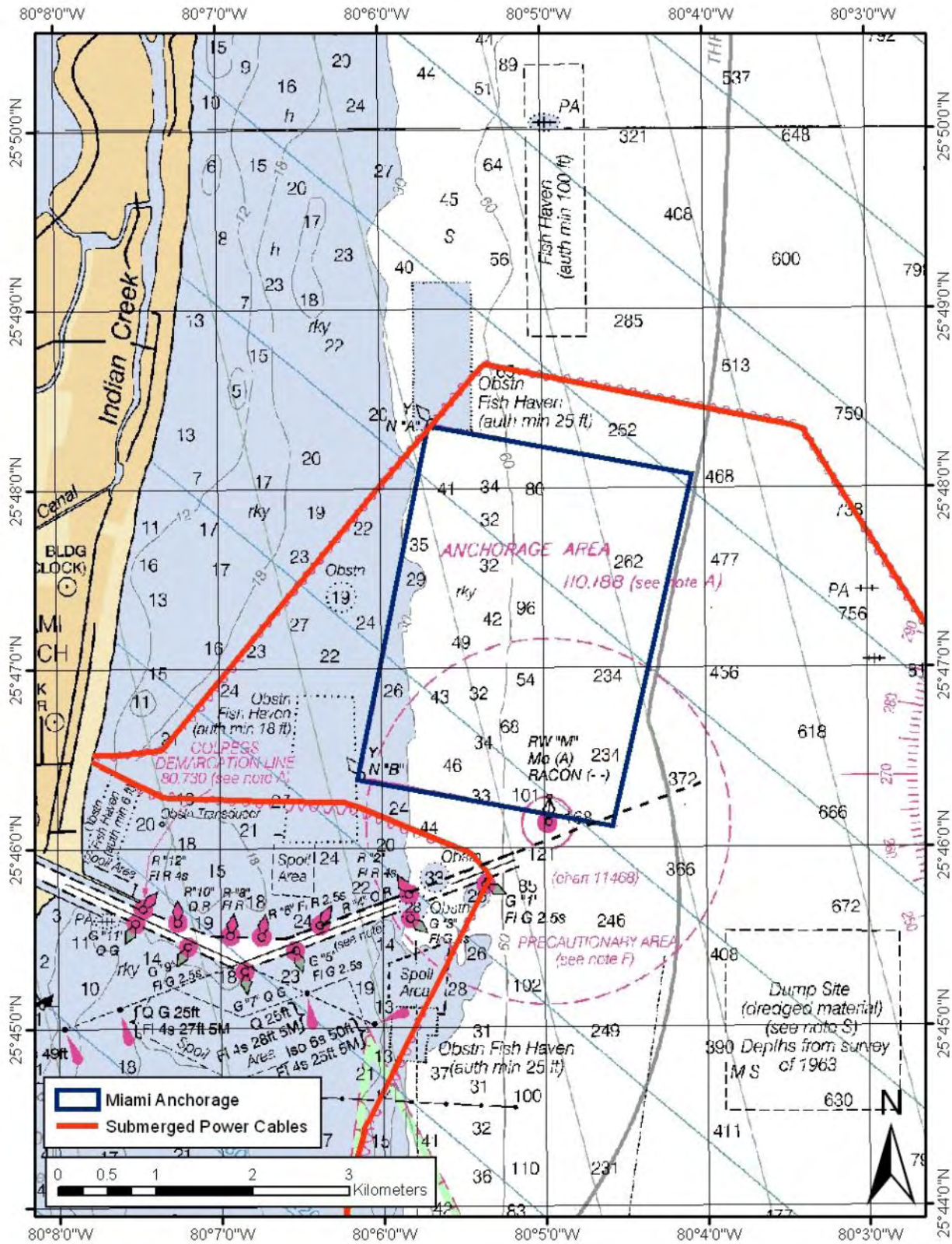


Figure 7. The Port of Miami anchorage (navy) overlain on the 2008 NOAA nautical chart. The anchorage overlaps with a fish haven and submerged power cables by 0.56 hectares in the NW and interferes with ship channel alignment in the SE. Dashed lines are proposed reconfigurations to avoid these hazards and impacts to coral habitat.

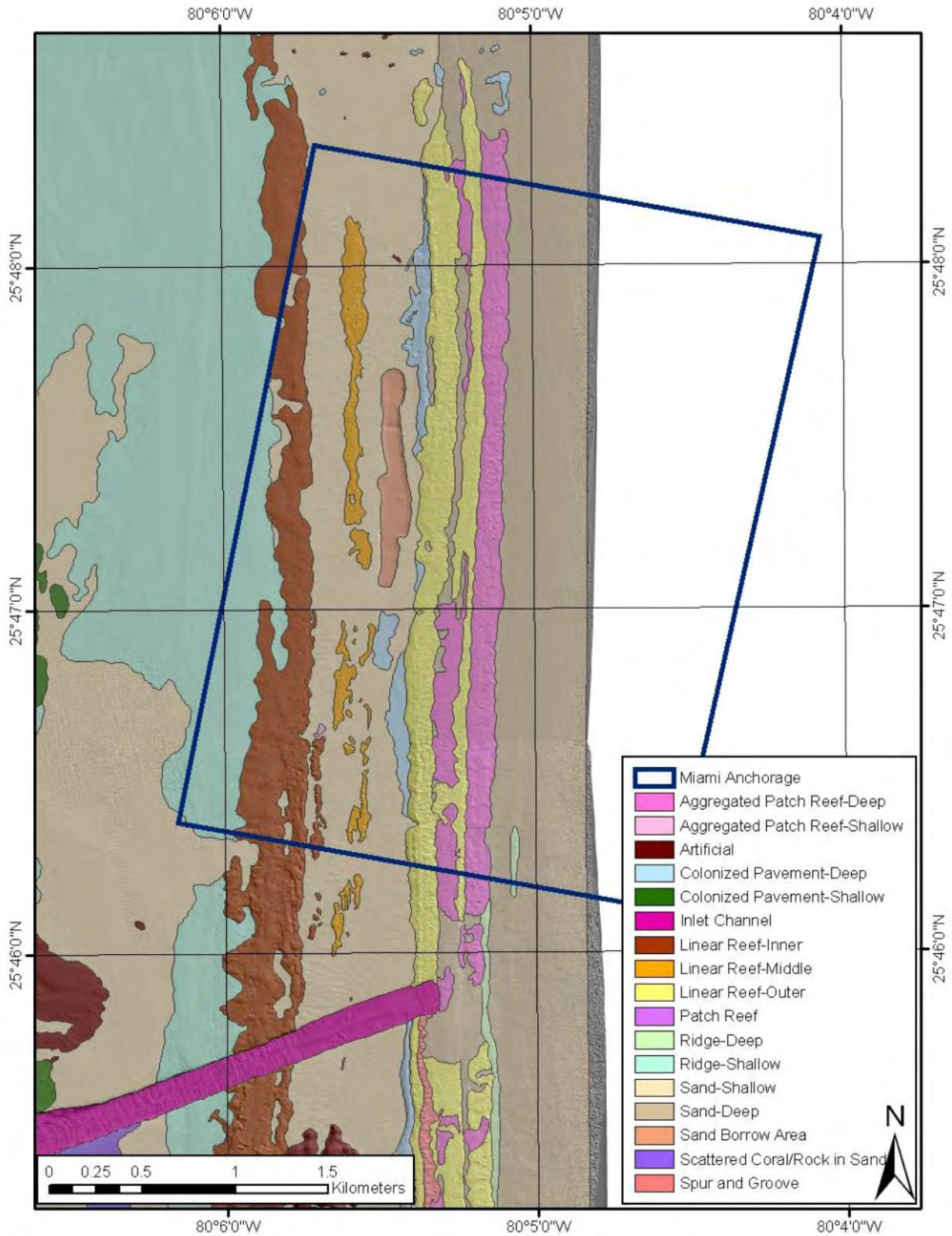


Figure 8. Map of Port of Miami anchorage (navy) overlain on the partially transparent Miami-Dade benthic habitat map and LADS bathymetry. Large portions of coral reef habitats are present within the western half of the anchorage.

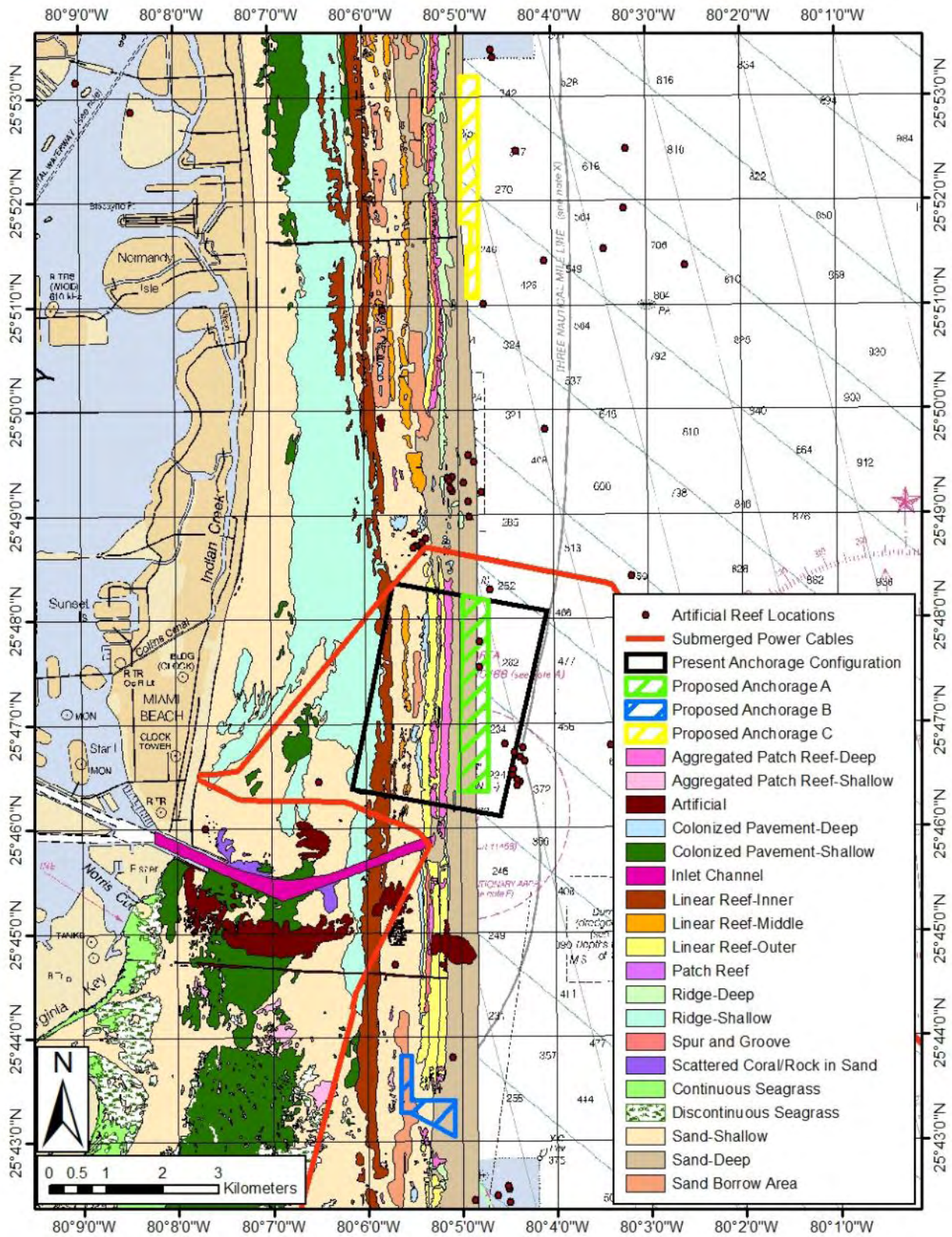


Figure 9. Map of 3 proposed alternate Miami anchorage configurations overlain on the benthic habitats and the 2008 NOAA electronic nautical chart.

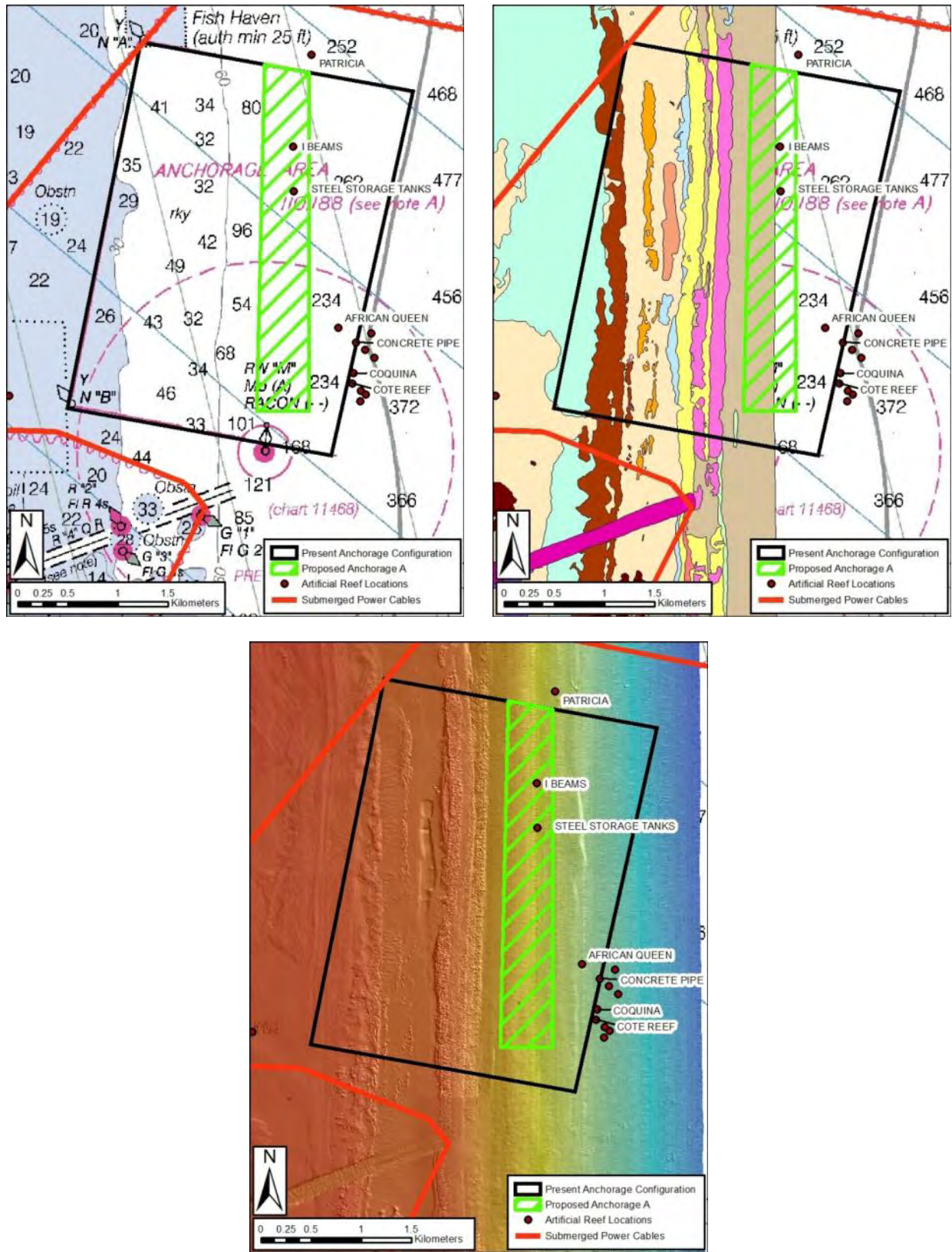


Figure 10. Proposed Anchorage A modification (green hash) in association with the NOAA nautical chart (top left), the benthic habitats (top right), and the 2009 NOAA hydrographic survey data (bottom). Several artificial reefs exist in the present anchorage.

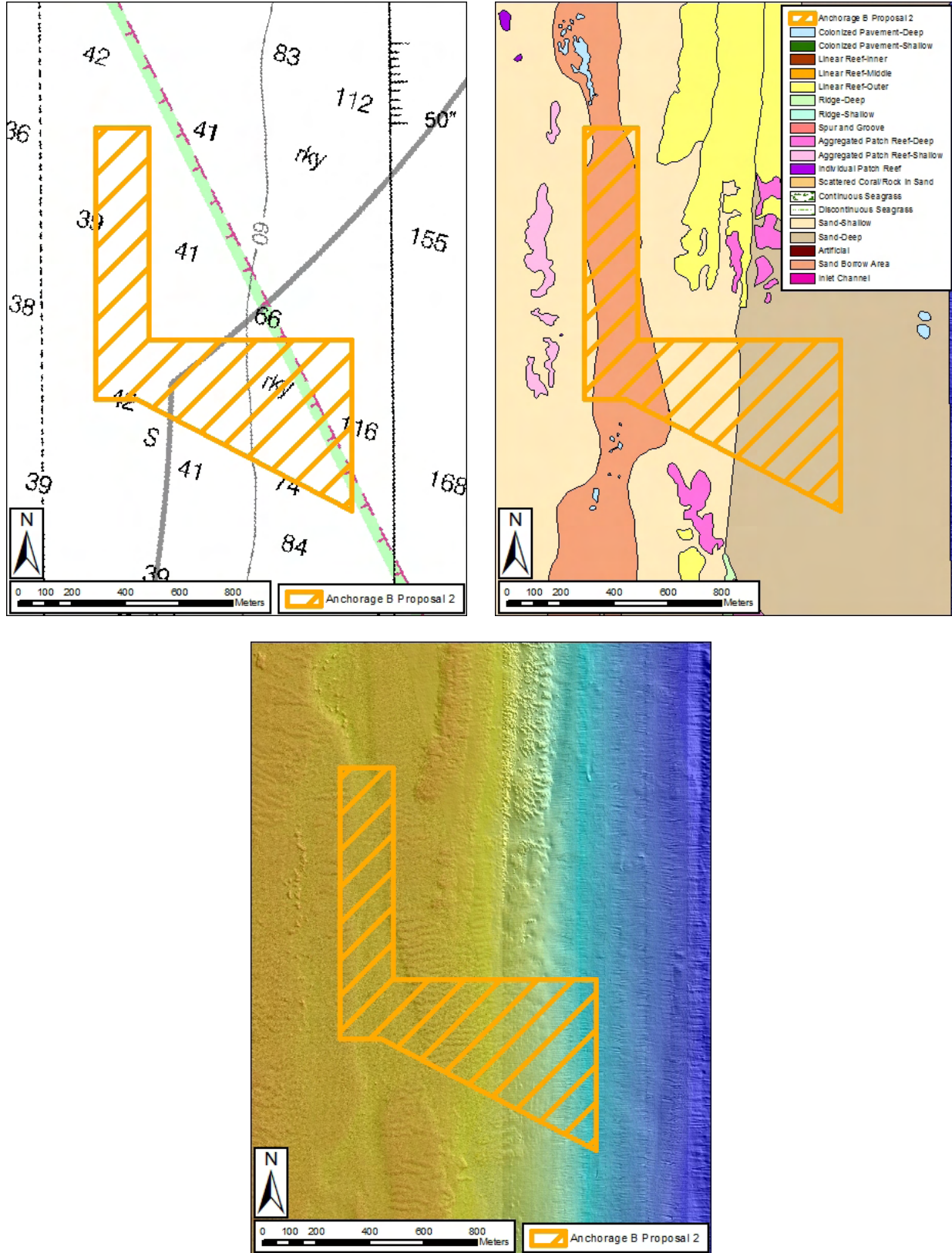


Figure 11. Proposed Anchorage B configuration (orange hash) in association with the NOAA nautical chart (top left), the benthic habitats (top right), and the 2009 NOAA hydrographic survey data (bottom).

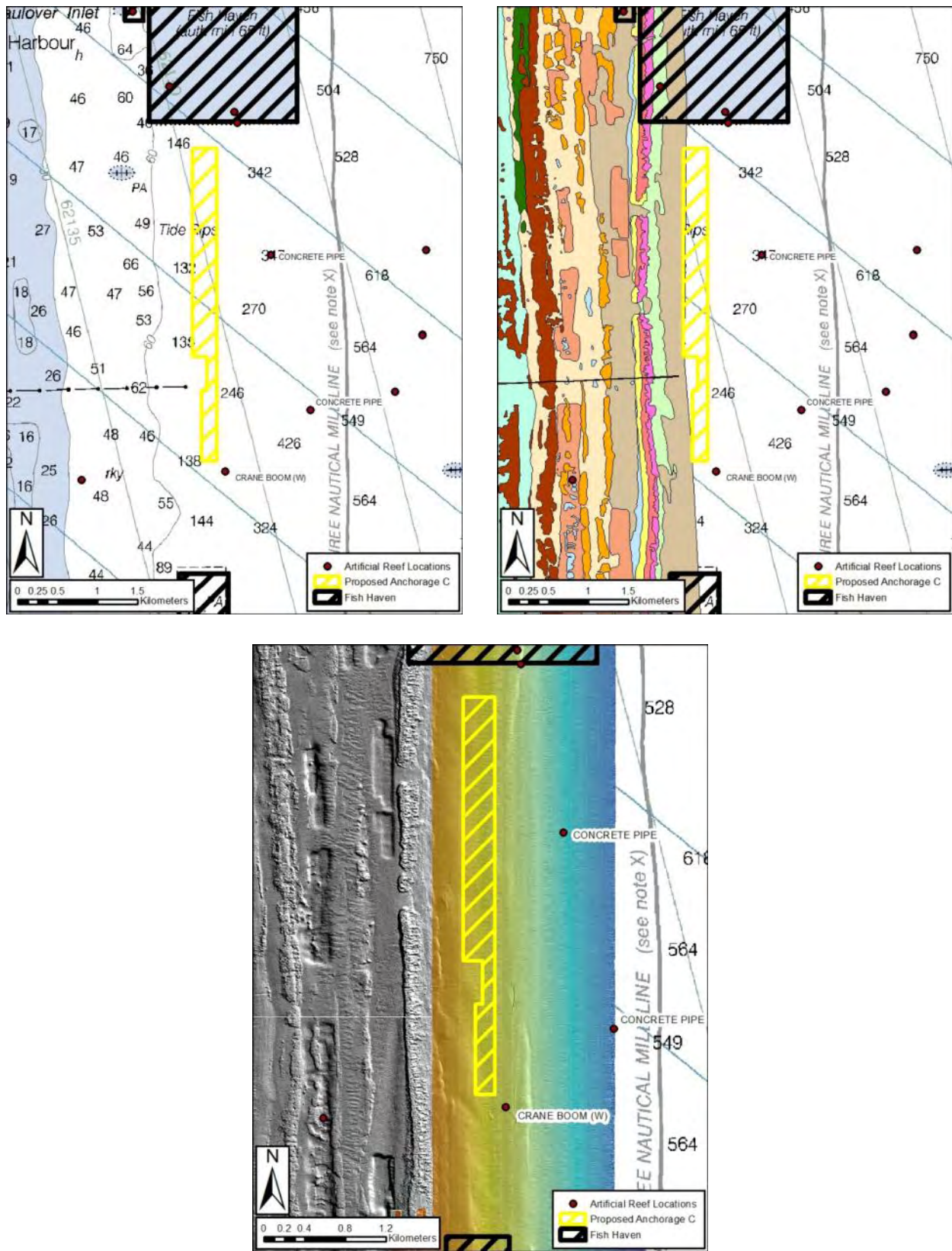


Figure 12. Proposed Anchorage C configuration (yellow hash) in association with the NOAA nautical chart (top left), the benthic habitats (top right), and the 2009 NOAA hydrographic survey data (bottom).

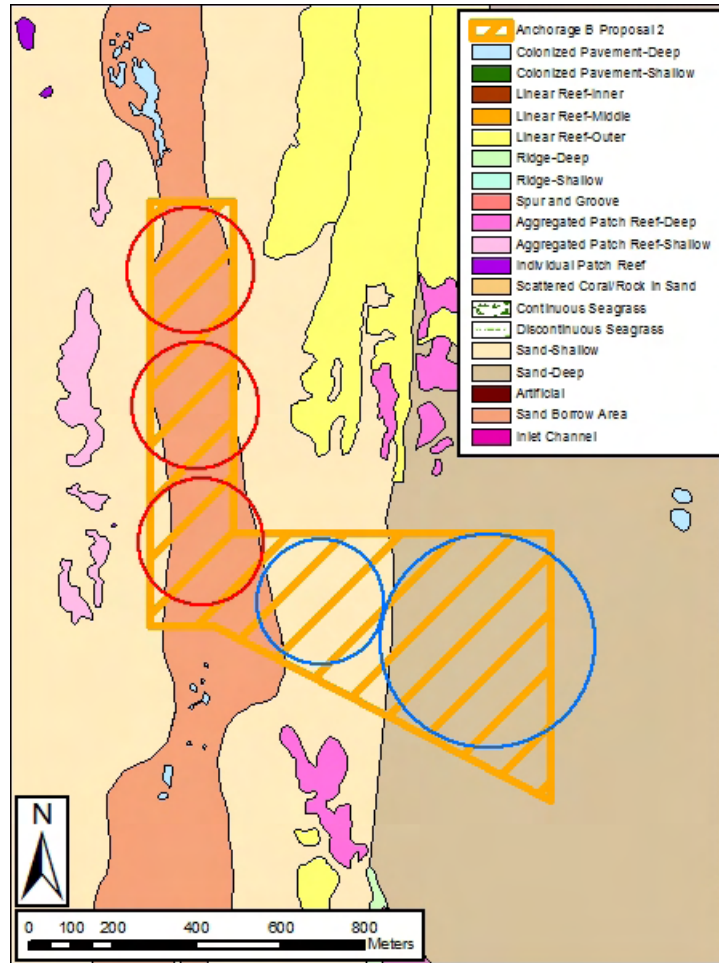


Figure 13. Proposed Anchorage B configuration (orange hash) in association with the benthic habitats. Circles show the estimated swing of a 75 m long vessel depending on depth using the 7 USCG Rule. It is estimated that 3 vessels can concurrently anchor in the shallow area (red circles) and 2 in the deep (blue circles).

Appendix 1. 1986 Federal Registry announcement for the Port of Palm Beach anchorage creation.

305

11726

Federal Register / Vol. 51, No. 68 / Monday, April 7, 1986 / Rules and Regulations

1986

DEPARTMENT OF TRANSPORTATION

Coast Guard

33 CFR Part 110

(CGD 7-85-10)

Anchorage Grounds: Atlantic Ocean off the Port of Palm Beach, FL

AGENCY: Coast Guard, DOT.

ACTION: Final rule.

SUMMARY: The Coast Guard is establishing two designated offshore Anchorage Grounds near the entrance to the Port of Palm Beach, FL. These offshore areas adjacent to Lake Worth Inlet are used as anchorage areas for vessels awaiting berthing space at the Port of Palm Beach. This rulemaking is needed to provide defined anchorage areas to protect local environmentally sensitive reefs presently being subjected to damage by ships' anchors and chains. EFFECTIVE DATE: May 7, 1986.

FOR FURTHER INFORMATION CONTACT: Lieutenant (j.g.) Harry D. Craig, (305) 350-5651.

SUPPLEMENTARY INFORMATION: On May 23, 1985 the Coast Guard published a notice of proposed rulemaking in the Federal Register for these regulations (50 FR 21310). Interested persons were requested to submit comments and six comments were received.

Drafting Information

The drafters of this notice are Lieutenant (j.g.) Harry D. Craig, project officer, Seventh Coast Guard District Port Safety Branch, and Lieutenant Commander Kenneth E. Gray, project attorney, Seventh Coast Guard District Legal Office.

Discussion of Comments

The majority of the comments received addressed potential conflicting usage for the proposed southern anchorage area. The Palm Beach County Health Department, the local administrator for the State's Artificial Reef Program, initially requested deletion of Anchorage B because of the suitability of this area for offshore artificial reefs. The constraints that limit placing artificial reef building materials in other areas of the county are "access to Lake Worth Inlet by large oceangoing vessels, creating reefs in locations which do not require long round trips and excessive expenditures, and prohibition from dumping material on existing productive natural and artificial reefs, submerged telephone cables, ocean outfall lines, or potential beach renourishment areas." Additional constraints require reef building

materials be placed on hard substrate and a 50' clearance be maintained over the deposited material. Two tenants of the Port of Palm Beach requested the proposed southern anchorage area be retained because of projections for increased vessel traffic at their facilities in the future. The Palm Beach Bar Pilots' Association also recommended retaining the proposed southern anchorage area because of "easy access to Lake Worth Inlet, greater protection than the proposed northern anchorage, deeper water closer to the beach and a sand bottom not endangering any natural reef areas." The Coast Guard solicited comments from the Army Corps of Engineers and the Florida Department of Environmental Regulation on the proposed rule because of their role as administrators of the Artificial Reef Program. The Corps of Engineers expressed no objection to the establishment of the anchorage grounds from the standpoint of their Federal Navigation Project, Harbor Project, or the location of artificial reefs and disposal areas. The Florida Department of Environmental Regulation did not desire to make any comments other than those expressed by the local Palm Beach County Artificial Reef Program Administrator. On Nov. 27, 1985, the Port of Palm Beach submitted a revised proposal for the southern anchorage area after meeting with the Palm Beach Bar Pilots and representatives of the Palm Beach Artificial Reef Committee. The change moved the northern boundary of Anchorage B approximately one half mile south to preserve this area for artificial reef sites. This change was acceptable to interested parties and did not substantially reduce the total anchorage area available. The coordinates of Anchorage B were revised in the Final Rule to reflect this change. No request for a public hearing was received and one was not held.

This final action has been thoroughly reviewed by the Coast Guard and has been determined to be categorically excluded from further environmental documentation in accordance with paragraph 2-B-3 of Commandant Instruction M16475.1A.

This regulation is issued pursuant to 33 U.S.C. 471 as set out in the authority citation for all of Part 110.

Economic Assessment and Certification

These regulations are considered to be non-major under Executive Order 12291 on Federal Regulation and nonsignificant under Department of Transportation regulatory policies and procedures (44 FR 11034; February 28, 1979). The economic impact of this final rule is expected to be so minimal that

Received  
4/14/86  
ACPG + Area 3  
CHTS:  
+11472 B +1035 ET 2  
ON 4/24/86  
+11466.04 4/23/86  
11460 NC  
11013 NC

Handwritten initials/signature

305

APR 14 1986



full regulatory evaluation is unnecessary. This regulation will provide defined anchorage areas for vessels awaiting berthing space at the Port of Palm Beach.

Since the impact of this final rule is expected to be minimal, the Coast Guard certifies that, if adopted, it will not have a significant economic impact on a substantial number of small entities.

**List of Subjects in 33 CFR Part 110**

Anchorage grounds.

**Final Regulations**

In consideration of the foregoing, Part 110 of Title 33, Code of Federal Regulations, is amended as follows:

**PART 110—(AMENDED)**

1. The authority citation for Part 110 continues to read as follows:

Authority: 33 U.S.C. 471, 2030, 2035, and 2071; 49 CFR 1.46 and 33 CFR 1.05-1(a).

2. Section 110.185 is added to read as follows:

§ 110.185 Atlantic Ocean, off the Port of Palm Beach, FL.

(a) The anchorage grounds. (1) Anchorage A. The waters lying within an area bounded by a line beginning at latitude 26°50'00" N., longitude 80°01'12" W.; thence westerly to latitude 26°50'00" N., longitude 80°01'30" W.; thence southerly to latitude 26°47'30" N., longitude 80°01'30" W.; thence easterly to latitude 26°47'30" N., longitude 80°01'12" W.; and thence northerly to the point of beginning.

(2) Anchorage B. The waters lying within an area bounded by a line beginning at latitude 26°45'08" N., longitude 80°01'12" W.; thence westerly to latitude 26°45'08" N., longitude 80°01'42" W.; thence southerly to latitude 26°43'48" N., longitude 80°01'42" W.; thence easterly to latitude 26°43'48" N., longitude 80°01'12" W.; and thence northerly to the point of beginning.

(b) The regulations. (1) Vessels in the Atlantic Ocean near Lake Worth Inlet awaiting berthing space at the Port of Palm Beach, shall only anchor within the anchorage areas hereby defined and established, except in cases of great emergency.

(2) Vessels anchoring under circumstances of great emergency outside the anchorage areas shall be shifted to new positions within the anchorage areas immediately after the emergency ceases.

Date: March 11, 1986.

R.P. Coarod,  
Rear Admiral, U.S. Coast Guard Commander,  
Seventh Coast Guard District.

[FR Doc. 86-7825 Filed 4-4-86; 8:45 am]

BILLING CODE 4910-14-8

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APR 14 1986

Appendix 2. Paperwork provided by Steve Soherr of NOAA Hydrographic Services on the inception of the fish haven "Palm Beach Reef Site #2".

		1423
Minute Memo		2001 TLW
Subject: Palm Beach Artificial Reef Site #2		
To	Message/Comment	From/Date
Products Branch E	<p>Cartog.</p> <p>Palm Beach Artificial Reef Site #2 has been an active reef site since 1989 and has an authorized minimum clearance of 45 feet. The coordinates for this reef are NAD 83. This information was provided by Tom Mahar of the Florida Fish and Wildlife Conservation Commission.</p> <p style="text-align: center;">Nautical Data Branch</p> <p style="text-align: center;"><b>CRITAREA DISCLAIMER!!!!</b>  <small>Critarea coordinates are based on NAD83.                      NDB has done a cursory examination of the attached data. Please review to check for data entry errors. Plots generated from the database cannot be assumed to be accurate unless coordinate listings have been checked. Please notify NDB if you find an error.</small></p> <p>Document Number <u>1423/01</u>                      Description <u>PALM BEACH #2</u>                      Date Entered <u>8/17/01</u></p> <p>(E) (D)  <b>PRODUCTS</b>                      CP4                      11472 ENC                      11472 B KAPP 295                      11472 B KAPP 296                      11466 KAPP 349                      11466 ENC                      11460                      11009                      11013                      411</p>	NDB 8/14/01
		1423
		AUG 20 2001

PALM BEACH SITE #2 (D)

Permit History:

ACOE:	SAJ-50 #86GP30295	issued: 9-86
DEP:	File No. 501077876	issued: 8-85
DNR:	File No. 501077876	issued: 7-90

Site Development History:

Tri-County Concrete	6124 Tons Concrete	1989-92
---------------------	--------------------	---------

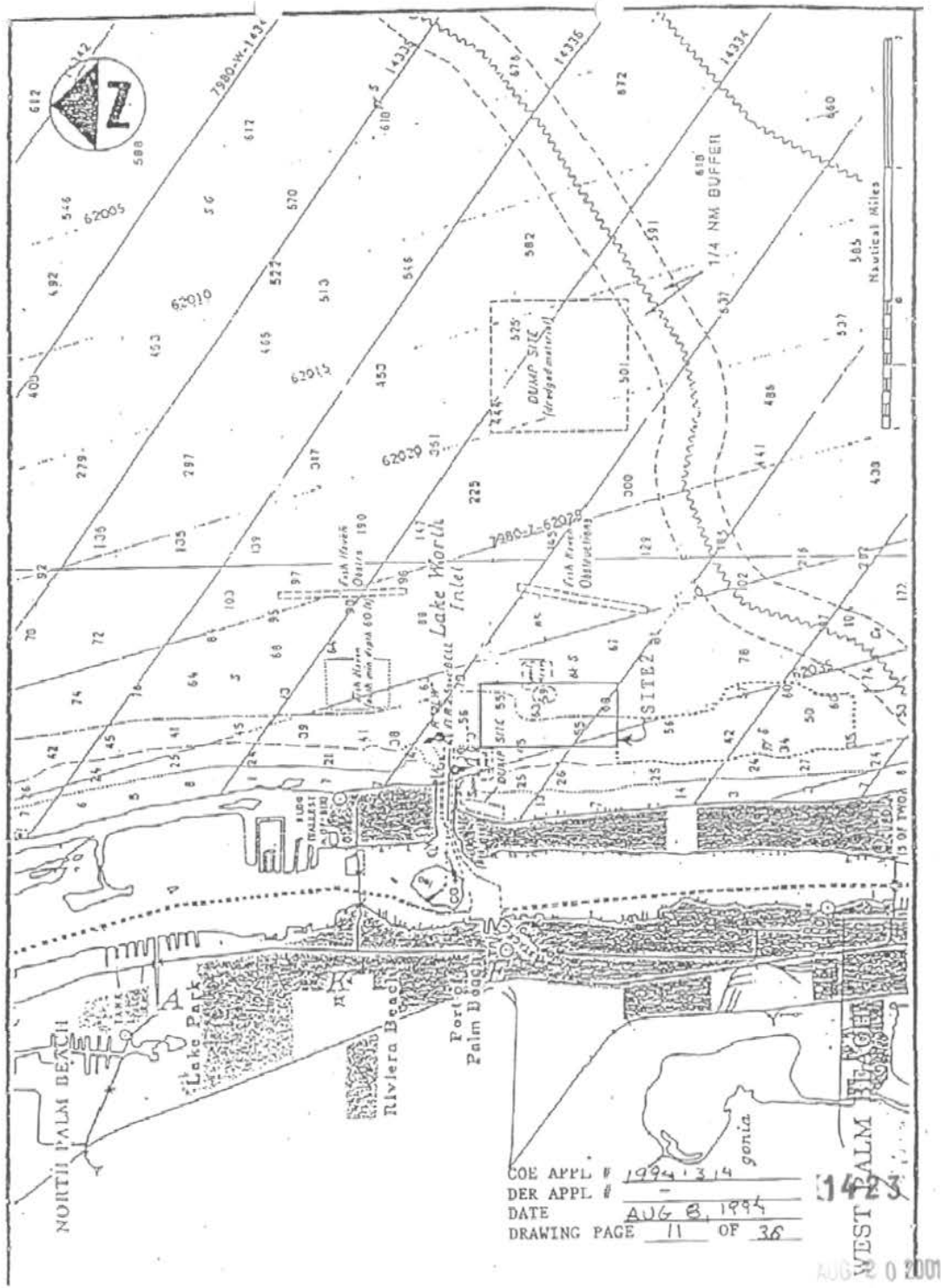
COORDINATES

NW Corner	26° 45.22'	80° 01.38'
SW Corner	26° 44.52'	80° 01.38'
Center	26° 45.07'	80° 01.22'
NE Corner	26° 45.22'	80° 01.05'
SE Corner	26° 44.52'	80° 01.05'

1423

COE APPL #	199401314
DER APPL #	-
DATE	AUG 8, 1994
DRAWING PAGE	10 OF 36

AUG 20 2001



**SITE SPECIFIC NAVIGATIONAL CLEARANCES**

Permit Application No. 199401314 (IP-TB)  
Palm Beach County

SITE	CLEARANCE
Jupiter Site #1	-50' MLLW
Jupiter Site #2	-50' MLLW
Palm Beach Site #1	-50' MLLW
Palm Beach Site #2	-45' MLLW
Palm Beach Site #3	-50' MLLW
Palm Beach Site #4	-12' MLLW
Palm Beach Site #5	-50' MLLW
Palm Beach Site #6	-50' MLLW
Boynton Beach Site #1	-50' MLLW
Boynton Beach Site #3	-50' MLLW
Boca Raton Site #1	-50' MLLW
Boca Raton Site #2	-50' MLLW
Kreusler Park Site	-6' MLLW
Lake Worth Lagoon Site #1	-10' MLLW
Lake Worth Lagoon Site #2	-10' MLLW
Lake Worth Lagoon Site #4	-6' MLLW

NOTES: The controlling depth for Lake Worth Inlet and the Port of Palm Beach is -33' MLLW. All other inlets in the county are listed by the Coast Guard as "hazardous without local knowledge" because of shoaling. No site is located within any shipping lane. The Kreusler Park Site is located entirely within a guarded swimming area that prohibits entry by boats. Charts and additional information for the Lake Worth Lagoon sites are attached.

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COE APPL # 199401314  
 DER APPL # -  
 DATE AUG 8 1994  
 DRAWING PAGE 36 OF 36

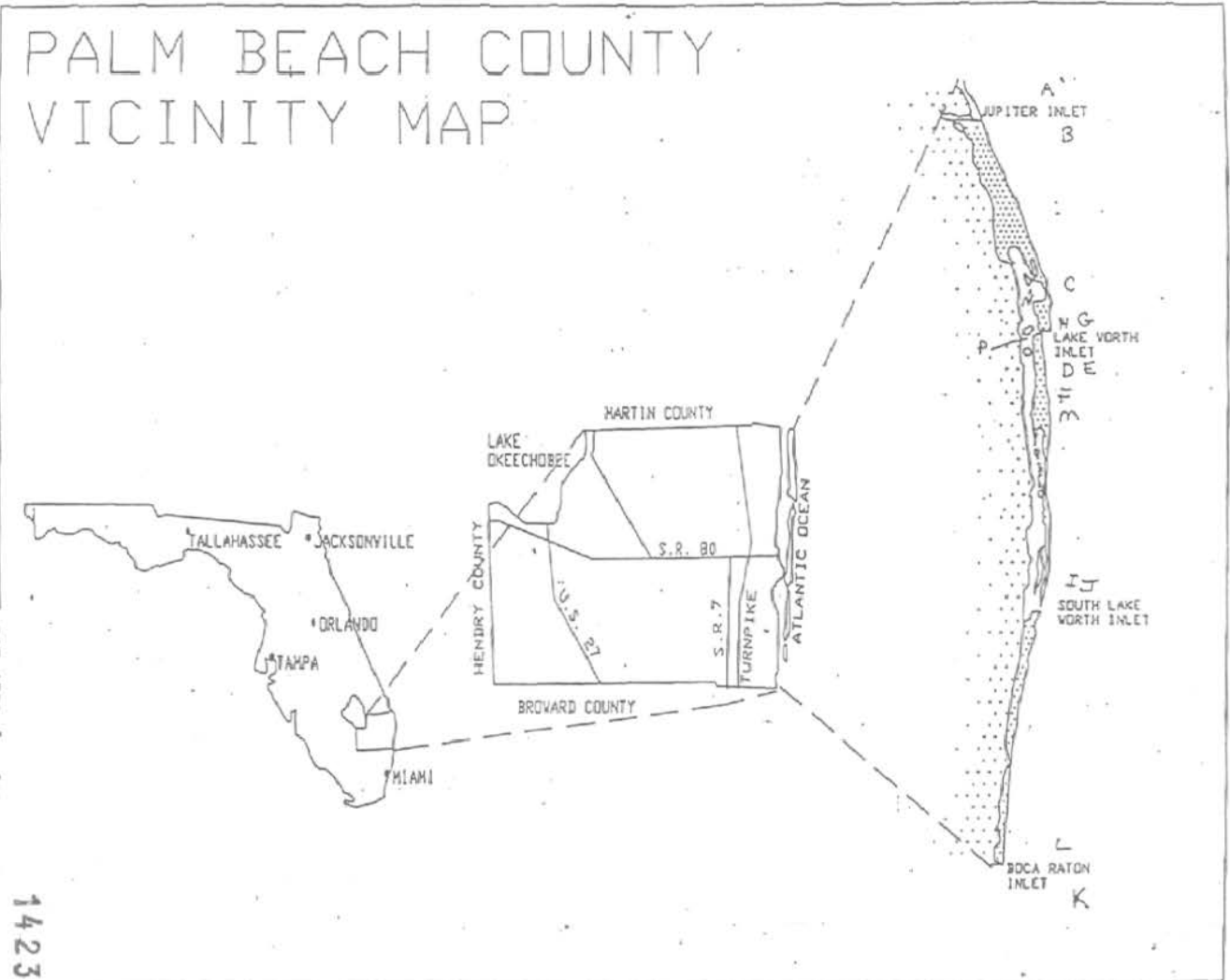
AUG 20 2001

199401314 (IP-TB) PALM BEACH COUNTY ARTIFICIAL REEF EXISTING CONDITIONS

REEF	LOCATION & SITE NUMBER	OLD COE PERMIT	EXISTING SITE CONDITIONS
A	JUPITER INLET SITE #1	1987 SAJ-50	THREE SHIPS AND 250 TONS OF CONCRETE ON BOTTOM
B	JUPITER INLET SITE #2	1985 SAJ-50	SITE IS EMPTY, AREA WAS FOUND SUITABLE IN 1985
C	PALM BEACH SITE #1	1985 SAJ-50	TWO LARGE BARGES AND 5400 TONS OF CONCRETE
D	PALM BEACH SITE #2	1986 SAJ-50	6124 TONS OF CONCRETE
E	PALM BEACH SITE #3	1985 SAJ-50	A FREIGHTER AND BARGE PLACED IN 1985
F	PALM BEACH SITE #4	1991 SAJ-50	CONCRETE MODULES
G	PALM BEACH SITE #5	1992 SAJ-50	ONE BARGE AND 400 TONS OF CONCRETE
H	PALM BEACH SITE #6	1967 PERMIT	FOUR SHIPS AND BRIDGE RUBBLE
I	BOYNTON BEACH SITE #1	1987 SAJ-50	TWO SHIPS AND 2300 TONS OF CONCRETE
J	BOYNTON BEACH SITE #3	1989 SAJ-50	ONE FREIGHTER
K	BOCA RATON SITE #1	1987 SAJ-50	ONE FREIGHTER AND ONE BARGE
L	BOCA RATON SITE #2	1989 SAJ-50	CONCRETE MODULES
M	KREUSLER SITE	1993 SAJ-50	SITE IS EMPTY, THE SITE NEAR THE SHORE IN +12 FEET OF WATER, THE SITE IS MILES FROM ANY INLET
N	LAKE WORTH LAGOON SITE #1	1991 SAJ-50	SEE ITEM "N" BELOW
O	LAKE WORTH LAGOON SITE #2	1991 SAJ-50	SEE ITEM "O" BELOW
P	LAKE WORTH LAGOON SITE #4	NEW SITE	SEE ITEM "P" BELOW

1423

COE APPL # 199401314  
 DER APPL # -  
 DATE Aug 8, 1994  
 DRAWING PAGE 2 OF 36  
 AUG 20 2001



1423

COE APPL # 19540314  
DER APPL #  
DATE AUG 2 1994  
DRAWING PAGE 3 OF 36  
AUG 2 0 2001

Palm Beach County Permitted Reef Sites Sheet 1

ACRES

SITE NAME	LATITUDE	LAT_DD	LONGITUDE	LON_DD	Location	gps	area
JUPITER INLET SITE #1	2658.54	26.97567	8001.65	-80.02750	Center	DGPS	25,758,518
JUPITER INLET SITE #1	2659.07	26.98450	8001.04	-80.01733	NE Corner	DGPS	
JUPITER INLET SITE #1	2657.96	26.96600	8000.86	-80.01433	SE Corner	DGPS	
JUPITER INLET SITE #1	2657.96	26.96600	8001.85	-80.03083	SW Corner	DGPS	
JUPITER INLET SITE #1	2659.07	26.98450	8001.45	-80.02417	NW Corner	DGPS	
JUPITER INLET SITE #2	2657.78	26.96300	7959.22	-79.98700	Center	DGPS	7,110,652
JUPITER INLET SITE #2	2657.58	26.95967	7959.07	-79.98450	NE Corner	DGPS	
JUPITER INLET SITE #2	2657.28	26.95467	7959.07	-79.98450	SE Corner	DGPS	
JUPITER INLET SITE #2	2657.28	26.95467	7959.40	-79.99000	SW Corner	DGPS	
JUPITER INLET SITE #2	2658.28	26.97133	7959.40	-79.99000	NW Corner	DGPS	
PALM BEACH SITE #1	2647.40	26.79000	7959.34	-79.98800	Center	DGPS	9,592,655
PALM BEACH SITE #1	2648.10	26.80167	7959.17	-79.98617	NE Corner	DGPS	
PALM BEACH SITE #1	2647.10	26.78500	7959.17	-79.98617	SE Corner	DGPS	
PALM BEACH SITE #1	2647.10	26.78500	7959.40	-79.99000	SW Corner	DGPS	
PALM BEACH SITE #1	2648.10	26.80167	7959.52	-79.99200	NW Corner	DGPS	
PALM BEACH SITE #2	2645.07	26.75117	8001.22	-80.02033	Center	DGPS	7,647,796
PALM BEACH SITE #2	2645.22	26.75367	8001.05	-80.01750	NE Corner	DGPS	
PALM BEACH SITE #2	2644.52	26.74200	8001.05	-80.01750	SE Corner	DGPS	
PALM BEACH SITE #2	2644.52	26.74200	8001.38	-80.02300	SW Corner	DGPS	
PALM BEACH SITE #2	2645.22	26.75367	8001.38	-80.02300	NW Corner	DGPS	
PALM BEACH SITE #3	2645.85	26.76417	8000.55	-80.00917	Center	DGPS	8,261,449
PALM BEACH SITE #3	2645.60	26.76000	8000.30	-80.00500	NE Corner	DGPS	
PALM BEACH SITE #3	2645.60	26.76000	8000.80	-80.01333	SE Corner	DGPS	
PALM BEACH SITE #3	2646.10	26.76833	8000.80	-80.01333	SW Corner	DGPS	
PALM BEACH SITE #3	2646.10	26.76833	8000.30	-80.00500	NW Corner	DGPS	
PALM BEACH SITE #4	2641.25	26.68750	8001.65	-80.02750	Center	DGPS	4,929,866
PALM BEACH SITE #4	2642.00	26.70000	8001.60	-80.02667	NE Corner	DGPS	
PALM BEACH SITE #4	2640.50	26.67500	8001.60	-80.02667	SE Corner	DGPS	
PALM BEACH SITE #4	2640.50	26.67500	8001.70	-80.02833	SW Corner	DGPS	
PALM BEACH SITE #4	2642.00	26.70000	8001.70	-80.02833	NW Corner	DGPS	
PALM BEACH SITE #5	2647.70	26.79500	8001.00	-80.01667	Center	DGPS	1,325,461
PALM BEACH SITE #5	2647.80	26.79667	8000.90	-80.01500	NE Corner	DGPS	
PALM BEACH SITE #5	2647.60	26.79333	8000.90	-80.01500	SE Corner	DGPS	
PALM BEACH SITE #5	2647.60	26.79333	8001.10	-80.01833	SW Corner	DGPS	
PALM BEACH SITE #5	2647.80	26.79667	8001.10	-80.01833	NW Corner	DGPS	
PALM BEACH SITE #6	2647.00	26.78333	8001.00	-80.01867	Center	DGPS	8,278,597
PALM BEACH SITE #6	2647.30	26.78833	8000.80	-80.01333	NE Corner	DGPS	
PALM BEACH SITE #6	2646.80	26.78000	8000.80	-80.01333	SE Corner	DGPS	
PALM BEACH SITE #6	2646.80	26.78000	8001.30	-80.02167	SW Corner	DGPS	
PALM BEACH SITE #6	2647.30	26.78833	8001.30	-80.02167	NW Corner	DGPS	
BOYNTON BEACH SITE #1	2628.80	26.48000	8002.25	-80.03750	Center	DGPS	12,775,205
BOYNTON BEACH SITE #1	2628.90	26.48167	8001.57	-80.02617	NE Corner	DGPS	
BOYNTON BEACH SITE #1	2628.41	26.47350	8002.15	-80.03583	SE Corner	DGPS	
BOYNTON BEACH SITE #1	2628.55	26.47583	8002.62	-80.04367	SW Corner	DGPS	
BOYNTON BEACH SITE #1	2629.02	26.48367	8002.53	-80.04217	NW Corner	DGPS	
BOYNTON BEACH SITE #3	2633.24	26.55400	8001.06	-80.01767	Center	DGPS	35,605
BOYNTON BEACH SITE #3	2634.00	26.56867	8000.48	-80.00800	NE Corner	DGPS	
BOYNTON BEACH SITE #3	2632.42	26.54033	8000.51	-80.00850	SE Corner	DGPS	
BOYNTON BEACH SITE #3	2632.46	26.54100	8001.14	-80.01900	SW Corner	DGPS	
BOYNTON BEACH SITE #3	2634.03	26.56717	8001.22	-80.02033	NW Corner	DGPS	
BOCA RATON SITE #1	2619.21	26.32017	8003.21	-80.05350	Center	DGPS	276,695
BOCA RATON SITE #1	2619.24	26.32067	8003.19	-80.05317	NE Corner	DGPS	
BOCA RATON SITE #1	2619.18	26.31967	8003.19	-80.05317	SE Corner	DGPS	
BOCA RATON SITE #1	2619.18	26.31967	8003.33	-80.05550	SW Corner	DGPS	
BOCA RATON SITE #1	2619.24	26.32067	8003.33	-80.05550	NW Corner	DGPS	

591.3

163.2

220.2

175.6

189.7

113.2

30.4

190.1

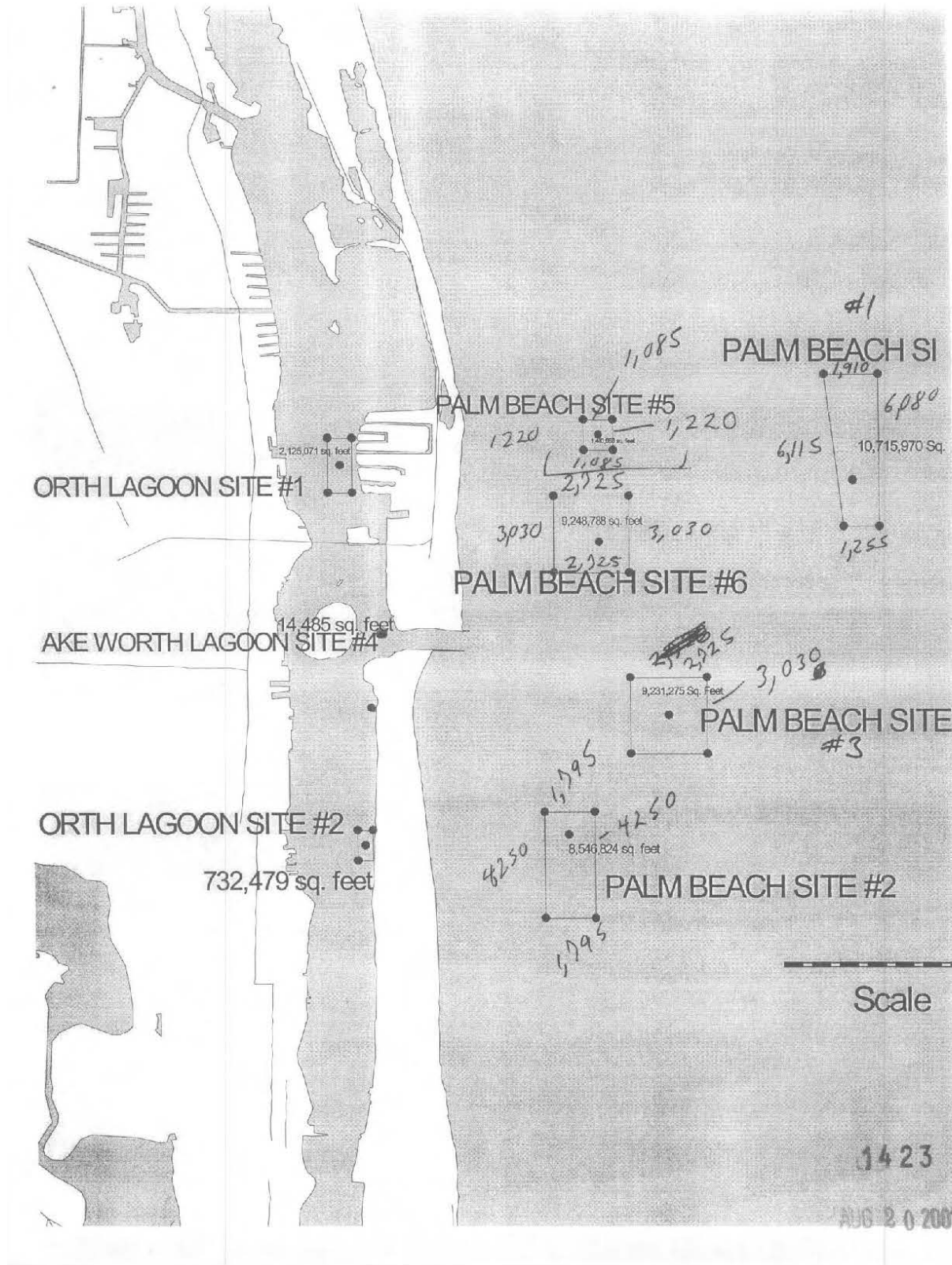
293.3

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6.4

1423







This notice of authorization must be conspicuously displayed at the site of work.

United States Army Corps of Engineers

SEPT 21  
19 94

WEST PALM BEACH COUNTY WILL CONTINUE TO DEVELOP 15 EXISTING ARTIFICIAL REEF SITES AND ONE NEW ARTIFICIAL REEF SITE.

At permit to

at 16 INDIVIDUAL SITES, (13 OFF SHORE PALM BEACH CO, 3 IN LAKE WORTH LAGOON)

has been issued to MR RICHARD E WALESKY, AGENT on SEPT 21 19 94

Address of Permittee 3111 S. DIXIE HWY, SUITE 146, WEST PALM BEACH, FL 33405

Permit Number

199401314(IP-TB)

*Terry L. Rice*  
TERRY L. RICE, COL., US ARMY COE  
District Commander

ENG FORM 4336 , Jul 81 (33 CFR 320-330) EDITION OF JUL 70 MAY BE USED

(Proponent: CECW-O)

1423

AUG 20 2001



Lawton Chiles  
Governor

# Florida Department of Environmental Protection

Port St. Lucie Branch Office  
1801 S.E. Hillmoor Drive, Suite C-204  
Port St. Lucie, Florida 34952

(407)871-7662  
(407)335-4310

Virginia B. Wetherell  
Secretary

JUN 01 1994

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
NOTICE OF PERMIT ISSUANCE

ENV. RES. MGMT.

Reviewed	_____
Caution & Warnings	<input type="checkbox"/>
Env. Reports	<input type="checkbox"/>
Wetlands Control	<input type="checkbox"/>
Water Resources	<input type="checkbox"/>
Fiscal	<input type="checkbox"/>
Asst. City Admin.	<input type="checkbox"/>
Copy <input type="checkbox"/> File <input type="checkbox"/>	

In the Matter of an Application                      DEP File No. 502475946  
for Permit by:

Palm Beach County Env. Resource Management  
c/o Jim Vaughn  
3111 S. Dixie Highway, Suite 146  
West Palm Beach, FL 33405

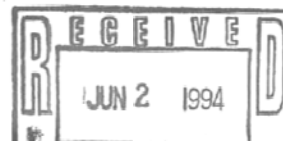
Dear Mr. Vaughn:

Enclosed is Permit Number 502475946 from the Division of Water Management, to combine sixteen (16) existing artificial reef sites under one individual permit, issued pursuant to Chapters 403 and 373, Florida Statutes (F.S.).

A person whose substantial interests are affected by this permit may petition for an administrative proceeding (hearing) in accordance with Section 120.57, F.S. The Petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of receipt of this permit. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative proceeding (hearing) under Section 120.57, F.S.

The petition shall contain the following information:

- (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;
- (b) A statement of how and when each petitioner received notice of the Department's action or proposed action;



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AUG 20 2001

Page No. 1  
08/17/01

UNCONVERTED DATA FOR DOC NUMBER

1423/01

RECORD NUMBER	DOCUMENT SEQUENCE	LATITUDE DEGREE	LATITUDE MINUTE	LATITUDE FRAC-MIN	LONGITUDE DEGREE	LONGITUDE MINUTE	LONGITUDE FRAC-MIN
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2	2	26	44	52	80	01	38
3	3	26	44	52	80	01	05
4	4	26	45	22	80	01	05
5	5	26	45	22	80	01	38

Page No. 1  
08/17/01

CONVERTED DATA FOR DOC NUMBER

1423/01

RECORD NUMBER	DOCUMENT SEQUENCE	LATITUDE DEGREE	LATITUDE MINUTE	LATITUDE SECOND	LONGITUDE DEGREE	LONGITUDE MINUTE	LONGITUDE SECOND
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2	2	26	44	31200	080	01	22800
3	3	26	44	31200	080	01	03000
4	4	26	45	13200	080	01	03000
5	5	26	45	13200	080	01	22800

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BY SDS

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AUG 20 2001

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NLAT = 264513200,SLAT = 264431200
WLON = 0800122800,ELON = 0800103000
proj intvl = 15
SOURCE DOCUMENT LETTER = 1423/01
scale = 1372
central lat = 0264452

... CHARTS SURROUNDING DATA LINES..
chart = 11472,kapp = 296,scale = 40000
chart = 11466,kapp = 349,scale = 80000
chart = 11460,kapp = 375,scale = 466940
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chart = 11013,kapp = 379,scale = 1200000
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chart intersections found = 7

... CHARTS INTERSECTING DATA LINES..
chart = 11472,kapp = 295,scale = 40000
End CABLES
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AUG 20 2001





DEPARTMENT OF THE ARMY  
ENGINEER REGIMENT  
WASHINGTON, D.C. 20315  
SEP 16 1986

Regulatory Section  
Miami  
86G130295  
SWJ-56

Continental Shelf Associates, Inc.  
759 Parkway Street  
Jupiter, Florida 33477  
Attn: R. Steve Dial

Gentlemen:

Reference is made to your application for a Department of the Army permit concerning:

placement of an artificial reef in the Atlantic Ocean near Lake Worth Inlet at Site #2, offshore Palm Beach County, Florida.

The project as proposed is authorized by General Permit SAJ-50, a copy of which is enclosed for your information and use. You are authorized to proceed with the project in accordance with the enclosed drawings subject to all conditions of the permit.

This letter of authorization does not obviate the necessity to obtain any other Federal, state or local permits which may be required.

Thank you for your cooperation with the Corps permit program.

Sincerely,

*Charles A. Schnepel*  
Charles A. Schnepel  
Chief, Regulatory Section

Enclosures

SAJN-RS



Continental Shelf Associates, Inc.

"Applied Science and Technology"

759 Parkway Street  
Jupiter, Florida 33477  
(305) 746-7946

11 September 1986

Mr. Chuck Schnepf  
U.S. Army Corps of Engineers  
P.O. Box 520766  
Miami, Florida 33152

Dear Chuck:

Enclosed is the letter regarding the Palm Beach Site 2 artificial reef site that was sent 2 July 1986.

Please expedite your review of this site and notify me as to when we can initiate dumping on this site.

Best regards,

A handwritten signature in cursive script that reads "Steve Dial".

R. Steve Dial  
Environmental Specialist

RSD/am

Enclosure





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2 July 1986

Mr. Chuck Schnepel  
U.S. Army Corps of Engineers  
P.O. Box 520766  
Miami, Florida 33152

Dear Chuck:

Enclosed you will find information required to permit the Palm Beach Site 2 artificial reef site in Palm Beach County. Tentative sites were already identified in our application submitted on 31 July 1985. Palm Beach Site 2 has been relocated (see Figure 1) to avoid conflict with the Port of Palm Beach Anchorage area.

If possible, we would like to obtain a general permit from your office by 1 August 1985.

Should you have any questions please call either Don Deis or myself.

Sincerely,

R. Steve Dial  
Environmental Specialist

RSD/pj

Enclosures

cc: Tim Smythe, PWC



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2 July 1986

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RSD/nj

Enclosures

cc: Tim Smythe, PRC

SOUTH FLORIDA 19 AUG 1986



Palm Beach Site 2 (Revised)

Location: The proposed site is located north of the Port of Palm Beach Anchorage Area and south of Lake Worth Inlet (Figure 1). The depth ranges from 40 to 75 ft MSL. The site is 0.5 nm by 1 nm.

	<u>Lat/Long</u>	<u>Distance to Shore</u>
SE Corner	26°45'06"N 80°01'05"W	1.0 NM
SW Corner	26°45'06"N 80°01'38"W	0.5 NM
NE Corner	26°46'07"N 80°01'05"W	1.0 NM
NW Corner	26°46'07"N 80°01'38"W	0.5 NM
Site Center	26°45'35"N 80°01'08"W	

Biological Description: The structure is composed of a thin sand veneer overlying hard bottom. Small exposed rock outcrops with sponge and soft coral assemblages are sparsely located along the western edge of the site. Several rock piles also are present along the western water edge of the site. This material was not placed on the site by the Palm Beach County Reef Program. Conversations with Jim Barry (HRS) indicate they were from early channel dredging projects. The creation of artificial reefs within this area is expected to increase overall fish utilization in this area.

Proposed Reef Material: Only clean fill material is proposed and will predominantly be composed of concrete pipe, concrete rubble, pilings, etc.

Navigational Clearances: A minimum of 50 ft depth clearance will be maintained at the proposed site.

Appendix 4. Port of Miami Harbor Safety Committee Anchorage Working Group GIS Meeting Notes, January 13, 2010 - USCG Sector Miami.

**Port of Miami (POM) Harbor Safety Committee (HSC) Anchorage  
Working  
Group (AWG)  
DRAFT  
GIS Meeting Notes  
January 13, 2010 - USCG Sector Miami**

**In Attendance:**

Becky Hope, Port of Miami  
Jon Nitkin, Miami Pilots  
Andy Melick, Miami Pilots  
Joe Embres, USCG  
Paul Steiner, USCG  
Melissa Sathe, Miami-Dade DERM  
Joanna Walczak, FDEP  
Brian Walker, Nova Southeastern University  
Audra Livergood, NOAA NMFS  
Jocelyn Karazsia, NOAA NMFS  
Chantal Collier, FDEP  
Erin McDevitt, FWC  
Kenny Thomas, USCG  
Brett Godfrey, FDEP  
Todd McCabe, FDEP  
Mark Hodges, FWC/USCG  
Hector Schmidt, USCG

- Joanna Walczak started the meeting by thanking everyone for their attendance, and giving a brief overview of how this project was started and why it is so necessary.
  - The project was identified as one of 140 projects for the Southeast Florida Coral Reef Initiative (SEFCRI) Local Action Strategy that needed to be completed as we work towards a management plan for the reefs north of Biscayne National Park to the St. Lucie Inlet.
  - This project falls under the SEFCRI MICCI focus team, and is going to follow the lessons learned from the process of modifying the Port Everglades (PE) anchorage.
- Dr. Walker briefly explained the reconfiguration plan.
  - This meeting was the 2<sup>nd</sup> of the planned 3, and the goal was to brief participants on the problems with the current anchorage configuration and to explain the rationale for the initial proposal designs. Then receive group input

regarding use of the anchorage, possible areas for relocation, etc. to come to consensus on the best possible alternative.

- The 3<sup>rd</sup> meeting would be to finalize the recommendations and work through any remaining issues.
- The outcome will then be presented to the Port of Miami Harbor Safety Committee for endorsement.
- Dr. Walker gave a brief presentation covering the initial anchorage modification proposals sent to the group via email one week prior. He started with the current anchorage and explained that it needed modifying because ~700 acres of the anchorage was mapped as coral reef habitat and critical habitat for two threatened coral species of *Acropora*. The anchorage also should be modified to not interfere with the channel approach on the southern end and a buffer should be placed from the submerged cables on the NW corner. He also explained that it was now illegal to anchor on coral reef habitat under a new Florida law, the Coral Reef Protection Act, and that if the anchorage is not modified it will direct ships to break this law. Joe Embres commented that state law does not supersede federal law. It was unclear if this applies in this circumstance and requires further inquiry with FL DEP lawyers. Brian then outlined the reasoning for choosing the other two proposed configurations.
- A group discussion ensued around two large printed maps on the tables to discuss problems with the current proposals and to possibly investigate new configurations.
- Brian stated that the latest update from NOAA was that they are processing the hydrographic surveys for Northern Biscayne Bay and Miami-Dade around Government Cut and will supply them shortly (early 2010).

**General concerns brought up by the group:**

- **Miami River Ships** - The biggest group concern was having an area of shallow water in the anchorage, mainly due to the Miami River ships.
  - Approximately 100 - 350ft max length vessels with <15ft draft.
  - Currently use the SW corner of the existing anchorage
  - Use patterns are unknown. The pilots estimated that 2-4 vessels/day use anchorage, but near holidays can be 12+ due to business closures. Not sure on the size of vessels, however it was thought that most of those could not anchor in deep water (>120 ft).
    - Could use archive satellite images to estimate use and size.
- **Fish Havens** - Look at the feasibility of modifying fish havens to free up anchorage areas.
  - There is plenty of deep water space available for anchoring outside of the Fish Havens, therefore it would only be useful to look at shallow-water areas. The shallow-water Fish Havens are heavily used and the cost of moving previously deployed artificial reef materials isn't a practical or recommended solution. The option exists to modify a permitted artificial

reef site if there are no existing structures/obstructions in the proposed area

- **Artificial Reef sites** – DERM (Melissa Sathe) will try to locate/confirm the Captain Henry's location.
  - They dove on the coordinates once and didn't find it. They will try again at the next opportune moment.
- **Safe Anchor Depths-**
  - Ships prefer anchoring between 5 and 20 fathoms depth in SE FL because anchoring deeper than 20 fathoms (120 ft) is a more difficult operation. Ships have been anchoring deeper than 120 ft in the Port Everglades anchorage for two years.
- **Jeopardizing unaffected reefs –**
  - It is presumed that the coral reef communities in the existing anchorage are heavily impacted by more than 40 years of anchoring. The point was brought up that moving the anchorage to a new area may jeopardize portions of the reef that were previously unaffected by large vessel anchor and anchor chains and may put them at greater risk for groundings.
- **Possible Impasse –**

What if a non-resource damaging shallow water anchorage area can't be found?

  - The group discussed possibly creating a smaller shallow water anchorage area in the current anchorage that the river ships under a certain size could use. This would require the sacrifice of ~55 acres of the Middle Reef and create a similar design to that of the old, unsuccessful Port Everglades anchorage that was recently revised.
  - Although supporting a reconfigured alternative that continues to impact reef resources is not desired, close work with the stakeholders on a suitable anchorage design will continue.

**Follow-up:**

- Send out Calypso PE anchorage review to the AWG.