

**FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION**

OFFICE OF BEACHES AND COASTAL SYSTEMS

STRATEGIC BEACH MANAGEMENT PLAN

SOUTHWEST GULF COAST REGION

SUBREGIONS

Pinellas Barriers, North Reach

Pinellas Barriers, South Reach

Sarasota Barriers, North Reach

Sarasota Barriers, South Reach

Manasota Barriers

Charlotte Harbor Complex

Estero Barriers

Naples Coast

Southern Barriers

PINELLAS BARRIERS NORTH REACH

Area Description

The **Pinellas Barriers North Reach** subregion extends from Anclote Key in Pasco County to the midpoint of Sand Key (R85) in Pinellas County, as shown on Figure SW.1. The area includes Anclote Key, Three Rooker Bar, Honeymoon Island, Caladesi Island, Clearwater Beach Island, and the northern portion of Sand Key. The islands are separated from the mainland by St. Joseph Sound, Clearwater Harbor, and the Intracoastal Waterway. The inlets include Hurricane Pass and Clearwater Pass. There are 7.8 miles of critically eroded beach in this subregion. Erosion is attributed to winter frontal systems, tropical storms and hurricanes, and the effects of the inlets. The most erosive storms in recent years were a subtropical storm of 1982, Hurricane Elena and Tropical Storm Juan in 1985, an extratropical storm of March 1993, and Tropical Storm Josephine in 1996.

Previous Actions

In 1969, sand was placed along the gulf shoreline of **Honeymoon Island** (R8-R12) using material from an offshore borrow area. A groin was constructed near the south end of the beach fill. In 1989, beach nourishment was conducted using sand from an upland source. A feasibility study completed in 1999 recommends beach nourishment and construction of a terminal groin.

Hurricane Pass is a natural inlet where a navigation channel was dredged in 1989. Maintenance dredging of the navigation channel has not been conducted. The northern gulf shoreline of Caladesi Island was breached in 1985 forming Willy's Cut at a location immediately south of Hurricane Pass. A feasibility study of navigation improvements completed in 1999 recommended maintenance dredging and placement of the dredged sand on Honeymoon Island. This work is scheduled for 2001.

Clearwater Pass is a federal navigation project. Dredging of the navigation channel was completed in 1961 by the U.S. Army Corps of Engineers. Initially, material from maintenance dredging of the navigation channel was disposed in the gulf and harbor. In 1973 and 1977, beach compatible dredged material was placed on the Sand Key shoreline south of the pass. Between 1981 and mid-1984, nearly one million cubic yards of beach compatible dredged material was placed on the Sand Key shoreline (R51-R60) using sand from an navigation improvement project. Since 1985, the entrance channel has not required dredging to maintained design channel depths.

The federal **Pinellas County Beach Erosion Control Project** authorizes beach restoration and periodic nourishment of Clearwater Beach Island, Sand Key, and Treasure Island, and periodic nourishment of Long Key. The federal authorization provides that the various island segments can be constructed together or independently as separate projects. Initial restoration has commenced on all segments except Clearwater Beach Island.

The **Sand Key** segment was restored in three construction phases between 1988 and 1992. Previously, a breakwater was constructed in 1986 at Redington Shores (R101). In 1988, beach restoration at Redington Shores and the northern 0.8 miles of North Redington Beach (R99-R107) was completed using sand from the Johns Pass ebb shoal. In 1990, beach restoration at Indian Rocks Beach (R72-R85) was completed using sand from the Egmont Channel Shoal. In 1992, beach restoration at Indian Shores (R85-R99) and beach nourishment of Redington Shores and North Redington Beach (R99-R107) was completed using sand from the Egmont Channel Shoal.

In 1998, initial beach restoration of Belleair Beach and the southern 0.8 miles of Clearwater Beach (R56-R66) on Sand Key was completed. During a second phase of construction in 1999, beach nourishment of the previously restored area (R71-R107) of Sand Key was completed using sand from the Egmont Channel Shoal. The Town of Belleair Shores (R66-R71) chose not to participate in the shore protection project. Beach restoration has not been conducted at Madeira Beach (R107-R125) where a groin field was constructed by local interests in the late 1950's and recently reconstructed.



Figure SW.1: Pinellas Barriers North Reach

Resources and Opportunities

Sponsors and Funding: This subregion contains the eligible governmental entities of Pasco County, Pinellas County, Clearwater, Belleair Beach, Belleair Shores, Indian Rocks Beach, and the U. S. Army Corps of Engineers (USACE). Participants with the Department as sponsors of beach management projects include Pinellas County and USACE. This area contains several islands managed by the Department's Division of Recreation and Parks, including Anclote Key, Three Rooker Bar, Honeymoon Island, and Caladesi Island. Project cost estimates may be found in the Beach Erosion Control Program - Long Range Budget Plan.

Environmental: The protection of sea turtles, manatees, shorebirds, and hardbottom/reef and seagrass habitat are primary environmental concerns within this subregion. The timing of construction activities has not been restricted during the marine turtle nesting season of May 1 through October 31. Projects and their method of construction are designed to avoid and minimize adverse impacts to wildlife and habitat.

Sand Supply: A feasibility study identified several potential borrow areas for beach restoration and nourishment of Honeymoon Island, but additional investigation during the design phase is necessary to define the borrow areas. The Egmont Channel Shoal has been used for several beach nourishment projects and appears to contain a substantial quantity of sand for future project needs over the next 15 years. Additional investigation of the offshore area east of the established Egmont borrow area is underway.

Monitoring: Implement a regional beach, inlet and offshore monitoring program to assess the status of the beach erosion control projects, to identify areas of greatest need for placement of dredged material, and to identify patterns of erosion and accretion.

Regionalization: Continue a sediment management strategy that uses beach compatible sand from the maintenance dredging of the navigation projects in the maintenance of the beach restoration projects. Opportunities exist to link projects in the construction and monitoring phases to improve cost effectiveness.

Innovation: Innovative technologies should be pursued when it has been demonstrated that they will result in improved project performance or lower costs. The Department, in ranking annual funding priorities of the beach erosion control program, considers the use of innovative technology. At this time, application of an innovative technology for a specific beach management activity in this subregion has not been identified.

Emergency Response: Develop emergency response plans for post-storm recovery and emergency beach maintenance. The plans will include damage assessment methodology, temporary structural measures, identification of potential borrow sites, and a secure source of funding. The local sponsors should hold an executable contract and all requisite permits/authorizations for emergency response activities.

Strategies for Inlets and Critically Eroded Beaches

Pinellas County R6-R12 is a 1.4-mile segment of critically eroded beach on the southern gulf shoreline of Honeymoon Island at Honeymoon Island State Recreation Area. Beach restoration was constructed, but not maintained. **Strategy:** Beach nourishment using available beach compatible sand from navigation maintenance dredging and offshore borrow areas.

Pinellas County, Hurricane Pass. **Strategy:** Place beach compatible sand from maintenance dredging on the adjacent eroded shoreline of Honeymoon Island.

Pinellas County R37-R39 is a 0.4-mile segment of critically eroded beach on Clearwater Beach Island south of the former opening of Dunedin Pass. Historically, private development was threatened in this area, but the shoreline has been experiencing an accretional trend. **Strategy:** Monitor.

Pinellas County R47-R49 is a 0.5-mile segment of critically eroded beach on the inlet shoreline of Clearwater Beach Island adjacent to Clearwater Pass. This area has been armored for the most part with concrete bulkheads. Groin construction has stabilized pocket beaches. **Strategy:** Monitor.

Pinellas County, Clearwater Pass. Strategy: Monitor; conduct an inlet management study at a later date if deemed appropriate by evaluation of monitoring data.

Pinellas County R56-R85 is a 5.5-mile segment of critically eroded beach on the northern gulf shoreline of Sand Key. This segment ends at the boundary of the subregion, but is contiguous with a critically eroded beach on the southern gulf shoreline of Sand Key. Beach restoration and nourishment have been conducted. **Strategy:** Continue beach nourishment using inlet and offshore sand sources.

References

Florida Department of Environmental Protection, Critical Beach Erosion Areas in Florida, January 2000.

Moffatt & Nichol Engineers, Inc., Preliminary Engineering Evaluation for Honeymoon Island and Dunedin Causeway Beach Restoration, September 1999.

Moffatt & Nichol Engineers, Inc., Preliminary Engineering Evaluation for Hurricane Pass Navigation Improvements, September 1999.

U.S. Army Corps of Engineers, Beach Erosion Control Project Review Study and Environmental Impact Statement for Pinellas County, Florida, July 1984 (revised December 1984).

U.S. Army Corps of Engineers, Pinellas County, Florida, Beach Erosion Control Project, 1st Renourishment, Sand Key Segment, Design Memorandum with Environmental Assessment, November 1996 (Revised March 1997).

U.S. Army Corps of Engineers, Water Resources Development in Florida, 1998.

PINELLAS BARRIERS SOUTH REACH

Area Description

The **Pinellas Barriers South Reach** subregion extends from the midpoint of Sand Key (R85) in Pinellas County, to the Southwest Channel entrance to Tampa Bay in Hillsborough County, as shown on Figure SW.2. The area includes the southern portion of Sand Key, Treasure Island, Long Key, Cabbage Key, Mullet Key, Egmont Key and other islands and emergent shoals. The islands are separated from the mainland by Boca Ciega Bay and Tampa Bay. The inlets include Johns Pass, Blind Pass, Pass-a-Grille, Bunces Pass, Egmont Channel, and Southwest Channel. Egmont Key, though separated from the coastal littoral system of Pinellas County by the entrance to Tampa Bay, is editorially included in this subregion for convenience. There are 15.3 miles of critically eroded beaches in this area. Erosion is attributed to winter frontal systems, tropical storms and hurricanes, and the effects of the inlets. The most erosive storms in recent years were the "No-name Storm" of 1982, Hurricane Elena and Tropical Storm Juan in 1985, and Tropical Storm Josephine in 1996.

Previous Actions

The federal **Pinellas County Beach Erosion Control** authorizes beach restoration and periodic nourishment of Clearwater Beach Island, Sand Key, and Treasure Island, and periodic nourishment of Long Key. The federal authorization provides that the various island segments can be constructed together or independently as separate projects. Initial restoration has commenced on all segments except Clearwater Beach Island.

The **Sand Key** segment was restored in three construction phases between 1988 and 1992. Previously, a breakwater was constructed in 1986 at Redington Shores (R101). In 1988, beach restoration at Redington Shores and the northern 0.8 miles of North Redington Beach (R99-R107) was completed using sand from the Johns Pass ebb shoal. In 1990, beach restoration at Indian Rocks Beach (R72-R85) was completed using sand from the Egmont Channel Shoal. In 1992, beach restoration at Indian Shores (R85-R99) and beach nourishment of Redington Shores and North Redington Beach (R99-R107) was completed using sand from the Egmont Channel Shoal.

In 1998, initial beach restoration of Belleair Beach and the southern 0.8 miles of Clearwater Beach (R56-R66) on Sand Key was completed. During a second phase of construction in 1999, beach nourishment of the previously restored area (R71-R107) of Sand Key was completed using sand from the Egmont Channel Shoal. The Town of Belleair Shores (R66-R71) chose not to participate in the shore protection project. Beach restoration has not been conducted at Madeira Beach (R107-R125) where a groin field was constructed by local interests in the late 1950's and recently reconstructed.

Johns Pass is a federal navigation project. Maintenance dredging of the entrance channel is conducted every 2 to 3 years as needed and the dredged sand placed on the Treasure Island beaches. The ebb shoal has been used as a sand source for beach nourishment on Sand Key. The management strategy listed below is based in part upon a 1993 inlet management study.

The **Treasure Island** segment (R126-R143) of the Pinellas County Beach Erosion Control Project was initially restored in 1969. Periodic beach nourishment along short segments of shoreline has been conducted every three to five years using sand from Blind Pass, Pass-A-Grille, an offshore borrow area and the Egmont Channel Shoal, in addition to the bypassing of maintenance dredged material from Johns Pass. Beach nourishment has created a wide beach along the central gulf shoreline (R128-R138). The construction of a groin near FDEP survey monument R141 during 1976 and the extension of the jetty/groin on the north side of Blind Pass (R143) during 1983 stabilized the southern segment of gulf shoreline. In 1996 and 2000, beach nourishment was conducted within a localized area of erosion between R138 and R140 using sand from the Johns Pass navigation channel and the Egmont Channel Shoal borrow area. A terminal groin at the north end of the island is scheduled for construction in 2000.

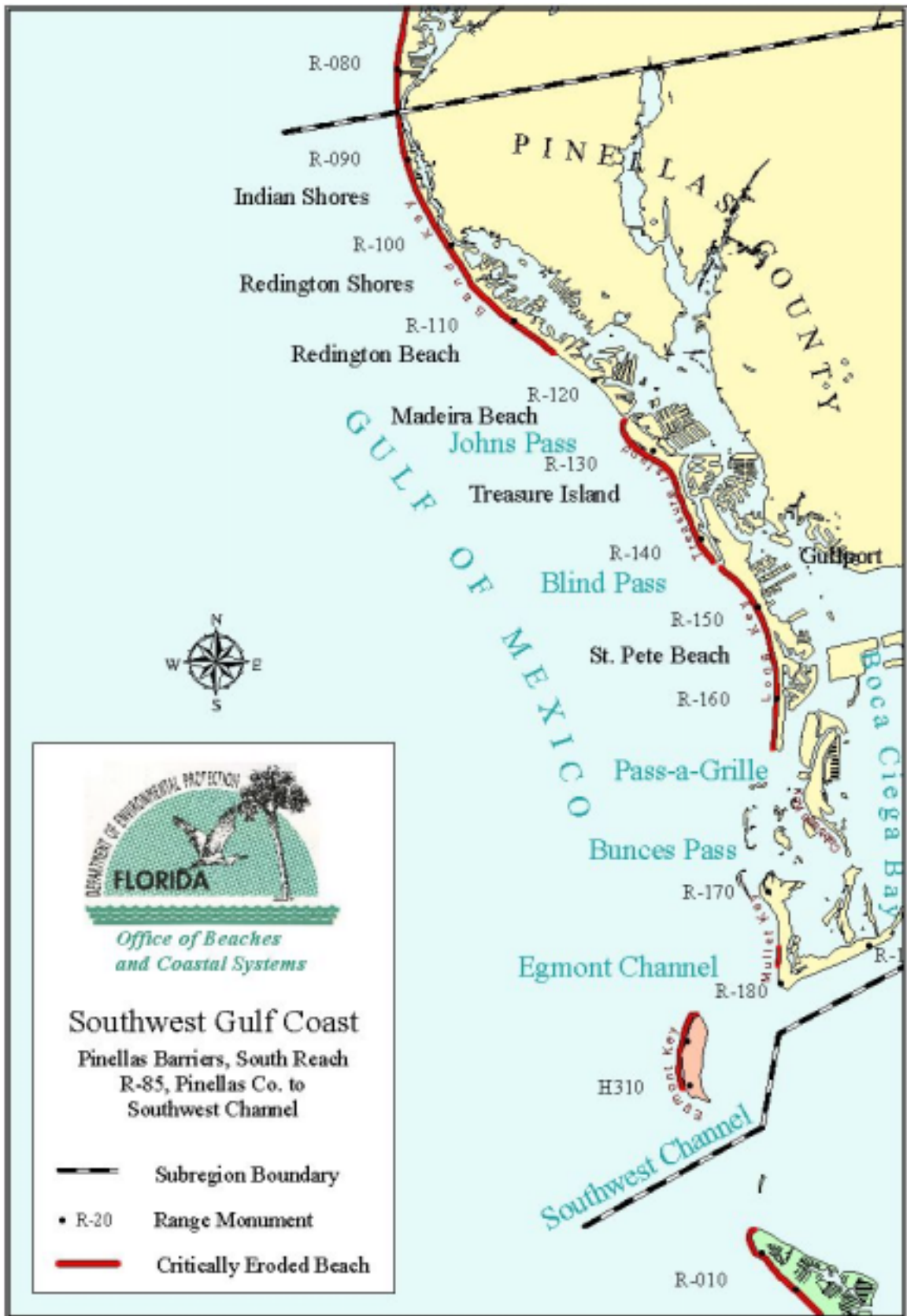


Figure SW.2: Pinellas Barriers South Reach

Blind Pass is not a federal navigation project, but the channel and ebb shoal have been dredged every four to five years by the U.S. Army Corps of Engineers as a sand source for beach nourishment on Treasure Island and Long Key. In 1983, the jetty/groin on the north side of Blind Pass (R143) was extended seaward. In 1986, an attached breakwater was constructed as an extension to the south jetty. The management strategy listed below is based in part upon a 1992 inlet management study.

Periodic beach nourishment of the northern gulf shoreline (R144-R147) of the **Long Key** segment of the Pinellas County Shore Protection Project has been conducted at least every five years since 1980 using sand from Blind Pass, Pass-A-Grille and Egmont Channel Shoal. Despite construction of the breakwater extension to the south jetty at Blind Pass, severe erosion continues along the northern gulf shoreline. In 1998, the Corps of Engineers studied the use of a groin field to slow erosion of the beach fill, but determined that it would not meet the economic requirements of the federal project authorization. Beach nourishment using sand from Blind Pass was completed in 2000.

Pass-A-Grille is a federal navigation project. Improvements to the authorized channel were completed in 1966. Maintenance dredging has not been required to maintain navigable depths.

In 1973, a federal beach erosion control project was constructed at **Mullet Key** that consisted of beach restoration along the gulf shoreline (R173-R179) using sand obtained from an offshore borrow area. The project included construction of a groin and revetment at the southwest point of the island. In 1977, beach nourishment was conducted along the project area and along the bay shoreline (R181-R191) using sand from channel deepening in Tampa Harbor. The federal project was deauthorized in 1990.

Egmont Channel is part of the federal Tampa Harbor navigation project. The maintenance dredged material is placed in an offshore disposal area because its excessive silt content is not suitable for beach nourishment. An offshore area north of the channel, known as Egmont Channel Shoal, is used as a source of beach compatible sand.

In 1997, a feasibility study of **Egmont Key** was conducted to evaluate long term solutions to the erosion threatening historical and natural resources on the island. The study considered coastal armoring, groins, a terminal jetty and beach nourishment. As an interim measure, beach nourishment using maintenance dredged material from the St. Petersburg Harbor navigation project and construction of two sand-filled geotextile groins is scheduled for 2000.

Resources and Opportunities

Sponsors and Funding: This subregion contains the eligible governmental entities of Pinellas County, Hillsborough County, Indian Shores, Redington Shores, North Redington Beach, Redington Beach, Maderia Beach, Treasure Island, St. Pete Beach and the U. S. Army Corps of Engineers (USACE). In addition, public park lands on Mullet Key and Egmont Key are managed by Pinellas County and the Department's Division of Recreation and Parks, respectively. Participants with the Department as sponsors of beach management projects include Pinellas County and USACE. Project cost estimates may be found in the Beach Erosion Control Program - Long Range Budget Plan.

Environmental: The protection of sea turtles and shorebirds, and their nesting habitat, and the protection of hardbottom/reef and seagrass habitat are primary environmental concerns within this subregion. Also, manatees migrate through the area. The timing of construction activities has not been restricted during the marine turtle nesting season of May 1 through October 31. Projects and their method of construction are designed to avoid and minimize adverse impacts to wildlife and habitat.

Sand Supply: The Egmont Channel Shoal has been used for beach restoration and nourishment of several segments of the Pinellas County project, but has not been fully investigated to determine the extent of beach compatible sand; however, previous investigations indicate sufficient material for beach nourishment over the next 15 years. The maintenance dredged material obtained from the Tampa Harbor navigation

project is placed in confined upland disposal sites or an open water offshore disposal area because its excessive silt content is not suitable for beach nourishment.

Regionalization: Continue a sediment management strategy that uses beach quality sand from the maintenance dredging of the navigation projects for the maintenance of the beach restoration projects. Continue to link project segments, such as Treasure Island and Long Key, for construction and implement a regional monitoring program of the combined projects. Further investigation is needed to determine if maintenance dredged material from the Tampa Harbor or other federal navigation projects could be placed in the nearshore zone adjacent to the Egmont Key gulf shoreline.

Innovation: Innovative technologies should be pursued when it has been demonstrated that they will result in improved project performance or lower costs. The Department, in ranking annual funding priorities of the beach erosion control program, considers the use of innovative technology. At this time, application of an innovative technology for a specific beach management activity in this subregion has not been identified. However, the use of hydrocyclone and mass density separator technology, which is used in the mining industry, may have the potential to extract beach quality sand from maintenance dredged material obtained from the Tampa Harbor or other federal navigation projects.

Monitoring: Implement a regional beach, inlet and offshore monitoring program to identify areas of greatest need for placement of dredged material, to assess the status of the beach erosion control projects, and to identify patterns of erosion and accretion.

Emergency Response: Develop emergency response plans for post-storm recovery and emergency beach maintenance. The plans will include damage assessment methodology, temporary structural measures, identification of potential borrow sites, and a secure source of funding. The local sponsors should hold an executable contract and all requisite permits/authorizations for emergency response activities.

Strategies for Inlets and Critically Eroded Beaches

Pinellas County R85-R115.4 is a 5.8-mile segment of critically eroded beach on the southern gulf shoreline of Sand Key. Beach restoration and nourishment have been conducted throughout this area, except Madeira Beach, where a groin field has been constructed. **Strategy:** Continue beach nourishment.

Pinellas County, Johns Pass. Strategy: Continue to use the channel and ebb shoal as a sand source for beach nourishment of Treasure Island.

Pinellas County R126-R143 is a 3.5-mile segment of critically eroded beach on Treasure Island. Beach restoration and nourishment have been conducted throughout this area. **Strategy:** Continue beach nourishment at areas of greatest need using sand from Johns Pass, or if using sand from Egmont Channel Shoal, then in conjunction with beach nourishment of other project segments. Construct a terminal groin at the north end of island. Investigate transfer of sand from overfilled beaches at the central and southern gulf shore to the localized area of erosion at northern gulf shore.

Pinellas County, Blind Pass. Strategy: Continue to use channel and ebb shoal as borrow area for beach nourishment of Long Key.

Pinellas County R144-R166 is a 4.1-mile segment of critically eroded beach on Long Key. Periodic beach nourishment is conducted at Upham Beach on the northern gulf shoreline. Shore protection structures have been built at the north and south ends of the island. **Strategy:** Continue periodic beach nourishment at the northern gulf shoreline of island using sand from Blind Pass.

Pinellas County, Pass-A-Grille. Strategy: Monitoring.

Pinellas County R176-178 is a 0.3-mile segment of critically eroded beach on Mullet Key.

Beach restoration and nourishment of the adjacent beaches was conducted but not maintained and armoring has been constructed at this location. **Strategy:** Monitoring.

Hillsborough County, Egmont Channel. **Strategy:** Investigate nearshore placement of maintenance dredged material at Egmont Key through an appropriate federal study of the Tampa Harbor Navigation Project.

Hillsborough County, Egmont Key is 1.6-mile segment of critically eroded beach on Egmont Key. **Strategy:** Beach nourishment using maintenance dredged material and shore protection structures.

References

Coastal Planning & Engineering, Inc., Blind Pass Inlet Management Plan, June 1992.

Coastal Planning & Engineering, Inc., Egmont Key Erosion Control Project Feasibility Study, December 1997.

Coastal Technology, Inc., John's Pass Inlet Management Plan, January 1993.

Florida Department of Environmental Protection, Critical Beach Erosion Areas in Florida, January 2000.

U.S. Army Corps of Engineers, Beach Erosion Control Project Review Study and Environmental Impact Statement for Pinellas County, July 1984 (revised December 1984).

U.S. Army Corps of Engineers, Beach Erosion Control Study on Pinellas County, Florida, January 1966.

U.S. Army Corps of Engineers, Feature Design Memorandum, Northern Treasure Island, Pinellas County, Florida, Beach Erosion Control Project, April 1995.

U.S. Army Corps of Engineers, General and Detail Design Memorandum, Mullet Key, Florida, Beach Erosion Control Project, April 1971 (revised November 1971).

U.S. Army Corps of Engineers, Water Resources Development in Florida, 1998.

SARASOTA BARRIERS NORTH REACH

Area Description

The **Sarasota Barriers North Reach** subregion extends from the Southwest Channel entrance to Tampa Bay in Manatee County to Sarasota Point (R45) on the northwest end of Siesta Key in Sarasota County, as shown on Figure SW.3. The area includes Passage Key, Anna Maria Island, Longboat Key, Lido Key, and northern Siesta Key, which are separated from the mainland by Tampa Bay and Sarasota Bay. The inlets include Passage Key Inlet, Longboat Pass, New Pass, and Big Sarasota Pass. There are 12.1 miles of critically eroded beaches in Manatee County and 8.9 miles of critically eroded beaches within this subregion of Sarasota County. Erosion is attributed to winter frontal systems, tropical storms and hurricanes, and the effects of the inlets. The most erosive storms in recent years were the "No-Name Storm" in 1982, Hurricane Elena and tropical storms Bob and Juan in 1985, and Tropical Storm Josephine in 1996.

Previous Actions

The federal **Manatee County Shore Protection Project** authorizes beach restoration along 3.2 miles of the central **Anna Maria Island** gulf shoreline and periodic nourishment of the entire 7.5 miles of gulf shoreline (R2-R41). In 1993, initial beach restoration was completed at Holmes Beach and Bradenton Beach (R12-R36) using sand from an offshore borrow area. In 1999, the County began preparation of engineering and design documents for the first beach nourishment to be conducted in FY 2000-2001 on a federal reimbursement basis. The initial project area has been expanded to include a segment of shoreline within the City of Anna Maria.

Longboat Pass is a federal navigation project. Initial dredging of the authorized channel was completed in 1977. Maintenance dredging of the channel has been conducted every three to five years. The dredged sand is placed on the adjacent gulf shorelines of Anna Maria Island and Longboat Key. The management strategy listed below is based in part upon a 1993 inlet management study.

The federal **Sarasota County Shore Protection Project** authorizes beach restoration of 2.4 miles of shoreline on Longboat Key in Manatee and Sarasota Counties, and 5.6 miles of shoreline at Venice in Sarasota County. In 1993, beach restoration of the **Longboat Key** segment (R46ME-R29ST) was completed using sand from the ebb shoals of Longboat Pass and New Pass. In 1997, interim beach nourishment of the central segment of the project (R62ME-R14ST) was conducted using sand from an offshore borrow area. The interim project included sand-filled geo-textile sill and groins installed at localized areas of accelerated erosion. In 1998, an extension of the terminal groin at the south end of the island was completed. Beach nourishment is scheduled for FY 2001-2002.

New Pass is a federal navigation project and entrance to the turning basins at Payne Terminal and Sarasota's City Pier. Initial dredging of the authorized channel was completed in 1964. Maintenance dredging of the entrance channel has been conducted every three to five years. The dredged sand has been placed on the gulf shorelines of Longboat Key and Lido Key.

The federal **Lido Key Shore Protection Project** was deauthorized in 1990, then reauthorized in 1999. In 1970, the City of Sarasota constructed beach restoration along Coolidge Park (R35-R38.4). The beach has been periodically nourished with sand from maintenance dredging of the New Pass navigation channel. In 1998, beach nourishment was conducted (R35-R40) using sand from an offshore borrow area. The City has initiated design and permitting of a beach restoration project along the southern gulf shoreline (R38-R44). The project is scheduled for construction in FY 2000-2001 on a federal reimbursement basis. The USACE has initiated a feasibility study of beach nourishment for the gulf shoreline (R35-R44), which includes the evaluation of shore protection structures to retain beach fill material.

Big Sarasota Pass has not been improved or dredged for navigation. The northern shoreline of Siesta Key, fronting on the pass, has been substantially armored.



Figure SW.3: Sarasota Barriers North Reach

Resources and Opportunities

Sponsors and Funding: This subregion contains the eligible governmental entities of Manatee County, Sarasota County, Anna Maria, Holmes Beach, Bradenton Beach, City of Longboat Key, City of Sarasota, West Coast Inland Navigation District (WCIND) and the U.S. Army Corps of Engineers (USACE), which participate as sponsors of beach management projects. Project cost estimates may be found in the Beach Erosion Control Program - Long Range Budget Plan.

Environmental: The protection of sea turtles, colonial shorebirds, manatees and hardbottom/reef habitat are primary environmental concerns within this subregion. The timing of construction activities has not been restricted during the marine turtle nesting season of May 1 through October 31. Projects and their method of construction are designed to avoid and minimize adverse impacts to wildlife and habitat.

Sand Supply: Potential borrow areas have been identified during design of beach restoration; however, these sand sources are not adequate to meet the needs of projects in this subregion over the next 15 years. A regional sand search and inventory should be performed to locate and characterize beach compatible sand.

Monitoring: Implement a regional beach, inlet and offshore monitoring program to validate or redefine the sediment budget developed in the inlet management studies, to identify areas of greatest need for placement of maintenance dredged material, to assess the status of the beach erosion control projects, and to identify patterns of erosion and accretion.

Regionalization: Refine the existing sediment management strategy that uses beach quality sand from the maintenance dredging of Longboat Pass and New Pass for maintenance of the beach restoration projects on Longboat Key and Lido Key.

Innovation: Innovative technologies should be pursued when it has been demonstrated that they will result in improved project performance or lower costs. The Department, in ranking annual funding priorities of the beach erosion control program, considers the use of innovative technology. At this time, application of an innovative technology for a specific beach management activity in this subregion has not been identified.

Emergency Response: Develop emergency response plans for post-storm recovery and emergency beach maintenance. The plans will include damage assessment methodology, temporary structural measures, identification of potential borrow sites, and a secure source of funding. The local sponsors should hold an executable contract and all requisite permits/authorizations for emergency response activities.

Strategies for Inlets and Critically Eroded Beaches

Manatee County R2-R41 is a 7.3-mile segment of critically eroded beach comprising the entire gulf shoreline of Anna Maria Island. Beach restoration has been constructed within a portion of this area. **Strategy:** Beach nourishment; placement of beach quality sand from maintenance dredging of the navigation projects in areas of greatest need.

Manatee County, Longboat Pass. Strategy: Continue to bypass all beach compatible maintenance dredged material to adjacent shoreline areas of greatest need meeting an average annual objective of 57,800 cubic yards; conduct a feasibility study on the use of the flood shoals to supplement inlet sand bypassing; revalidate or refine the sediment budget contained in the study report.

Manatee County R47-R67 through Sarasota County R1-R29 is a 10.2-mile segment of critically eroded beach comprising the entire gulf shoreline of Longboat Key. Beach restoration has been constructed. **Strategy:** Continue beach nourishment; placement of beach quality sand from maintenance dredging of the navigation projects on areas of greatest need; feasibility study of erosion control structure at north end of the island to retain beach fill.

Sarasota County, New Pass. Strategy: Continue to bypass all beach compatible maintenance dredged material to adjacent shoreline areas of greatest need.

Sarasota County R30-R44.5 is a 2.7-mile segment of critically eroded beach along the New Pass and gulf shorelines of Lido Key. Beach restoration and nourishment have been conducted along the central gulf shoreline of the island. **Strategy:** Beach nourishment; placement of beach quality sand from maintenance dredging of the navigation projects on areas of greatest need; beach restoration of the remaining critically eroded beach along the southern gulf shoreline of the island.

Sarasota County R44A-R45 is a 0.8-mile segment of critically eroded beach on north shore of Siesta Key adjacent to Big Sarasota Pass. Threatened private development along this segment of shoreline has been armored with bulkheads and rock revetments. **Strategy:** Monitor.

References

Applied Technology and Management, Inc., Longboat Pass Inlet Management Plan, May 1993.

Coastal Planning & Engineering, Inc., draft Big Sarasota Pass Inlet Management Plan, September 1993.

Coastal Planning & Engineering, Inc., New Pass Inlet Management Plan, September 1993.

Florida Department of Environmental Protection, Critical Beach Erosion Areas in Florida, January 2000.

U.S. Army Corps of Engineers, Beach Erosion Control Study for Sarasota County, Florida, with Environmental Impact Statement, July 1984.

U.S. Army Corps of Engineers, Manatee County, Florida, Shore Protection Project, General Design Memorandum with Supplemental Environmental Impact Statement, July 1989 (revised January 1990).

U.S. Army Corps of Engineers, Water Resources Development in Florida, 1998.

SARASOTA BARRIERS SOUTH REACH

Area Description

The **Sarasota Barriers South Reach** subregion extends from Sarasota Point (R45) on the northwest end of Siesta Key to the north end of Manasota Key (R143) in Sarasota County, as shown on Figure SW.4. The area includes Siesta Key and Casey Key, and the mainland beach south of Venice Inlet. The islands are separated from the mainland by Roberts Bay, Little Sarasota Bay, and Blackburn Bay and divided by inlets at Midnight Pass (now closed) and Venice Inlet. There are 10.7 miles of critically eroded beaches in this subregion. Erosion is attributed to winter frontal systems, tropical storms and hurricanes, and the effects of the inlets. The most erosive storms in recent years were the "No-Name Storm" in 1982, Hurricane Elena and tropical storms Bob and Juan in 1985, and Tropical Storm Josephine in 1996.

Previous Actions

Venice Inlet (a.k.a. Caseys Pass) is part of the federal Intracoastal Waterway navigation project. Small volumes of maintenance dredged material have been removed on an infrequent basis from the inlet channel since navigation improvements were constructed in 1938. The Department adopted an inlet management plan in September 1998 that specifies the placement of beach compatible maintenance dredged material or offshore material on downdrift beaches. The combined total of material from all sources shall equal or exceed 64,620 cubic yards on an average annual basis.

The federal **Sarasota County Shore Protection Project** authorizes beach restoration of 2.4 miles of shoreline at Longboat Key in Manatee and Sarasota Counties, and 5.6 miles of shoreline at Venice in Sarasota County. A beach restoration project was constructed along 3.2 miles of shoreline at **Venice** (R116-R133) south of the inlet in two phases between August 1994 and May 1996 using sand from borrow areas offshore of Manasota Key. The first beach nourishment of the project is planned for 2004.

Resources and Opportunities

Sponsors and Funding: This subregion contains the eligible governmental entities of Sarasota County, City of Venice, West Coast Inland Navigation District, and the U.S. Army Corps of Engineers, which participate with the Department as sponsors of beach management projects. Project cost estimates may be found in the Beach Erosion Control Program - Long Range Budget Plan.

Environmental: The protection of sea turtles, colonial shorebirds, manatees and hardbottom/reef habitat are primary environmental concerns within this subregion. The timing of construction activities has not been restricted during the marine turtle nesting season of May 1 through October 31. Projects and their method of construction are designed to avoid or minimize adverse impacts to wildlife and habitat.

Sand Supply: Potential borrow areas have been identified during design of beach restoration; however, these sand sources are not adequate to meet the needs of projects in this subregion over the next 15 years. A regional sand search and inventory should be performed to locate and characterize beach compatible sand.

Monitoring: Implement a regional beach, inlet and offshore monitoring program to validate or redefine the sediment budget adopted in the inlet management plan, to identify areas of greatest need for placement of maintenance dredged material, to assess the status of the beach erosion control projects, and to identify patterns of erosion and accretion.

Regionalization: There are critically eroded beaches on the adjacent islands of Siesta Key and Casey Key where beach erosion control projects have not been implemented. There is an opportunity to couple the implementation of projects on both these islands; however, at this time funding constraints have restricted a proposed feasibility study to Casey Key.

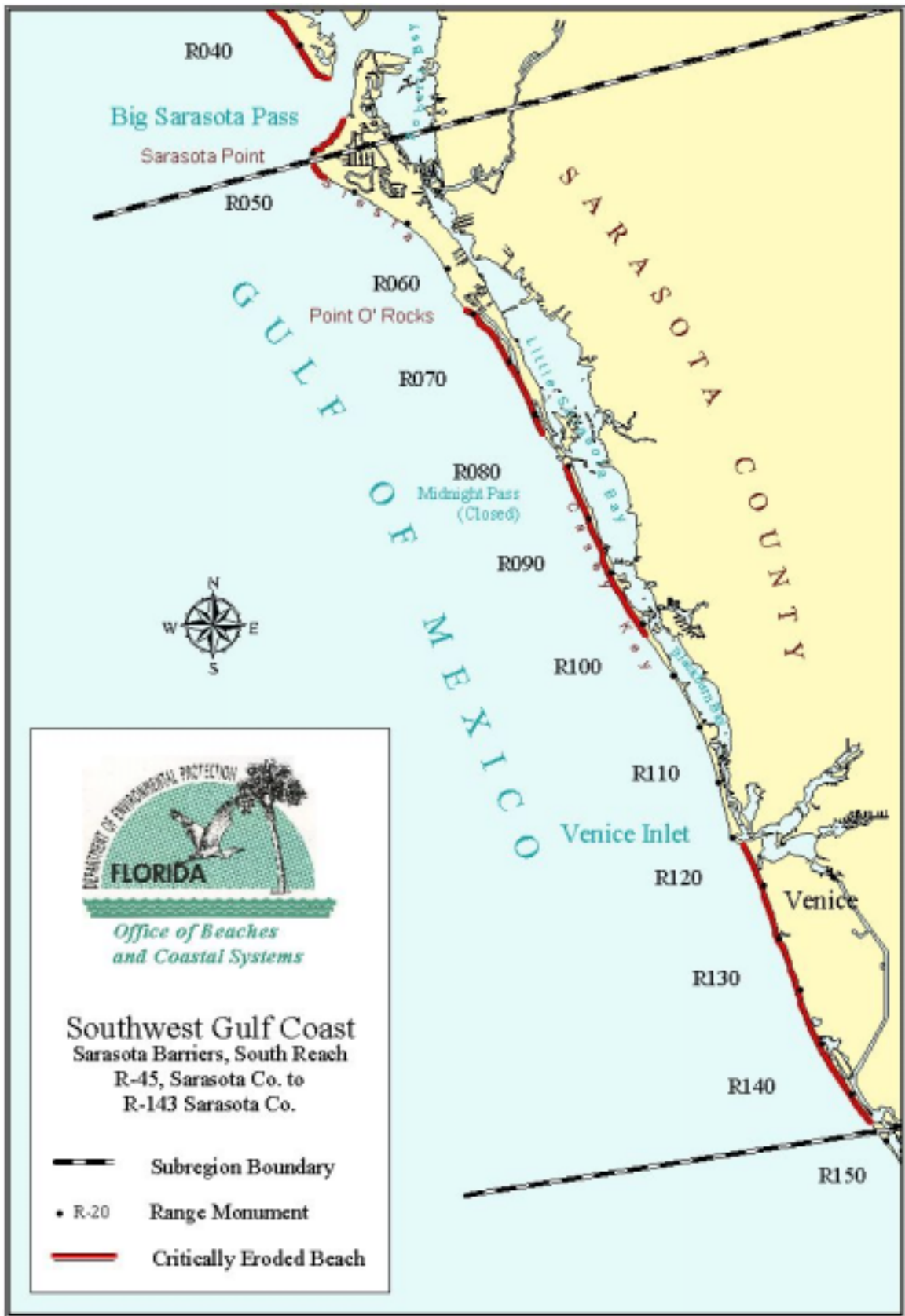


Figure SW.4: Sarasota Barriers South Reach

Innovation: Innovative technologies should be pursued when it has been demonstrated that they will result in improved project performance or lower costs. The Department, in ranking annual funding priorities of the beach erosion control program, considers the use of innovative technology. At this time, application of an innovative technology for a specific beach management activity in this subregion has not been identified.

Emergency Response: Develop emergency response plans for post-storm recovery and emergency beach maintenance. The plans will include damage assessment methodology, temporary structural measures, identification of potential borrow sites, and a secure source of funding. The local sponsors should hold an executable contract and all requisite permits/authorizations for emergency response activities.

Strategies for Inlets and Critically Eroded Beaches

Sarasota County R46-R47.5 is a 0.3-mile segment of critically eroded beach on the northern gulf shore of Siesta Key immediately south of Sarasota Point. This area is contiguous with a 0.8-mile segment of critically eroded beach on the north shore of Siesta Key adjacent to Big Sarasota Pass. The area has been armored with rock revetments. **Strategy:** Monitoring.

Sarasota County R64-R77 is a 2.4-mile segment of critically eroded beach on the southern gulf shore of Siesta Key, south of Point O' Rocks. **Strategy:** Feasibility study of beach restoration.

Sarasota County R81-R96 is a 2.9-mile segment of critically eroded beach on the northern gulf shore of Casey Key south of Midnight Pass, which is now closed. The area has been extensively armored with rock revetments. **Strategy:** Feasibility study of beach restoration.

Sarasota County, Venice Inlet. Strategy: Place all beach compatible maintenance dredged material on the downdrift beaches in areas of greatest need. Supplemented with sand from offshore borrow areas the combined bypassing total from all sources shall equal or exceed 64,620 cubic yards on an average annual basis. Conduct a feasibility study regarding possible impacts to the updrift and downdrift shorelines if the ebb shoal, flood shoal, or channel is utilized as a borrow source. Conduct a feasibility study of realignment of the jetties and methods to improve mechanical bypassing. Revalidate or refine the sediment budget contained in the study report.

Sarasota County, Venice, R116-R143 is a 5.1-mile segment of critically eroded beach on the downdrift shore south of Venice Inlet. The northern 3.2 miles of beach has been restored. **Strategy:** Continue beach nourishment using sand from navigation maintenance dredging and offshore borrow areas; conduct a feasibility study of beach restoration of the remaining portion of the critically eroded beach.

References

Coastal Planning & Engineering, Inc., Venice Inlet Management Plan, April 1994.

Florida Department of Environmental Protection, Critical Beach Erosion Areas in Florida, January 2000.

Florida Department of Environmental Protection, Venice Inlet Management Study Implementation Plan, September 1998.

U.S. Army Corps of Engineers, Beach Erosion Control Study for Sarasota County, Florida, with Environmental Impact Statement, July 1984.

U.S. Army Corps of Engineers, Water Resources Development in Florida, 1998.

MANASOTA BARRIERS

Area Description

The **Manasota Barriers** subregion extends from the north end of Manasota Key (R143) in Sarasota County, to Gasparilla Pass (R60) in Charlotte County, as shown on Figure SW.5. The area includes Manasota Key, which is a peninsula extending from the mainland, and a merged island formed by Knight Island, Bocilla Island, Don Pedro Island, Little Gasparilla Island. The peninsula and islands are separated from the mainland by Lemon Bay and Placida Harbor. Stump Pass is located at the north end of the Knight Island complex and Gasparilla Pass is at the south end. There are 2.9 miles of critically eroded beaches in this subregion of Sarasota County and 5.2 miles of critically eroded beaches in Charlotte County. Erosion is attributed to winter frontal systems, tropical weather systems in the Gulf, and the effects of the inlets. The most erosive storms in recent years were the "No-name Storm" of 1982, Tropical Storm Bob and Hurricane Elena in 1985 and Tropical Storm Josephine in 1996.

Previous Actions

The federal **Charlotte County Shore Protection Project** (R1-R21) was authorized in 1986 and provides for 3.9 miles of beach restoration from the Sarasota County line to Stump Pass. Construction has not been initiated and the project is inactive and eligible for deauthorization.

Stump Pass was a natural inlet until a navigation channel was dredged in 1980. The dredged material was placed on the beach north of the pass within the Port Charlotte Beach State Recreation Area. Coastal structures to stabilize the inlet have not been constructed and maintenance dredging of the original navigation channel has not been conducted. In 1990, an inlet management study was conducted which is now being updated. In 1998, dredging of a small interim navigation channel through the natural ebb channel was conducted pending implementation of an inlet management/navigation plan. The dredged material was placed on the Knight Island shoreline adjacent to the pass and the gulf shoreline beginning approximately one mile south the pass. The maintenance dredging of the interim channel is scheduled for the year 2000.

In 1994, a beach restoration project was constructed along the northern gulf shoreline of **Knight Island** (R27.5-R30.5) by Charlotte County using sand obtained from the southern lobe of the Stump Pass ebb tidal shoal. In 1998, the dredged material from the interim navigation channel at Stump Pass was placed below the mean high water contour along the southern portion of the beach restoration project area. The sand from maintenance dredging of the interim channel will be placed in this general area in 2000.

Resources and Opportunities

Sponsors and Funding: This subregion contains the eligible governmental entities of Sarasota County, Charlotte County, West Coast Inland Navigation District (WCIND), and the U.S. Army Corps of Engineers (USACE), which participate with the Department as sponsors of beach management projects. Project cost estimates may be found in the Beach Erosion Control Program - Long Range Budget Plan.

Environmental: The protection of sea turtles, colonial shorebirds, manatees and both hardbottom/reef habitat and seagrass beds are environmental concerns within this subregion. The timing of construction activities has been restricted during the marine turtle nesting season of May 1 through October 31. Projects and their method of construction are designed to avoid and minimize adverse impacts to wildlife and habitat.

Sand Supply: Sand sources to meet the needs of future projects in this subregion over the next 15 years have not been identified. A regional sand search and inventory should be performed to locate and characterize beach compatible sand.

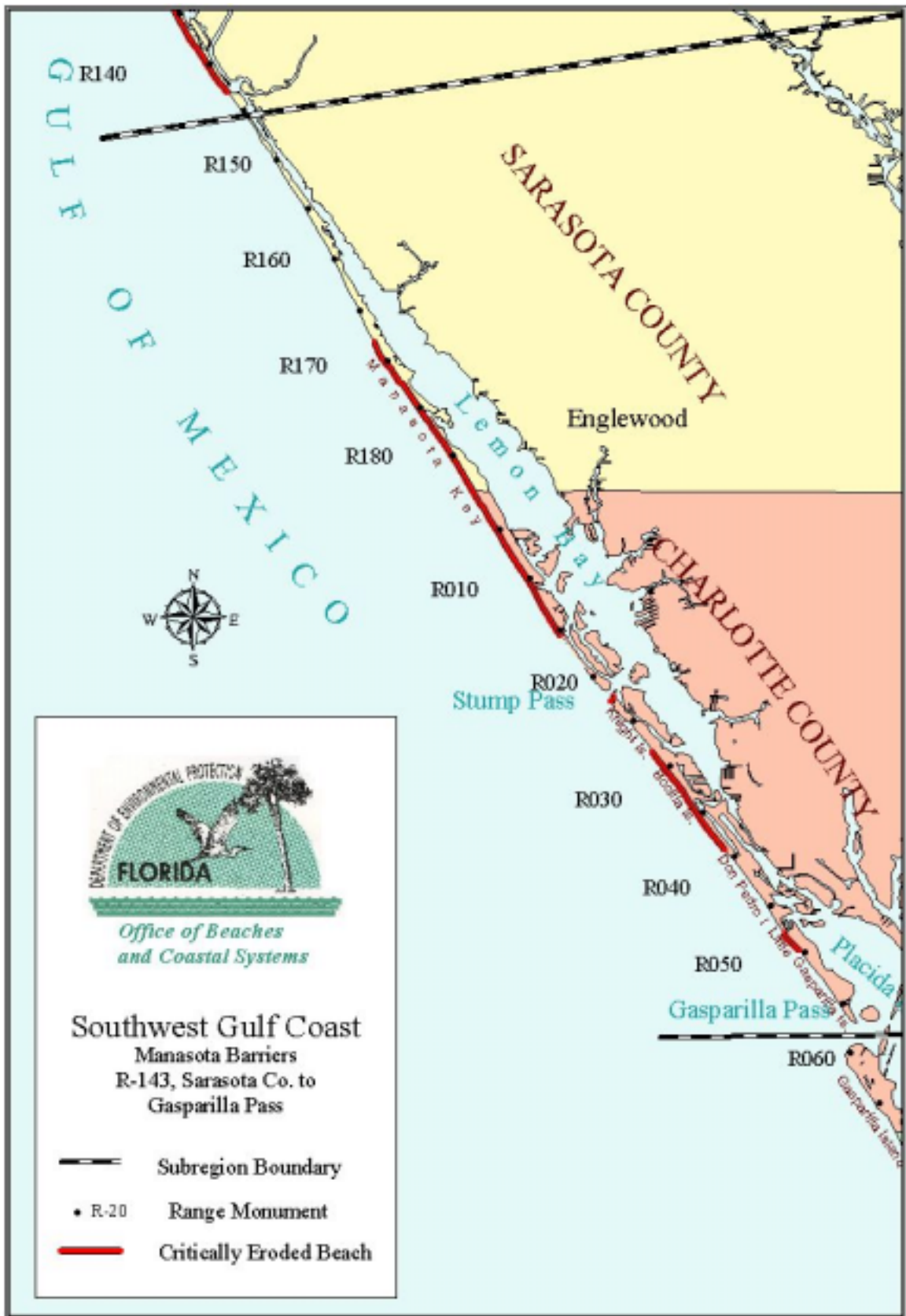


Figure SW.5: Manasota Barriers

Monitoring: Implement a regional beach, inlet and offshore monitoring program to identify patterns of erosion and accretion and assess the feasibility of inlet and beach erosion control projects.

Regionalization: Conduct a regional feasibility study of beach restoration of the critically eroded beaches on Manasota Key and the merged Knight Island complex which considers utilization of material dredged to maintain Stump Pass as a sand source in addition to offshore borrow areas.

Innovation: Innovative technologies should be pursued when it has been demonstrated that they will result in improved project performance or lower costs. The Department, in ranking annual funding priorities of the beach erosion control program, considers the use of innovative technology. At this time, application of an innovative technology for a specific beach management activity in this subregion has not been identified.

Emergency Response: Develop emergency response plans for post-storm recovery and emergency beach maintenance. The plans will include damage assessment methodology, temporary structural measures, identification of potential borrow sites, and a secure source of funding. The local sponsors should hold an executable contract and all requisite permits/authorizations for emergency response activities.

Strategies for Inlets and Critically Eroded Beaches

Sarasota County R168-R183 and Charlotte County R1-R15.4 is approximately 5.6-mile segment (2.9 miles in Sarasota County and 2.7 miles in Charlotte County) of critically eroded beach on Manasota Key that includes Englewood Beach. **Strategy:** Conduct a feasibility study of beach restoration.

Charlotte County, Stump Pass. **Strategy:** Place available beach compatible maintenance dredged material on the downdrift shoreline or an acceptable inshore location that ensures bypassing.

Charlotte County R22-R24 is a 0.3-mile segment of critically eroded beach on the northern shore of Knight Island adjacent to Stump Pass. Sand from dredging of the interim navigation channel has been placed in this area. **Strategy:** Monitor.

Charlotte County R28-R39 is a 1.8-mile segment of critically eroded beach on the merged segment of Knight Island/Bocilla Island that includes the former Bocilla Pass. Beach restoration was conducted within the north portion of this segment. Sand from dredging of the interim navigation channel has been placed in this area. **Strategy:** Conduct a feasibility study of beach restoration.

Charlotte County R47.5-R49.5 is a 0.4-mile segment of critically eroded beach on Little Gasparilla Island south of the former Little Gasparilla Pass. This area eroded due to the effects of the pass but may now be returning to stability. **Strategy:** Monitor.

References

Florida Department of Environmental Protection, Critical Beach Erosion Areas in Florida, January 2000.

Coastal Engineering Consultants, Inc., Stump Pass Inlet Management Plan, December 1991.

U.S. Army Corps of Engineers, Water Resources Development in Florida, 1998.

CHARLOTTE HARBOR COMPLEX

Area Description

The **Charlotte Harbor Complex** subregion extends from Gasparilla Pass (R60) in Charlotte County, to the San Carlos Bay Entrance (R174) in Lee County, as shown on Figure SW.6. It includes Gasparilla Island, Cayo Costa, North Captiva Island, Captiva Island and Sanibel Island, which are separated from the mainland by Gasparilla Sound, Charlotte Harbor, Pine Island Sound, and San Carlos Bay. The inlets between these islands include Boca Grande Pass, Captiva Pass, Redfish Pass, and Blind Pass. There are 13.5 miles of critically eroded beaches in this subregion of Lee County. Erosion is attributed to winter frontal systems, tropical weather systems in the Gulf, and the effects of the inlets. The most erosive storms in recent years were a subtropical storm of 1982, Tropical Storm Keith in 1988 and Tropical Storm Gordon in 1995.

Previous Actions

The federal **Lee County Shore Protection Project** authorizes beach restoration, and associated shore protection structures, as needed, for eroding beaches on Gasparilla Island, Captiva Island and Estero Island. In 1999, the U.S. Army Corps of Engineers (USACE) completed a general reevaluation report for Gasparilla and Estero Islands. The recommended project for the two islands was modified. The modified project provides for beach restoration of 2.8 miles of shoreline on **Gasparilla Island** (R11-R24). A seven-year beach nourishment interval is anticipated. A terminal groin at the south end of the island adjacent to Boca Grande Pass was considered uneconomical and not recommended. In January 2000, the Department and Lee County initiated engineering design and permitting to construct the project on a reimbursement basis with the federal government. The design goal is to modify the recommended project by justifying construction of the terminal groin and qualifying the changes for federal reimbursement. Construction is scheduled for FY 2001-2002.

Boca Grande Pass is a part of the federal Charlotte Harbor navigation project. Initial dredging of the authorized channel was completed in 1912. Maintenance dredging of the entrance channel has been conducted every two or three years since 1971. The dredged sand has been placed offshore, except in 1981, 1993, and 1997, when placed on the adjacent gulf shoreline of Gasparilla Island. In 1991, the USACE completed a study that recommended that maintenance dredged material from the Charlotte Harbor navigation project be placed on the gulf shoreline of Gasparilla Island to provide storm protection and recreational benefits in accordance with Section 933, Public Law 99-662. However, future maintenance dredging requirements are uncertain due to closure of a local oil shipping terminal.

Redfish Pass, a natural inlet formed in 1921, provides recreational boating access through a relatively deep channel that has not needed maintenance dredging. In 1981 and 1988/89, the ebb shoal was used as a sand source for beach nourishment of Captiva Island. In 1993, an inlet management study was sponsored by Captiva Erosion Prevention District (CEPD). In 1998, groins were constructed on the south end of **North Captiva Island**, as recommended in the study.

In 1981, beach restoration was conducted along the northern portion of the **Captiva Island** (R84-R109) segment of the federal shore protection project without federal participation. In 1988/89, beach nourishment of this area and beach restoration of the remainder of Captiva Island was completed on a federal reimbursement basis.

In 1972, a terminal groin was constructed at the south end of Captiva Island to protect the bridge across Blind Pass. In 1988, the groin was extended to stabilize the beach restoration project at the south end of the island. In 1977, construction began on a terminal groin at the north end of Captiva Island adjacent to Redfish Pass, which was completed to its current length in 1981.

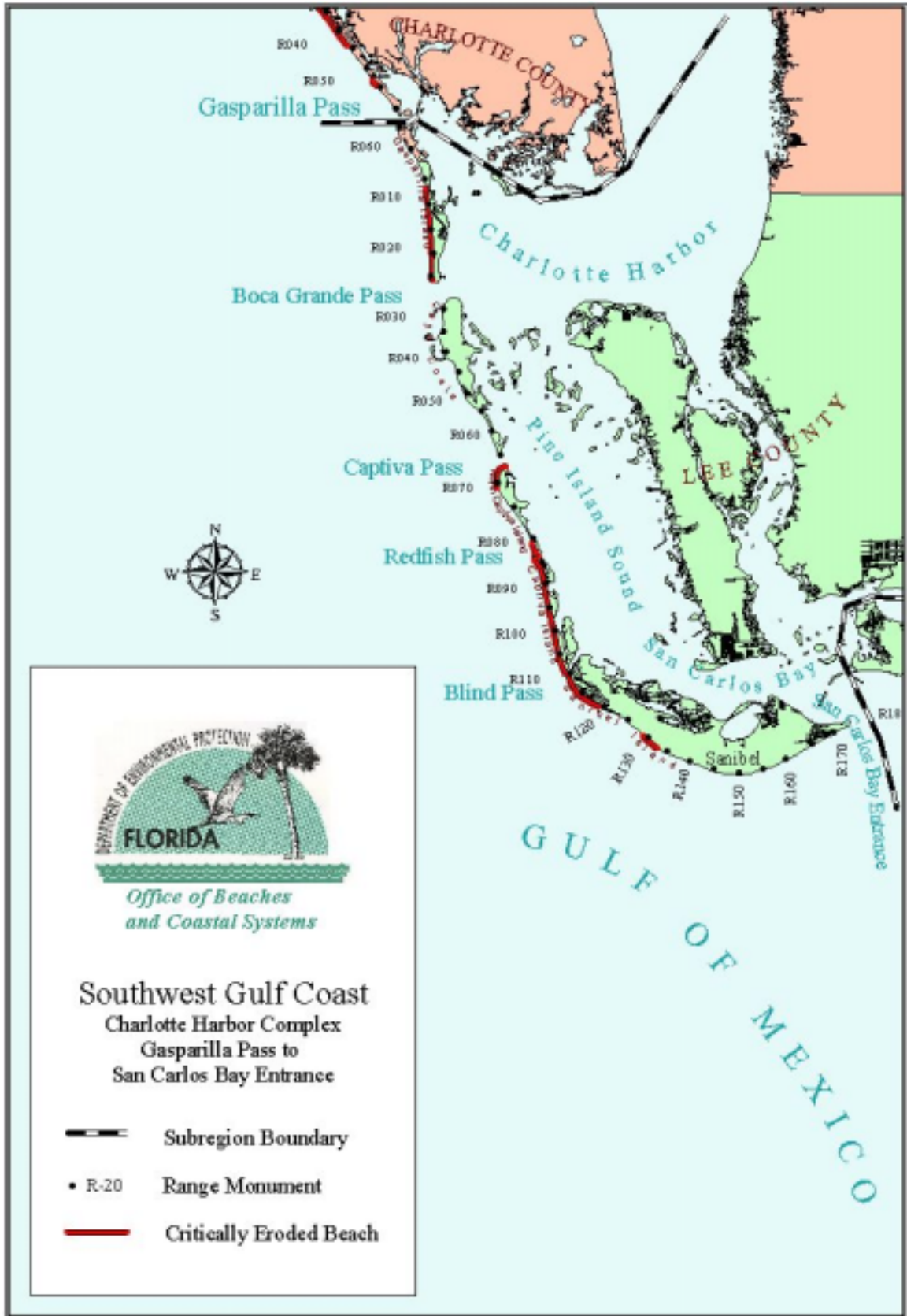


Figure SW.6: Charlotte Harbor Complex

In 1996, beach nourishment of Captiva Island and the northern gulf shoreline of Sanibel Island (R110-R114) was completed using sand from an offshore borrow area. Beach nourishment is planned for FY 2003/2004.

Blind Pass is a historic natural inlet, but shoaling has frequently closed the pass since the opening of Redfish Pass. In 1993, the Department and CEPD sponsored an inlet management study.

In 1996, beach restoration of the northern gulf shoreline of **Sanibel Island** (R110-R114) was conducted in conjunction with beach nourishment of Captiva Island. Concurrently, but under a separate contract with the dredging contractor, the City of Sanibel constructed a beach restoration project along the **Gulf Pines** (R129-R132) segment of the island using sand from an offshore borrow area. Beach nourishment of the northern project area is planned for FY 2003-2004.

Resources and Opportunities

Sponsors and Funding: This subregion contains the eligible governmental entities of Charlotte County, Lee County, Captiva Erosion Prevention District (CEPD), City of Sanibel, West Coast Inland Navigation District (WCIND), and the U. S. Army Corps of Engineers, which participate with the Department as sponsors of beach management projects. The island of Cayo Costa and a number of properties on Gasparilla and North Captiva Island are managed by the Department's Division of Recreation and Parks. Project cost estimates are provided in the Beach Erosion Control Program - Long Range Budget Plan.

Environmental: The protection of sea turtles, colonial shorebirds, manatees and both hardbottom/reef habitat and seagrass beds are environmental concerns within this subregion. The timing of construction activities has not been restricted during the marine turtle nesting season of May 1 through October 31. Projects and their method of construction are designed to avoid and minimize adverse impacts to wildlife and habitat.

Sand Supply: Sand sources to meet the needs of future projects in this subregion over the next 15 years have not been identified. A regional sand search and inventory should be performed to locate and characterize beach compatible sand.

Monitoring: Implement a regional beach, inlet and offshore monitoring program to validate or redefine the sediment budget developed in the inlet management studies, to identify areas of greatest need for placement of navigation maintenance dredged material, to assess the status of the beach erosion control projects, and to identify patterns of erosion and accretion.

Regionalization: Considering the results of the USACE's section 933 study of Charlotte Harbor, future maintenance of the beach restoration project at Gasparilla Island should be conducted in conjunction with the maintenance dredging of Boca Grande Pass. Initial construction of the Gasparilla Island and Estero Island segments of the federal shore protection project should be conducted under a single contract if the same type of dredge vessel can be used for both segments. To reduce dredge mobilization fees a single contract for beach nourishment of both Captiva and Sanibel Islands should be considered and the schedule coordinated with beach nourishment of Gasparilla Island and Estero Island.

Innovation: Innovative technologies should be pursued when it has been demonstrated that they will result in improved project performance or lower costs. The Department, in ranking annual funding priorities of the beach erosion control program, considers the use of innovative technology. At this time, application of an innovative technology for a specific beach management activity in this subregion has not been identified.

Emergency Response: Develop emergency response plans for post-storm recovery and emergency beach maintenance. The plans will include damage assessment methodology, temporary structural measures, identification of potential borrow sites, and a secure source of funding. The local sponsors should hold an executable contract and all requisite permits/authorizations for emergency response activities.

Strategies for Inlets and Critically Eroded Beaches

Lee County R7-R26 is a 4.1-mile segment of critically eroded beaches along the southern gulf shore of Gasparilla Island. Sand from the maintenance dredging of Boca Grande Pass has been placed along the southern portion of this area. **Strategy:** Beach restoration including construction of a terminal shore protection structure(s) if determined necessary for the design integrity of the project; conduct a feasibility study of beach restoration of the remaining critically eroded beach outside the federal project limits.

Lee County, Boca Grande Pass. Strategy: Place beach compatible sand from maintenance dredging on the shoreline of Gasparilla Island in conjunction with the beach erosion control project.

Lee County R66-R71, is a 1.2-mile segment of critically eroded beach on the northern shore of North Captiva Island, including 1,000 feet of inlet shore east of R66 adjacent to Captiva Pass. A terminal groin field and revetment have been constructed. This area is expected to undergo periods of accretion and erosion as a result of the changes to the inlet channel and the ebb shoal. **Strategy:** Monitor and re-evaluate critical erosion designation.

Lee County R81-R82 is a 0.4-mile segment of critically eroded beach on the southern gulf shore of North Captiva Island adjacent to Redfish Pass. Shore protection structures were constructed in 1998. **Strategy:** Include in comprehensive monitoring program with Redfish Pass and evaluate performance of existing shore protection structures and additional erosion control alternatives.

Lee County, Redfish Pass. Strategy: Implement a comprehensive beach, inlet and offshore monitoring program to validate or redefine the sediment budget developed in the inlet management study.

Lee County R83-R109 is a 5.2-mile segment of critically eroded beach that includes the entire gulf shoreline of Captiva Island and a 0.2-mile segment of inlet shore adjacent to Redfish Pass. Beach restoration and nourishment have been conducted and terminal groins constructed at each end of the project area. **Strategy:** Beach nourishment; reconstruction of terminal groin at the north end of the project adjacent to Redfish Pass.

Lee County, Blind Pass. Strategy: Bypass on an annual average basis 37,250 cubic yards of beach compatible sand to the downdrift shoreline south of the inlet. Conduct a feasibility study of using the ebb and flood shoals as a source of beach compatible sand for beach nourishment of the downdrift shoreline. Implement a comprehensive beach, inlet and offshore monitoring program to validate or redefine the sediment budget developed in the inlet management study.

Lee County R109-R118 is a 1.7-mile segment of critically eroded beach on the northern gulf shore of Sanibel Island. Beach restoration has been conducted as mitigation for inlet impacts. **Strategy:** Beach nourishment.

Lee County R129-R133 is a 0.9-mile segment of critically eroded beach on the central gulf shore of Sanibel Island at Gulf Pines subdivision. Beach restoration has been conducted. **Strategy:** Feasibility study of periodic beach nourishment, including shore protection structural alternatives to enhance beach nourishment.

References

City of Sanibel and Humiston & Moore Engineers, P.A., Sanibel Island-Wide Beach Management Plan, April 1995.

Coastal Planning & Engineering, Inc., et al., Blind Pass Inlet Management Plan, November 1993.

Coastal Planning & Engineering, Inc., Redfish Pass Inlet Management Plan, November 1993.

Florida Department of Environmental Protection, Critical Beach Erosion Areas in Florida, January 2000.

U.S. Army Corps of Engineers, Charlotte Harbor, Lee County, Florida, Section 933 Study with Environmental Assessment, July 1990 (revised April 1991).

U.S. Army Corps of Engineers, Lee County, Florida, Shore Protection Project (Gasparilla and Estero Islands), General Reevaluation Report with draft Environmental Impact Statement, August 1999.

U.S. Army Corps of Engineers, Water Resources Development in Florida, 1998.

ESTERO BARRIERS

Area Description

The **Estero Barriers** subregion extends from the San Carlos Bay Entrance in Lee County to the Lee-Collier County boundary line, as shown on Figure SW.7. It includes Estero Island (Ft. Myers Beach), Lovers Key, Big Hickory Island and Little Hickory Island (Bonita Beach), which are separated from the mainland by Estero Bay. The inlets between these islands include Matanzas Pass, Big Carlos Pass, New Pass and Big Hickory Pass. There are 7.1 miles of critically eroded beaches in this subregion of Lee County. Erosion is attributed to winter frontal systems, tropical weather systems in the Gulf, and the effects of the inlets. The most erosive storms in recent years were tropical storms Keith in 1988, Gordon in 1995, and Josephine in 1996.

Previous Actions

The navigation channel through **Matanzas Pass** was completed in 1973 as an extension of the federal Ft. Myers Beach navigation project. Maintenance dredging of the pass was conducted in 1986 and 1998 with placement of the dredged material along the northern gulf shoreline of Estero Island. The U.S. Army Corps of Engineers (USACE) is planning the next maintenance dredging of the pass and interior navigation channels. The work may include processing the dredged material with hydrocyclone/maximum density separators to remove fine-grain sediments for upland disposal and placement of beach quality sand on the gulf shoreline.

The federal **Lee County Shore Protection Project** authorizes beach restoration, and associated shore protection structures, as needed, for eroding beaches on Gasparilla Island, Captiva Island and Estero Island. In August 1999, the U.S. Army Corps of Engineers (USACE) completed a general reevaluation report for Gasparilla and Estero Islands. The recommended project for the two islands was modified. The modified project provides for beach restoration of 4.7 miles of shoreline on **Estero Island** (R175-R199). The project includes a terminal groin at the north end of the island adjacent to Matanzas Pass. In 2000, engineering design and permitting were initiated to construct the project on a federal reimbursement basis. The design goal is to modify the recommended project by using a closer borrow area, increasing the interval between beach nourishment events, and qualifying the changes for federal reimbursement. Additional non-federal project features to be included as construction options are beach restoration on southern Estero Island (R208-R210) and **Lover's Key** (R215-R221). Construction is scheduled for FY 2001-2002.

Big Carlos Pass, New Pass and Big Hickory Pass are hydraulically connected via Estero Bay and have not been structurally stabilized. Big Hickory Pass has closed repeatedly and been reopened by storms and by mechanical excavation. In 1994, an inlet management study of New Pass and Big Hickory Pass was completed. Based in part on the study, the ebb shoal of New Pass was dredged as a sand source for beach restoration at Bonita Beach and terminal groins were constructed adjacent to Big Hickory Pass.

In 1995, the non-federal **Bonita Beach Restoration Project** (R226-R230) was constructed along the northern gulf shoreline of Little Hickory Island using sand from the ebb shoal of New Pass. The project includes two terminal groins constructed at the north limits of the beach fill adjacent to Big Hickory Pass. Beach nourishment is scheduled for FY 2001-2002.

Resources and Opportunities

Sponsors and Funding: This subregion contains the eligible governmental entities of Lee County, Fort Myers Beach, Bonita Springs, West Coast Inland Navigation District (WCIND) and the U.S. Army Corps of Engineers (USACE). Lover's Key is a state recreation area managed by the Department's Division of Recreation and Parks. Participants with the Department as sponsors of beach management projects include Lee County, WCIND and USACE. Project cost estimates may be found in the Beach Erosion Control Program - Long Range Budget Plan.



Figure SW.7: Estero Barriers

Environmental: The protection of sea turtles, colonial shorebirds, manatees and both hardbottom/reef habitat and seagrass beds are environmental concerns within this subregion. The timing of construction activities has not been restricted during the marine turtle nesting season of May 1 through October 31. Projects and their method of construction are designed to avoid and minimize adverse impacts to wildlife and habitat. The emergent shoals at the south end of Estero Island are considered important wildlife habitat. The designation of critically eroded beach on Lover's Key is due in part to the threatened erosion of wetland habitat.

Sand Supply: Sand sources to meet the needs of future projects in this subregion over the next 15 years have not been identified. A regional sand search and inventory should be performed to locate and characterize beach compatible sand.

Monitoring: Implement a regional beach, inlet and offshore monitoring program to identify areas of greatest need for placement of dredged material, to assess the status of the beach erosion control projects, and to identify patterns of erosion and accretion.

Regionalization: Construction of the Gasparilla Island and Estero Island segments of the federal shore protection project should be conducted under a single contract if the same type of dredge vessel can be used for both segments. The construction of non-federal beach restoration projects on southern Estero Island, Lover's Key and Bonita Beach should be included as bid options to contracts for construction of the Estero Island segment. Maintenance dredged material from the Ft. Myers Beach navigation project should be used to supplement offshore sand sources for beach nourishment of Estero Island.

Innovation: Innovative technologies should be pursued when it has been demonstrated that they will result in improved project performance or lower costs. The Department, in ranking annual funding priorities of the beach erosion control program, considers the use of innovative technology. The use of hydrocyclone or mass density separators, a technology used in the mining industry, has been identified as an innovative technology to be demonstrated at the Ft. Myers Beach navigation project. The work would include processing the dredged material with hydrocyclone/mass density separators to remove fine-grain sediments for upland disposal and placement of beach quality sand on the gulf shoreline.

Emergency Response: Develop emergency response plans for post-storm recovery and emergency beach maintenance. The plans will include damage assessment methodology, temporary structural measures, identification of potential borrow sites, and a secure source of funding. The local sponsors should hold an executable contract and all requisite permits/authorizations for emergency response activities.

Strategies for Inlets and Critically Eroded Beaches

Lee County, Matanzas Pass. Strategy: Continue placement of sand from the maintenance dredging of the Ft. Myers Beach navigation project on Estero Island.

Lee County R176-R200 is a 4.8-mile segment of critically eroded beach on Estero Island that includes Ft. Myers Beach. Sand from the maintenance dredging of Matanzas Pass has been placed along the northern portion of this area. **Strategy:** Beach restoration and construction of a terminal groin.

Lee County R208-R210 is a 0.4-mile segment of critically eroded beach on the inlet shoreline of Estero Island adjacent to Big Carlos Pass. **Strategy:** Conduct a feasibility study of beach restoration.

Lee County R215-R221 is a 1.1-mile segment of critically eroded beach on Lovers Key. **Strategy:** Beach restoration.

Lee County R226-R230 is a 0.8-mile segment of critically eroded beach on Little Hickory Island at Bonita Beach. Beach restoration has been completed. **Strategy:** Beach nourishment.

References

Florida Department of Environmental Protection, Critical Beach Erosion Areas in Florida, January 2000.

Humiston and Moore Engineers, Estero Island Beach Restoration Study, March 1997.

Olsen Associates, Inc., New Pass and Big Hickory Pass Inlet Management Plan; Lee County, Florida, February 1994.

U.S. Army Corps of Engineers, Lee County, Florida, Shore Protection Project (Gasparilla and Estero Islands), General Reevaluation Report with draft Environmental Impact Statement, August 1999.

U.S. Army Corps of Engineers, Water Resources Development in Florida, 1998.

NAPLES COAST

Area Description

The **Naples Coast** subregion extends from the Lee/Collier County line to the midpoint of Keewaydin Island (R111), Collier County, as shown on Figure SW.8. It includes the Naples headland and Keewaydin Island. The barrier beaches are separated from the mainland by mangrove swamp, salt marsh and small bays, and divided by Wiggins Pass, Doctors Pass, and Gordon Pass. There are 8.5 miles of critically eroded beach in this subregion of Collier County. Erosion is attributed to winter frontal systems, tropical weather systems in the Gulf, and the effects of the inlets. The most erosive storms in recent years were a subtropical storm of 1982, Hurricane Andrew in 1992 and Tropical Storm Gordon in 1995.

Previous Actions

Since 1984, Collier County has conducted periodic maintenance dredging of a small boat channel through the ebb shoal of **Wiggins Pass** and placed the dredged sand on the beach both north and south of the inlet. However, the channel fills rapidly creating unreliable navigable depths. A 1995 study of inlet management alternatives was used to support the County's application for environmental permits to construct navigation and sediment management improvements. The improvements include deepening the channel through the ebb shoal and excavation of a sediment deposition basin adjacent to the channel. The work is scheduled for the year 2000.

In 1996, the non-federal **Collier County Beach Restoration Project** was constructed at Vanderbilt Beach (R22-R30), Park Shore (R50-R54) and Naples (R58-R78) using sand from offshore borrow areas. The County has initiated an annual maintenance program of beach nourishment using sand from upland borrow areas. At Naples, the project included removal of numerous degraded groins and the reconstruction of six rock groins and a timber pile groin. Many wood plank and timber pile groins have been constructed along the remaining southern shoreline of Naples and some are in a deteriorated state. In 2000, the City of Naples constructed T-head groins and reconstruction wood plank groins along the gulf shoreline near Gordon Pass.

In 1960, the City of Naples improved **Doctors Pass** for navigation by channel dredging and jetty construction. In 1966, the pass was again dredged and the jetties were augmented with rock and sand from the dredging. Maintenance dredging has been conducted about every four years with dredged sand being placed on the beach or inshore zone south of the inlet. In 1996, a sediment basin was dredged within the ebb shoal and the north jetty was extended, which were recommended in an inlet management study. In 1997, the Department adopted an inlet management plan that specified all dredged material be placed on the beaches or inshore zone south of the inlet meeting a minimum bypassing goal of 10,000 cubic yards on an average annual basis.

The navigation channel through **Gordon Pass** is part of a federal navigation project that includes an interior channel from Naples to Big Marco Pass. In 1962, the U.S. Army Corps of Engineers (USACE) dredged the channel and private interests constructed a jetty on the south side of the inlet. Groins and armoring have been constructed to protect gulf front development north of the inlet. Maintenance dredging by the USACE has been conducted about every seven years with most of the dredged material placed on the beach a short distance south of the inlet. The management strategy listed below is based in part upon a 1998 inlet management study.

Resources and Opportunities

Sponsors and Funding: This subregion contains the eligible governmental entities of Collier County, the City of Naples and the U.S. Army Corps of Engineers (USACE), which participate with the Department as sponsors of beach management projects. Project cost estimates may be found in the Beach Erosion Control Program - Long Range Budget Plan.

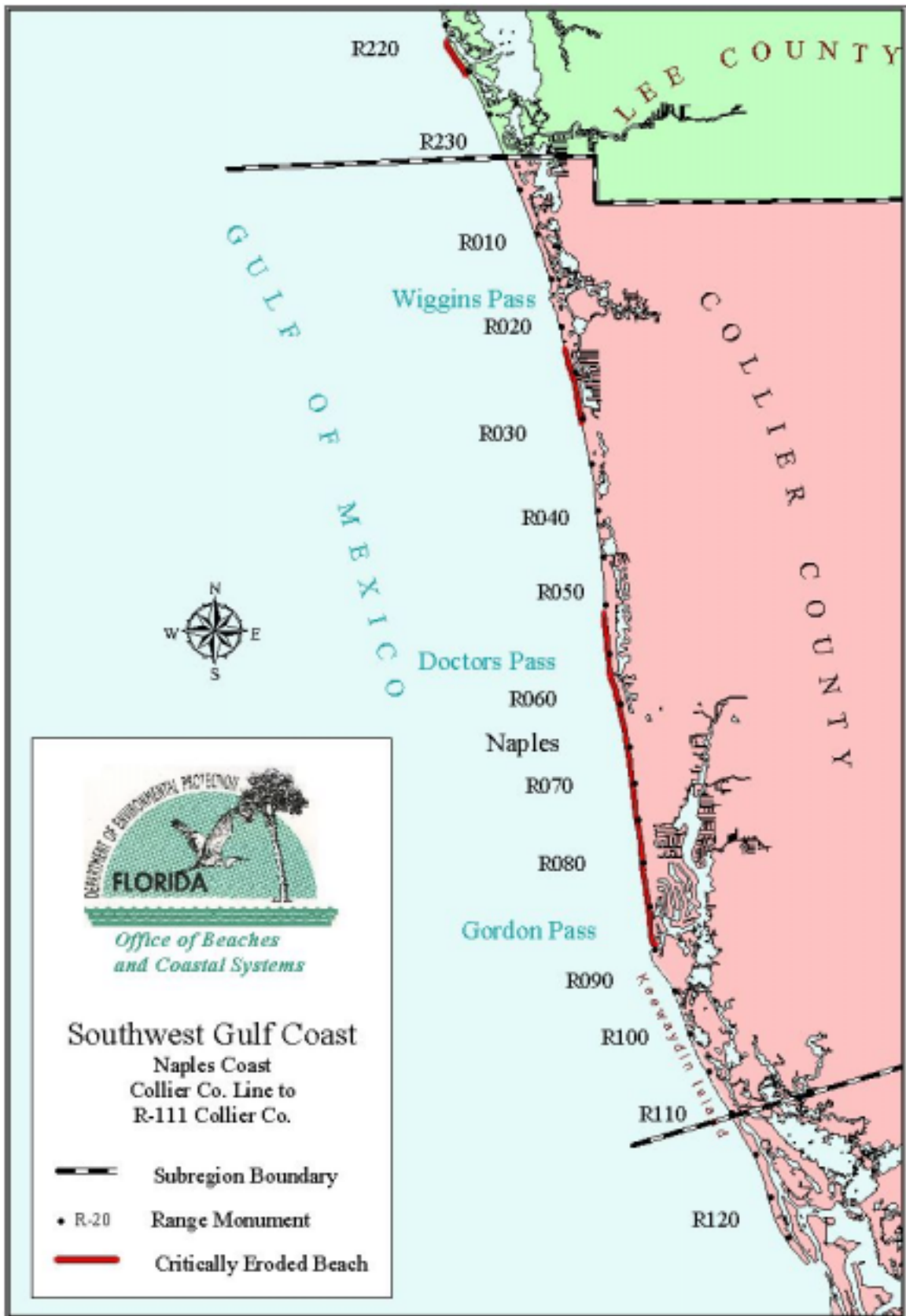


Figure SW.8: Naples Coast

Environmental: The protection of sea turtles, gopher tortoise, colonial shorebirds, manatees and both hardbottom/reef habitat and seagrass beds are environmental concerns within this subregion. The timing of construction activities has been restricted during the marine turtle nesting season of May 1 through October 31. Projects and their method of construction are designed to avoid and minimize adverse impacts to wildlife and habitat. Beach nourishment activities must mitigate the potential for closure of Clam Pass, through which tidal exchange and flushing maintain water quality in the interior bay/mangrove habitat.

Sand Supply: Sand sources to meet the needs of future projects in this subregion over the next 15 years have not been identified. A regional sand search and inventory should be performed to locate and characterize beach compatible sand.

Monitoring: Implement a regional beach, inlet and offshore monitoring program to validate or redefine the sediment budget developed in the inlet management plans, to identify areas of greatest need for placement of dredged material, to assess the status of the beach erosion control projects, and to identify patterns of erosion and accretion.

Regionalization: Maintenance of the Collier County Beach Restoration Project and the Marco Island Beach Restoration Project using offshore sand sources should be conducted under a single contract in order to reduce equipment mobilization costs.

Innovation: Innovative technologies should be pursued when it has been demonstrated that they will result in improved project performance or lower costs. The Department, in ranking annual funding priorities of the beach erosion control program, considers the use of innovative technology. At this time, application of an innovative technology for a specific beach management activity in this subregion has not been identified.

Emergency Response: Develop emergency response plans for post-storm recovery and emergency beach maintenance. The plans will include damage assessment methodology, temporary structural measures, identification of potential borrow sites, and a secure source of funding. The local sponsors should hold an executable contract and all requisite permits/authorizations for emergency response activities.

Strategies for Inlets and Critically Eroded Beaches

Collier County, Wiggins Pass. Strategy: Place maintenance dredged material on adjacent beaches north and south of the inlet within areas of greatest need.

Collier County R22.3-R30.5 is a 1.6-mile segment of critically eroded beach at Vanderbilt Beach. Beach restoration was completed in 1996. **Strategy:** Beach nourishment.

Collier County R50.65-R57.5 is a 1.3-mile segment of critically eroded beach at Park Shore north of Doctors Pass. Beach restoration was completed in 1996. **Strategy:** Beach nourishment.

Collier County, Doctors Pass. Strategy: Place all dredged material on the beach or inshore zone south of the inlet meeting a minimum bypassing goal of 10,000 cubic yards on an average annual basis; validate or redefine the sediment budget contained in the study report.

Collier County R57.8-R89 is a 5.6-mile segment of critically eroded beach at Naples between Doctors Pass and Gordon Pass. Beach restoration of the northern 3.8 miles of shoreline was completed in 1996. **Strategy:** Maintenance of the beach restoration project using sand dredged from Doctors Pass combined with sand from offshore and upland sources.

Collier County, Gordon Pass. Strategy: Place maintenance dredged material on downdrift beaches south of the inlet; conduct a feasibility study of sand tightening the south jetty.

References

Coastal Planning & Engineering, Inc., Gordon Pass Inlet Management Study, June 1998.

Coastal Planning & Engineering, Inc., Wiggins Pass Inlet Management Plan, August 1995.

Florida Department of Environmental Protection, Critical Beach Erosion Areas in Florida, January 2000.

Florida Department of Environmental Protection, Doctors Pass Inlet Management Study Implementation Plan, June 1997.

Suboceanic Consultants, Inc., Tackney and Associates, Inc., Doctors Pass Comprehensive Inlet Management Plan, February 1994.

U.S. Army Corps of Engineers, Water Resources Development in Florida, 1998.

SOUTHERN BARRIERS

Area Description

The **Southern Barriers** subregion extends from about the midpoint of Keewaydin Island (R111) to Cape Romano in Collier County, as seen on Figure SW.9. It includes the southern portion of Keewaydin Island, Sea Oat Island, Marco Island, Kice Island and Morgan Island. The islands are separated by Little Marco Pass, the Big Marco and Capri Pass inlet system, Caxambas Pass and Blind Pass. The passes connect a series of shallow bays, mangrove swamp and salt marsh to the Gulf of Mexico. There are 2.5 miles of critically eroded beaches in this subregion of Collier County. Erosion is attributed to winter frontal systems, tropical weather systems in the Gulf, and the effects of the inlets. The most erosive storms in recent years were Hurricane Andrew in 1992, an extratropical storm in March 1993, Tropical Storm Gordon in 1995, and Tropical Storm Harvey in 1999.

Previous Actions

Big Marco Pass is a part of a federal navigation project that includes an interior channel from Naples, although the pass has not been dredged for navigation purposes. It was the sole connection with the Gulf of Mexico between Sea Oat Island and Marco Island until 1967 when **Capri Pass** opened an inlet through Sea Oat Island. Capri Pass has become the larger inlet and the severed end of Sea Oat Island, named Coconut Island, has migrated and eroded to a small remnant. As Big Marco Pass has diminished, sand from its ebb shoal has migrated toward Marco Island creating an emergent spit called Sand Dollar Island. The management strategy listed below is based in part on an inlet management study was completed in 1997.

Changes in the Big Marco and Capri Pass inlet system have coincided with erosion of **Hideaway Beach** (east of R128) on the north end of Marco Island. In 1991, the area was included in the non-federal Marco Island Beach Restoration Project using sand from a borrow area within the adjacent ebb shoal. In 1997, temporary groins constructed of sand-filled geo-textile bags were installed at two locations. Periodic beach nourishment using sand from upland borrow sites is being conducted and the area is monitored to determine the effectiveness of the groins.

In addition to the Hideaway Beach segment, the 1991 **Marco Island Beach Restoration Project** also included two segments of gulf shoreline between R135-R139 and R143-R149 using sand from borrow areas within the Big Marco/Capri Pass and Caxambas Pass ebb shoals. The project included terminal groins constructed at the southwest end of the island (R149). In 1997, breakwaters were constructed offshore of the terminal groins and additional sand from the Caxambas Pass borrow area was placed within the south beach segment. Periodic beach nourishment using sand from upland borrow sites is being conducted and the area is monitored to determine the effectiveness of the groins and breakwaters.

Caxambas Pass is a natural inlet that has not been altered or maintained for navigation, but was dredged as a borrow area for beach restoration of Marco Island in 1991 and 1997. An inlet management study was completed in 1996.

Resources and Opportunities

Sponsors and Funding: This subregion contains the eligible governmental entities of Collier County, Marco Island and the U.S. Army Corps of Engineers (USACE). The County has participated with the Department as the local sponsor of beach management projects. Project cost estimates may be found in the Beach Erosion Control Program - Long Range Budget Plan.

Environmental: The protection of sea turtles, colonial shorebirds and manatees, and mangrove and seagrass beds are environmental concerns within this subregion. The timing of construction activities has been restricted during the marine turtle nesting season of May 1 through October 31. Projects and their method of construction are designed to avoid and minimize adverse impacts to wildlife and habitat. Beach

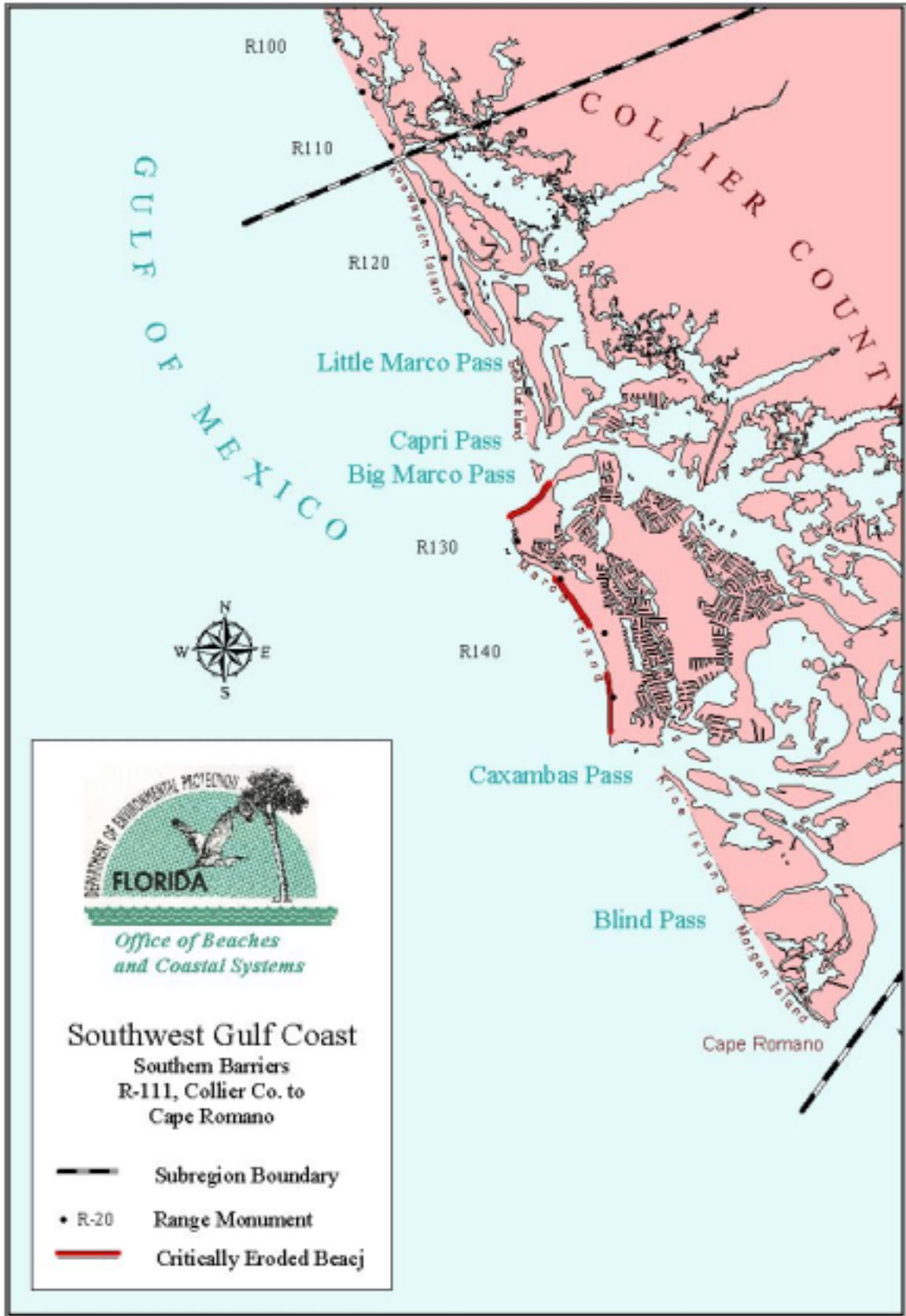


Figure SW.9: Southern Barriers

nourishment activities must avoid potential impacts to the emergent shoals at the northwest end of Marco Island and within Caxambas Pass, which are considered critical wildlife habitat for colonial shorebirds.

Sand Supply: Sand sources to meet the needs of future projects in this subregion over the next 15 years have not been identified. A regional sand search and inventory should be performed to locate and characterize beach compatible sand.

Monitoring: Implement a regional beach, inlet and offshore monitoring program to validate or redefine the sediment budget developed in the inlet management plan, to identify areas of greatest need for placement of dredged material, to assess the status of the beach erosion control projects, and to identify patterns of erosion and accretion.

Regionalization: Maintenance of the Collier County Beach Restoration Project and the Marco Island Beach Restoration Project should be conducted under a single contract in order to reduce equipment mobilization costs.

Innovation: Innovative technologies should be pursued when it has been demonstrated that they will result in improved project performance or lower costs. The Department, in ranking annual funding priorities of the beach erosion control program, considers the use of innovative technology. At this time, application of an innovative technology for a specific beach management activity in this subregion has not been identified.

Emergency Response: Develop emergency response plans for post-storm recovery and emergency beach maintenance. The plans will include damage assessment methodology, temporary structural measures, identification of potential borrow sites, and a secure source of funding. The local sponsors should hold an executable contract and all requisite permits/authorizations for emergency response activities.

Strategies for Inlets and Critically Eroded Beaches

Collier County, east of R128 is a 0.8-mile segment of critically eroded beach at Hideaway Beach on the north coast of Marco Island adjacent to Big Marco Pass. Beach restoration and temporary groins have been completed. The effectiveness of groins in controlling beach erosion is being monitored. **Strategy:** Beach nourishment; feasibility study of Big Marco Pass ebb channel relocation and use of Little Marco Pass ebb shoal as a sand source for beach nourishment.

Collier County R134.5-R139 is a 0.8-mile segment of critically eroded beach on the central gulf coast of Marco Island. Beach restoration has been completed. **Strategy:** Beach nourishment.

Collier County R143-R148 is a 0.9-mile segment of critically eroded beach on the southern gulf coast of Marco Island. Beach restoration and terminal shore protection structures have been completed. **Strategy:** Beach nourishment.

References

Coastal Engineering Consultants, Inc., Caxambas Pass Inlet Management Plan, October 1996.

Florida Department of Environmental Protection, Critical Beach Erosion Areas in Florida, January 2000.

Humiston & Moore Engineers, P.A., Big Marco and Capri Pass Inlet Management Study, July 1997.

U.S. Army Corps of Engineers, Water Resources Development in Florida, 1998.