



Photo 77. Threatened single-family dwellings along North Atlantic Avenue (R161).

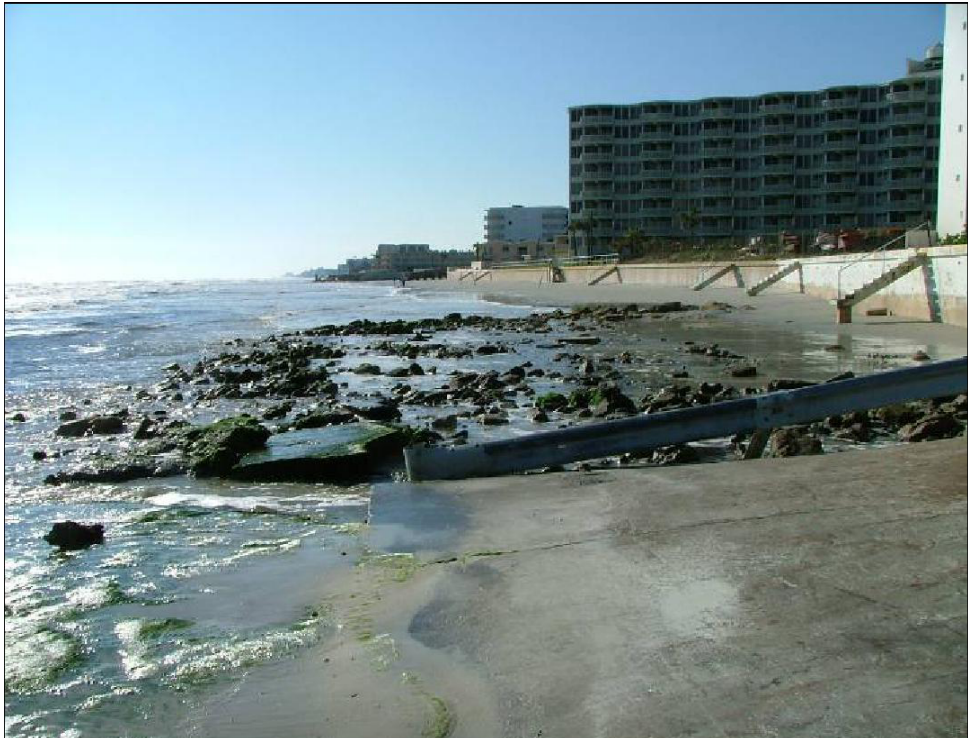


Photo 78. Major beach erosion, New Smyrna Beach (R162); concrete vehicular access ramp in foreground.



Photo 79. Beach and dune conditions, September 1, 2005, at the Holiday Inn (R168).



Photo 80. Severe dune erosion after Wilma at the Holiday Inn (R168).



Photo 81. Major beach and dune erosion, New Smyrna Beach (R174).

#### Flagler, St. Johns, Duval, and Nassau Counties

The northeast coast of Florida generally sustained minor beach erosion (condition I) as Hurricane Wilma tracked very rapidly offshore. The overall effect was comparable to a northeaster. Erosion conditions were much less severe than those realized during Hurricanes Frances and Jeanne (September 2004), or during Hurricane Ophelia (that passed offshore in early September 2005) and Tropical Storm Tammy, which made landfall at Mayport (Duval County) on October 5, 2005.

#### **Storm Damage**

Wind damage substantially diminished to the north of Broward County. Tornadoes were reported near Cape Canaveral. Scattered damages were sustained along the east coast of Florida due to the waves and erosion at locations where structures were already vulnerable after Hurricanes Frances and Jeanne in 2004.

#### Palm Beach County

The Palm Beach International Airport recorded a maximum sustained wind of 82 mph during Hurricane Wilma. Minor to major wind damages to residential and commercial buildings occurred throughout the county. Typical damages incurred were minor to major roofing damage, broken windows and shutters, damaged awnings, gutters, and screened porches. In the south county communities of Delray Beach and Boynton Beach, more extensive wind damages were observed, and the Palm Beach County Department of

Public Safety reported approximately 150 residences were destroyed by the wind. Widespread wind damage was also sustained to minor structures, such as, signs, utility poles and lines, fences, storage sheds, pet houses, canopies, decks and gazebos. Additionally, widespread wind damage was sustained by trees, shrubs, and ornamental plants. The agricultural areas of western Palm Beach County, significantly impacted by Hurricanes Frances and Jeanne in September 2004, sustained additional wind damage from Hurricane Wilma. A maximum sustained wind of 103 mph was recorded at Okeechobee, and a number of residences were destroyed in the western county towns of Belle Glade and South Bay. Along the beaches, no major structural damage was observed seaward of the Palm Beach County Coastal Construction Control Line.

### Martin County

Scattered minor to major wind damages were sustained in Martin County. The Martin County Property Appraiser's Office reported that 1,238 residences sustained damage, including 44 single-family dwellings that were destroyed. Typical wind damages included broken windows and shutters, damaged roofing, awnings, screened porches, fences, signs, utility lines, and landscaping. Along the beaches, two single-family dwellings were destroyed due to high wind gusts on south Hutchinson Island. The destroyed dwellings were located seaward of the Martin County Coastal Construction Control Line and MacArthur Boulevard at R28.6 and R33.15 (Photo 82).



Photo 82. Destroyed single-family dwelling, Martin County (R33).

### St. Lucie County

Minor wind damages were sustained in St. Lucie County, as the winds of Hurricane Wilma were generally below hurricane strength. However, the St. Lucie County Civic Center, damaged by the hurricanes of 2004, sustained additional roof damage from Hurricane Wilma, and may now have to be demolished and re-built. In Port St. Lucie, an earthen dam was destroyed by storm water discharge at the C-24 Canal and Monterrey Waterway. Along the beaches, no major structural damage was observed seaward of the St. Lucie County Coastal Construction Control Line.

### Indian River County

With the hurricane force winds associated with Hurricane Wilma located well to the south of Indian River County, only minor wind damages were sustained throughout the county. Along the beaches, Gray and Gorham (2005) reported that a condominium swimming pool and a single-family dwelling (Photo 83) had their foundations exposed due to the beach and dune erosion.



Photo 83. Foundation damage to single-family dwelling, Vero Beach (R79.5).

### Brevard County

The center of Hurricane Wilma's eye was about 90 miles to the south of Brevard County and wind damage was generally minimal; however, at least five tornados were reported. The county sustained wide-spread flooding after receiving about five inches of rain on

saturated soil conditions. The Brevard County Storm Water Utility Department reported significant flooding of the roads and neighborhoods in the communities of Port St. John, Canaveral Groves, West Melbourne, and Palm Bay. About 50 county roads were flooded. Significant flooding from the Indian River Lagoon also impacted the City of Cocoa. Along the beaches, no major structural damage was sustained, except for a swimming pool that was undermined at R158.5 (Photo 84).



Photo 84. Pool undermined by Hurricane Wilma, Brevard County (R158.5).

### Volusia County

The damages sustained in Volusia County occurred along the ocean-front and were caused by the storm waves and erosion of Hurricane Wilma. Along the northern peninsula, three beach access vehicle ramps were damaged in Daytona Beach Shores at Emilia, Van, and Browning Avenues. Most of the damage was sustained along the south peninsula in New Smyrna Beach between Sapphire Road and 27<sup>th</sup> Avenue (R160-R176). In this area, all the seawalls sustained additional exposure with an estimated two feet or more of beach profile lowering. Nearly all the conservation posts that designate sea turtle nesting habitat were lost. Generally, all the beach access dune walkways were damaged, with approximately one fourth of them destroyed. At the north end of New Smyrna Beach, a single-family dwelling at R160.8 was undermined (Photo 85) and the Crawford Avenue beach ramp (R161.7) was damaged. At 2<sup>nd</sup> Avenue (R167.1), a return wall was flanked and failed, and the erosion now threatens a single-family dwelling that is within 10 feet of the erosion scarp (Photo 86). Two properties to the south (R167.3), a concrete

patio and retaining wall fronting a single-family dwelling were destroyed (Photo 87). In addition, a 50-foot wood retaining wall was destroyed at R170.2.



Photo 85. Undermined single-family dwelling, New Smyrna Beach (R160.8).



Photo 86. Wall destroyed and dwelling threatened, New Smyrna Beach (R167.1).



Photo 87. Patio and retaining wall destroyed, New Smyrna Beach (R167.3).



## **Beach Recovery Recommendations and Management Strategies**

### **Area-wide Strategies and Recommendations**

- Assist local governments in seeking Federal Emergency Management Agency (FEMA) assistance to repair nonfederal beach and dune restoration projects.
- Conduct assisted-recovery activities consisting of dune restoration and revegetation, with supplemental beach fill as needed, in areas above mean high water where valuable natural resources or upland development are vulnerable to damage from the impact of a moderate storm.
- Support further sand search studies to locate sufficient upland and offshore sand resources to replenish storm-eroded beaches and dunes.

### **Site-specific Recommendations**

#### **Collier County**

- **Kice Island**  
Designate V23 to V31.4 as critically eroded (1.6 miles).
- **Morgan Island**  
Designate V33.8 to V41.8 as critically eroded (1.5 miles).

#### **Monroe County**

- **Islamorada**  
Designate the sandy shoreline of Lower Matecumbe Key, including Sea Oats Beach, as critically eroded (0.7 mile).  
Initiate a feasibility study to evaluate erosion control solutions.
- **Long Key State Park**  
Expedite planning, design, and construction of beach and dune restoration.  
Conduct a post-storm survey to evaluate beach conditions.
- **Curry Hammocks State Park**  
Expedite planning, design, and construction of beach and dune restoration.  
Conduct a post-storm survey to evaluate beach conditions.
- **Coco Plum Beach**  
Assist recovery through beach nourishment of the public beach areas above mean high water using trucked-in sand.
- **Key Colony Beach**  
Designate the west shoreline of Key Colony Beach, including Sunset Beach, as critically eroded (0.2 mile).  
Assist recovery through beach and dune nourishment of the public beach areas above mean high water using trucked-in sand.

- **Sombrero Beach**  
Assist recovery through beach nourishment of the public beach above mean high water using trucked-in sand.
- **Little Duck Key**  
Designate the sandy shoreline of Little Duck Key as critically eroded (0.2 mile). Assist recovery through beach nourishment of the public beach above mean high water using trucked-in sand.
- **Bahia Honda Key State Park**  
Expedite planning, design, and construction of beach and dune restoration. Conduct post-storm survey to evaluate beach conditions.
- **Boca Chica Beach**  
Designate the public shoreline segment of Boca Chica Beach as critically eroded (1.3 miles). Assist recovery through beach and dune nourishment of the public beach areas above mean high water using trucked-in sand.
- **Key West beaches**  
Conduct post-storm survey to evaluate beach conditions. Assist recovery through beach and dune nourishment of the public beach areas above mean high water using trucked-in sand. Designate Simonton Beach on the gulf as critically eroded (0.1 mile).
- **Fort Zachary Taylor Historic State Park**  
Expedite planning, design, and construction of beach and dune restoration. Conduct post-storm survey to evaluate beach conditions. Repair the west shore revetment to prevent breaching of the terminal groin.

### **Dade County**

- **Northern Dade County beaches**  
Continue beach monitoring.
- **Virginia Key**  
Continue beach monitoring.
- **Key Biscayne**  
Continue beach monitoring.

## References

Balsillie, J. H. and Clark R. R., 1992. *The Gulf Coast of Florida: Overview of Physiography, Geology, and Historical Shoreline Change*, Florida Department of Natural Resources, 18 pp.

Clark, R.R., 1990. *The Carbonate Beaches of Florida: an Inventory of Monroe County Beaches*, Beaches and Shores Technical and Design Memorandum 90-1, Florida Department of Natural Resources, 63 pp.

FDEP, 2005. *Critically Eroded Beaches Report*, Florida Department of Environmental Protection, [http://www.dep.state.fl.us/beaches/publications/tech-rpt.htm#Critical\\_Erosion\\_Reports](http://www.dep.state.fl.us/beaches/publications/tech-rpt.htm#Critical_Erosion_Reports)

Gray, J., and J. Gorham, 2005. *Preliminary Beach Damage Assessment: Hurricane Wilma*, Indian River County, Coastal Engineering Division, 15 pp.

Shier, D.E., 1969, Vermetid reefs and coastal development in the Ten Thousand Islands, southwest Florida: *Geological Society of America Bulletin*, v.80.

Tabar, J. et al, 2005. *Post-Storm Performance Evaluation of Coastal Armoring Structures – 2004 Hurricane Season*, Post, Buckley, Schuh and Jernigan, Inc. (PBS&J) Report, 133 pp.

Tanner, W.F., 1960. Florida coastal classification: *Transactions of the Gulf Coast Association of Geological Studies*, v.10, pp. 259-266.