

## Chapter 16: Hurricanes and Storms

Florida has over 1,300 miles of coastline and no part of the state is more than 75 miles from the Atlantic Ocean or the Gulf of Mexico. In the words of hurricane historian Jay Barnes:

Its low-lying terrain, in some areas only a few feet above sea level, extends miles inland from the coast. Its many rivers, lakes, and glades are prone to flooding from heavy rains. Along with its position in a near-tropical sea, these physical features contribute to Florida's great vulnerability to the recurring effects of hurricanes and tropical storms."<sup>783</sup>

Hurricanes are a fact of life in the Everglades, representing one more challenge for NPS managers. Hurricane preparedness at Everglades National Park has progressed from a 20-page hurricane plan prepared in 1951 to a plan of more than 160 pages in place at this writing. Throughout the park's history, the safeguarding of humans lives—those of visitors and park staff—has been the top priority.

Following the park's establishment, the first hurricane to affect the park was the Miami hurricane of September 21, 1948.<sup>784</sup> This brought a storm surge of six to eight feet at Flamingo, knocking many of the houses there off their supports. Much to the disappointment of Superintendent Beard, residents did not abandon their homes but quickly propped them back up (see chapter 6). The park's first hurricane plan established a system of green, yellow, and red alerts to be in effect as a storm approached. The plan was always viewed as an evolving document, to be reviewed and updated annually. The green-red-yellow system has given way to a comparable three-step arrangement of preliminary, advanced, and final hurricane preparations. The park keeps a hurricane incident management team in place, ready to go into action when a storm approaches. Working under a designated incident commander are four team leaders, for planning, logistics, finance, and operations. Following 1992's Hurricane Andrew, the park has emphasized beginning hurricane preparations early, even though many times preparations will end up being unnecessary because a storm takes a different track.<sup>785</sup>

<sup>783</sup> Jay Barnes, *Florida's Hurricane History* (Chapel Hill: University of North Carolina Press, 1998), 1-2.

<sup>784</sup> The National Weather Bureau did not begin naming hurricanes until 1953; Miami hurricane has become the accepted name for this storm.

<sup>785</sup> SMR, Aug. 1951; Everglades and Dry Tortugas National Parks Hurricane Plan, 2006, EVER 22965; "Hurricane Preparedness at Everglades and Dry Tortugas," *South Dade New Leader*, May 25, 2014.

The park's experience with major storms is treated in some detail here, and all storms recorded as doing damage in the park are summarized in the table at the end of the chapter.

## Hurricane Donna, 1960

A quiet decade for Atlantic storms came to an abrupt end in September 1960 with Hurricane Donna. Donna did considerable damage in the Caribbean before heading toward the Florida keys and the west coast of Florida over the night of September 9-10. The storm moved north along the Gulf Coast, with the eye just offshore, battering Flamingo and Everglades City with winds estimated at 140 miles per hour (all of the Flamingo wind gauges were blown away) (figure 16-1, damage to concessioner's shop from Hurricane Donna). In Everglades City some 200 people took refuge on the second floor of the Collier County Courthouse as seven to eight feet of water coursed through the streets. The storm surge at Flamingo was estimated at 12 feet above normal high tide. Somehow the six people who rode out the storm there survived.<sup>786</sup>



**Figure 16-1. Damage to concessioner's shop at Flamingo from Hurricane Donna, 1960**

Damage to the mangrove belt from Madeira Bay west to White-water Bay and the visitor facilities at Flamingo was extensive. Many stands of mangrove and mahogany were killed outright. Wading birds, most of them at roost because the hurricane hit at night, were hit hard. The park estimated mortality among great white herons at 35 percent, although enough survived (about 500) that they were not wiped out. Great numbers of the more common American and snowy egrets and white ibis were killed. The park had counted 50 bald eagle nests just before the hurricane. All but two were destroyed, and four months later just 12 had been rebuilt. At Flamingo, the motel and restaurant lost their roofs; the marina, two employee residences and five comfort stations were

<sup>786</sup> Barnes, 197-207; Supt. Hamilton to RDR1, Sep. 15, 1960. NARA Ph, RG 79, 79-66-A-661; "Flamingo a Shambles from Hurricane Winds," *Miami Herald*, Sep. 13, 1960.

destroyed. Overall, clean-up and rebuilding cost \$400,000, equivalent to \$3.2 million in 2014 dollars.<sup>787</sup>

Donna also affected cultural resources. With vegetation swept away, aerial reconnaissance revealed at least two previously unknown Native American mounds. A tantalizing glimpse of the pioneer-era structures still present in the 1950s is provided in a posthurricane memo from Gulf Coast District Ranger Richard Stokes. He reported that “the storm solved many of our problems as far as buildings with the park in Gulf Coast District.” Stokes reported the Watson Place on Chatham River as almost completely destroyed, and “shacks” at Turkey Key (2), Rabbit Key (1), Pelican Key (3), and Mormon Key (unspecified number) washed away. At Chatham Key, three camps were destroyed while one was in good condition and Darwin’s Place on Chevelier Bay remained in good condition.<sup>788</sup>

Restoration of visitor areas moved forward quickly. The road to Flamingo was opened September 18, the motel was able to reopen on December 15, and the Flamingo campground on January 7, 1961. The plantings around the Flamingo visitor center complex were replaced in 1962. A few outside the Service thought the hurricane provided a chance to scale back the Flamingo development to something more appropriate for a wilderness, but the NPS repaired or replaced all facilities.<sup>789</sup>

Devastating as it was, Hurricane Donna provided an opportunity for park naturalists and outside scientists to measure hurricane effects in ways never before possible. Park collaborator Frank Craighead established 38 test plots in the mangrove forest from Little Madeira Bay to Lostmans River to monitor revegetation and recommended they be checked every six months. Craighead and Vernon C. Gilbert published a preliminary report on hurricane effects on vegetation in March 1962. Dr. Bill Robertson delivered a paper on the hurricane’s effects on bird populations at the 1961 annual meeting of the American Ornithologists Union. Donna was the first storm to demonstrate the ability of hurricane to spread nonnative species. The hurricane spread Australian pine (*Casuarina equisetifolia*) extensively up the park’s west coast.<sup>790</sup>

787 SMR, Nov. 1960; Supt. Hamilton to RDR1, Oct. 21, 1960, “Hurricane Damage to Everglades National Park,” NPS press release, Nov. 2, 1960, NARA Ph, RG 79, 79-66-A-661; Barnes, 207.

788 “Mounds ‘Found’ by Donna,” *Miami Herald*, Sep. 13, 1960; Gulf Coast District Ranger Richard A. Stokes to Supt., Oct. 9, 1960, EVER 22965.

789 SMR, Dec. 1960, Jan. 1961; Completion Report, Grading, Seeding, Planting, Flamingo, Dec. 1962; SOI to Mrs. Benjamin Butler, Nov. 9, 1960, NARA II, RG 79, NPS AF, box 420.

790 NPS collaborator Frank C. Craighead to Supt., Nov. 8, 1961, EVER 42242; Frank C. Craighead and Vernon C. Gilbert, “The Effects of Hurricane Donna on the Vegetation of Southern Florida,” *The Quarterly of the Florida Academy of Sciences* 25/1 (March 1962):1-9; Dr. William B. Robertson, “Effects of Hurricane Donna upon Bird Populations of Southern Florida”; G. E. Davis, L. L. Loupe, C. T. Roman, G. Smith, J. T. Tilmant, and M. Soukup, compilers and ed., *Effects of Hurricane Andrew on Natural and Archeological Resources* (Denver: NPS, 1996), xvii, <http://archive.org/details/effettofhurrica00davi>.

## Hurricane Betsy, 1965

Betsy formed as a weak tropical depression east of Barbados in late August 1965. After strengthening into a hurricane, the storm moved north of the Bahamas. It appeared headed for the Carolinas, but changed course and move southwest toward the tip of the Florida peninsula. Betsy hit the keys and Everglades National Park on September 8, 1965, as a category 3 hurricane with an eye 40 miles wide and wind gusts estimated at 140 miles per hour. The storm brought three to five inches of rain to the park, which helped some to alleviate a severe drought. Downed trees temporarily closed the park's Pa-Hay-Okee, Mahogany Hammock, and Gumbo Limbo Trails; Cuthbert Lake Rookery also was damaged. Because of the amount of downed fuel, all of Pine Island was included in the prescribed burn program in 1965/1966 following the hurricane. Repairs to roads, structures and utilities ran to \$180,000, the 2014 equivalent of \$1.4 million. After moving into the Gulf, Betsy headed to Louisiana where she caused widespread devastation.<sup>791</sup>

## Hurricane Andrew, 1992

No employee of any of the South Florida parks on duty in August 1992 is likely to forget the experience of Hurricane Andrew. Forming as a tropical wave off the Cape Verde Islands, Andrew was the first named tropical storm of the season. Andrew passed well north of Puerto Rico on August 21 and strengthened from a tropical storm to a category 4 hurricane in just 30 hours. The hurricane made landfall on the 24<sup>th</sup> just before 5:00 am, passing directly over Biscayne National Park, Homestead, and Everglades National Park. A small, fast-moving, but incredibly intense storm, Andrew had sustained winds of 140 miles per hour and gusts up to 175 miles per hour. Rainfall from the hurricane was a minor factor, and the storm surge mainly affected properties close to Biscayne Bay. It was Andrew's winds that wreaked havoc across a narrow band of South Florida.<sup>792</sup>

When Andrew suddenly strengthened, Superintendent Richard Ring implemented the park's hurricane preparedness plan on August 22 and appointed a park incident commander. By nightfall on the 23<sup>rd</sup>, the park was closed and park employees either had been released to their homes outside the park or collected at shelter locations at Pine Island, park headquarters, and the Oasis Visitor Center in Big Cypress. When employees ventured out at daybreak on August 24 after the storm had passed, they confronted a scene of almost unbelievable destruction. Park interpreter Deborah Liggett

<sup>791</sup> Barnes, 223-230; SMR, Sep., Nov. and Dec. 1965; Acting RDSE to Dir., Oct. 19, 1965, NARA Ph, RG 79, 79-69-A-384.

<sup>792</sup> Barnes, 261-265.

remembered, “We weren’t at the end of the world, but we could see it from here.” Conditions within the park remained hazardous for the first 72 hours as crews went out to survey damage. Passing over the mainland in just over three hours, Andrew left a narrow, 20-to 30-mile-wide path of devastation. At Everglades, the main visitor center, Pine Island, Long Pine Key, the Daniel Beard Center, Chekika, and several boardwalk trails were heavily damaged, while facilities at Everglades City, Flamingo, and Key Largo were virtually untouched. Many downed trees had to be removed before roads were passable. The park requested a Type I incident management team, which was activated on August 25<sup>th</sup>, with Rick Gale from the NPS Washington, D.C., ranger activities division as incident commander. On October 8, a type II incident management team under Bill Blake took over to coordinate the return of authority to the park superintendent. The type II team demobilized on October 25, but continued to provide administrative support to park managers during a two-month transition period. Some 300 NPS employees from other parts of the country served on the two teams.<sup>793</sup>

Andrew left nearby communities such as Homestead, Florida City, Naranja, and Cutler Ridge in chaos, and the first priority was finding and assisting park employees. Andrew left 175,000 homeless and 1.4 million temporarily without power. One Fort Jefferson employee, Natividad “Tito” Roheno, was killed by falling debris at his Naranja Lakes home. Among the 258 employees of the four parks, 101 had their homes destroyed, while another 75 suffered major property loss. The storm demolished the old Royal Palm Lodge at its new site in Homestead and virtually destroyed Homestead AFB. Phone service, including cell phone service, was spotty to nonexistent.<sup>794</sup> The incident management team used satellite phones for the first time in an NPS disaster. Many staff members were in a state of shock, and employee assistance teams went door to door helping to stabilize houses and salvage possessions and providing other assistance. A donation fund, managed by Eastern National Parks and Monuments Association, collected \$200,000 servicewide. Looting was widespread after Andrew and many park employees had to stand guard over their homes with shotguns. Understanding the toll the situation was taking, the NPS did its best to arrange hardship transfers for employees who requested them. About 30 employees of the three parks ended up

<sup>793</sup> “Embracing the Everglades,” *Miami Herald*, Dec. 18, 1992; NPS, *Reference Manual 55, Incident Management Program*, <http://www.nps.gov/policy/rm55manual.pdf>; Hurricane Andrew Incident Management Team, *Hurricane Andrew, 1992: The National Park Service Response in South Florida* (Denver: NPS, 1994), 47-48, 61-62. The NPS developed the incident command system in the 1980s to coordinate activities in fighting major wildland fires. The system ensured that uniform procedures were in place before an incident and that a team with the necessary skills could be quickly assembled from across the National Park System. Andrew was the first use of the system for a natural disaster.

<sup>794</sup> Although not as common as they are now, cell phones were owned by 11 million Americans in 1992, and some park staff had them.

moving on. Outside the park, National Guard troops and nonprofits handled relief efforts, soon supplemented by regular military units.<sup>795</sup>

Andrew affected employees' possessions in the short term and their emotional resources over the long term. Superintendent Ring, who had been at Everglades just a bit over three months, had his house destroyed. As he describes it, "we weren't looking outside to see what was happening. We moved from room to room in our house as the storm grew and ended up in our garage inside my minivan. The house came apart around us; it was pretty well totaled." Mike Soukup, director of the South Florida Natural Resources Center, was luckier, having purchased a 1957 house that "was built to withstand hurricanes. We watched as our neighbors' houses literally flew past us, but our house never got any water inside." The superintendent's secretary and her husband lived in a neighborhood that was repeatedly looted. As then Assistant Superintendent Larry Belli remembered, "He was in the front yard of his house with a gun for the better part of a year. She finally talked him into going out to dinner one night, and that was the night they got looted." That was the last straw, and she transferred to another park. For months following Andrew, park employees spent their working days rebuilding the park and their off-duty hours rebuilding their homes.<sup>796</sup>

### *Resource Damage from Andrew*

Flooding is the major cause of wildlife death in hurricanes; there was little flooding with Andrew because it was a relatively dry storm. Maximum rainfall recorded in Everglades National Park was 4.5 inches; most areas got 1.5 inches or less. Animals with radio collars—panthers, black bears, and deer—could be checked relatively quickly; none of the collared animals perished. Alligators were already experiencing a poor nesting year, and Andrew broke up 27 percent of nests. Crocodiles and manatees were not affected. Many birds disappeared for a few days, but soon were back in the park in customary numbers. Mangrove forests, pine uplands, and hardwood hammocks near the storm's eye were severely affected. There were many downed trees and limbs in the park's pinelands (figure 16-2, damage to pinelands from Hurricane Andrew). Approximately 70,000 acres of mangroves knocked down, but many trees showed new growth within weeks. Andrew did little damage to marine resources in Florida Bay or

<sup>795</sup> SAR, 1992; "Transition Plan, Hurricane Andrew Incident," Oct. 1992, EVER-01767.

<sup>796</sup> Richard Ring, interview by author, July 18, 2012; Michael Soukup, interview by author, July 25, 2012; Lawrence Belli, interview by author, June 27, 2012; "Rebuilding Continues," *Federal Times*, Aug. 30, 1993.

along the park's Gulf Coast. Archeological sites on tree islands in the park and in the Ten Thousand Islands suffered relatively minor damage from uprooted trees.<sup>797</sup>

At the urging of Southeast Region Chief Scientist Dominic Dottavio and others, the NPS brought together a team of 23 scientists to assess the posthurricane condition of natural and archeological resources in Everglades, Biscayne, and Big Cypress. Nationally prominent experts worked with local scientists and formed three teams: marine, terrestrial, and freshwater. In addition to making an initial assessment, the teams made short-term and long-term monitoring and mitigation recommendations. Gary E. Davis, former SFRC employee, then at Channel Islands, and Cameron Shaw of the U.S. Fish and Wildlife Service were the team coordinators, along with Laurie Park of Everglades, who handled logistics. The teams were in the parks from September 15 through 23. Overall the group concluded that "initial ecosystem responses seemed normal." The scientists noted that hurricane winds almost certainly spread nonnative plant species. Scientists who participated later collaborated to produce a special issue of the journal *BioScience* in April 1994 containing six articles on the effects of Hurricane Andrew.<sup>798</sup>

A major concern with hurricanes in South Florida is the opportunity they provide for the spread of invasive species. The scientific team that visited Everglades in September recommended monitoring for the spread of species such as Brazilian pepper. During Andrew, several sites outside the park with exotic animals were destroyed, releasing their denizens into the wild. Among the specimens that escaped were Burmese pythons. As recounted above in chapter 14, Burmese pythons since then have established a breeding population in the park.<sup>799</sup>

### *Damage to Park Facilities*

Damage to park facilities was estimated at \$30 to \$40 million. The key to reopening the park was restoring electrical service. Power poles were down all along the main park road and the roads to Royal Palm and the Dan Beard Center. The park had previously planned to place electrical cables underground, and this project was fast-tracked after Andrew. Park managers set the goal of reopening the park on December 15, in time for the winter tourist season. Achieving this goal depended on having the power grid back up. A \$6.5 million contract for laying the buried cable for the new electrical

<sup>797</sup> Gary E. Davis, General Comments – Resource Conditions, Everglades, Biscayne, and Big Cypress Resulting from Hurricane Andrew, n.d. [Sep. 1992], EVER 58222; Gary E. Davis, et al., *Effects of Hurricane Andrew*, 97-99.

<sup>798</sup> Stuart L. Pimm, Gary E. Davis, Lloyd Loope, Charles T. Roman, Thomas J. Smith III, and James Tilmant, "Hurricane Andrew," *BioScience* 44/4 (Apr. 1994):224-229; Gary E. Davis, et al., *Effects of Hurricane Andrew*, 4-6. The latter document contains a list of all team members and peer reviewers.

<sup>799</sup> Davis, et al., *Effects of Hurricane Andrew*, 38-40.



Figure 16-2. Damage to pine uplands from Hurricane Andrew, 1992



system was completed in 108 working hours and the work was rushed along. The main visitor center and some employee houses were not salvageable and were demolished. A number of structures, including the Dan Beard Center, suffered roofing damage and water intrusion. Chapter 18 covers damage to museum collections in the Beard Center. As soon as contracts could be let, crews began work on debris removal, reroofing buildings, and repair/replacement of damaged trails. Three residential buildings at Pine Island were damaged beyond repair and were burned as training exercises for the park's structural fire crew. A contemporary park report described them as dormitory housing, but a comparison of before and after site plans indicates that they were two seasonal duplex structures and a three-bedroom house variously described as the chief clerk's residence or the superintendent's residence. The latter was built in 1951 and had oak floors and cypress paneling.<sup>800</sup>

The areas of the park that were outside Andrew's narrow path of destruction were back in service relatively quickly. The Everglades City visitor center and boat tours were running again on September 21. Shark Valley and its tram tours reopened to the public by Nov. 3. The reopening of the main park entrance, Royal Palm, and Flamingo occurred on schedule on December 15 and received considerable media attention. Park interpreters emphasized to visitors that hurricanes are a natural occurrence, and that the Everglades ecosystem was, for the most part, responding naturally. A temporary visitor center in a mobile unit served as an orientation point at the park entrance. The Gumbo Limbo and Pinelands Trails were open, as was part of the Mahogany Hammock Trails. The Anhinga Trail had to be rebuilt, and opened at the end of February 1993. The Chekika and Long Pine Key campgrounds remained closed through the 1992/1993 season. As described in chapter 7, the Ernest F. Coe Visitor Center opened in 1996.<sup>801</sup>

The effects of Andrew on park resources and park staff were long lasting. On August 27, 1993, the three South Florida parks "held a general staff meeting to commemorate the anniversary of Hurricane Andrew. By bringing the park family together, the year's experiences, accomplishments, and future plans were again shared as part of the healing process."<sup>802</sup>

800 SAR, 1992; NPS, Andrew Update – Day 365, Aug. 1993, EVER-58222; Form 10-768, Chief Clerk's Residence, Pine Island, Dec. 28, 1968, EVER 22965; Oron Bass, personal communication, Oct. 22, 2013.

801 "Everglades Opens Shark Valley Area, *Miami Herald*, Nov. 3, 1992; "Everglades Park's Main Street Reopens," *Miami Herald*, Dec. 15, 1992; "Everglades Park Reopens Trail," *Miami Herald*, Feb. 28, 1993.

802 SAR, 1993.

## Hurricane Katrina, 2005

Katrina developed in the Bahamas in late August and was a weak category 1 hurricane when it made landfall near the Dade/Broward County line around 6:30 pm on August 25. The storm spent about seven hours over Florida before entering the Gulf of Mexico. Although it did far greater damage later in Louisiana, Katrina had significant effects at Everglades. Katrina was barely a hurricane and forecasts called for it to pass to the north of Flamingo, so park management opted not to evacuate that area. The storm took an unanticipated dip to the south and ended up bringing a storm surge of approximately four to six feet at Flamingo. The surge damaged boats and deposited a large amount of dead sea grass. The storm damaged or destroyed a number of government and private vehicles that remained on site because of the failure to evacuate. There was also considerable loss of employee property (figure 16-3, houseboats floated onto dock by Katrina). Some backcountry campsites were also damaged by the storm surge. August 25 proved to be a harrowing night for the employees at Flamingo.



Figure 16-3. Houseboats floated onto dock by Hurricane Katrina, 2005

Flamingo District Ranger Tony Terry describes four-foot waves in front of his house and alarms sounding through the night as the storm surge bounced vehicles around.<sup>803</sup>

Park staff began clean-up operations immediately after the storm passed, and an incident management team (IMT) under the command of Gordon Wissinger was in the park from August 30 through September 15. The major accomplishments of the IMT were restoring power to Flamingo, removing debris and sediment, clearing trails, and repairing and replacing appliances and equipment. Land-line telephone service had to be reestablished, and Flamingo residents were provided rented cell phones in the interim. The IMT called in a critical incident stress management (CISM) team, which conducted six group debriefings and additional one-on-one sessions to help staff cope with stress and restart their lives. During the IMT's duration, approximately \$850,000 was expended on salaries, contracts, and other recovery expenses. One major lesson from Katrina was to err on the side of caution in implementing the park's hurricane preparedness plan, which indicated that Flamingo should have been evacuated.<sup>804</sup>

### **Hurricane Wilma, 2005**

The park was still recovering from Katrina when a stronger hurricane, Wilma, passed over South Florida on October 24. Wilma formed as a tropical depression south of Jamaica on October 15, 2005, and moved to the west and northwest. The storm touched the northeastern tip of the Yucatan peninsula on October 21 as a category 4 hurricane and moved into the open waters of the Gulf of Mexico. Wilma then moved to the northeast, making landfall near Cape Romano on October 24 as a category 3 with sustained winds of 120 miles per hour. The hurricane was over the Florida peninsula for a bit more than four hours before moving into the Atlantic Ocean.<sup>805</sup>

On October 19, Superintendent Kimball formed a hurricane incident management team with Bob Panko as incident commander (IC). It became the IC's responsibility to oversee the completion of hurricane preparations and see to the well-being of park staff. Park staff began securing buildings, moving equipment, and instituting a phased closure of the park. Shark Valley and Everglades City were shut down by the close of business on Thursday, Oct. 20. An all employees meeting was held at 4 pm on October 22 to go over closing procedures and other matters; that same day, Supervisory Park Ranger Curt Dimmick took over as IC from Bob Panko, who left for previously scheduled fire training in West Virginia. The main entrance and the

<sup>803</sup> SAR, 2005; Tony Terry, interview by author, Jan. 18, 2012; NOAA, <http://www.ncdc.noaa.gov/special-reports/katrina.html>.

<sup>804</sup> Gordon Wissinger, "Hurricane Katrina Incident, Everglades and Dry Tortugas National Parks, Aug. 30 – Sep. 15, 2005" (Homestead, Fla.: NPS, Sep. 15, 2005); Allyson Gantt, personal communication, June 28, 2013.

<sup>805</sup> NOAA, Hurricane Wilma, <http://www.nhc.noaa.gov/outreach/history/#wilma>.



**Figure 16-4. Flamingo housing area following Hurricane Wilma, 2005**

entire park were closed at 8 am on Sunday, October 23. Most employees by then had been released to make preparations at their homes, and Flamingo residents sheltered at headquarters. Once the storm had passed, a national incident management team under IC J. D. Swed formally took over from the park team on October 25, although the hand-off was implemented over several days. The national team gave way to park type 3 incident management team on November 9; this team demobilized as of November 21, turning responsibility back to the park superintendent.<sup>806</sup>

Wilma was a fast-moving storm with a wide eye. Her winds were considerably stronger north of the eye; to the south, most of the damage was from storm surge. Everglades City and Chokoloskee had storm surges of eight to ten feet, and Flamingo from six to eight feet (figure 16-4, Flamingo housing area following Wilma). The hurricane did not lose much strength over the peninsula and was still a category 2 when she passed into the Atlantic. Wilma caused considerable damage in the built-up areas

<sup>806</sup> Supt. Kimball to Bob Panko, Oct. 19, 2005; Bob Panko, Incident Commander, to Supt., Oct. 22, 2005; Transfer of Command Plan for Everglades and Dry Tortugas National Parks, n.d. [1<sup>st</sup> week Nov. 2005], EVER 22965; Allyson Gantt, personal communication, June 28, 2013.

of Fort Lauderdale and West Palm Beach. In the immediate aftermath of the storm, six million customers were without power in the state.<sup>807</sup>

Because Wilma did such widespread damage across South Florida, there was considerable competition for recovery resources, slowing the park's rebound. Within Everglades National Park, Flamingo took the most serious hit. As the Miami Herald put it:

Hurricanes Katrina and Wilma flooded the aging hotel and nearby cottages, leaving behind a soggy, stinking, uninhabitable mess. The storms filled the ground-floor rooms with six inches of bay bottom, fried electrical systems and trashed just about everything not made of concrete.<sup>808</sup>

Power was restored to nearly all of the park by first week in November, and to the Flamingo residential area by the end of November. The Everglades City Visitor Center reopened November 3, the main visitor center on November 11, and the Shark Valley area on November 12. It took some time to clear the main road all the way to Flamingo, and the Flamingo Visitor Center and the marina store did not reopen until some time in December. The Flamingo lodge and housekeeping cabins were damaged beyond repair and the wreckage was ultimately hauled away. Park staff, a representative from the NPS Southeast Regional Office, and a representative from the Florida State Historic Preservation Office conferred on-site and concluded that the lodge was not eligible for the National Register. The housekeeping cabins had not reached 50 years of age and were found not to be exceptionally significant. The park received \$5.6 million in hurricane recovery funding in FY2007 and \$2.1 million in FY2008. Clearing some 10,000 cubic yards of sediment from the Flamingo boat basin was a major chore that occupied much of the summer of 2006 and cost \$540,000. The park was able to open the boat ramps in August 2006.<sup>809</sup>

Wilma did not cause great damage to natural resources, and may have had a beneficial effect in clearing sediments from Florida Bay. Many trees were downed on canoe trails, which took some weeks to clear away. Following Wilma, Margo Schwadron, a SEAC archeologist, did a preliminary assessment of 10 archeological sites on the Gulf

807 "Hurricane Wilma, 2005," *Coastal Breeze News* website, <http://www.coastalbreezenews.com/2010/08/12/hurricane-wilma-2005/>.

808 "Ruined Lodge Needs Plan, Funds," *Miami Herald*, Oct. 1, 2006.

809 NOAA, Hurricane Wilma, <http://www.nhc.noaa.gov/outreach/history/#wilma>; "High Season Is a Casualty after Storms," *New York Times*, Nov. 23, 2005; SAR, 2005; "Everglades National Park Reopens Florida Bay Boat Ramps in Time for Labor Day Holiday," ENP media release, Aug. 18, 2006, ENP CF; Allyson Gantt, personal communication, June 28, 2013; Fred Herling, personal communication, Oct. 30, 2013.

Coast. Wave action had eroded a number of shell midden sites and the root balls of downed trees had exposed some artifacts at others.<sup>810</sup>

The implementation of the park's hurricane preparedness plan was considerably more successful for Wilma than it was for Katrina. Cooperation among park divisions and between park staff and IMT staff was judged to be superior. The park experienced shortages of generator fuel after Wilma, and keeping tanks topped off in future emerged as a recommendation. The two hurricanes of 2005 took a considerable toll on park staff. Within a year after Wilma, a number of employees stationed at Flamingo had moved on to other park units.<sup>811</sup>

### Summary of Hurricanes and Tropical Storms Doing More than Minimal Damage to Everglades National Park

Storm	Date	Notes
Miami Hurricane	Sept. 21, 1948	Storm surge of 6-8 feet at Flamingo.
Hurricane Donna	Sept. 8, 1960	\$400,000 damage, mostly at Flamingo.
Hurricane Isbell	Oct. 14, 1964	Passed directly over Everglades City from the Gulf. Destroyed Lostmans River Ranger Station, \$11,000 damage.
Hurricane Betsy	Sept. 7-8, 1965	\$180,000 in damage; boardwalk trails were rebuilt.
T. S. Dennis	Aug. 17, 1981	Heavy rainfall and flooding in East Everglades.
Hurricane Floyd	Oct. 12, 1987	Weak category 1; \$17,000 required for park cleanup
Hurricane Andrew	Aug. 23, 1992	\$30 - \$40 million in damage to the park, including the loss of the main visitor center and many roofs.
T. S. Gordon	Nov. 16, 1994	Caused flooding in the East Everglades
Hurricane Katrina	Aug. 2005	Damage to buildings and vehicles at Flamingo.
Hurricane Wilma	Oct. 24, 2005	\$7 million in damage; Flamingo Lodge and cabins a total loss.

810 "High Season Is a Casualty after Storms," *New York Times*, Nov. 23, 2005; Margo Schwadron, SEAC, to Bob Panko, ENP, n.d. [Nov. 2005], EVER 22965.

811 NPS, Wilma: What Were the Most Difficult Challenges Overcome?, n.d. [Nov. 2005], EVER 22965.