2.0 ALTERNATIVES CONSIDERED

2.1 No-Action

The No-Action Alternative is defined as not designating an ODMDS pursuant to Section 102 of the MPRSA for the Palm Beach Harbor and the Port Everglades Harbor. The No-Action Alternative would not provide an acceptable EPA-designated disposal sites for use by the USACE or other entities for the disposal of dredged material. Without final-designation disposal sites, the maintenance of the existing Federal Navigation Projects at Palm Beach Harbor and Port Everglades Harbor would be adversely impacted with subsequent effects upon the local and regional economies. Interim designated ODMDSs are not available (see discussion under 2.4). Alternative dredged material disposal methods would be required or the dredging and dredged material disposal discontinued.

In the absence of a designated ODMDS, the USACE could select an alternative pursuant to Section 103 of MPRSA. In this case, the ocean site selected for disposal would be evaluated according to the criteria specified in Section 102(a) of the MPRSA and EPA's Ocean Dumping Regulation and Criteria 40 CFR Part 228, and EPA concurrence is required. A site so selected can be used for five years without EPA designation, and can continue to be used for another five years if:

- No feasible disposal site has been designated;
- Use of the alternative site is necessary to maintain navigation and interstate commerce; and
- The EPA determines continued site use does not pose an unacceptable risk to human health, aquatic resources, or the environment.

Accordingly, the No-Action Alternative would not provide a long-term management option for dredged material disposal.

2.2 Non-Ocean Alternative Disposal

Alternatives to ocean disposal are considered, as required by Section 103 of the MPRSA, and include upland disposal and beach re-nourishment. Cost effective upland disposal options are not available in the intensively developed areas around Port of Palm Beach and Port Everglades (see appendices B and C, respectively). Many of the potential upland disposal sites were considered environmentally valuable in their own right, and none of them or combination of them was more cost-effective than ocean disposal. As a result, land disposal is not a viable option for the placement of dredged materials from the Palm Beach Harbor and the Port Everglades Harbor Federal Navigation Projects.

Beach re-nourishment of suitable dredged material is the preferred disposal alternative for all dredging projects. The materials that are to be dredged from Palm Beach Harbor and Port Everglades contain beach quality material (PPB, 1998). Consequently, the placement of beach quality material near the proposed sites is subject to agreement between the State of Florida and the USACE.

2.3 Alternative Sites

In the nearshore areas of Palm Beach Harbor and Port Everglades Harbor, hard bottom habitats supporting coral/algal and worm reef communities are concentrated on the continental shelf. Disposal operations on the shelf could adversely impact these reef habitats. The outer continental shelf is narrow near the proposed sites, with a width of about 0.63 nautical miles (nmi) (1.17 kilometer [km]) at Port of Palm Beach and 0.63 nmi (1.16 km) at Port Everglades (Uchupi, 1968). Consequently, the transport of dredged materials for disposal beyond the shelf is both practical and economically feasible.

Alternative sites considered for the Port of Palm Beach include the offshore interim site, the 3-mile site, the 4.5-mile site and the 9-mile site (Figure 1). The interim and 4.5-mile sites are approximately one square mile in size. The 3-mile site is four square miles in size. The 9-mile site was originally one square mile in size, but was subsequently increased to approximately four square miles based on deposition modeling to insure that most of the material deposits within the disposal site boundaries. The 3-mile site was dropped from further consideration in favor of the 4.5-mile site as it was determined that a four square mile site was not necessary. Note that the deeper depths at the 9-mile site result in a larger disposal footprint necessitating the larger disposal site. The alternatives are summarized below:

Palm Beach Harbor Alternatives	Distance from shore to western edge of site
Offshore Interim Site	2.9 nautical miles
3-Mile Candidate Site	3.3 nautical miles
4.5-Mile Site (Preferred)	4.3 nautical miles
9-Mile Candidate Site	8 nautical miles

The 4.5-mile and 9-mile sites have been carried forward for detailed analysis with the 4.5-mile site as the preferred alternative. The interim site is discussed further in the following section.

Alternative sites considered for the Port of Port Everglades include the interim site, the 4-mile site and the 7-mile site (Figure 2). The interim and 4-mile sites are approximately one square mile in size. The 7-mile site was originally one square mile in size, but was subsequently increased to approximately four square miles based on deposition modeling to insure that most of the material deposits within the disposal site boundaries.

Port Everglades Harbor Alternatives	Distance from shore to western edge of site
Interim Site	1.6 nautical miles
4-Mile Site (Preferred)	3.8 nautical miles
7-Mile Candidate Site	6 nautical miles

The 4-mile and 7-mile sites have been carried forward for detailed analysis with the 4-mile site as the preferred alternative. The interim site is discussed further in the following section.

2.4 EPA Interim-Designated Ocean Dredged Material Disposal Site

Interim-designated ocean disposal sites have historically been used for the disposal of dredged material from Palm Beach Harbor and Port Everglades Harbor. Two interim sites were designated for Palm Beach Harbor, one of which is located nearshore at the port entrance and the other is located approximately 2.9 nmi (4.5 km) offshore. The nearshore interim site was not considered an alternative for final designation. Use of these sites was discontinued as a result of the implementation of the Water Resources Development Act (WRDA) of 1992. WRDA 92 prohibited after January 1, 1997 issuance of any permit or MPRSA Section 103(e) authorization for an EPA ODMDS which does not have a final designation. Following discussions with the State of Florida, a zone of siting feasibility was established eliminating from consideration any areas within three nautical miles of shore to avoid direct impact to natural reefs in the area. As a result, both Palm Beach Harbor interim sites were not considered further.

The interim site for Port Everglades is located 1.7 nmi (3.2 km) offshore. A 1984 survey conducted by the EPA indicated that some damage to nearby inshore, hard bottom areas may have occurred due to the movement of fine material associated with disposed dredged material. In light of the survey findings, disposal at the Port Everglades interim site was discontinued and the site was eliminated from further consideration.

2.5 Considered Alternative ODMDSs

The proposed action is the designation of new ODMDSs for the areas of Palm Beach Harbor and Port Everglades Harbor. These sites were evaluated and selected with the full cognizance of the five general and 11 specific site selection criteria set forth in 40 CFR 228.5 and 228.6 (Ocean Dumping Criteria). The extent to which these candidate sites meet the criteria is addressed in Section 4.3.2, *Evaluation Using General and Specific Criteria*, of this document.

2.5.1 Palm Beach Harbor

2.5.1.1 4.5-Mile Site (Preferred Site). The preferred site near Palm Beach Harbor proposed for ODMDS designation is an area approximately one square nmi (3.4 km^2) located east northeast of the Lake Worth Inlet and approximately 4.5 nmi (8.3 km) offshore (Figure 1). The preferred site for this new ODMDS near Palm Beach Harbor is defined by the following boundary coordinates (NAD 83):

(NW)	26°47'30"N	79°57'09"W
(NE)	26°47'30"N	79°56'02"W
(SW)	26°46'30"N	79°57'09"W
(SE)	26°46'30"N	79°56'02"W

The site is centered at 26°47'00"N, 79°52'35"W. Depths in the site range from 525 feet (160 meters) to 625 feet (190 meters).

2.5.1.2 9-Mile Candidate Site. The 9-mile site is also considered a candidate site for ODMDS designation. The site is located approximately 9 nmi (16.7 km) offshore (see Figure 1). The 9-mile site is defined by the following boundary coordinates (NAD 83):

(NW)	26°45’00” N	79°53’00” W
(NE)	26°45’00” N	79°51’00” W

(SW) 26°47’00” N 79°53’00” W
(SE) 26°47’00” N 79°51’00” W

The site is centered at 26°46’00” N, 79°52’00” N. Depths in the site range from 855 feet (260 meters) to 985 feet (300 meters).

2.5.2 Port Everglades Harbor

2.5.2.1 4-Mile Site (Preferred Site). The preferred site at Port Everglades Harbor proposed for ODMDS designation is an area approximately one square nmi (3.4 km^2) located east northeast of Port Everglades and approximately 4 nmi (7.4 km) offshore (Figure 2). The preferred site for this new ODMDS at Port Everglades Harbor is defined by the following boundary coordinates (NAD 83):

(NW) 26°07'30"N 80°02'00"W
(NE) 26°07'30"N 80°01'00"W
(SW) 26°06'30"N 80°02'00"W
(SE) 26°06'30"N 80°01'00"W

The site is centered at 26°07'00"N, 80°01'30"W. Depths in the site range from 640 feet (195 meters) to 705 feet (215 meters).

2.5.2.2 7-Mile Candidate Site. The 7-mile site is also considered a candidate site for ODMDS designation. The site is located approximately 7 nmi (13.0 km) from offshore (see Figure 2). The 7-mile site is defined by the following boundary coordinates (NAD 83):

(NW) 26° 06’30” N 79°57’30” W
(NE) 26° 06’30” N 79°59’30” W
(SW) 26° 08’30” N 79°59’30” W
(SE) 26° 08’30” N 79°57’30” W

The site is centered at 26°07’30” N, 79°58’30” N. Depths in the site range from 785 feet (240 meters) to 920 feet (280 meters).

2.6 Selection of Preferred Alternative

The characteristics of the alternative sites with respect to EPA’s five general (40 CFR 228.5) and 11 specific (40 CFR 228.6) criteria for site selection are compared in sections 4.3.2 through 4.3.5. These comparisons are used as the basis for selection of the preferred alternatives. Detailed information on the physical, biological, and socioeconomic environment and potential impacts of the proposed action are presented in chapters 3 and 4.

2.6.1 Palm Beach Harbor

Based on comparison of the alternative sites to the general and specific criteria, the 4.5-mile Site was selected by EPA and the USACE as the preferred alternative. This site was selected for the following reasons:

- Sediment surveys of the site indicate that sediments within the 4.5-mile and 9-mile sites are similar to the dredged material proposed for disposal.
- No significant impacts to resources or amenity areas (e.g., offshore coral reefs) are expected to result from designation of either the 4.5-mile or 9-mile site.
- Potential impacts to surface and mid-water dwelling organisms are expected to be insignificant regardless of which of the alternative sites is used for dredged material disposal.
- Potential impacts to bottom-dwelling organisms are considered significant at either of the considered alternative sites. However, the area of impact is expected to be greater at the 9-mile site due to the greater footprint of disposed dredged material at this site. The 9-mile site would require a four square nautical mile site to contain the footprint of the disposal mound within the site boundaries compared to a one square nautical mile site for the 4.5-mile site.
- Designation of the 4.5-mile site would require significantly less consumption of resources (e.g., fuel, federal dollars) than the 9-mile site for transportation of dredged material for disposal.
- Designation of the 4.5-mile site would result in significantly less air emissions from the disposal vessel than the 9-mile site.
- Monitoring of the 4.5-mile site would be less costly and less difficult than monitoring the 9-mile site due to the 9-mile site's greater depths and distance from shore.

2.6.2 Port Everglades Harbor

Based on comparison of the alternative sites to the general and specific criteria, the 4-mile site was selected by EPA and the USACE as the preferred alternative. This site was selected for the following reasons:

- Sediment surveys of the site indicate that sediments within the 4-mile site are similar to the dredged material proposed for disposal. Sediments in the northern portion of the 7-mile site are also sandy and similar to proposed dredged material. However, the southern portion of the 7-mile site consists of low relief limestone hard bottom. Disposal of dredged material in this area would result in a significant change in the benthic characteristics.
- No significant impacts to resources or amenity areas (e.g., offshore coral reefs) are expected to result from designation of either the 4-mile or 7-mile site.
- Potential impacts to surface and mid-water dwelling organisms are expected to be insignificant regardless of which of the alternative sites is used for dredged material disposal.
- Potential impacts to bottom-dwelling organisms are considered significant at either of the considered alternative sites. However, the area of impact is expected to be greater at the 7-mile site due to the greater footprint of disposed dredged material at this site. The 7-mile site would require a four-square nautical mile site to contain the footprint of the disposal mound within the site boundaries compared to a one square nautical mile site for the 4-mile site. In addition, disposal of dredged material on the low relief limestone hard bottom within the southern half of the 7-mile site would likely result in a change from a hard bottom to a soft bottom benthos.

- Designation of the 4-mile site would require significantly less consumption of resources (e.g., fuel, federal dollars) than the 7-mile site for transportation of dredged material for disposal.
- Designation of the 4-mile site would result in significantly less air emissions from the disposal vessel than the 7-mile site.
- Monitoring of the 4-mile site would be less costly and less difficult than monitoring the 7-mile site due to the 7-mile site's greater depths and distance from shore.