



Figure 20: Palm Beach County Location Map

Palm Beach County

Palm Beach County beaches extend for 45.3 miles between Martin County and Broward County. Palm Beach County includes the following barrier beach communities and major parks: Tequesta, Jupiter Inlet Colony, Juno Beach, John D. MacArthur Beach State Park, Riviera Beach, Palm Beach, Lake Worth, South Palm Beach, Lantana, Manalapan, Ocean Ridge, Briny Breezes, Gulf Stream, Delray Beach, Highland Beach, and Boca Raton (Figure 20). There are eight designated critical erosion areas (30.7 miles) in Palm Beach County. Within these areas are five beach restoration projects and 4 inlet sand transfer projects.

Coastal Inlets

The four coastal inlets of Palm Beach County are Jupiter Inlet, Lake Worth Inlet, South Lake Worth Inlet, and Boca Raton Inlet. Lake Worth Inlet has a federal navigation channel that sustained shoaling from both Hurricanes Frances and Jeanne. A sand transfer plant constructed on the north jetty sustained no significant exterior damage, but the interior was flooded, causing damage to plant equipment. Wave run-up along the north jetty caused scour of the adjacent beach and overwash into the dune. The sand bypassing plants at both Lake Worth Inlet and South Lake Worth Inlet have a substantial quantity of material available after the storms to bypass material southward. Jupiter Inlet likely had shoaling, but the sand trap was recently dredged and the material hydraulically bypassed south of the inlet. Boca Raton Inlet, at the south end of the county also had a significant quantity of shoaling. Post-storm surveys will better define the quantity of material available for bypassing at these inlets.

Beach and Dune Erosion

Palm Beach County generally experienced moderate dune erosion and beach profile lowering from the impact of Hurricane Frances. The impact of Hurricane Jeanne was minor along most of the coast of Palm Beach County, perhaps because its path was located further north and because it moved through more quickly than Frances. Since much of the upland development is generally sited on the frontal dune, there are many structures now vulnerable to the impact of future storms, unless located landward of coastal armoring or protected by a beach restoration project. A particular area of concern is the critically eroded beaches of Singer Island (R60.5-R69).

Hurricane Frances caused a significant adjustment to the beach restoration projects by transporting sand into the storm bar and changing the horizontal beach berm into a sloping beach profile, but upland development remains well protected by the beach projects. Generally, Hurricane Jeanne did not erode the natural recovery berm accreting along the beach since the impact of Hurricane Frances.

The northernmost 1.9 miles of Palm Beach County (R1-R12) on Jupiter Island north of Jupiter Inlet, includes a 1.2-mile segment of critically eroded beach (R3-R10). In 1993, a dune restoration project was completed in Coral Cove Park (R5-R7.6), using sand trucked to the site from an upland source. Hurricane Frances caused moderate beach and

dune erosion (Condition III) exposing extensive outcrops of underlying rock formations and completely eroding the Coral Cove Park dune restoration project.

The 7.5-mile segment of coast from Jupiter Inlet (R13) south through to Lost Tree Village (R51) on Singer Island, includes a 5.0-mile segment of critically eroded beach (R12-R38). Beach restoration has been conducted at Jupiter-Carlin Park (R13.5-R19) and Juno Beach (R26-R38). Hurricane Frances caused minor erosion of the beach fill (Condition II), with moderate adjustment of the horizontal berm into a sloping beach profile. A natural recovery berm has begun to accrete along the beach.

The remaining 4.6-mile segment of Singer Island from John D. MacArthur Beach State Park to Lake Worth Inlet (R51-R75), includes a 1.7-mile segment of critically eroded beach (R60.5-R69). Historical erosion of the dune bluff threatens upland condominiums, and sand from upland sources has been placed to maintain the protective dune. Hurricane Frances caused moderate dune erosion and beach profile lowering (Condition III) exposing extensive outcrops of underlying rock formations. Hurricane Jeanne caused additional dune bluff retreat. Many of the upland structures are now vulnerable to damage from the impact of a major northeaster storm during the coming winter season.

The 15.6-mile long Palm Beach Island (R76-R151) includes a 10.9-mile segment of critically eroded beach at the Town of Palm Beach (R76-R128), and a 0.7-mile segment at South Palm Beach (R133-R137). Since most of the island's eroded beaches were already narrow, the moderate beach erosion (Condition III) caused by Hurricane Frances, resulted in no dry beach remaining seaward of the extensive coastal armoring in this area. Approximately 2,000 feet south of Lake Worth Inlet begins Reach 2 (R78-R90.4) of the Palm Beach Coastal Management Plan, where a wide beach within the fillet south of the inlet transitions to no dry beach seaward of the bulkheads. Further south, the Mid-Town Beach Restoration Project (R90.4-R101.4), completed in 1995 and nourished in 2003, experienced moderate erosion and loss of the beach fill (Condition III).

At the Phipps Ocean Park Beach Restoration Project (R116-R126), where construction is pending the completion of an environmental impact statement and issuance of a federal permit, Hurricanes Frances and Jeanne caused moderate dune erosion and beach profile lowering exposing extensive outcrops of underlying rock formations (Photo 34). Since the existing structures are generally sited on the frontal dune or immediately upland of a coastal armoring structure, the upland development is now vulnerable to damage from the impact of a strong northeaster storm during the coming winter season.



Photo 34. Erosion at Phipps Ocean Park

The remaining 15.4 miles of south Palm Beach County beaches from South Lake Worth Inlet through Boca Raton (R152-R227), generally experienced minor dune erosion and beach profile lowering (Condition II). A sand transfer plant constructed on the north jetty of the inlet sustained no significant exterior damage, but the interior was flooded causing damage to plant equipment. This stretch of coast includes a 3.3-mile segment of critically eroded beach at Ocean Ridge (R152-R168), a 2.9-mile segment of critically eroded beach at Delray Beach (R176-R190), and a 5.0-mile segment of critically eroded beach at Boca Raton (R204-R227.9). Beach restoration and nourishment has been conducted within each of these areas. The beach fill projects prevented storm damage to the upland property while experiencing adjustment from a horizontal beach berm at +9 ft. NGVD to a sloped beach profile with an unknown amount of fill material lost to the nearshore bar. Follow-up post-storm surveys will quantify the combined storm erosion losses from these projects.

Palm Beach County Damages

Upland major structures were not damaged by the storm tides or waves of Hurricanes Frances and Jeanne. A few beach and nearshore structures were impacted. On Jupiter Island, a 200-foot backshore sill (R4.5) was damaged by Frances and destroyed by Jeanne. On Singer Island, failure of a bulkhead panel at Jupiter Reef Club (R21) caused minor loss of backfill material and failure of concrete decking. The Juno Beach fishing pier sustained decking damage but no structural damage. On southern Singer Island, a

50-foot north return wall to a concrete seawall (R65.3) was destroyed. A high-rise condominium in Riviera Beach sustained major wind damage. The 37-floor Tiara is the tallest building in Palm Beach County (R70) and the winds of Frances tore away six-story lengths of exterior stucco paneling, revealing steel columns and beams (Photo 35). Many of Tiara's 320 units sustained severe rain and wind damage. The building had been in the process of renovation and contractors had removed the hurricane shutters. At Phipps Park, a portion of the road was undermined and dune walkovers were damaged. The only other significant structural damage was seen at the Lake Worth Pier (R128.55) where complete sections were destroyed, including the loss of piles, bents and decking (Photo 35).



Photo 35: Wind Damage, Riviera Beach (R70) & Damage to Lake Worth Pier

In summary, Palm Beach County saw major damage to only a pier and a condominium and two coastal protection structures totaling 250 feet in length.

Broward and Dade Counties

Broward County and Dade County beaches extend for 24 miles and 20.8 miles respectively south of Palm Beach County. On the leeward side of both Hurricanes Frances and Jeanne, only minor beach erosion was observed along these beaches. However, because of the high energy storm wave conditions, several fishing piers sustained various levels of damage. The only major damage was sustained by the pier in Ft. Lauderdale, which saw its shore segment destroyed along with extensive decking damage. Fishing piers in Deerfield Beach, Pompano Beach, and Sunny Isles sustained decking damage without any structural damage. There was no damage to the Dania Pier.