reconnaissance is not conducted prior to dune stabilization and construction activities; however, with proper reconnaissance and ameliorative measures prior to such activities, no significant adverse impacts are anticipated. Secondary tourism and development induced from beach restoration activities may further stress existing communities of threatened and endangered dune species; however, with proper permitting and ameliorative actions, impacts of this sort are not anticipated to be significant. The no-action alternative would allow erosion to continue, increasing the probability of dune erosion during significant storm events, which may further endanger these communities. While marginal impacts to threatened and endangered species in inlet communities (Johnson's sea grass) is possible, no significant adverse impacts to inlet community species are anticipated from either the no-action or action alternatives.

Impacts to the threatened seagrass, *Halophila johnsonii*, Johnson's seagrass, is difficult to determine at the present time. Associated impacts will be discussed in tiered documentation after project details become available.

Although the southern extremity of the right whale calving range is located approximately 70 miles north of Region III near the Sebastian Inlet in Brevard County, right whale, *Eubalaena glacialis*, and other whale encounters are possible during COFS action alternative implementation. The most likely whale encounters would be by support boats moving from marinas and dock areas towards dredge vessels; however, the likelihood of encounters is remote. With implementation of proper siting protocols, no significant adverse impacts to whales are anticipated.

Other than the species discussed, no threatened or endangered species would likely be impacted by action alternatives of COFS. Likewise, the no-action alternative should not allow conditions to develop that should cause significant adverse impacts to any threatened or endangered species besides those discussed herein. However, as previously discussed, increases in the potential for dune erosion and subsequent dune community exposure would be result under the no-action alternative.

4.3.1.2 Sea Grass Beds. Impacts to sea grass beds would be largely confined to the Key Biscayne Key nourishment project and possibly inlets based on bed-mapping conducted by the FMRI. Furthermore, based on results of the environmental monitoring of the Key Biscayne Beach restoration project (Flynn, *et al.*, 1991), impacts on sea grass beds should be isolated to direct impacts of sand burial. No impacts associated with turbidity or sand migration were observed in the first-year monitoring of this project.[21] Based on Flynn *et al.* (1991) *Halodule, Syringodium*, and *Thalassia* were observed in the area in decreasing densities. Based on available information, direct impacts to sea grass beds in the vicinity of Key Biscayne are estimated between 6 and 70 acres. Further field investigations are needed to obtain a more accurate estimate of impact. Although storm activity will likely cause some short-term damage to existing sea grass beds in Region III under either the no-action or action alternatives, the no-action alternative would not likely allow conditions to develop that would significantly adversely affect existing grass beds of Region III.

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[21]This project as noted in Flynn *et al.* (1991) utilized a single borrow area located between 4,000 and 5,000 feet southeast of the fill zone. Highly compatible with the native beach sand, this mobile shoal had high quality sand with less than 1 percent fines (Flynn *et al.*, 1991).

4.3.1.3 Hardgrounds. Beach nourishment activities of COFS in Region III would cover approximately 31, 25, and 5 acres of hardground habitat within the nearshore environment in Palm Beach, Broward, and Dade counties, respectively (USACE, 1996). Primary effects of coverage and abrasion would occur on the hardground areas in the nourishment zone and in the margin areas, and turbidity impacts would occur north-south and east-west of these zones, with precise areas depending on the geomorphology of the area.

CPE (1989) documented much higher ambient sedimentation rates in the nearshore environment than the offshore environment, illustrating that communities in this area are already naturally selected for turbidity resilience. Higher turbidity and corresponding sedimentation has been documented to stress some coral species. Turbidity impacts were estimated at 1,200 feet north to 850 feet south of the borrow site for the 1990 Bal Harbor renourishment project, where the Dade County (1990) found tissue loss in more than 60 percent of the hard coral colonies within 525 feet of the borrow site.[22] Furthermore, over 50 percent of the hard coral colonies that were surveyed within 100 meters of the borrow site were killed.[23] Soft coral species also exhibited death from burial by accumulated sediment. Stress responses (bleaching) were documented in the stony coral, brain coral (*Meandrina meandrites)*, with higher turbidity episodes; however, no other stress responses were observed by CPE for other stony corals. In addition, no stress responses were documented by CPE (1989) for gorgonian (soft corals) species or other species during increased turbidity events. Goldberg (1985) found reductions in coral species one year after borrow and fill activities, but draws no relationships between dredge and fill activities and coral population reductions.[24] Dodge (1987) was also unable to make a significant correlation between periods of lowered hard coral growth in Broward County and periods of beach nourishment activity.[25] Likewise, Dodge *et al.* (1991) and Dodge *et al.* (1993) were unable to document any pattern of variations in organism abundance and richness relative to

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[22]The borrow site for this project is located 1.6 miles offshore and is shaped in a dog-leg approximately 10,500 feet long with an average width of approximately 1,500 feet (County of Dade, 1990). Hardbottom reef areas are located from within 165 to 330 feet away (*Ibid*).

[23]One possible explanation of decline is described by Telesnicki and Goldberg (1994 in press). They document that elevated turbidity levels create an increased respiration stress response in addition to increased mucus production, hydrostatic pumping, and ciliary action in two hard-coral species, *Dichoncoenia sotkesii* and *Meandrina meandrites*. Photosynthesis: respiration ratios less than one display consuming behavior. That is, increases in maintenance energy expended necessarily decreases the amount of energy that would otherwise be used for reproduction.

[24]Goldberg (1985) studied past effects of the beach nourishment activity for the 8.6 mile Lauderdale-By-The-Sea to Pompano Beach segment conducted over 70 days in summer 1983. Three borrow areas located between 1.25 and 2 miles offshore in water depths between -39 and -92 feet were excavated by cutterhead/suction dredges for a total of 1.91 million cubic yards of fill. Silt and clay percentages of the fill were between 3.2 and 5.2, with several anomalously high percentage samples (16-25 percent) (Arthur Strock and Associates, Inc., 1981 [as cited by Goldberg, 1985]). Goldberg (1985) documented that no mechanical damage or sediment loading damage were observed during or 60 days after dredge operations. Furthermore, neither bleaching stress response nor mortality was observed in the 60 days. However, as noted by Goldberg (1985), mortality generally occurs within six weeks of excessively turbid waters. Reductions in Scleractinians and gorgonians were observed in the 15-month post-dredge monitoring; however, sponge populations were not observed to have a pattern associated with dredging over the 15-month post-dredge monitoring period. Furthermore, other factors (an anomalous high turbidity event not associated with dredging activities, a winter storm, and possible cold-water upwelling) could have contributed or been the cause of losses (Goldberg, 1980 [as cited by Goldberg 1985]; Goldberg, 1985).

[21]This study investigated the effects of turbidity and sedimentation on the growth of *D. labyrinthinformis* and *M. annularis* in Broward County. In only one site did *D. labyrinthiformis* exhibit significantly lower normalized growth than control sites (Dodge *et al.*, 1987).

dredge and fill activities one year after the John U. Lloyd Beach renourishment project.[26] The potential of mechanical damage to reef zones from dredge operations would likely be greater with hopper dredge operations than with cutterhead/suction dredge operations and has been documented on two occasions in Dade County (County of Dade, 1990; County of Dade, 1988). Hydraulically dredged, Bahamian sand dredging is not likely to cause any damage to hardbottoms. In addition, an operational buffer zone around the defined dredge lease, as used at the Sandy Cay, Bahamas, dredge site, should minimize impacts.[27]

Therefore, there is a potential for some hard coral stress and mortality in the hardground areas and less of a potential for soft coral impacts from turbidity and excessive sedimentation associated with borrow and fill activities. As a group, sponges will be the least affected by these activities. Mechanical damage to reef zones may occur from dredge operations, with hopper dredge operations having a higher likelihood of mechanical damage impacts than with a cutterhead/suction dredge operations. The natural exposure/burial cycles of nearshore hardgrounds would also tend to show longer burial cycles with any of the nourishment activities (USACE, 1994-Fish and Wildlife Coordination Act Report for Jupiter Carlin Beach Nourishment Project). Under both the no-action and action alternatives, storm events and other factors would cause both mechanical damage and turbidity impacts to reef zones in Region III; however, the extent of these damages cannot be predicted. Furthermore, impacts under the no-action alternative would not include those potential mechanical damage impacts and turbidity impacts that may be associated with borrow and fill operations of COFS projects. Under the no-action alternative, less sediment would be in the nearshore environment, which would likely result in greater hardground exposure and corresponding habitat than under nourishment scenarios.

Fish and other motile vertebrates inhabiting the hardgrounds in the nourishment zones would be displaced to other hardground areas nearby or to deeper waters as displayed during storms (CPE, 1989). However, CPE (1991) documented virtually no correlation in motile invertebrates and nearshore fish populations with the area of exposed rock.

Therefore, no permanent, significant adverse impacts from borrow and fill activities are expected to occur to these populations. Likewise, the no-action alternative should not allow conditions to develop that would significantly affect these populations.

4.3.1.4 Softgrounds. In a study conducted seven years after the Hallandale Beach nourishment, Marsh *et al.* (1980) and Marsh and Turberville (1981), as cited by Goldberg (1985), documented that there were no long-term impacts to nearshore infaunal communities from the nourishment. Likewise, Simon and Dauer (1977), as cited by Goldberg (1985), documented infaunal diversity equilibrium one year after defaunation. Gorzelany (1983), also cited by Nelson (1985), found no evidence of adverse effects on nearshore infaunal communities from beach nourishment activities. Moreover, Nelson (1985) concluded that natural seasonal variation in infaunal communities was greater than the estimated effects from beach nourishment based on results of Gorzelany (1983). However, Goldberg (1985) documented major changes in infaunal

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[26]Specific exceptions include Gorgonians, which exhibited greater abundance on dredging reefs after perturbation (Dodge, 1993) and the tanaidaceans and isopods on offshore infaunal monitoring sites, which did not recover within the first year post-construction.

[27]CPE (1994) notes investigations of Tabb *et al.* (1973), which described the ship channel area between Ocean Cay and Sandy Cay as having organisms (coral, sea cucumber, sea star, anemones, etc.) in "good condition" (Tabb, *et al.*, 1973 [as cited by CPE, 1994]).

diversity one year after borrow and fill activities, illustrating slow recovery for infaunal communities.[28] Likewise, major benthic faunal community changes were observed by Dodge *et al.* (1991) and Dodge *et al.* (1993) in both the fill and borrow site monitoring stations.[29] Blair and Flynn (1989) document no turbidity impacts or sand migration impacts to sea grass beds from fill activities within the first year post-construction of the Key Biscayne Beach restoration project of 1987; however, sea grass beds surveyed did not survive direct burial by nourishment. Furthermore, Blair and Flynn (1989) note that algal communities have a slow rate of recovery after perturbations.[30] Based on several studies, the use of Bahamian sand should not pose any additional difficulties for nearshore softbottom communities from exotic introduction.[31] Furthermore, turbidity and sedimentation associated with Bahamian sand dredging operations in the Bahamas should extend for relatively short distances based on findings of Rehrer (1975) [as cited by CPE, 1994].[32] Some sea grass beds are located in the vicinity of Bahamain sand dredging sites; however, based on the homogeneous nature of the area, there are likely extensive areas where sea grass beds can be avoided during dredging operations.[33] However, dredged sites have been noted to serve as sediment sinks in which sea grasses and algal communities colonized in greater areas, perhaps establishing greater grass areas than existed prior to perturbation (Rehrer, 1975 and 1977 [as cited by CPE, 1994]). Tabb *et al.* (1973), as cited by CPE (1994), noted that softbottom communities adjacent to borrow areas showed no indications of decline approximately three years after dredging operations commenced; however, core samples were not discussed in CPE (1994).

Therefore, it is possible that major infaunal diversity changes will occur in the short-term in some nearshore and offshore softbottom areas, with potential equilibrium recovery periods in excess of one year. Recovery will vary in time depending on a variety of factors. Short-term disruption with energy webs may also result; however, explicit impacts of this nature are

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[28]Goldberg (1985) noted major impacts to infaunal diversity, showing slow recovery 15 months after perturbation. Slow recovery could be due to vagaries of predation, migration, patchy recruitment, dependence on recolonization rates on life history, short-term responses by opportunistic species, dredge perturbation, or other factors (Thorson, 1966, and Levin, 1984 [both cited by Goldberg, 1985]; Goldberg, 1985). Specifically, density was reduced but taxonomic diversity was less seriously impacted (Goldberg, 1985). He further adds that the existing literature database as of 1985 was insufficient to make any conclusions of rapid infaunal recovery.

[29]Dodge *et al.* (1991) note that changes in faunal communities around the toe-of-fill monitoring site for the John U. Lloyd Beach renourishment project are likely the result of the change in the sedimentary environment. Furthermore, recovery of the benthic communities around the borrow site for this project had not recovered fully within the first year post-project.

Blair and Flynn (1989) discuss recent findings showing major differences between non-impacted areas and impacted areas in algal communities two years after perturbation. Furthermore, Hanisak *et al.* (1989) as cited by Blair and Flynn (1989) note that there are significant differences in habitat value between disturbed and undisturbed sites.

[31]CPE (1994) cites findings on CSA (1992) of the Fisher Island Study. As found by other studies, infaunal diversity suffered up to two years post-nourishment of the Fisher Island Beach nourishment project (CSA, 1992 [as cited by CPE, 1994]). Furthermore, CPE (1994) notes that the introduction of exotic Bahamian species should not be a problem because: the Gulf Stream reaches both coastal Florida and the Bahamas; oolitic Aragonite already exists on Region III beaches to some extent (USACE, 1987 [as cited by CPE, 1994]); and both Florida and the Bahamas are located in the same biogeographic providence, resulting in similar flora and fauna (Miller-Way *et al.*, 1987; USACE, 1987 [both cited by CPE, 1994]).

[32]Rehrer (1975) finds that elevated turbidity levels extended no more than approximately 0.5 miles west of the Sandy Cay dredging site (as cited by CPE, 1994).

[33] *Thalassia testudinum*, *Syringodium filiforma* and *Halodule wrightii*, and *Halophila engelmanni* as observed by Rehrer (1977), where manatee grass (*Syringodium filiforma*) predominates (Rehrer, 1975 [as cited by CPE, 1994]).

impossible to predict at this time. Effects of Bahamian sand dredging in the Bahamas on the softground infaunal communities of the area is inconclusive from existing literature; however, based on studies at Sandy Cay, Bahamas, no significant adverse impacts from sedimentation can be expected to epibenthic communities adjacent to borrow areas. The no-action alternative would allow erosion to continue in Region III's nearshore zone, but should not allow any conditions to develop that would significantly adversely affect softground communities in the proposed borrow and fill sites; however, under the no-action alternative Bahamian sand dredging would still be conducted in the Bahamas for other pursuits (cement, glass production, and others).

4.3.1.5 Inlet Communities. Inlet communities should not generally be adversely affected from any of COFS project actions. However, as discussed above, increased work-crew boat traffic does increase the probability of manatee encounters. Dredge operations may actually provide temporary increases in hardground habitat in inlets. Secondary impacts of turbidity should not be a major concern due to tidal flushing; however, temporary, insignificant impacts are likely during construction. Permanent perturbations (sand transfer plants) will likely have greater impacts; however, tidal flushed shoal source-material should minimize turbidity. The no-action alternative should not allow conditions to develop that would significantly adversely affect inlet communities; however, under the no-action alternative periodic dredging of proposed project inlets would still be necessary for navigational concerns.

4.3.1.6 Dune Communities. Approximately 100, 91, and 24 acres of new beach would be created under the proposed combination of alternatives in Palm Beach, Broward, and Dade counties, respectively. Temporary impacts to dune community vegetation may occur to vegetation located at the seaward toe of the existing dune during beach fill operations. Temporary impacts on existing vegetation from the placement of saltwater-laden sand in the formation of new dunes may also occur; however, regular inundation with saltwater in these areas from storm events has selectively bred species in this community to be resilient to temporary saltwater inundations. The proposed beach nourishments would help stabilize the existing dune and protect them from erosion. The no-action alternative would continue to allow beach and dune erosion to continue, decreasing available habitat for dune communities species.

4.3.1.7 Migratory Birds. Because of the scarcity of migratory bird sightings and the fact that birds would only be temporarily displaced by anthropogenic activity, no significant adverse impacts are anticipated to migratory bird populations from any COFS project activities. The no-action alternative would continue to allow beach erosion to continue, further decreasing the habitat utilized by the few migratory birds species typically found along Region III's coastline.

### 4.3.2. Mitigation

4.3.2.1 Endangered Species. Project-specific mitigation plans will be developed as project details become available and will be included in tiered documentation at a later date. However, general mitigative actions are discussed below.

Sea Turtles: Section 7 consultation for the Region III study has been completed with the USFWS. A Biological Opinion (BO) dated October 24, 1996 is included in Appendix D of the EIS. Section 7 coordination with the USFWS will also be conducted, as needed, prior to all actions and future nourishments in order to ensure minimal impact. Furthermore, although Bahamian sand is being considered as a potential source for the Coast of Florida Study, this material will not be used until the appropriate studies have been completed and its use approved by the state and the USFWS. The BO and information received from the Florida DEP, suggest that significant adverse impacts can be largely avoided with the implementation of proper action timing and monitoring of post-nourished beach compaction levels prior to the nesting season (DEP letter dated 14 November 1994a). Prior to any nourishment or borrow activities, personnel will be instructed on the possibility of endangered species encounters and the penalties associated with harming, harassing or killing them. Nourishment and dune activities should be conducted outside of the highest activity of the nesting season in Region III. In some areas of high density nesting, where nesting relocation would be inappropriate, the Corps would not perform nourishment during the main part of the sea turtle nesting season. Furthermore, consideration will be given to areas of excessive erosion (where nesting does not occur or where nesting failure is inevitable) when timing of nourishment activities is considered. If nest relocation is warranted, nests would be relocated by properly trained and permitted personnel between sunrise and 9:00 A.M. each day to a nearby hatchery or safer beach site located away from artificial lights. Furthermore, nourished beaches should be monitored for the 500 cone penetometer index units (CPU) sand compaction standard immediately following completion of the nourishment activity, and before the nesting season, for two years post-nourishment. Beaches exceeding the 500 CPU limit should be tilled to a depth of 36 inches (90 centimeters). Likewise, escarpments exceeding 500 CPU that are greater than 18 inches (45 centimeters) high, and extend more than 100 feet (30 meters), should be mechanically leveled prior to the beginning of the nesting season in Region III. Lighting on sea-moored equipment should meet Coast Guard and OSHA requirements but be kept at a minimum by screening/shielding lights, eliminating lights, and using shielded low pressure sodium lights. Should hopper dredging methods be utilized, conditions established by the NMFS in their 25 August 1995 Biological Opinion on hopper dredging in the southeastern United States would be observed.[34] With the implementation of mitigating measures noted above, no significant adverse impacts are anticipated. Logs of any sea turtle injuries or deaths, that may occur, will be maintained, with immediate notification of any incident to the Jacksonville District, USACE and the USFWS or NMFS as appropriate.

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[34]Specifically, the relevant conditions described in the 25 August 1995 NMFS Biological Opinion on hopper dredging in the southeastern United States include: 1) mandated 100 percent inflow screening and suggested 100 percent outflow screening; 2) use of a rigid deflector on the draghead; 3) use of shipboard observers only or special approval by NMFS for use of beach observers; 4) keep dredge pumps disengaged when dragheads are not firmly on bottom; 5) preliminary "take" report within 30 days of completion and a cumulative annual report on impacts to all NMFS endangered species; 6) shipboard monitoring with experienced at-sea large whale observers during intervals between dredge spoil monitoring.

Manatees: According to the Florida DEP, standard manatee protection conditions should minimize potential adverse impacts to manatee populations along coastal Region III (DEP letter dated 14 November 1994a). Signs should be posted on all crew boats and floating work stations informing the crew of the possibility of manatee encounters and of the proper responses should any manatees be in the area. Furthermore, all vessels should operate at "no-wake" speeds at all times in shallow waters, channels, or where the draft of the vessel allows fewer than three feet of clearance to bottom. Vessels should be of light displacement and should follow deep water routes where feasible. Also, upland routes should be used (where available and where less shallow water boat operation would result) for the transport of personnel to fill zones. Finally, logs of manatee encounters (sightings, damage, collisions, or accidental killings) should be kept for the entire contract period and submitted to USFWS and Florida DEP staff after contracts are complete. Any incident involving any listed threatened or endangered species would be immediately reported to both the Jacksonville District, USACE and the USFWS. No significant adverse impacts (takings) are expected to occur with the implementation of these best management practices.

Other Endangered Species: The 25 August 1995 NMFS Biological Opinion on hopper dredging in the southeastern United States noted that the NMFS is unable to make a determination on the collective impacts to Johnson's seagrass, *Halophila johnsonii*, from hopper dredge operations. Annual take estimates should be developed by project and cumulated. These estimates should be reviewed upon completion by the NMFS to develop appropriate ameliorative and mitigative actions.

Standard whale protection measures should minimize potential adverse impacts to right whales venturing into Region III waters. However, should hopper dredging methods be utilized, conditions established by the NMFS in their 25 August 1995 Biological Opinion on hopper dredging in the southeastern United States would be observed.[35] Namely, under the hopper dredge scenario, shipboard observers would be used to look for whales during dredging operations and transportation of material to the fill site. Crews should be informed of the possibility of encounter and of the proper responses should any whales be in the area, namely the avoidance of individuals and the maintenance of at least a 500 foot buffer zone. Also, upland routes should be used (where available and where less boat operation would result) for the transport of personnel to fill zones. As with all listed threatened or endangered species, any incident involving any whales would be immediately reported to both the Jacksonville District, USACE and the NMFS. Finally, as with manatee encounters, logs of whale encounters (sightings, collisions, or other) should be kept for the entire contract period. These would be submitted to NMFS and Florida DEP staff after contracts are complete. No significant adverse impacts (takings) are expected to occur, given the implementation of these best management practices.

4.3.2.2 Sea Grass Beds. Based on available information, preliminary estimates indicate that as little as 6 acres to a maximum of 70 acres of seagrasses could be impacted by beach nourishment at Key Biscayne. Additional field investigations will be required for a more accurate estimate. Project-specific mitigation plans will be developed as project details become

[35] *Ibid.*

available and will be included in tiered documentation at a later date. Every attempt would be made to avoid and/or minimize impacts to sea grass beds with berm width/slope design modifications where they are encountered. In the event that sea grass beds are unavoidable, mitigation with transplantation to sites outside of the impact zone would be pursued as described by Fonsca (1993).[36] Because this mitigation alternative was documented to be ineffective in the Key Biscayne Beach restoration project, site specific mitigation plans should be developed with the aid of USFWS, Florida DEP, and County of Dade Department of Environmental Resources Management (DERM) staff as needed.[37] Ameliorative and mitigative actions associated with the proposed threatened Johnson's seagrass should be developed in consultation with the NMFS.

4.3.2.3 Hardgrounds. Mitigation for hardground impact due to beach nourishment projects as discussed below is appropriate. However, mitigation may not be appropriate in situations where sand is being placed on the beach downdrift of a navigation inlet to restore a normal flow of sand that has been interrupted by inlet construction and/or maintenance dredging. Project-specific mitigation plans will be developed as project details become available and will be included in tiered documentation at a later date. However, general mitigative actions are discussed herein. The design template for each recommended nourishment project has been designed to avoid and/or minimize impacts to nearshore hardground to the greatest extent practicable. However, some unavoidable impacts to these resources would occur by burial. Preliminary estimates suggest that approximately 31, 25, and 5 acres of nearshore hardgrounds would be impacted from the recommended plan (USACE, 1996). Borrow area design will ensure sufficient buffer areas (presently planned at 400 feet) to minimize impacts of turbidity and mechanical damage on offshore hardgrounds. Precision positioning of equipment, with a Geographic Positioning Systems, will aid in avoidance of sensitive areas. Unavoidable impacts to hardgrounds would likely be post-project mitigated. Post-project mitigation accomplished no sooner than one year after project completion, and no later than two years after project completion, is necessary in order to allow the beach to come to equilibrium and to enable accurate estimates of the time-weighted average area of permanently impacted hardgrounds. In-kind mitigation through habitat replacement with limestone boulders, artificial reef modules of limestone and concrete, or concrete riprap should be incorporated into the project mitigation plans after the time-weighted area of impacted hardgrounds are calculated. A mitigation loss to replacement ratio of 0.5 to 1 was used by the USFWS of the U.S. Department of the Interior for nearshore hardground impacts mitigation for the Jupiter/Carlin Segment shore protection project; however, depending on the habitat value and the physical characteristics of the impacted hardgrounds, higher replacement ratios may be enforced and discussed in the project-specific mitigation plans (USACE, 1994). According to the working plan published by NMFS in 1985, artificial reefs should be designed primarily for impacted species and secondarily for users, utilizing the best available scientific information on species habitat (USACE, 1994 - Fish and Wildlife Coordination Act Report for the Jupiter Carlin, Palm Beach County Beach Nourishment Project). Accordingly, siting of project mitigation would ideally be on-site, targeting the locally impacted species for habitat construction. However, in cases where mitigation cannot be performed on-site, nearby locations will be identified and chosen based on the following ranking

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[36]Fonsca, M. 1993. *Guide to Planting Sea Grasses in the Gulf of Mexico.* TAMU-SG-94-601.

[37]Seventy acres of sea grass beds were transplanted from the nourishment zone to barren areas several miles from the dredge area. Three-foot by three-foot "turfs" were mechanically removed and planted in four-foot intervals (Flynn *et al.*, 1991). Only 10.4 percent of the 70 acres survived one year after transplant (Dade County DERM, unpublished memorandum [as cited by Flynn *et al.*, 1991]).

criteria: (1) existing platform; (2) similar depth regime, wave action, currents, light availability, and other physical characteristics; (3) location with respect to impact areas of other projects; (4) location with respect to areas claimed for salvage or other private or public concerns; and (5) location with respect to public access. This last criteria (5) is concerned with public access to facilitate public SCUBA diving and snorkeling recreation, but it should be noted that this is only a secondary concern, less important to the decision-making than are the criteria associated with enduring habitat value. Therefore, although of secondary concern, artificial reefs should be both aesthetically pleasing and safe for divers, as well as primarily a functional and enduring replacement habitat.[38] No significant adverse impacts to hardgrounds are anticipated with the implementation of mitigation plans as noted above.

4.3.2.4 Softgrounds. Although major loss of softground fauna and infauna may occur in some borrow and fill areas in the short-term from COFS projects, no long-term (longer than several years) and, therefore, no significant adverse impacts are anticipated from COFS actions. Accordingly, no mitigation would be necessary for impacts to softbottom communities.

4.3.2.5 Inlet Communities. Because no significant adverse impacts to inlet communities are anticipated from COFS projects, no mitigation would be necessary.

4.3.2.6 Dune Communities. Because no significant adverse impacts to dune communities are anticipated from COFS projects, no mitigation would be necessary.

4.3.2.7 Migratory Birds. Because no significant adverse impacts to migratory bird species are anticipated from COFS projects, no mitigation would be necessary.

## 4.4 Socioeconomic Resources

### 4.4.1 Impacts

Projects proposed in COFS would span over several years, and geographically, over three counties in southeast Florida. Although some of the labor would be hired locally, many of the dredge companies are based outside of Region III; therefore, benefits from the spending of earned wages from project labor would be only partly felt by Region III economies. Slight increases in population may occur with the migration of transient labor and their families; however, impacts to social services should be insignificant. Many of the temporary construction workers would move to other areas for employment after contracts are complete, leaving only insignificant numbers of workers and families in Region III.

Based on existing low unemployment of Region III, employment should not be significantly adversely affected during this transition. Furthermore, employment rates would

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[38]Functionality of artificial reefs is further defined in the Fish and Wildlife Coordination Act Report for the Jupiter Carlin, Palm Beach County Beach Nourishment Project (USACE, 1994). Specifically, artificial reefs should have, " . . .1) extensive unshaded horizontal surface area for the attachment and growth of gorgonians and macroalgae; 2) openings near the bottom, for Spiny lobster, depth of at least 2 foot. and height of no more than 1 foot.; 3) interstitial spaces of approximately 10 cubic foot.; 4) large overhanging ledges to provide shaded resting space for large fish, particularly common snook; 5) numerous projections, crevices, and holes ranging in size from one to three inches in width and up to 1 foot in length (projections) and up to one foot in depth (holes and crevices). These smaller features are intended to provide refuge for small fish and for juvenile fishes, as well as provide additional surface area for epibiotic growth" (USACE, 1994 - Fish and Wildlife Coordination Act Report for the Jupiter Carlin, Palm Beach County Beach Nourishment Project).

likely benefit during the construction of COFS projects, with direct jobs (construction and supply employment) and indirect jobs (employment associated with the spending of workers' wages) increasing. The major benefit of the projects within COFS to local communities would be the avoidance of storm damages. Commerce from increased Region III beach recreation associated with COFS projects would be an incidental benefit. Estimates suggest that an average annual equivalent recreational benefit as great as $8.7 million could be realized in Region III with the implementation of the recommended plan (USACE, 1996).

Based on model runs displayed in the Economics Appendix of the *Feasibility Report, Coast of Florida Erosion and Storm Effects Study, Region III, October 1996,* USACE, Jacksonville District, approximately $33 million in damages would be prevented for the 10 to 20 year return interval storm under the preferred alternatives. No significant adverse impacts to commercial and recreational fisheries industries of Region III are anticipated because motile species would be able to relocate during perturbations. Although temporary turbidity and sedimentation impacts to the diving industry may occur, peak diving periods during the summer months would also be peak turtle nesting months during which beach nourishment and dredging activities would be suspended. The no-action alternative would allow erosion to continue and conditions develop that would result in potential damages for the 10 and 20 year storms in the year 2000 of $8.6 and $12.0 million. Furthermore, although the extent of the effects on the Region III economy cannot be predicted accurately, the no-action alternative would continue to allow beaches to erode, decreasing valuable beach recreation commerce.

### 4.4.2 Mitigation

Because significant adverse impacts are not anticipated to the socioeconomic environment of Region III from the implementation of COFS projects, no mitigation would be necessary.

## 4.5 Cultural Resources

### 4.5.1 Impacts

Cultural resource compliance for Region III of COFS includes coordination with the Florida State Historic Preservation Officer (SHPO), an analysis of the proposed alternatives, and determination of which resources may be present and the possible effects on those resources. Coordination with the SHPO for the Draft Environmental Impact Statement was initiated in a letter dated 9 November 1994, with response dated 8 December 1994. According to the Florida SHPO, activities that would likely affect historic shipwrecks include sand bypassing at inlets using conventional dredging, construction of groins and/or offshore breakwaters, construction of sand traps, and offshore borrowing.

The scope of work for any required fieldwork will be based on in-house analysis of the project alternatives for possible effects on significant cultural resources and consultation with the SHPO. It is not likely that significant cultural resources are located in areas that have been previously dredged. Generally, these will not be subjected to a cultural resource magnetometer survey.

The Corps disposes of sand on beach segments that have been affected by erosion. Placement of sand on the beach would protect historic and archeological sites from the effects of

erosion. Similarly, it is the District's determination that placement of dredged material in nearshore disposal areas will not adversely affect significant underwater archeological resources.

### 4.5.2 Mitigation

Project-specific mitigation plans will be developed as project details become available and will be included in tiered documentation at a later date. During the planning phase for each project, an archival and literature search will be conducted, in addition to consultation with the SHPO. Any required field investigations will be based on consultation with SHPO and will be conducted in compliance with the National Historic Preservation Act as amended (PL 89-665), the Archeological and Historic Preservation Act, and 36 CFR Part 800.

During the planning phase for each project located within Region III, SHPO coordination will be conducted in addition to an archival and literature review to determine if significant cultural resources may be located in the area of impact. Magnetometer surveys will be conducted for offshore borrow areas and sand bypass systems at inlets. The results of these surveys will be coordinated with the SHPO, in compliance with the National Historic Preservation Act, as amended, and 36 CFR Part 800. In consultation with the SHPO, buffer zones will be established to protect potentially significant magnetic anomalies identified in the area of impact. If these potentially significant anomalies cannot be avoided, then the anomalies will be investigated by archeological divers under the direction of the Corps.

## 4.6 Recreational Resources

### 4.6.1 Impacts

With the implementation of COFS projects, beach widths and the corresponding recreational value of beaches would increase in the long run. It is estimated that an additional 100, 91, and 24 acres of new beach would be created under the proposed combination of alternatives in Palm Beach, Broward, and Dade counties, respectively. Recreational analysis suggests that an average annual equivalent benefit of $8.7 million would be realized in Region III with the implementation of the recommended plan (USACE, 1996). However, short-term adverse aesthetic impacts associated with water turbidity and viewscape of construction equipment and personnel would likely occur in many areas. Sand transfer plants would not likely detract significantly from the aesthetic value of proposed sites, since these proposed sites' aesthetic value as these areas (Lake Worth, and South Lake Worth inlets) are areas of significant existing disturbance and anthropogenic activity. Nearshore snorkeling, SCUBA diving, and fishing activities may also be impacted by increased turbidity during nourishment and shortly thereafter. Specifically, natural nearshore reef areas currently utilized by snorkelers and SCUBA divers will diminish and be replaced by mitigating artificial reefs, which are less aesthetically pleasing. Long-term adverse impacts to these water activities from nourishment are not anticipated. Boat operations may be detoured during construction activities; however, the extent of these detours and time frame of operations render these impacts insignificant.

### 4.6.2 Mitigation

Because no significant adverse impacts are anticipated to beach or water related recreation in Region III from COFS projects, no mitigation would be necessary.

## 4.7 Other Considerations

### 4.7.1 Cumulative Impacts

Discussion of cumulative impacts must be referenced to a historical point from which incremental project impacts are added and compared to assess the cumulative effects of all projects considered. An example of a historic reference point could be the Florida Atlantic coastline prior to inlets and other anthropogenic activity. This coastline was wider, reflecting a beach in equilibrium. With regard to this reference point, cumulative benefits towards the natural coastline would be realized by all projects under COFS. Furthermore, hardgrounds exposed from erosion of the natural shoreline since perturbation would simply be reburied, more closely reflecting the natural nearshore coastline. Another reference point from which cumulative impacts could be gauged is the pre-project conditions. Under this reference point, cumulative impacts or losses of nearshore hardgrounds, and impacts of coastal turbidity would occur. Secondary socioeconomic benefits of development and increased tourism may also occur cumulatively from COFS actions. This may further endanger existing upland habitat, increase the probability of sea turtle and manatee encounters, and further deter migratory species from Region III's coastline. However, continued development in the area, with similar effects, would also occur under the no-action scenario.

### 4.7.2 Coastal Barrier Resources Act

The purpose of the Coastal Barrier Resources Act is to minimize the loss of human life, wasteful expenditure of Federal monies; and the damage to fish, wildlife, and other resources associated with the coastal barriers along the Atlantic coast by restricting future Federal expenditures and financial assistance, which have the effect of encouraging development of these coastal barriers. Except for two parcels near Dania Beach in Broward County (P14A), no project locations in Region III are "undeveloped coastal barriers" as defined in the Coastal Barrier Resources Act; therefore, most project sites are not included in the Coastal Barrier Resources System and are not within the jurisdiction of the Coastal Barrier Resources Act. Beach fill activities around the two Coastal Barrier Resource units must be coordinated with representatives of USFWS.

### 4.7.3 Florida Coastal Zone Management Program

The effect of the COFS projects would be enhancement of the coastal zone's appearance and suitability for beach recreation and restoration of some of the coastal zone's ability to provide protection against storms. Review of this Environmental Impact Statement by the State of Florida will comprise the consistency review under the Florida Coastal Zone Management Program (CZMP). The Corps has determined that the Coast of Florida Erosion and Storm Effects Study, Region III is consistent with the Florida CZMP at this stage. A Federal Consistency Evaluation is included as Appendix B.

### 4.7.4 Irretrievable and Irreversible Commitments of Resources

The environment of the COFS activities is dynamic and generally resilient with respect to perturbation. Cyclical coverage and exposure of hardbottoms and seasonal beach profile cycles both illustrate that the effects from COFS action alternatives are reversible. Sand transfer plants will incur greater irretrievable economic and labor resources in reversing project effects. Accordingly, no significant irretrievable or irreversible commitments of resources would be made with any of COFS's action alternatives, but small irretrievable energy, labor, and hard structure materials commitments would be made during the construction efforts and operation of all alternatives (discussed below). Under the no-action alternative, erosive conditions would develop that would threaten turtle nests and resulting sea turtle populations. These erosive conditions would also threaten life and coastal property, both of which are irreversible and irretrievable in nature.

### 4.7.5 Energy Requirements

Energy requirements of COFS action alternatives would be minimal, confined to fuel for labor transportation and construction/dredge equipment. Sand transfer plants would require energy while in operation and, therefore, will create a net increase in area energy consumption during the entire project lives; however, impacts to area and national energy reserves would be insignificant. The no-action alternative would allow conditions to develop that may endanger coastal property from storm surges and wave erosion during significant storm events in the future. On-site preventive actions and post clean-up under the no-action alternative would likely demand greater energy than that which would be required in the implementation of any COFS action alternatives.

### 4.7.6 Future Renourishment Impacts

Future renourishment projects would have similar impacts as described in the sections above; however, available nourishment material will become more scarce, particularly in Broward and Dade counties. Each future renourishment project will be evaluated separately as a tiered environmental document, augmenting general impact analyses found herein, and monitoring results of initial nourishment effects.

### 4.7.7 Compliance with Federal Statutes, Executive Orders, and Policies

Coordination with Federal, State, and local agencies is incomplete as of the production of the Draft Report on 17 January 1995. However, coordination efforts to date have not revealed inconsistencies or potential problems associated with final full compliance with all relevant statues, Executive Orders, and policies listed in Table 4.1.

## Table 4.1. Compliance with Federal Statutes, Executive Orders, and Policies

| Statutes, Executive Orders, and Policies | Project Compliance |
|---|---|
| **Federal Acts** | |
| Archeological and Historic Preservation Act, as amended. 16 U.S.C. 469, *et seq.* P.L. 93-291 | Partial compliance: initial coordination complete |
| Clean Air Act, as amended, 42 U.S.C. 1857h-7, *et seq.* P.L. 91-604 | Full compliance |
| Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251, *et seq.* P.L. 92-500 | Partial compliance |
| Coastal Barrier Resources Act, 16 U.S.C. 3501, *et seq.* P.L. 97-348 | Partial compliance: coordination associated with two coastal barrier resource parcels in Broward County still necessary |
| Coastal Zone Management Act, as amended, 16 U.S.C. 1451, *et seq.* P.L. 92-583 | Full compliance |
| Endangered Species Act, as amended, 16 U.S.C. 1531 *et seq.* P.L. 93-205 | Full compliance |
| Estuary Protection Act, 16 U.S.C. 1221, *et seq.* P.L. 90-454 | Full compliance |
| Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1(12), *et seq.* P.L. 85-72 | Full compliance |
| Fish and Wildlife Coordination Act, 48 Stat. 401, as amended, 16 U.S.C. 661, *et seq.* P.L. 86-624 | Partial compliance |
| Land and Water Conservation Fund Act, as amended, 16 U.S.C. 4601-4601-11, *et seq.* P.L. 88-578 | Not applicable |
| Marine Mammal Protection Act 16 U.S.C. 1361, *et seq.* P.L. 92-522 | Full compliance |
| Marine Protection, Research and Sanctuaries Act, 33 U.S.C. 1401, *et seq.* P.L. 92-532 | Full compliance |
| National Historic Preservation Act, as amended, 16 U.S.C. 470a, *et seq.* P.L. 89-655 | Full compliance |
| National Environmental Policy Act, as amended, 42 U.S.C. 4321, *et seq.* P.L. 91-190 | Partial compliance |
| River and Harbor Act, 33 U.S.C. 401, *et seq.* | Not applicable |
| Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, *et seq.* P.L. 83-566 | Not applicable |
| Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, *et seq.* P.L. 90-542 | Not applicable |
| **Executive Orders** | |
| Floodplain Management (E.O. 11988) | Full compliance |
| Protection of Wetlands (E.O. 11990) | Full compliance |
| Protection and Enhancement of Environmental Quality (E.O. 11514, amended E.O. 11991) | Full compliance |
| Protection and Enhancement of the Cultural Environment (E.O. 11593) | Full compliance |
| Federal Compliance with Pollution Control Standards | Full compliance |
| **Other Federal Policies** | |
| CEQ Memorandum of August 11, 1980: Analysis of Impacts on Prime and Unique Agricultural Lands in Implementing NEPA | Not applicable |
| CEQ Memorandum of August 10, 1980: Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory | Not applicable |
| Migratory Bird Treaties and Other International Agreements listed in the Endangered Species Act of 1973 as amended. Section 2(a) (4) | Full compliance |

## 5.0 LIST OF PREPARERS

| Name | Discipline/Expertise | Role in EIS Preparation | Experience |
|---|---|---|---|
| Mr. Leonard Guilbeau<br>Gulf Engineers & Consultants | Geologist | Geology; Sand Source Quantity and Quality Analysis | 5-years, Gulf Engineers & Consultants<br>28-years, Louisiana Department of Transportation and Development |
| Mr. Scott L. Hoffeld<br>Gulf Engineers & Consultants | Natural Resources Planner/Socioeconomist | Project Manager, Principal Author | 3-years, Gulf Engineers & Consultants |
| Dr. Michael Loden<br>Gulf Engineers & Consultants | Senior Environmental Scientist | 1st Tier Supervision, Gulf Engineers & Consultants | 5-years, Gulf Engineers & Consultants<br>10-years, Jefferson Parish, Louisiana Department of Environmental Quality |
| Mr. John Thompson<br>Continental Self Associates | Marine Biologist | Hardground and Softground Affected Environment and Impact Review | 6-years, Harbor Branch Oceanographic Institute<br>14-years Continental Self Associates |
| Mr. Michael Dupes<br>USACE Jacksonville District | Biologist | Document Review | 20 years, USACE Jacksonville District |
| Nancy C. Shaw<br>Gulf Engineers & Consultants | Editor/Typist | Editing and typing report. | 7-years, Gulf Engineers & Consultants |
| Peggy G. Strother<br>Gulf Engineers & Consultants | Typist | Typing report. | 4-years, Gulf Engineers & Consultants |

# 6.0 PUBLIC INVOLVEMENT, REVIEW AND COORDINATION

## 6.1 Public Involvement Program

Scoping letters were sent on 8 November 1994 to local sponsors; Federal, State, county, other local authorities; and other interested parties and organizations. A copy of this letter appears in Appendix C. This letter requested input on significant ecological, cultural, aesthetic, and socioeconomic issues that should be considered in evaluating impacts of the COFS projects. The Notice of Intent to prepare the Draft Environmental Impact Statement was published in the Federal Register on 28 November 1994. Several responses were received as of the production of the draft document on 17 January 1994. Copies of responses also appear in Appendix C. Issues of concern raised by respondents and county officials interviewed include: (1) the accuracy of hardground locations on GIS maps; (2) symbol consistency on nearshore hardground GIS maps; (3) the paucity of data on the impacts of Bahamian sand on gender development in turtle nests; (4) sedimentation impacts associated with borrow and fill activities; (5) the potential destruction of nearshore hardground habitat from nourishment burial; and (6) the design and/or need of particular projects located in Region III.

## 6.2 Required Coordination

Coordination with relevant Federal, State and local agencies was performed by the Jacksonville District. Copies of relevant correspondence from this coordination appear in Appendices C and D. The Draft Environmental Impact Statement (DEIS) and/or a Notice of Availability will be circulated to Federal, State and local governmental agencies including the public and special interest groups. Recipients are listed in section 6.3 below.

## 6.3 Statement Recipients

### Federal Agencies

Advisory Council on Historic Preservation, Washington, D.C.
Environmental Protection Agency, Washington, D.C.
Environmental Protection Agency, Atlanta, Georgia
Department of the Interior, Office of the Secretary, Washington, D.C.
Department of the Interior, U.S. Fish and Wildlife Service, Atlanta, Georgia
Department of the Interior, U.S. Fish and Wildlife Service, Vero Beach, Florida
National Marine Fisheries Service, Panama City, Florida
National Marine Fisheries Service, St. Petersburg, Florida
National Marine Fisheries Service, Miami, Florida
Federal Emergency Management Administration, Washington, D.C.
Federal Emergency Management Administration, Atlanta, Georgia
Federal Maritime Commission, Washington, D.C.
U.S. Department of Commerce, Director, Ecology and Conservation Office, Washington, D.C.
Housing and Urban Development, Atlanta, Georgia
U.S. Coast Guard, Seventh District, Miami, Florida
U.S. Forest Service, Department of Agriculture, Atlanta, Georgia
Center for Disease Control, Atlanta Georgia

Soil Conservation Service, Gainesville, Florida
Department of Energy, Washington, D.C.

**State Agencies**

Florida State Clearinghouse, Department of Community Affairs, Tallahassee, Florida
Florida Department of Environmental Protection, Florida Marine Institute, Tequesta, Florida
Florida Department of Environmental Protection, Office of Aquatic Preserves, Ft. Pierce, Florida
Florida Department of Environmental Protection, Bureau of State Lands, West Palm Beach, Florida
Florida Department of Environmental Protection, Division of Beaches and Coastal Systems, Tallahassee, Florida
Division of Historical Resources, State Historic Preservation Officer, Tallahassee, Florida
South Florida Water Management District, West Palm Beach, Florida
Florida Game and Fresh Water Fish Commission, Tallahassee, Florida

**Local Agencies**

Palm Beach County Board of County Commissioners, West Palm Beach, Florida
Palm Beach County Environmental Resources Management, West Palm Beach, Florida
Palm Beach County Parks and Recreation, Lake Worth, Florida
Palm Beach County Heath Unit, Environmental Science and Engineering, West Palm Beach, Florida
Palm Beach County Planning, Zoning, and Building, West Palm Beach, Florida
Palm Beach County Soil and Water Conservation, West Palm Beach, Florida
Palm Beach County Tourist Development Council, West Palm Beach, Florida
Broward County Department of Natural Resources Protection, Ft. Lauderdale, Florida
Broward County Administrator, Ft. Lauderdale, Florida
Broward County Planning Council, Ft. Lauderdale, Florida
Broward County Board of County Commissioners, Ft. Lauderdale Florida
Dade County Department of Environmental Resource Management, Miami, Florida
Dade County Board of County Commissioners, Miami, Florida
Metro Dade Planning Department, Miami, Florida
Metro Dade Park and Recreation Department, Miami, Florida
Director, Public Works Department, Miami, Florida
Jupiter Inlet District, Jupiter, Florida
Port of Palm Beach District, Rivera Beach, Florida
South Lake Worth Inlet District, Lantana, Florida
Florida Inland Navigation District, Jupiter, Florida

Hillsboro Inlet Improvement and Maintenance District, Ft. Lauderdale, Florida
Director, Port Everglades Authority, Ft. Lauderdale, Florida
Treasure Coast Regional Planning Council, Palm City, Florida
South Florida Regional Planning Council, Hollywood, Florida

**Individuals and Interest Groups**

Florida Audubon Society, Casselberry, Florida
Isaak Walton League, Palm Beach, Florida
Florida Wildlife Federation, Tallahassee, Florida
Professor John Gifford, Rosenstiel School of Marine and Atmospheric Science, Miami, Florida
Environmental Services, Inc., Jacksonville, Florida
Caribbean Conservation Corporation, Gainesville, Florida
TAMS Consultants, New York, New York
Biodiversity Associates, Laramie, Wyoming
American Littoral Society, Miami Florida
American Littoral Society, Key Biscayne, Florida
Sierra Club - Loxahatchee Group, Lake Worth, Florida
Sierra Club, Miami Florida
Audubon Society of the Everglades, West Palm Beach, Florida
Royal Palm Audubon Society, Boca Raton, Florida
Tropical Audubon Society, Miami, Florida
Florida Oceanographic Society, Stuart, Florida
Florida Marine Conservation Corporation, West Palm Beach, Florida
Florida Shore and Beach Preservation Association, Tallahassee, Florida
Florida Shore and Beach Preservation Association, Singer Island Chapter Riviera Beach, Florida
Regional Director, The Wilderness Society, Coral Gables, Florida

## 6.4 Results of Coordination

Written comments on the DEIS were received from the following Federal agencies: U.S. Departmentof Housing and Urban Development, U.S. Department of Commerce (National Marine Fisheries Service), U.S. Department of the Interior, U.S. Environmental Protection Agency (Region 4). State and local agencies responding to the DEIS include: Florida Department of Community Affairs (State Clearinghouse), Department of Environmental Protection, Florida Department of State - Division of Historical Resources (SHPO), Florida Game and Fresh Water Fish Commission, Department of Health and Rehabilitative Services, Florida Department of Transportation, South Florida Water Management District, Treasure Coast Regional Planning Council, South Florida Regional Planning Council, City of Boca Raton, City of Delray Beach, Town of Palm Beach, Hillsboro Inlet District and Port Everglades. Individuals and interest groups responding include: Mr. Jim Koontz, Dr. Sanford F. Kurvin and the Beaches and Nearshore Habitats Initiative. Comment letters are shown in Appendix D or the FEIS. Responses to significant comments immediately follow the letter in which the comment was made.