

At the south end of Marco Island, nine high rise condominiums sustained minor wind damages, to include, broken windows, torn or destroyed screen porch enclosures, and damaged storm shutters (Photo 17). Five single-family dwellings and 12 high rise condominiums sustained major wind damages to some of their units or to their roofing (Photo 18). One condominium sustained understructure damage due to the storm surge and three carports were destroyed. Landward of the Coastal Construction Control Line within the Coastal Building Zone numerous single-family dwellings sustained minor to major wind damages.

At the southwest tip of Marco Island an existing seawall and revetment sustained level two damage (Photo 19). Several tie backs were damaged and the wall was overtopped, losing a significant amount of material between the wall and the buildings. Along the north segment of the seawall, a discharge gully was cut, eroding the dune structure, and allowing the storm surge to flood and sand a swimming pool.



Photo 17. Window damage to high-rise condominium (R145.3).



Photo 18. Major roof damage, Marco Island (R145.4).



Photo 19. Seawall and revetment overtopped and damaged, south end of Marco Island.

## Monroe County

The Monroe County coast includes the Florida Keys south of Dade County fronting on the Straits of Florida and Gulf of Mexico, and the peninsula mainland fronting on the Gulf of Mexico between Cape Sable and Collier County to the north (Figure 12). The Florida Keys is an elongate, arcuate archipelago over 220 miles in length from Soldier Key at its northeast end of the chain near Miami, southwest to the Dry Tortugas. The Florida Keys are separated from the mainland by Florida Bay, a broad shallow marine system which is compartmentalized by numerous carbonate mud banks. Sand beaches exist throughout the Florida Keys; however, beach and dune formation is not common in comparison to the barrier island coasts of peninsula Florida (Clark, 1990). There are 26.4 miles of Monroe County beaches fronting on the Straits of Florida and 26.1 miles of beaches fronting on the Gulf of Mexico, including 16.2 miles of mainland peninsula beaches of Cape Sable and Key McLaughlin.

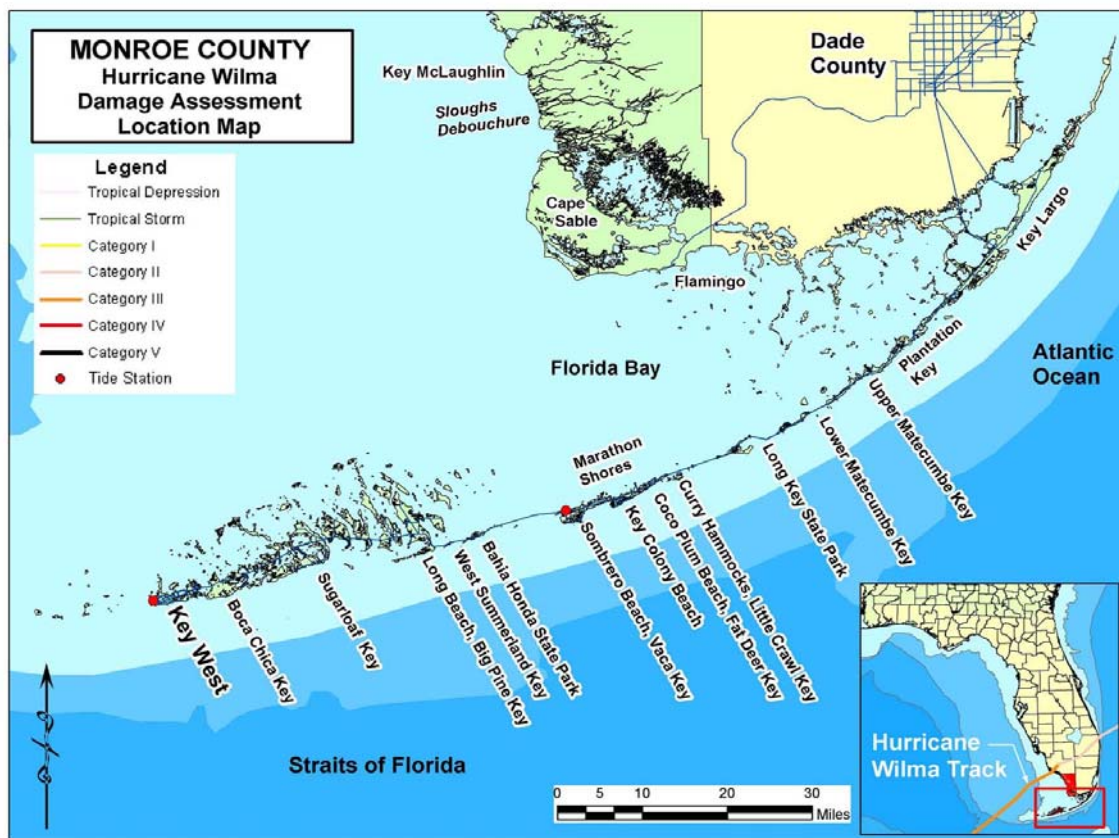


Figure 12. Monroe County location map.

Prior to the 2005 hurricane season, there were eight designated critically eroded beach areas (7.7 miles) and three noncritically eroded beach areas (2.9 miles) along the Florida Keys fronting on the Straits of Florida between Key Largo and Key West. There are no identified erosion problem areas in the upper keys but there are four in the middle keys. A one-mile stretch of Long Key is critically eroded, threatening recreational interests at the Long Key State Park. Another 0.1-mile segment at Curry Hammocks State Park on

Little Crawl Key is also critically eroded threatening recreation interests. Near Key Colony, the eastern 0.6-mile of Coco Plum Beach is noncritically eroded. This area is a Marathon city park. The western 0.3-mile of Coco Plum Beach and the entire 0.9-mile stretch of Key Colony Beach is critically eroded threatening private development. At Sombrero Beach on Vaca Key is a small stretch (0.3-mile) of critical erosion threatening recreational interests at another Marathon city park.

The lower keys have significantly more erosion than the upper or middle keys, as calcium carbonate sand beaches become more frequent although still limited. The sandy island of Bahia Honda Key has three erosion areas. Within Bahia Honda State Park, Calusa Beach (between the bridges), Loggerhead Beach (a western segment) fronting on the Straits of Florida, and a stretch of Sandspur Beach at the east end of Bahia Honda Key have two miles of critically eroded shoreline, threatening recreational interests as well as the park road. Further west are two separate designated noncritically eroded beach areas including one mile of Long Beach on Big Pine Key and 1.3 miles on Boca Chica Key.

Nearly the entire south coast of the island of Key West is critically eroded extending for 2.8 miles. Erosion along the eastern portion of Key West completely eliminated the recreational beach. A beach restoration project has been constructed at Smathers Beach and minor nourishment projects have been constructed at other public and private beaches to the west including Rest Beach and Higgs Beach. At the west end of Key West, the 0.3-mile beach along Fort Zachary Taylor Historic State Park is critically eroded threatening recreational interests. A terminal groin and breakwater project has been constructed and minor nourishment has been conducted at this site.

### **Storm Effects and Erosion Conditions**

The center of the eye of Hurricane Wilma passed approximately 70 miles north of Key West as the storm tracked from west to east, and made landfall on the coast of Collier County just north of the Ten Thousand Islands and close to the north Monroe County line. Wilma's maximum sustained winds of 125 mph crossed northern Monroe County near Cape Sable. The peak winds of Wilma measured throughout the Florida Keys include (from west to east):

- Dry Tortugas – 134 mph
- Key West – 85 mph
- Cudjoe Key – 123 mph
- Sombrero Key – 101 mph
- Long Key – 81 mph

Wilma brought storm tides estimated to reach approximately 10 feet along the northern gulf coast of Monroe County affecting the Florida Everglades National Park. Storm tides of eight to ten feet inundated the lower and middle keys, with the highest storm surge affecting the keys from the Gulf of Mexico and Florida Bay sides of the islands. Roughly 35 percent of the island of Key West was flooded, including the airport, which had five feet of water at its entrance and three feet of water on the runway. Photos 20-22 depict the storm surge flooding in Key West.

Hurricane Wilma caused moderate to major beach and dune erosion throughout the keys. Specific beach conditions at various major beach sites are discussed as follows.

Upper Keys

On Key Largo, the man-made beaches at Ocean Reef Club and John Pennekamp State Park sustained no apparent erosion. The man-made beaches of Tavernier and the private beaches of Plantation Key and Windley Key sustained no apparent erosion.



Photo 20. North Roosevelt Boulevard, Key West (Credit: City of Key West).



Photo 21. Key West flooding (Credit: City of Key West).



Photo 22. Key West flooding (Credit: City of Key West).

### Islamorada, Upper and Lower Matecumbe Key

Upper and Lower Matecumbe Keys sustained significant flooding from Florida Bay. Sea Oats Beach along Lower Matecumbe Key sustained additional moderate beach and dune erosion (condition III) (Photo 23). Hurricane Wilma's surge and waves from the Straits of Florida overwashed U.S. Highway 1, pushing debris and sand across the road.



Photo 23. Sea Oats Beach, Lower Matecumbe Key (Islamorada).

### Long Key State Park

In September, 2005, Hurricane Rita traversed the Straits of Florida and severely impacted the beach along Long Key State Park, destroying all 60 camp sites. Wilma significantly worsened the beach conditions and camp sites. In the early stages of the storm's impact, the surge and waves from the straits were inflicting additional erosional stress to the shoreline and upland areas. As the eye of Wilma passed to the north, the large storm surge from within Florida Bay overtopped the island from the north, and flood waters were conveyed southward across U.S. Highway 1 and the state park. This "back door" flooding caused large scour channels throughout the park's camp grounds and transported beach and overwash sediments seaward into the nearshore waters off the park's beach (Photo 24).



Photo 24. Storm surge scour channels, Long Key State Park.

#### Grassy Key and Toms Harbor Keys

Grassy Key, like other islands in the middle keys, sustained significant flooding from the storm surge out of Florida Bay following significant erosion from waves out of the straits. Moderate to major beach and dune erosion (condition III-IV) was sustained. Ironically, a large wrack of sea grass left by Hurricane Rita and piled a few feet deep along the shoreline, was lifted and transported away toward the straits during the storm surge flooding of Wilma.

#### Curry Hammocks State Park, Little Crawl Key

The critically eroded beach conditions at Curry Hammocks State Park substantially worsened. After Hurricane Rita, there was only a small segment of condition II erosion; however, after Wilma most of the park's shoreline had sustained moderate to major erosion (condition III-IV). Most surprising was the significant erosion into what were essentially marl uplands of a former dredge and fill project (Photo 25). A beach restoration project in the planning stages will now have to account for additional quantities of beach fill.





Photo 25. Significant erosion, Curry Hammocks State Park.

### Coco Plum Beach

The flooding of Coco Plum Beach was not as severe as many other keys in the vicinity due to its lesser exposure to the surge off Florida Bay. Still, Coco Plum has very low elevations and flooding was significant. Along the developed segment of Coco Plum Beach, which is designated as critically eroded, the erosion conditions varied from minor beach and dune erosion (condition II) at the Coco Plum Beach Villas and Royal Plum Condominium to moderate beach and dune erosion (condition III) along the west end of Coco Plum Beach. The City of Marathon park that traverses the eastern two thirds of Coco Plum Beach sustained additional erosion and overwash of beach sediments into the mangrove wetlands landward of the beach. The extreme east end of the park sustained severe major beach erosion (condition IV) (Photo 26).

### City of Key Colony Beach

The City of Key Colony Beach sustained less flooding than did Marathon Shores, which was flooded from Florida Bay; however, the flooding was still significant off Hawk Channel. The west shoreline of Key Colony Beach northwest of Sandy Point sustained moderate to major beach and dune erosion (condition III-IV). Sunset Beach, the city's public beach, sustained major erosion conditions into the uplands (Photo 27).



Photo 26. Severe beach erosion, Coco Plum Beach.



Photo 27. Sunset Beach, City of Key Colony Beach.

Along the private beaches east of Sandy Point, minor to moderate beach and dune erosion (condition II-III) was sustained. These beaches are within a groin field, and the cumulative erosion conditions since Hurricanes George (1998) and Irene (1999) have severely reduced their recreational and storm protective values. The segment of beach at the Key Colony Point Condominiums has been totally lost seaward of the seawall that fronts the development (Photo 28).



Photo 28. Complete loss of emergent beach at Key Colony Point, Key Colony Beach.

#### City of Marathon, Vaca Key and Tingler Island

Storm surge flooding was sustained throughout Marathon as the flooding crossed U.S. Highway 1 from Florida Bay. Flood waters two to four feet deep flowed across parts of the island and the runway of the Marathon Florida Keys Airport, partially submerging planes, cars, homes, and businesses.

#### Sombrero Beach, Vaca Key

Significant overwash from four hurricanes has caused minor to moderate beach and dune erosion (condition II-III) along the City of Marathon park at Sombrero Beach (Photo 29). Additional sediment losses have occurred as the southwest waves have driven beach material into the Tingler Island canals as well as the nearshore.



Photo 29. Sombbrero Beach erosion, Marathon.

#### Little Duck Key, Missouri Key, and Ohio Key

Moderate beach and dune erosion (condition III) was sustained along Little Duck Key, Missouri Key and Ohio Key. At Veterans Memorial Park on Little Duck Key the erosion and flooding was the most severe in recent history. The park's recreation beach has now been critically eroded.

#### Bahia Honda State Park

Calusa Beach – Due to the exposure of Calusa Beach to the storm surge and waves of Wilma off the bay of Bahia Honda, the erosion conditions were much worse than occurred during Rita. The north half of the beach sustained significant overwash which transported sand into the public parking area and northern four picnic shelters. The south half of the beach sustained moderate to major beach and dune erosion (condition III-IV) leaving some park facilities destroyed and others threatened (see Wilma damage discussion for Bahia Honda State Park).

Loggerhead Beach – Exposed to the south waves of Wilma, Loggerhead Beach sustained moderate to major beach and dune erosion (condition III-IV). The erosion conditions were the greatest to the west of the bathhouse, where 300 feet of service road was lost to the erosion (Photos 30 & 31).



Photo 30. Severe erosion at Loggerhead Beach, Bahia Honda State Park.



Photo 31. Eroded bluff at Loggerhead Beach, Bahia Honda State Park.

Sandspur Beach – As occurred during Hurricane Rita in September 2005, minor dune erosion (condition II) was sustained along Sandspur Beach; however, there was substantial accretion of the beach during the passage of Hurricane Wilma. Historically and prior to the 2005 hurricane season, the beach width at Sandspur Beach was roughly 50 feet (Clark, 1990). After Wilma, the beach width exceeds 100 feet (Photo 32). In contrast, on the east end of the island, condition IV erosion was sustained due to scour by the storm surge being conveyed through the Ohio Bahia Honda Channel.



Photo 32. Substantial beach accretion at Sandspur Beach, Bahia Honda State Park.

#### West Summerland Key

Moderate to major beach and dune erosion (condition II-IV) was sustained along West Summerland Key. Along the eastern segment of beach at the Camp Wesumkee Girl Scout Camp, moderate dune erosion and overwash has leveled the coastal ridge, which now provides a wider recreational sandy beach. Along the western segment of beach at Camp Sawyer Boy Scout Camp, moderate to major beach and dune erosion was sustained (condition III-IV). A segment of the coastal ridge was leveled and deposited as overwash across the campgrounds.

#### Long Beach, Big Pine Key and Newfound Harbor Keys

Moderate to major beach and dune erosion (condition III-IV) was sustained along the private residential area of Long Beach. Significant overwash contributed to the beach losses. Storm surge discharge channels were incurred along the beach similar to Long

Key (Photo 33). Moderate to major beach and dune erosion (condition III-IV) was also sustained along the Newfound Harbor Keys.



Photo 33. Storm surge discharge channels, Long Beach, Big Pine Key.

#### Sugarloaf Beach, Sugarloaf Key

Sugarloaf Beach sustained moderate to major beach and dune erosion (condition III-IV). Storm surge discharge scour channels caused extensive beach damage similar to that observed along Long Key and Big Pine Key. The beach gullies along Sugarloaf Key were particularly severe and caused the destruction of a single-family dwelling, and left two other dwellings imminently threatened.

#### Boca Chica Key

The eroded beach conditions at the Monroe County park along Boca Chica Key substantially worsened. After Hurricane Rita, there was generally condition II erosion; however, after Hurricane Wilma impacted the area, the majority of the park's shoreline had sustained moderate to major erosion (condition III-IV). Rita caused overwash deposits onto Boca Chica Road, while Wilma substantially damaged a considerable stretch of the road (see Wilma damage discussion). This now critically eroded beach is not expected to naturally recover to its pre-2005 beach position, as most of its sand loss has been translated upland into overwash deposits.

## Key West Beaches

South Roosevelt Boulevard – The eastern three-quarters of a mile of seawalled shoreline fronting U.S. Highway A1A was overtopped by the storm tide and waves of Wilma. Significant scour was sustained landward of the seawall (Photo 34).



Photo 34. Scour behind seawall along South Roosevelt Boulevard  
(Credit: City of Key West).

George Smathers Beach – The city’s 3,000-foot man-made public beach fronting the Straits of Florida sustained minor beach and dune erosion (condition II). Major overwash deposits of sand were carried across South Roosevelt Boulevard (Photos 35 and 36). The erosion was additive to the losses sustained during Hurricanes Dennis, Katrina, and Rita. No storm effects performance data will be available for the project; however, following recovery of all overwash sediments back to the beach system, surveys will be obtained to determine the net deficit of beach sand needed for future maintenance.

Berg and Kitsos Beach – To the west of Smathers Beach is a segment of straits fronting beach at the 1800 Atlantic Condominium and the City of Key West public beach known as Berg and Kitsos Beach. Moderate to major beach and dune erosion (condition III-IV) was sustained along this segment of shoreline. When the storm surge that inundated Key West withdrew, scour channels were carved across Berg and Kitsos Beach (Photo 37). The city will have to fill these storm surge discharge scour holes and channels. Additional beach sediments have been lost through overwash into the mangrove wetlands landward of the beach.





Photo 35. Overwash from Smathers Beach onto South Roosevelt Boulevard  
(Credit: City of Key West)



Photo 36. Overwash from Smathers Beach onto South Roosevelt Boulevard  
(Credit: City of Key West)



Photo 37. Scour channel, Berg and Kitsos Beach.

Rest Beach - The beach conditions at the City of Key West park known as Rest Beach substantially worsened. After Hurricane Rita, there was generally condition II erosion; however, after Wilma most of the park's shoreline had sustained major beach and dune erosion (condition IV) (Photo 38). Rita caused flooding and some overwash deposits onto Atlantic Boulevard, but Wilma inflicted severe erosion, flooding, and overwash, and substantially destroyed the entire park's recreational infrastructure (see Wilma damage discussion). This critically eroded beach is not expected to naturally recover to its pre-2005 beach condition, as most of its sand loss has been due to overwash deposits.

Clarence Higgs Beach – Condition I erosion was sustained along this one-quarter mile long Monroe County park beach.

Casa Marina Beach – Private beaches exist to the west of the city and county park beaches. At the Casa Marina Hotel, a restored perched beach constructed in 1979, sustained minor beach and dune erosion (condition II). To the west, adjacent the Reach Hotel, minor beach erosion (condition I) was sustained.

South Beach and Dog Beach – Dog Beach, the tiny beach at the end of Vernon Street, and South Beach, the city's public beach adjacent the end of Duval Street, sustained minor beach erosion (condition I) due primarily to overwash losses.



Photo 38. Major beach and dune erosion at Rest Beach, Key West.

Truman Annex, U.S. Navy – The federal beaches both east and west of the revetted headland (Whitehead Spit) sustained minor beach erosion (condition I) due primarily to overwash losses. The east beach was somewhat sheltered from the west and southwest waves of Wilma, and the west beach received some accretion from the adjacent state park beach to minimize the erosion conditions.

Fort Zachary Taylor Historic State Park – As occurred during Hurricane Rita, continued minor beach and dune erosion (condition II) was sustained along the eastern half of the park's shoreline during Wilma. From the middle of the park's shoreline to the west end at the terminal groin, erosion conditions worsened from moderate to major beach and dune erosion (condition III to IV). Wilma's southwest storm waves propagating on the storm surge across the Key West Ship Channel inflicted substantial dune recession near the terminal groin (Photo 39). In addition, the west shoreline of the park, exposed to waves from both the straits and the gulf, sustained moderate upland bank erosion (condition III) behind the rock revetment.

Simonton Beach – The City of Key West's public beach fronting on the Gulf of Mexico at the end of Simonton Street sustained minor beach and dune erosion (condition II). This beach was exposed to the significant storm surge flooding and storm waves of Wilma. Beach conditions at this small public recreation beach are not expected to naturally recover to its pre-2005 condition. The city's recreation beach is now critically eroded.



Photo 39. Severe dune erosion, Fort Zachary Taylor Historic State Park.

#### Sunset Key (formerly Tank Island)

Conditions varied around the island ranging from minor to major beach and dune erosion (condition II-IV).

#### Christmas Tree Island

Moderate to major beach and dune erosion (condition III-IV) was sustained around this sandy island northwest of Key West. Over 30 boats (sailboats and other pleasure craft) were deposited on and landward of the beach by the storm surge.

#### Distal Sand Keys

No report is available on the beach erosion conditions of Woman Key, Boca Grade Key, or the Marquesas Keys; however, given the proximity to these sandy islands to the eye of Wilma, severe erosion impacts were likely sustained along the shorelines facing not only the Florida Straits, but also the Gulf of Mexico.

#### Dry Tortugas, including Fort Jefferson

The highest wind gust measured in Florida during Hurricane Wilma was reported from the Dry Tortugas, with a reading of 134 mph. The storm waves of Wilma caused major beach and dune erosion (condition IV) throughout the Dry Tortugas. Overwash from the beaches of Garden Key overtopped the 150-year old moat wall and was deposited into the

moats. Storm surge flooding was incurred within the fort. The breach between Garden Key and Bush Key also increased in width during Wilma. In addition, another breach formed across the middle of Bush Key.

#### Cape Sable

The maximum wind field and highest storm surge of Hurricane Wilma devastated the 12.2 miles of carbonate sand and shell beaches of Cape Sable. Severe beach and dune erosion (condition IV) was sustained throughout this undeveloped region on the mainland gulf coast of Monroe County (Photo 40). Along segments where important sea turtle nesting habitat has been lost, the beaches have become critically eroded.



Photo 40. Severe beach erosion north of the Northwest Cape (Cape Sable).

#### Everglades Sloughs Debouchure (Shark River to Pavilion Key)

The maximum wind field and highest storm surge of Hurricane Wilma devastated the discontinuous carbonate sand and shell beaches of this region. Severe beach and dune erosion (condition IV) was sustained throughout this undeveloped region on the mainland gulf coast of Monroe County (Photo 41). Along segments where important sea turtle nesting habitat has been lost, the beaches have become critically eroded.



Photo 41. Storm surge scour channels between Shark River and Pavilion Key.

### **Storm Damage**

Throughout the Florida Keys were moderate to major flooding damages and minor to moderate wind damages to residential, commercial, and public buildings and infrastructure. The Monroe County Growth Management Department assessed residential damages in unincorporated areas of the county where approximately 4,100 single-family dwellings, 2,500 mobile homes, and 90 apartment/condominium units sustained at least minor damage. Of these, six single-family dwellings and 15 mobile homes were destroyed, and 20 single-family dwellings and 257 mobile homes sustained major damage.

#### Upper Keys

Sections of U.S. Highway 1 linking Florida City (Dade County) with Key Largo were flooded by the storm surge from Florida Bay. Much of the highway was impassable after the storm due to flooding and debris on the road. On Key Largo, generally light wind damages were observed; however, one commercial building (the Key Largo Shopper) lost its roof and many single-family dwellings on the bayside were flooded. Along Tavernier a 100-foot concrete seawall was destroyed.

#### Islamorada

Severe flood damages were sustained throughout Plantation Key, Windley Key, Upper Matecumbe Key, and Lower Matecumbe Key. Light to moderate wind damages were

sustained on Plantation Key, and 36 piers and docks were substantially damaged or destroyed on the Straits of Florida. Some dock and marina damage was sustained on Windley Key. Marinas, commercial businesses, and residential development throughout Islamorada were damaged by the storm surge flooding that was the worst since Hurricane Betsy in 1965. The Islamorada Town Hall building was rendered uninhabitable by the flooding, and the Village of Islamorada has removed all personnel, furniture and records from the premises. On Upper Matecumbe Key there were minor damages sustained by a number of rock revetments and major damage to approximately 300 feet of concrete seawalls. Light to moderate wind damage was sustained and 16 piers and docks were substantially damaged or destroyed on the Straits of Florida. On Lower Matecumbe Key, an additional eight piers and docks were destroyed or substantially damaged.

### Long Key

The community of Layton on the north side of Long Key sustained severe flood damage from the storm surge of Wilma. An oceanographic research center sustained severe damage to all its buildings and facilities. Single-family dwellings along the west end of Long Key sustained flooding and understructure damages. In addition, three piers were destroyed. Minor revetment damage was also sustained along the Conch Keys west of Long Key.

### Long Key State Park

As previously discussed, Wilma significantly worsened the beach conditions and the 60 camp sites that were destroyed. West of the campgrounds, 50 feet of the end of the park road was destroyed by a storm surge discharge channel that has created a deep gully across the dune and beach (Photos 42 and 43). In addition, the 650-foot rock revetment east of the campsites that was both damaged and overtopped during Rita, sustained additional level three damage.

### Grassy Key and Crawl Key

Single-family dwellings, motels, and commercial buildings on both the Florida Straits shoreline and Florida Bay shoreline sustained significant flood damage from the storm surge of Wilma. Four mobile homes were destroyed by the surge and waves off the straits and a number of others were severely flooded. A pool house and two piers were also destroyed. Eight concrete seawalls (450 feet) sustained major damage (level three to four). Another concrete seawall (100 feet) was destroyed on Crawl Key. Light to moderate wind damage was also sustained throughout Grassy Key and Crawl Key.

### Curry Hammocks State Park

There may have been some additional minor damage to the shoreline rock structure along the eastern segment of the park shoreline; however, no major damage was observed to any of the park facilities other than a barricade-type fence that was destroyed adjacent the beach.

### Coco Plum Beach

Wilma inflicted little additional damage to coastal or shore protection structures, including those revetments damaged by Rita. Flooding damage was sustained to

development within the designated critically eroded area. Minor flood damage was sustained at the Royal Plum Condominium and the Coco Plum Beach Villas. A single-family dwelling sustained first floor side wall damage and a pier was also destroyed near the west end.

#### City of Key Colony Beach

The rock revetment fronting Sunset Beach was substantially destroyed by Rita; however, Wilma inflicted even greater damage given the park's exposure to the storm's southwest waves. Throughout Key Colony Beach, beach front structures incurred minor to moderate flooding. The pool deck at the Key Colony Beach Motel was destroyed and piers were destroyed or substantially damaged at the Tortuga Club, the Casa Clara Condominium, the Key Colony Beach Motel, and the Castillo del Sol Condominiums. Light to moderate wind damage was sustained throughout the city, including damages to roofing, siding, signs, fences, trees and shrubs.





Photo 42. Storm surge discharge gully, Long Key State Park.



Photo 43. Storm surge discharge gully, Long Key State Park.

## City of Marathon

Throughout the City of Marathon on Fat Deer Key, Stirrup Key, Vaca Key, Boot Key, and Tingler Island, light to moderate wind damage was sustained, including damages to roofing, siding, signs, fences, trees and shrubs. Flooding was incurred to residential development and commercial development on both the straits and bay sides of the city.

On Vaca Key, two seawalls (totaling 125 feet) and four rock revetments (totaling 150 feet) were destroyed or substantially damaged. In addition, six piers fronting the Straits of Florida were destroyed. On Tingler Island, two seawalls were damaged. One 90-foot concrete seawall on the exposed west shoreline was totally destroyed (level four damage) (Photo 44) and another 100-foot concrete seawall was damaged (level two damage). At the city's public beach, Sombrero Beach, much of the park's infrastructure was damaged, including beach access walkways, picnic shelters, fences, trees and shrubs. In addition, 35 feet of the end of the asphalt paved road at Sombrero Beach was destroyed. Offshore, all the trees on the small island of West Sister Rock were completely removed by the storm surge, wind and waves.



Photo 44. Seawall destroyed by Wilma, Tingler Island.

### Little Duck Key

Veteran’s Memorial Park, a Monroe County beach, was severely impacted by the storm surge and waves of Wilma. Five concrete picnic shelters were substantially damaged and rendered irreparable (Photo 45).



Photo 45. Damaged picnic shelter, Little Duck Key.

### Bahia Honda State Park

Calusa Beach – The park’s public beach facilities on Calusa Beach were substantially damaged by the storm surge and waves of Wilma from the Gulf of Mexico that propagated across the bay of Bahia Honda. The north half of the beach sustained significant overwash, which transported sand into the public parking area and the northern four picnic shelters. The middle two concrete picnic shelters were undermined, but are being salvaged by the emergency placement of sand obtained from overwash deposits. The southern three concrete picnic shelters were destroyed by the storm surge and waves (Photo 46). In addition, the park’s interpretive center building is presently threatened by the condition IV erosion.



Photo 46. Destroyed picnic shelters, Calusa Beach, Bahia Honda State Park.

Loggerhead Beach – The park’s west end beach fronting the Straits of Florida was severely impacted by the surge and waves of Wilma (see Photos 23 and 24). A 300-foot long service road west of the public bathhouse was destroyed by the erosion, and a beach access walkway was also destroyed. A section of the paved parking lot was also damaged.

Road to Sandspur Beach – Along the road east of the park entrance, about 600 feet of rock revetment was substantially damaged (level four damage) and 75 feet of road had pavement damage (Photo 47).

Sandspur Beach – In addition to the beach access walkway destroyed by Rita, five beach access walkways were destroyed by Wilma. Also, a pavilion had its concrete slab destroyed by scour and undermining.



Photo 47. Road and revetment damage, Bahia Honda State Park.

#### West Summerland Key

Minor wind and flooding damage was sustained to the Girl Scout and Boy Scout facilities of Camp Wesumkee and Camp Sawyer. In addition, a swimming area dock was destroyed at Camp Sawyer and 25 feet of the bridge abutment wall was damaged.

#### Lower Keys, including Big Pine Key, No Name Key, Big and Little Torch Keys, Ramrod Key, Summerland Key, Knockemdown Keys, Cudjoe Key, Sugarloaf Key, Saddlebunch Keys, Big Coppit Key, Geiger Key, Rockland Key, Raccoon Key, and Stock Island

Moderate to major flooding damages were sustained to residential and commercial development throughout the lower keys. Flood damage figures are currently being developed by Monroe County, and will be included in any future update to this report. Light to moderate wind damage was also sustained throughout the lower keys, including damages to roofing, siding, signs, fences, trees and shrubs. Docks, bulkheads, and other marina facilities, as well as small craft (recreational and commercial vessels) were particularly hard hit by the storm surge (Photos 48 and 49).



Photo 48. Trailered boat damaged by Wilma's storm surge on Stock Island.



Photo 49. Damaged house boat, Garrison Bight.

Additional damages were realized along the Straits of Florida shoreline. On Big Pine Key, a 100-foot rock revetment was destroyed. On the Newfound Harbor Keys, a single-family dwelling was destroyed and others sustained major flood damage. On Munson Key, a pier was substantially damaged, and on Cudjoe Key nine piers were destroyed or substantially damaged. Along the Cudjoe Bay shoreline, numerous docks, boats, and gazebos were damaged, along with 150 feet of rock revetment and two concrete seawalls (200 feet). On Sugarloaf Key, three piers, 200 feet of concrete seawalls, and 100 feet of rock revetments were destroyed. One single-family dwelling was destroyed by the storm surge and two other dwellings are imminently threatened by the erosion conditions (Photo 50). On Geiger Key, another single-family dwelling was destroyed by the storm surge, and 50 feet of rock revetment was damaged.



Photo 50. Imminently threatened dwelling, Sugarloaf Key.

### Boca Chica Key

Along with the erosion and overwash of 1480 feet of Boca Chica Beach Road at the Monroe County park, 620 feet of the road was destroyed or substantially damaged (Photos 51 and 52). West of the county park, two additional 1000-foot segments of the paved road at the Naval Air Station were destroyed.



Photo 51. Boca Chica Beach Road damaged.



Photo 52. Boca Chica Beach Road damaged.



## Key West

Throughout the City of Key West, moderate to major flooding damages were sustained to residential and commercial development. An estimated 35 percent of the city was flooded impacting infrastructure and utilities as well as city parks (Photo 53). A large number of vehicles were also destroyed by the flood waters. Widespread light to moderate wind damage was sustained throughout the city (Photo 54).

South Atlantic Boulevard and Bertha Street – Roughly 50 feet of the street end at Bertha Street and another 25 feet of South Atlantic Boulevard was damaged (Photos 55 and 56).

West of Smathers Beach, the 1800 Atlantic Condominium sustained understructure damage. At Berg and Kitsos Beach, two beach access walkways were destroyed.



Photo 53. Key West interior city park flooding.

Photo 54. Key West wind damage.





Photo 55. Bertha Street during Wilma's falling storm surge.  
(Credit: City of Key West)



Photo 56. Bertha Street damaged. (Credit: City of Key West)