

APPENDIX E

**DREDGED MATERIAL MANAGEMENT PLAN
(DMMP)**

FINAL
FEASIBILITY REPORT
AND ENVIRONMENTAL IMPACT STATEMENT
PORT EVERGLADES HARBOR NAVIGATION
STUDY
BROWARD COUNTY, FLORIDA

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1. Project Name and Description

1a. Name: Port Everglades

1b. CWIS #: 010207

1c. Project Description:

The Federal navigation project is in Port Everglades Harbor, a major seaport located on the southeast coast of Florida in Broward County. The entrance of the Port is approximately 17 nautical miles north of Miami Harbor, 31 nautical miles south of the Port of Palm Beach, and 196 nautical miles south of Jacksonville Harbor, all located in Florida.

The authorized project for Port Everglades is presented in **Figure 1** and the proposed Navigational improvement is shown in **Figure 2**. The harbor project provides for the following existing features identified by section with dimensions shown in Table 1:

Outer Entrance Channel (OEC) - The outermost approach channel extends approximately 5,000 feet from the outer sea buoy to the seaward end of the harbor jetties with a 500-foot width over a project depth of 45 feet.

Inner Entrance Channel (IEC) - A rectangular approach channel inside Port Everglades harbor at 450 feet in width, with a project depth of 42 feet extending approximately 2,340 feet from the landward end of the OEC to the main turning basin.

Main Turning Basin (MTB) – A 95-acre turning basin area adjacent to the entrance channels, with a project depth of 42 feet, an east to west dimension of about 1,200 feet, and a north to south dimension of about 2,450 feet . Dimensions vary along the perimeter of the MTB with 2,600 feet along the west side, 800 feet along the north side, and 1,100 feet along the south side.

North Turning Basin (NTB or Northport) – The NTB covers about 19 acres immediately to the north of the MTB and has a project depth of 31 feet. The turning basin extends about 1200 feet to the north with a depth of 31 feet and east-west dimension tapering from 800 to 500 feet.

South Turning Basin (STB or Midport) – A 20-acre turning basin area located south of the main turning basin containing berths 16 through 22 with varying project depths of 31-37 feet. The turning basin to the south has a depth of 31 feet and measuring about 1,000 feet north-south and 1100 feet east-west with a channel inside along the westerly edge varying in depth from 37 to 36 feet and narrowing in width from 300 feet to 150 feet over a distance of about 1,000 feet.

Southport Access Channel (SAC) – North South channel extending 8,500 ft south from the MTB area with a 400-foot width over a project depth of 42 feet. The SAC has a 150 degree bend at the north end known as “the knuckle”.

Turning Notch (TN) – The TN has a width of about 750 feet and length of 1000 feet

over a project depth of 42 feet. The container terminal facilities located south of the TN are known as Southport.



Figure 1: Existing Federal Channel Components

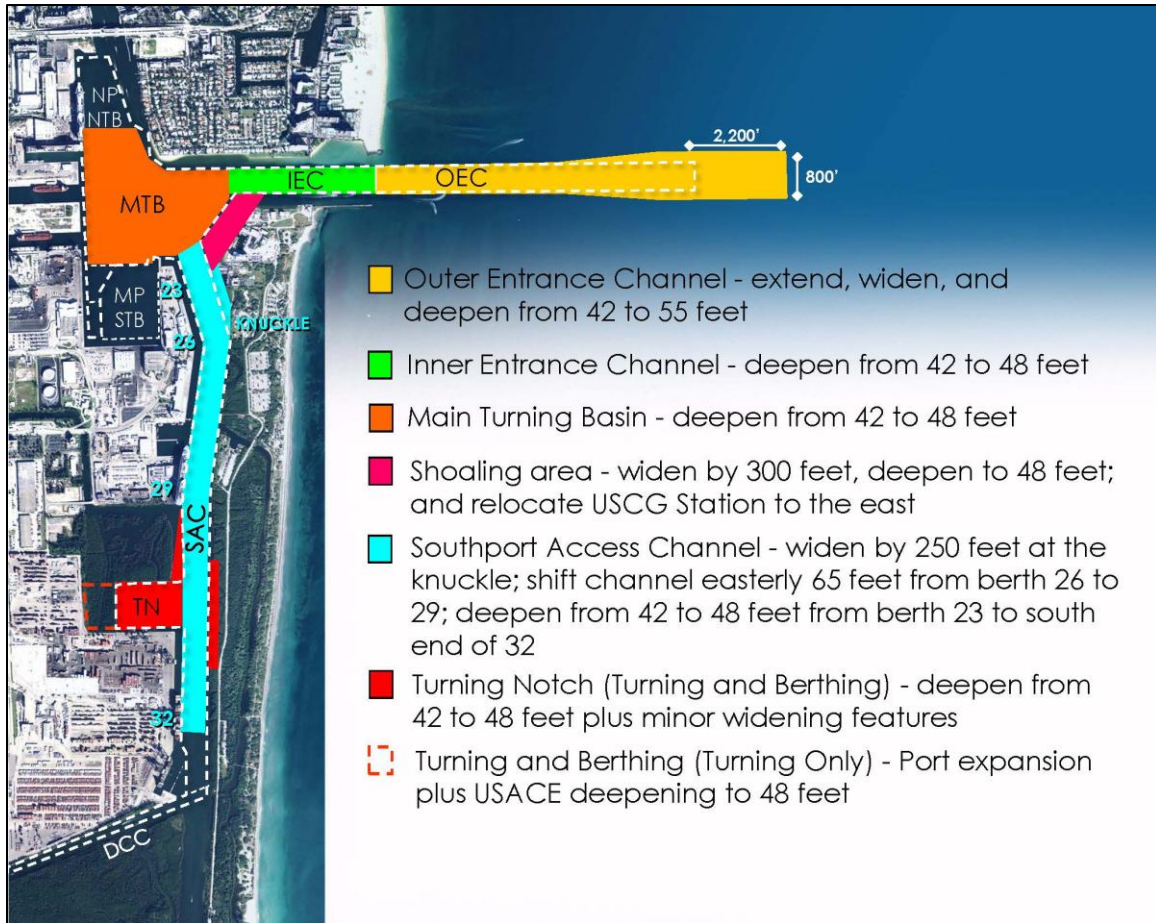


Figure 2: Proposed Port Everglades Harbor Navigation Improvement Project Components

1d. Current Project as Being Maintained:

The Federal project exists as authorized and shown by the dashed lines in **Figure 1** and with the authorized dimensions described in **Table 1**. Maintenance of the authorized Federal channel depths and dimensions has continued as identified in **Table 1**.

Table 1: Project Status

Reach or Segment	Nominal Depth (feet) ¹		Nominal Channel Width (feet)		Max Sailing Draft ² (feet)	Project Sponsor (Y/N)
	(as auth.)	(as maint.)	(as auth.)	(as maint.)		
Outer Entrance Channel (OEC)	45	45	500	500	42	Y
Inner Entrance Channel (IEC)	42	42	450	450	40	Y
Main Turning Basin (MTB)	42	42	2400(N-S)	2400(N-S)	40	Y
North Turning Basin (NTB)	31	31	1200(N-S)	1200(N-S)	29	Y
South Turning Basin (STB)	31,36,37	31,36,37	1000(N-S)	1000(N-S)	29,34.35	Y
Turning Notch (TN)	42	42	750 (N-S)	750 (N-S)	40	Y
Southport Access Channel (SAC)	42	42	400	400	40	Y
Source: Waterborne Commerce of the United States (CY2008)						
Name: Broward County Port Everglades Department						
Address: 1850 Eller Drive						
City: Fort Lauderdale			State: Florida		Zip: 33316	
Point of Contact: Mr. David Anderton				Email: DANDERTON@broward.org		

NOTE: ¹ Does not include overdepth

² For vessels currently using the harbor with no use of tides. Mean tidal variation is less than 2 feet MLLW in the entrance and less than 2 feet in the bay (Engineering Appendix, P. A-16)

1e. Sponsor: Broward County Port Everglades Department
 1850 Eller Drive
 Fort Lauderdale, Florida, 33316
 Point of Contact: (954) 523-3404

1f. Name and Status of Cooperation Agreement:

The most recent Project Cooperation Agreement is between the United States of America and the Port Everglades Authority for modification authorized in 1974. In 2004, a Reimbursement Agreement between the Department of the Army and Broward County was signed stating that work on the Southport Access Channel and Turning Notch performed by non-Federal interests is consistent with Federal navigation interest.

2. Authority

Tables 2 and 3 provide the Congressional authorizing documents for the existing Port Everglades general navigation features.

Table 2: Previous Reports and Authorizing Documents

Study Type ¹	Report Date	Results	Congressional Documents				Authorizing Act
			Type	No.	Cong.	Session	
PE	1928	U	-	-	-	-	-
PE	1929	U	-	-	-	-	-
SR	1930	F	H	357	71	2	R&H 1930
PE	1932	F	-	-	-	-	-
SR	1933	U	-	-	-	-	-
SR	1935	F	H	25	74	1	30-Aug-25
SR	1937	F	H	545	75	3	20-Jun-38
SR	1944	F	H	768	78	2	24-Jul-46
SR	1946	U	-	-	-	-	-
SR	1958	F	H	346	85	2	3-Jul-58
SR	1971	F	H	144	93	1	9 and 31 May 1974
RR	1987	F	-	-	-	-	-
FR	1991	F	H	126	103	1	WRDA 1992, Title I Sec 101(9)
LRR ²	1998	U	-	-	-	-	WRDA 2000 Sec 515

¹ PE = Preliminary Assessment, SR = Survey Report, FR = Feasibility Report, LRR = Limited Re-Evaluation Report

² Reimbursement of \$15,003,000 was authorized by Congress

The reports outlined in Table 2 are described in the 1991 Feasibility Report and 1998 Limited Reevaluation Report.

Table 3: Authorizing Acts

Act	Document, Congress/Session	Work Authorized
R&H Act 1930	HD 357, 71/2	Federal maintenance of entrance channel, turning basin, and jetties constructed by local interests.
R&H Act 1935	HR Committee of R&H Doc. 25, 74/1	Construction and maintenance of an enlarged entrance channel, and a 1,200 ft square turning basin to a depth of 35 feet.
R&H Act 1938	HD 545, 75/3	Construction and maintenance of a 350 ft wide trapezoidal area on the north side of the main turning basin.
R&H Act 1946	HD 768, 78/2	Construction and maintenance of a 200 ft northerly and 500 ft southerly extensions to the main turning basin.
R&H Act 1958	HD 346, 85/2	Construction and maintenance of outer entrance channel deepening to 40 ft, inner entrance channel deepening to 37 feet, expanding the main turning basin to the north and south.
PL 89-298 Section 201, 1974	HD 93-144	Deepen outer entrance channel to 45 feet at a width of 500 feet, inner entrance channel to 42 feet at a width of 450 feet, main turning basin to 42 feet, channel opposite Pier 7 to 36 feet, maintain channel opposite Berth 18 to 36 feet
WRDA 1992	HD 103-126, 103/1	Federal maintenance of locally constructed Southport Access Channel dredging to 42 feet, and locally constructed turning notch to a depth of 42 feet.

3. Economic Assessment

Port Everglades infrastructure is divided into three Port terminal areas, each with individual characteristics and use: Northport, Midport, and Southport. The Port Everglades' Northport region is a multi-use facility, primarily handling cruise operations and liquid bulk unloading (petroleum), but with additional capabilities for container vessels, neobulk cargos, roll-on/roll-off ("ro/ro") cargos, military berthing, and some smaller lay-in spaces. The Northport region covers Berths 1-13. The Northport area has oil product storage tanks, cement silos, railroad spur access, road access, and airport access nearby. There is also two daily cruise vessels that berth in this area.

Port Everglades' Midport, like Northport, is a multi-use facility. Midport berthing serves cruise industries, lift-on/lift-off ("lo/lo") cargo, ro/ro cargo, naval ships, harbor tugboats, and smaller lay-in vessels. Primary cargos handled in this area of the port include containers, bulk cement, lumber, and steel. The Midport region covers Berths 14-29.

Along with berthing, Midport provides: 2 rail-mounted Panamax gantry cranes, a refrigerated warehouse, 77 acres of open yard area for containers and neobulk storage, and 9 dockside terminal buildings that provide additional cargo storage as well as passenger facilities. Terminals 16 and 29 are dedicated to cargo operations. Terminals 18, 19, and 26 are dual-use passenger/cargo terminals. Terminals 21, 22, 24, and 25 operate passenger facilities only. Midport and Southport contain Foreign Trade Zone (FTZ) #25. Established in 1976, it includes five warehouses with a total of 388,600 square feet.

Port Everglades handles a wide variety of cargo and vessel types. Port Everglades is one of the world's largest cruise ports and is one of the southeastern US's major cargo ports. The Port's total cruise passengers and waterborne commerce by type are shown in **Table 4**.

Table 4: Port Everglades Cruise Passengers and Total Tonnage by Type (FY2012)

Total Cruise Passengers	3,757,320
Single-day	68,298
Multi-day	3,689,022
Total Containerized Cargo Tonnage	5,944,513
TEUs Loaded	655,046
TEUs Total	923,600
Total Petroleum Tonnage	14,830,384
Total Bulk Tonnage	973,191
Bulk Cement	613,051
Other Dry Bulk	346,976
Liquid Bulk (non-petroleum)	13,164
Total Break Bulk Tonnage	120,812
Steel/Coil/Rebar	53,055
Other Break Bulk	67,757
Total Vehicles and Yachts	166,237
Total Waterborne Commerce Tonnage	22,116,275
Source: Port Everglades Commerce Report FY2012	
Notes: Short tons. Cruise Passengers are counted at embarkation and debarkation.	

For containerized cargo, Port Everglades handles the largest share (28%) of South and Central American-Caribbean regional¹ cargo (558,032 loaded TEUs in FY2012) as compared to all other southeastern US ports, including Jacksonville, Palm Beach, Miami, Savannah, and Charleston. However, the Port's total containerized cargo throughput is similar to that of both Jacksonville and Miami.

Port Everglades is an important stimulus to the economic growth and progress of the Fort Lauderdale and South Florida area. Job-related industries, transportation of finished products, and cruise-oriented activities have contributed significantly in the expansion of economic activity. As the Port's role as a key gateway to the world has developed, so has its significance as a major economic engine for the County, regional and state economies.

Transportation networks, connecting Port Everglades to Florida and the remainder of the region, are extensive. Major transportation infrastructure is located west of the Port. This includes: the Fort Lauderdale/ Hollywood International Airport, two interstate highways, and Florida's turnpike. The Port has excellent access to Florida's East Coast Railway links. The Fort Lauderdale International Airport handles a majority of cruise passengers using the port.

¹ South and Central American-Caribbean regional cargo refers to international trade with nation in the Caribbean, Central America, east coast of South America, north coast of South America, and the west coast of South America

According to the Waterborne Commerce Statistics Center, over 22 million tons of waterborne cargo passed through Port Everglades in 2012. Major commodities moving through the port in 2012 included: petroleum products, manufactured goods, food and farm products, and manufactured machinery. As shown in **Figure 3**, liquid bulk represents 67% of the total tonnage while containerized cargo includes about 27%.

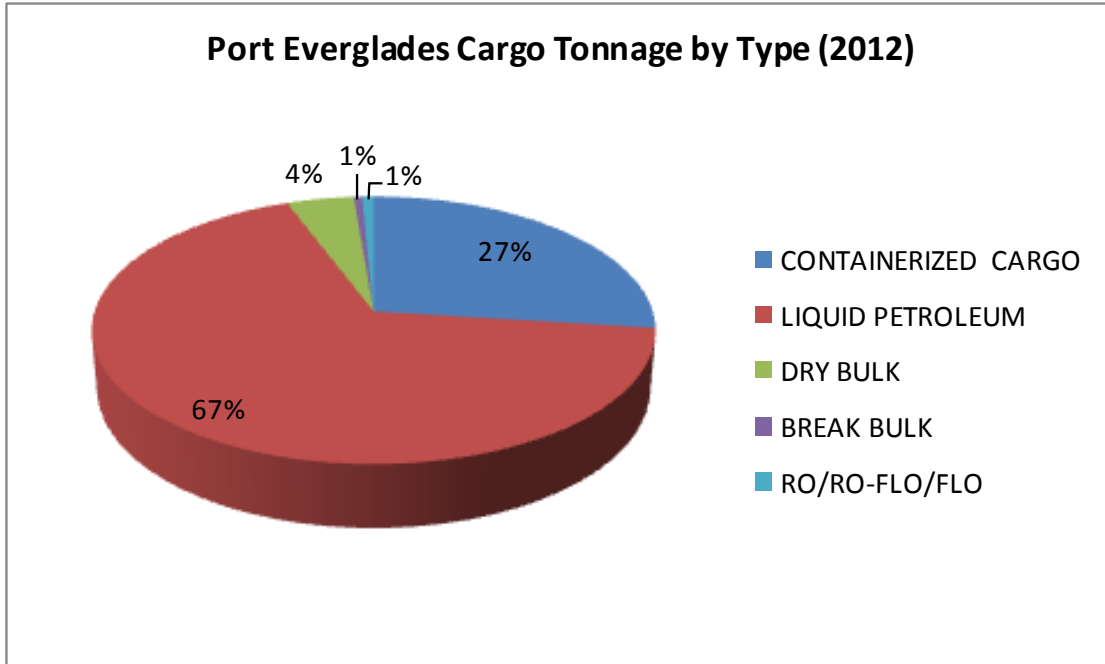


Figure 3: Port Everglades Waterborne Commerce Commodities

4. Shoaling and Maintenance

Shoaling

Littoral processes at Port Everglades are influenced heavily by the presence of man-made structures in the vicinity of the port's entrance channel. A shoal to the north of the inlet, the inlet's jetties, and the navigation channel itself lead to the occurrence of accretion and erosion at the adjacent shorelines.

The navigation channel and south jetty act jointly as a sediment sink for sediment that reaches the inlet. Based on surveys of channel dredging, it is estimated that approximately 21,700 cubic yards of sand enters the inlet each year (Olsen Associates Inc., 2007, Engineering Appendix A). This material migrates westerly along the northern seawall and deposits on the side slopes of the channel, at the western end of the wall adjacent to the Main Turning Basin, and in the Main Turning Basin.

The net southerly longshore sediment transport rate is 54,900 cubic yards per year, of which 37,700 cubic yards accumulate along the north beach and 17,200 cubic yards deposit in the inlet. The annual erosion rate of 48,500 cubic yards at John U. Lloyd includes an additional 4,500 cubic yards entering the inlet and 7,500 cubic yards being lost in the cross-shore. The resultant net transport rate to the south is 36,500 cubic yards.

History of Maintenance

Port Everglades was authorized as a Federal navigation project in 1930. There has been a total of eleven Federally sponsored maintenance dredging projects aimed at removing accumulated sediments within the entrance channel and turning basin since then. **Table 5** shows the historical dredging and disposal up until 1978 as documented in the 1990 Feasibility Report, with more recent data from the Port Authority and the Jacksonville District added. Between 1934 and 2005 Federal channel maintenance included a total volume of 1,538,500 cubic yards dredged from the OEC, IEC, MTB, NTB, and STB. The average shoaling rate for this time period is approximately 21,700 cy per year (Engineering Appendix Section 2.5 and 4.5.2).

Table 5: Historic Maintenance Dredging for Port Everglades

Date	Volume (cy)	Location	Method	Disposal
1934	139,900	Entrance Channel and Turning Basin	Hopper Dredge	Ocean
1935	97,400	Entrance Channel and Turning Basin		Ocean
	73,100	Turning Basin	Pipeline Dredge	Upland
1939	48,300	Entrance Channel and Turning Basin		Upland
1948	93,900	South side of Turning Basin		Upland
	206,300	Entrance Channel and North side of Turning Basin	Hopper Dredge	Ocean
1950	47,300	North side of Turning Basin	Pipeline Dredge	Upland
1953	97,300	Entrance Channel	Hopper Dredge	Ocean
	179,800	Turning Basin	Pipeline Dredge	Upland
1954	101,200	Turning Basin		Upland
1960	38,700	Entrance Channel	Hopper Dredge	Ocean
	179,800	Turning Basin	Pipeline Dredge	Upland
1961-62	9,600	Turning Basin		Upland
	12,200	Turning Basin		Ocean
	22,500	Entrance Channel		Ocean/Beach
1978	144,500	Turning Basin	Hopper Dredge	Ocean
2005	46,700	Turning Basin		Ocean

Most Recent and Anticipated Maintenance

The most recent maintenance event took place in 2013. A total of 418,674 cubic yards was dredged with 96,126 cy beach placement and 322,548 cy to the ODMDS. **Table 6** provides the estimated volumes by component. Future maintenance of the channel and basin including the new work construction areas are expected in years 2027, 2037, 2047, and 2057. Table A-22 in Engineering Appendix A and **Table 6** below provide the breakdown. Future maintenance material is expected to be placed in the Port Everglades Ocean Dredged Material Disposal Site (ODMDS). Programmed dredging including the construction of the proposed navigation improvements is presented in **Table 8**.

Future Federal maintenance of Port Everglades Harbor was estimated using the history of Federal maintenance dredging previously discussed in this document. Shoaled material per square foot of the channel is approximately 0.003 cubic yards. The extension of the OEC will increase the channel by approximately 2,033,000 square feet, increasing the estimated annual shoaling rate for the increased project footprint by 5,740 cy/yr to total rate of 27,440 cy/yr.

The Port has reported that approximately 30,000 cubic yards has been maintenance dredged from berthing areas in the last 15 years. This translates to a yearly berthing area maintenance dredge rate of 2,000 cy/yr. Maintaining berthing areas to project depths is the responsibility of the Broward County Port Authority.

The most recent hydrographic survey for Port Everglades yielded a total of 265,366 cubic yards projected quantity for future maintenance dredging of the harbor to design depth, **Table 7**. The survey indicates shoal areas along the perimeter of the inner entrance channel, main turning basin area, and along the east portions of the Federal Southport Access Channel.

Table 6: Current Maintenance Volumes

Component	Volume (cy)
OEC (45')	46,633
IEC (42')	42,204
MTB (42')	41,799
Widener	---
SAC (42')	0
TN (42')	91,972
SAC and TN (42')	41,758
TOTALS	265,366

Table 7: Anticipated Dredging Volumes

Project Component	Estimated Future Shoaling Rate (cy/yr)	Estimated Future Maintenance Quantity (cy)			
		2027	2037	2047	2057
Federal Channels	27,440	274,000	274,000	274,000	274,000
Port Berthing Areas	2,000	20,000	20,000	20,000	20,000

Note: From EN Appendix Table A-22

Table 8: Proposed Construction Phasing

Location	Depth	Federal Quantity ¹ (cy)	Berth Quantity (cy)	Site	Start Year	Construct No.
ODMDS Designation	-	-	-	-	Year 1	1
Plans & Specifications	-	-	-	-	Year 2	1
Outer Entrance Channel	55	1,057,062	0	ODMDS	Year 3	1
Inner Entrance Channel	48	307,693	0	ODMDS	Year 4	1
Widener	48	996,245	0	ODMDS	Year 5	1
Main Turning Basin	48	700,734	146,286	ODMDS	Year 6	1
Southport Access Channel	48	1,571,500	40,004	ODMDS	Year 7	1
Turning Notch	48	608,528	42,497	ODMDS	Year 8	1

1. Quantities include maintenance material and required and allowable overdepth

5. Material Type

Geotechnical core borings and investigations determined that materials at Port Everglades were composed predominately of sand, “soft” rock (rock not requiring blasting for excavation), and “hard” rock (rock requiring blasting). **Table 9** gives estimated percentages of materials based on project component.

Table 9: Distribution of Materials by Percentage

Location	Percentage of Sand (%)	Percentage of Soft Rock (%)	Percentage of Hard Rock (%)
Outer Entrance Channel	70.0	20.0	10.0
Inner Entrance Channel	40.0	55.0	5.0
Main Turning Basin	40.0	20.0	40.0
North Turning Basin	40.0	10.0	50.0
South Turning Basin	40.0	10.0	50.0
Widener	50.0	50.0	0.0
Southport Access Channel	50.0	50.0	0.0
Turning Notch	50.0	50.0	0.0
Dania Cutoff Canal	50.0	40.0	10.0

A geotechnical analysis for beach quality sand potential at the Widener area was performed. The purpose of the analysis was to evaluate all available information gathered to date to determine and quantify the suitability of the excavated material for beach quality materials. Based on the analysis, the information shows without processing, the excavated material would produce marginal quality beach fill. Processing would consist of screening out any gravel (+1 inch) and removing all silts and peat deposits, resulting in slightly gravelly-fine to coarse-grained sand. Thirty five percent of the as-excavated material would require processing. This material contains 5-percent gravel larger than 1-inch in size, 15-percent gravel up to 1-inch in size, and 15-percent fines (#200-sieve).

6. Material Disposal Options

Three disposal methods were initially considered for Port Everglades material: beach disposal, offshore disposal, and upland disposal.

Beach disposal consists of using excavated materials as beach fill. As part of the regional sediment management investigation, use of beach quality sand would be placed on John U. Lloyd State Park located immediately south of the entrance channel as directed by previous Environmental Assessments for both Port Everglades Harbor and a onetime Port Everglades Entrance Channel. While the majority of excavated materials at Port Everglades will be sand sized, these materials will contain gravel components, pockets of silt, and limited deposits of peat. In addition, excavation of hard massive rock areas will result in a mixture of sandy gravelly materials, cobbles, and boulders depending on the method of excavation employed. Separation of materials “by layer” during the dredging process is not feasible due to the mixed quality of sand w/gravel and silts as well as the presences of multiple lens of harder materials. This makes it unfeasible to do nearshore placement. Nearshore placement is also not an option due to the nearshore hardbottoms that are present and are designated critical habitat for threatened coral species. Nearshore placement would involve the burial of that habitat. In addition, a sand bypassing operation currently in development by the County at this location is expected to restrict beach quality sand from entering the channel that otherwise might have been available.

Offshore disposal consists of excavating materials using a clamshell dredge, placing it on barges, and towing the barges to a designated offshore dredged material disposal site (ODMDS). Ocean disposal is a viable option for dredged material in the Port Everglades (PE) area. The existing PE ODMDS is intended for disposal of dredged material from the Port Everglades Harbor and vicinity.

In 2005 an ODMDS site was designated 4 miles northeast of Port Everglades. Based on numerical modeling prior to designation, disposal capacity is limited to 500,000 cubic yards per event. As the volume of material for this project is expected to exceed this cap, the USACE Jacksonville District and EPA Region 4 have identified the need to expand the existing ODMDS and this effort to expand and redefine the capacity is underway. Formal designation of the expanded disposal site is expected to be complete before the final Feasibility Study is completed.

Processing of materials would have to be done after excavation and would require a staging/production area within reasonable transport/pumping distance of the project area. The Fort Lauderdale area is extensively developed and no staging/production area could be located. Therefore, due to the inability to process the material, either in situ (via dredging process) or upland, in order to extract the quality of beach fill required for permitting, this alternative was screened out during the Feasibility phase screening process.

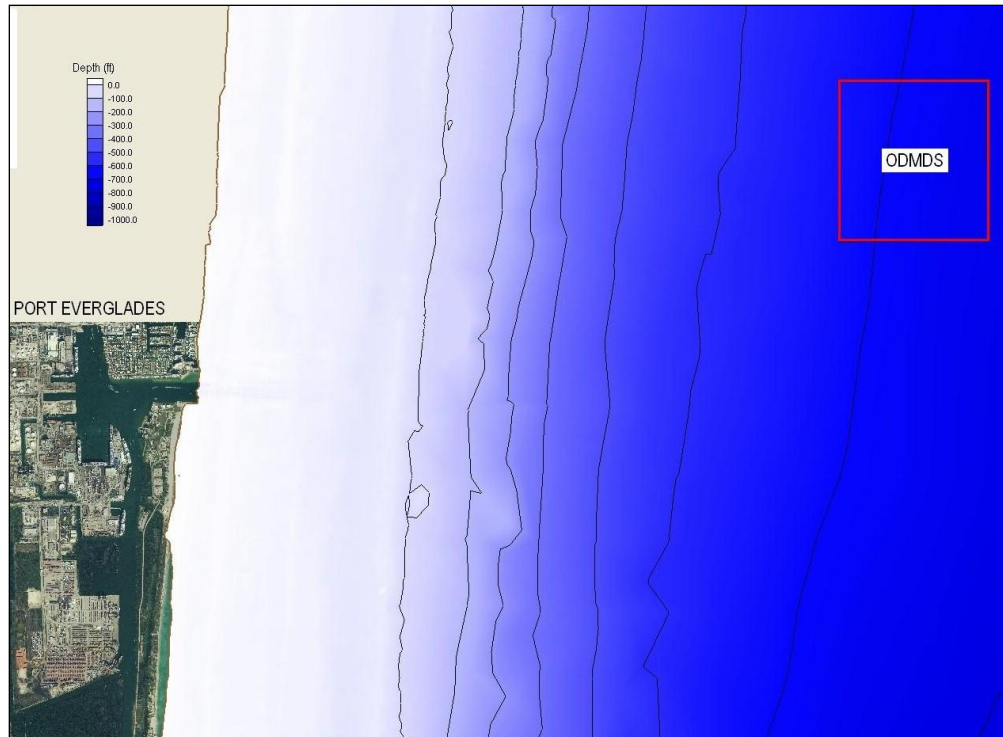


Figure 4: Port Everglades ODMDS Location

Upland disposal is a third option. This option consists of excavating materials using a cutter suction dredge and pumping them through a pipeline to a diked upland disposal site. Two upland sites were originally identified, just north of the Dania Cutoff Canal. Site 1 (**Figure 5**) was a single use site located at the southwest corner of Port property. During the early stages of the study, Site 1 measured 62 acres offering approximately 1 million cubic yards of storage, but later evolved into 107 acres with a capacity of 3.2 million cubic yards. Site 2 (**Figure 6**) was a 64 acre site located on Airport property expected to provide a capacity of approximately 1.6 million cubic yards. Although originally designated as a multiple use site, plans to expand the Airport's runway system made it necessary to designate Site 2 as a single use site.

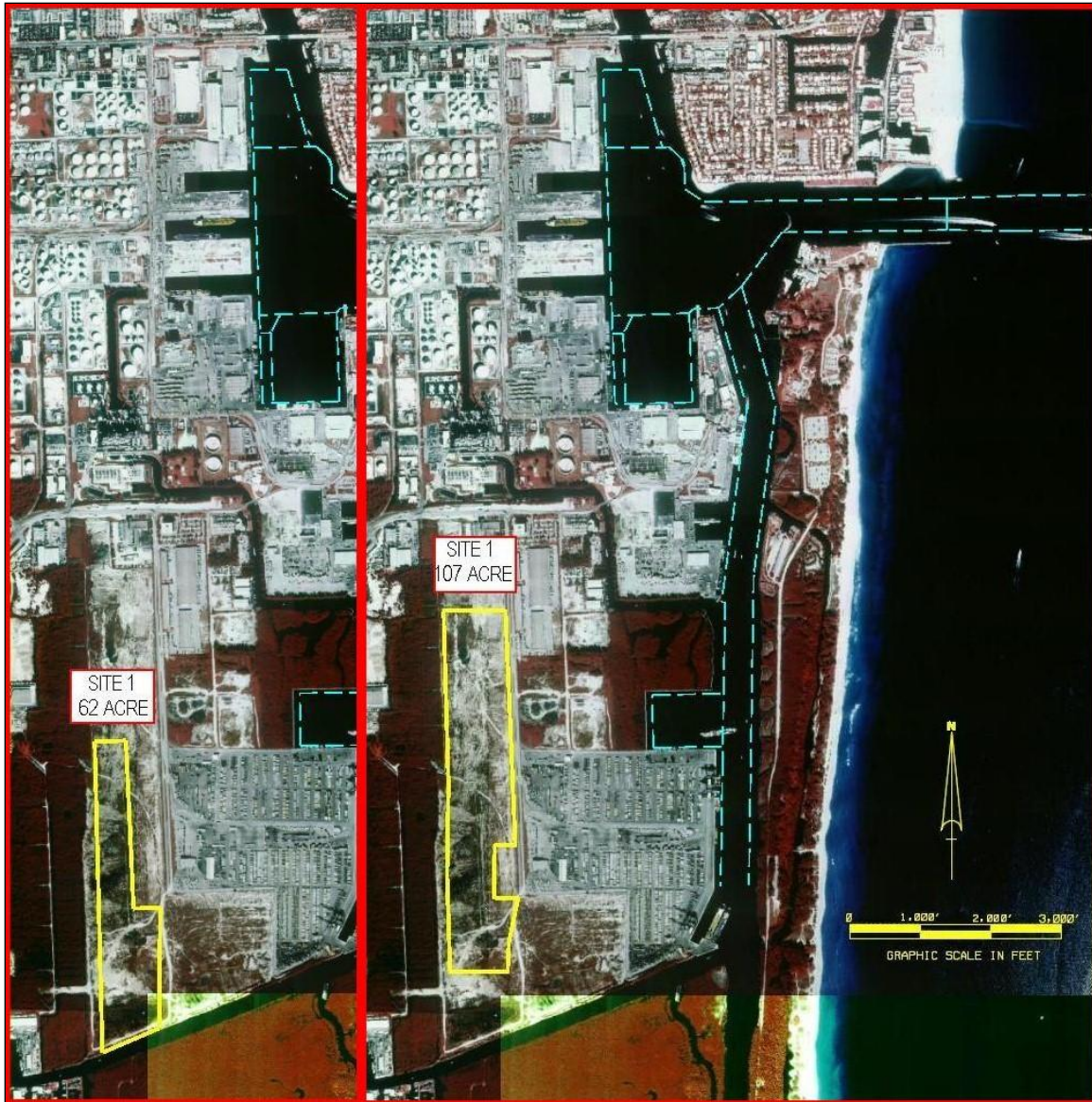


Figure 5: Disposal Site “Site 1” (2 Alternatives) Located at Port Everglades



Figure 6: Disposal Site “Site 2” Located at Fort Lauderdale Airport

Due to development within the Port and further evaluation of the Airport’s runway expansion plans, both the Port and the Airport have withdrawn the use of their upland properties as disposal sites. Therefore, Site 1 and Site 2 disposal areas have been removed from further consideration.

In order to pump dredged material to an upland site and dewater disposal material, any disposal site would need proximity to the Port. However, Fort Lauderdale, Florida, and the region around the Port specifically, are extremely developed and open space is rare. Originally two potential disposal sites were identified, a 64 acre site located on Ft Lauderdale Airport property and a 72 acre site located on Port property. These were the only two locations of viable size, within acceptable proximity to the project site that were located. Both sites were studied and phasing plans for multiple disposal events were developed. However, during the course of the study the Airport began implementing plans for runway expansion. Due to conflicts with their construction/development plans, the use of the Airport disposal site was rescinded. Similarly, during the same time frame, portions of the Port disposal site were developed or reserved for future development. The resulting acreage and configuration of the remaining land was not suitable for the construction of a disposal facility. As determined earlier in the study, no additional available open land of suitable acreage was identified within reasonable proximity to the project.

7. Dredged Material Disposal Site Capacity and Usage

Port Everglades Harbor ODMDS Background and Disposal History:

A Disposal Area Study (DAS) was completed for the Port Everglades Harbor Project in 1994 (CESAJ, 1994). The purpose of the DAS was to determine the availability and feasibility of using upland sites in comparison to use of an Offshore Dredged Material Disposal Site (ODMDS). The DAS investigated 153 potential upland sites within a 10 mile radius and found 22 of those sites were suitable for disposal. The study concluded that the Port Everglades Harbor ODMDS site was the most economically viable site.

Beneficial use placement has taken place in association with construction or maintenance dredging of the Federal channels of the Port Everglades Harbor Project. In 1961-62 maintenance dredge material was placed on the beach adjacent to John U. Lloyd SRA. An Environmental Assessment was completed and a Finding of No Significant Impact on January 5, 2004 for Broward County to dredge beach quality sand from the Inner Entrance Channel and place the sand on John U. Lloyd SRA. In addition, a draft Environmental Assessment is currently in revision for a long-term disposal plan for beach quality maintenance dredge material to be placed on Broward County beaches.

An additional beneficial use of dredged material from the port involves placement of large blasted rock material into reef creation sites located north of the outer channel to serve as substrate for artificial reef creation.

As part of the Port Everglades Dredging Feasibility Study, various options were identified for managing dredged material, including upland storage/disposal at two Confined Disposal Facilities (CDF) or offshore disposal at an ODMDS. The lack of a suitable upland site near the Fort Lauderdale Airport for the projected volume of dredged material has resulted in the need to pursue offshore disposal.

It is intended that the Port Everglades Harbor ODMDS will be used for disposal of dredged material (both maintenance and construction or new work material) from the Port Everglades Harbor and vicinity. The primary user of the ODMDS will be the U.S. Army Corps of Engineers for maintenance of the Port Everglades Harbor Federal Project.

Historically, the interim offshore disposal site located approximately 1.6 nautical miles from shore was used for ocean disposal of dredged material from Port Everglades Harbor. Approximately 219,000 cubic yards of dredged material was disposed of at the interim site since 1976 with the last disposal of 16,400 cubic yards occurring in 1982 (WES, 1999). The Jacksonville District Corps of Engineers has projected annual average disposal rates of 30,000 cubic yards from Port Everglades Harbor, however, annual disposal events are unlikely. Maintenance dredging project sizes have ranged from 26,000 cubic yards to 144,000 cubic yards including portions used for beneficial uses (Brodehl, 2003). Maintenance disposal volumes at the ODMDS will likely be less than 294,000 CY every ten years. The new work from the proposed harbor expansion will produce approximately 2.54 MCY of material.

Existing Port Everglades Harbor ODMDS Description (Port Everglades Harbor ODMDS, 2004 SMMP):

The Port Everglades Harbor ODMDS was designated in 2005 as a 1 nmi by 1 nmi square area centered at the coordinates 26° 07.00'N latitude and 80° 01.50'W longitude (NAD83) or state plane coordinates 649292.4 N and 976098.2 E (NAD83). The corner coordinates are as follows:

Table 10: Existing ODMDS Coordinates

	Geographic (NAD83)		State Plane (FL East 0901 FT NAD83)	
NW Corner	26°07.50' N	80°02.00' W	652301.1 N	973341.1 E
NE Corner	26°07.50' N	80°01.00' W	652342.1 N	978810.0 E
SW Corner	26°06.50' N	80°02.00' W	646242.9 N	973386.1 E
SE Corner	26°06.50' N	80°01.00' W	646283.9 N	978855.7 E

[†]Data from 2004 Port Everglades SMMP

The existing Port Everglades Harbor ODMDS is located approximately 4 nmi east-northeast of the PE Harbor. This site is located on the upper continental slope on the western edge of the Florida Current and consists of primarily soft-bottom habitat in water depths of 195 to 215 meters (640 to 705 feet). See **Figure 7**.

All project dredging in the deep harbor area has been in navigable waters of the United States.

Table 12: Disposal Site Data

Disposal Site(s) (Identifier)	Site Type ¹	Disposal Site Capacity		Beneficial Uses (CY per year)		Other Users ²	Disposal Site Monitor Sponsor (Y/N)
		Original (1000s CY)	Percent Filled	Existing	Anticipated		
ODMDS	2	500 per event	N/A	N/A	N/A	B	Y
Beach	4	200 per event	depends on nourishment cycle	Beach considered beneficial use	Beach considered beneficial use	B	Y
Disposal 1	6	3200	Unconstructed	N/A	N/A	TBD	TBD
Disposal 2	6	1600	Unconstructed	N/A	N/A	TBD	TBD
Name: Broward County Department of Port Everglades							
Address: 1850 Eller Drive							
City: Fort Lauderdale			State: Florida		Zip: 33316		
Point of Contact: Mr. David Anderton				Email: DANDERTON@broward.org			

NOTES:

¹ Disposal Sites:

- 1- Open water, unrestrained
- 2- Designated open water
- 3- Near shore (surf zone)
- 4- Onshore (beach nourishment)
- 5- Near shore confined (in-water CDF)
- 6- Upland confined (onshore CDF)
- 7- Upland unconfined

² Non-Corps Users

- A- None, Corps exclusive use
- B- Authorized (other parties allowed to use, with or without Corps consent)
- C- Allocated (space available for project relate non-Corps dredging at no cost)
- D- Permitted (space available for non-Corps dredging in the area at cost)
- E- Restricted (non-Corps use controlled by another party, Corps has full use)
- F- Royalty (site controlled by another party, Corps uses at cost)

8. Reef Mitigation

The hardbottom habitats offshore of southeast Florida form three tracts parallel to shore, running north to south, and also comprise a nearshore hardbottom area adjacent to shore. Specifically, the three offshore tracts are referred to as “fossil” reefs because the substructure of these hardbottoms was created thousands of years ago. However, the “reef” crusts are an invaluable resource in that living corals still thrive in association with macroalgae, sponges, and numerous species of macroinvertebrates and fishes. The depths at the peaks of the submerged reefs range from 8 to 12 meters.

In addition to performing ecosystem services for hundreds of species of fauna and flora, southeast Florida reefs serve important functions for endangered and threatened species. Sea turtles are known to use reefs for grazing and for cover when migrating between inshore and offshore habitats and for individuals migrating north and south along the coast. *Acropora* species (stag- and elk-horn corals), which are listed as “threatened,” are known from the area (much of which comprises designated critical habitat), but were not observed in the project footprint (DC&A 2009). Other species of special status, including marine mammals, also depend on reef resources.

Finally, south Florida reefs, including those near Port Everglades, support both recreational and commercial fisheries (including for shrimp and lobster) and are a major feature of south Florida tourism. Reefs also serve to protect the shore from tropical storm waves.

Impacts to reefs and hardbottom habitat will be compensated through installation of artificial reef habitats in Broward County.

{Reference: Dial Cordy and Associates Inc.; Incremental Cost Analysis for Compensatory Mitigation, Port Everglades Feasibility Study}

Several alternatives for artificial reef construction have been discussed. One alternative consists of mining the rock during the channel expansion and moving it to a mitigation area north of the channel. Displaced corals would then be transplanted to the relocated rock. A second alternative would be to harvest a land based source of limestone that would be cut to specifications and relocated to the designated mitigation area north of the channel. The same displaced corals would be transplanted to the relocated limestone. Creation of artificial reef is required as part of the project mitigation, but whether dredged material can be beneficially used will depend on the contractor’s dredging methods.

9. Environmental Compliance

ODMDS Designation Process:

The Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA) assigns basic responsibility to EPA and USACE for ensuring that ocean dredged material disposal activities will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment (MPRSA Sections 102 and 103).

Section 102 of the MPRSA authorizes EPA to designate sites or times at which dumping may occur and to establish criteria for reviewing and evaluating permit applications, including those for dredged material. It also authorizes EPA, in conjunction with USACE, to develop site management plans for dredged material disposal sites.

Under Section 102 of the MPRSA, EPA is authorized to designate sites and time periods for dumping. EPA site designations are published in the Federal Register at 40 CFR Part 228 and require the development of a voluntary NEPA document. Site designations include a description of the site, the type of material for which the site is designated, and any restrictions on site use established by EPA. 40 CFR 228.4 (e) requires that Ocean Dredged Material Disposal Site (ODMDS) designations be based on environmental studies of each site. 40 CFR 228.13 provides guidance on baseline studies. A history of related documents is included below in **Table 13**.

The designation process is currently underway between the agencies and is scheduled for completion in 2015 so that the ODMDS may be used for the Port Everglades Harbor construction dredging starting in 2015.

The main environmental concerns regarding disposal of dredged material at the Port Everglades Harbor ODMDS are: (1) disposal of sediments that may cause significant mortality or bioaccumulation of contaminants within the disposal site or adjacent to the site boundaries, and (2) adverse ecological changes to the ODMDS and the surrounding sea floor. The first concern is addressed through the permitting/evaluation process in which the sediments are evaluated. The second concern is addressed through monitoring of the ODMDS. Changes in the benthic community inside the ODMDS are expected because different grain size characteristics in the dredged material may promote colonization of the site by different benthic species. If dredged material is detected outside of the ODMDS, benthic community changes adjacent to the site may be evaluated to determine whether these changes are acceptable. Additionally, at the Port Everglades Harbor ODMDS there are concerns about potential impacts to nearshore living coral and coralline algal reef systems along the coastline to the west of the site.

Table 13: ODMDS Studies

Survey Title	Conducted by	Date	Purpose	Conclusion
<i>Benthic Macroinfaunal Analysis of the Port Everglades and Palm Beach, Florida ODMDS Surveys</i>	Battelle for EPA	1984	Characterization (sediment analysis, benthic biota) Survey	Characterization of benthos for February & November 1984
<i>Field Studies in Nearshore Areas at Port Everglades, Palm Beach County, and Brevard County, Florida</i>	Continental Shelf Associates for EPA	1986	Benthic characterization of one square mile candidate site (4 mile candidate site) through sidescan and bathymetry.	No high relief ledges, rock outcrops or steep slopes detected. Occasional rubble or cobbles and some low relief rock outcrop
<i>Video, Still Camera, and Side-Scan Sonar Survey of the Seafloor Within and Downcurrent of a Tentative Alternative ODMDS off Port Everglades, Florida.</i>	Continental Shelf Associates for EPA	1986	Look for presence of natural resources (critical habitats) and presence of man made obstructions on the bottom and down current of site.	Data showed a predominately fine-to-coarse sediment covered bottom with scattered rocks, areas of rock rubble and sand ripples.
<i>Sediment & Water Quality of Candidate Ocean Dredged Material Disposal Sites for Port Everglades and Palm Beach, Florida</i>	U.S. EPA Region 4	1999	Characterization (water column profiles, water quality, sediment characteristics, benthic biota) survey	Conditions at the site are relatively pristine. Water column is clear with low suspended sediment concentrations (2-20mg/l). Sediments consists of mostly fine sand (70%) and have low level of contaminants.
<i>Sidescan Survey of Candidate Ocean Dredged Material Disposal Sites for Port Everglades and Palm Beach, Florida</i>	U.S. EPA Region 4	1999	Look for presence of natural resources (critical habitats) and presence of man made obstructions on the bottom.	The side-scan sonar data indicated a fine sandy bottom with scattered rubble zones throughout the site and areas 2 miles to the north and 2 miles south of the site. No areas of rock outcrops or potential wrecks were identified through the side-scan record within the site or north or south of the site.

10. Conclusions

Preliminary assessment of the deep harbor serving the port indicates that the disposal of shoal material has no major problems for the foreseeable dredging cycle. Future maintenance dredging will utilize the designated ODMDS. EPA designation of an expanded ODMDS has proceeded on schedule with no identified problems. The designation process currently underway between the agencies indicates completion before the end of 2015. The ODMDS may be used for Port Everglades Harbor new construction dredging (approximately 2.5MCY).

The economic viability of Port Everglades Harbor is not in question at the present time. Over the years the amount of containerized cargo tonnage in the deep draft harbor has increased from approximately 1.5 million short tons to over 5 million short tons. Port related industries have significant investments in terminals and infrastructure to handle the tonnage volume. Available information indicates Port Everglades represents an economically viable project, justified for future maintenance, and not limited by environmental compliance over the next twenty years.

Should EPA not designate a disposal site with capacity for proposed material from the Port Everglades Harbor deepening under Section 102 of the Marine, Research, Protection, and Sanctuaries Act (MPRSA), Section 103(b) of MPRSA authorizes USACE, with USEPA concurrence, to select a site for one time disposal of dredged material in ocean waters when the use of a site designated by USEPA is not feasible. The necessary documentation was written by SAJ, and is sufficiently complete for this time in the project implementation schedule. This one-time use would be a permit for the entire construction event (which will produce about 2.5 MCY); the site's capacity is 6.7 MCY. After this use, USACE and EPA have the option to permit it beyond that time frame under Section 103. All maintenance material will be placed in the existing ODMDS site, which has more than enough capacity. The existing site has an event limit of 500,000 CY; Port Everglades only has about 30,000 CY of shoaling a year. Historically, the Federal channel has been dredged every ten years, which is a total of about 300,000 CY per event. The no action alternative in the Environmental Assessment (EA) for the expansion of the Port Everglades ODMDS would entail continued use of the existing ODMDS for operations and maintenance dredging; and/or the emergency one time designation of a site by the Corps of Engineers under Section 103(b) of MPRSA for the dredged material generated by the proposed port expansion. The cost involved with this contingency plan would be approximately \$100,000 (only labor funds for designation).

11. Recommendations

The Port Everglades Federal Navigation project warrants continued maintenance on the basis of project usage and indicators of economic productivity, sufficient disposal capacity availability, and maintenance activities in compliance with applicable environmental laws and regulations for the next 20 years. Therefore, no additional dredged material management plan (DMMP) is necessary beyond this assessment.