

but on the people of the community. The storm had stripped them of their homes and possessions, leaving them no place to go. Segars likened the displacement of residents in his area to "taking the south half of the population and moving it to the north half. People were living in houses that didn't have roofs or in makeshift structures." WASA employees were divided into two groups—those who had homes and those who did not. Virtually all of Florida City's utility personnel were either injured in the storm or lost their homes and belongings.

other parts of the state. Water departments north of Andrew's path provided plant operators, maintenance crews, portable generators, and other equipment and supplies. Orlando sent an 8,000-gal tanker truck to deliver potable water in the Miami-Dade area. Orange County brought portable generators to the city of Homestead to help pump down rising sewage levels at lift stations. Homestead Director of Utilities Rob Brush points out, "The help we received from various agencies was not provided for by some preexisting mutual agreement. People just showed up out of goodwill."

Because the situation in the community was so chaotic, with some lightly damaged buildings continuously occupied and other structures taken over by squatters, the utility decided to close all service accounts and mail deposits to the last known address.

According to Tom Segars, WASA staffing was reduced by 50 percent in the most seriously affected areas. However, many water facilities workers showed extraordinary dedication and perseverance. When Luis Aguiar arrived at work Monday just hours after the worst of the storm, he found two staffers waiting for him. By noon Monday, more than 25 percent of his division had shown up for work. Even employees who had lost their homes were back to work within 24 hours.

Water departments did their best to help employees cope with their losses. With so many in the community homeless and not enough rentals available, WASA housed employees on site for several months. According to WASA Administrative Division Chief Sharon Mitchell, Dade County assisted employees by serving meals, giving paid time off, establishing low-interest credit union loans, helping employees locate housing, and offering day care and psychological counseling. Volunteers donated their services to help board up employee's homes. As recovery continued, WASA temporarily adjusted work-site rules to permit employees to rebuild their personal lives—to contact insurance company representatives and to meet with contractors about repairing or replacing their homes.

In Homestead and Florida City, homeless workers without other available shelter moved into treatment plants with their families. Florida City's municipal recovery process allowed for repair of city employees' homes, relieving them of private concerns so they could concentrate on work and assist in the restoration of the water and sewer service.

Water community pitches in

Almost before Hurricane Andrew had left the state, southern Florida was receiving offers of assistance from

Florida City, laid waste by the hurricane, was almost entirely dependent on outside help and became the logical destination for the military and other relief agencies and personnel. Although most of the town's residents had left, the population actually increased because of the influx of relief workers and military. "One of our main missions," explains Richard Coates, "was to get the water and sewer system pieced together so we could set up tent cities to house both those left homeless by the storm and those coming in to help." Crews repaired the distribution system at a trailer park, modifying it by running special lines for kitchens and showers. Because so many people were living at the site, one or two water professionals stayed on the premises to ensure that water and sewer lines remained operational.

Coates specifically cites Boca Raton and its deputy director of the public utilities department, Joseph Hancock, for their help to Florida City. Boca Raton provided portable generators that helped relieve Florida City's overburdened lift stations. Coates emphasizes that "all of the most effective relief efforts were done by teams that were self-contained in terms of personnel, tools, equipment, and supplies." He singles out the city of Sumter, S.C., as a perfect example of this concept. "Sumter came down in a convoy, complete with their own food, tents, trucks, and all supplies. All they asked for was an acre where they could set up and operate. They knew the score; they came in ready to take care of themselves and were twice or three times as effective because of it. Conversely, some relief crews spent a large portion of valuable time securing lodging and food in the disaster area."

Sumter's preparedness and willingness to help stemmed from its own encounter with Hurricane Hugo. Says Ed Davis, Sumter public works director, "We had a heck of a response from utilities after Hugo

in 1989. We decided to adopt a place that had been through Hurricane Andrew and try to assist such public works as water and sewer sanitation. We took 25 people experienced in getting water and sewer on line and 22 pieces of equipment such as clam loaders, dump trucks, and refuse trailers to move debris." Davis and his team stayed two weeks, repairing lines and clearing up lift stations. Adds Davis, "After two hurricanes, I've had enough for a lifetime."

AWWA sections to the rescue

Local AWWA sections were among the first to rally to help their colleagues in southern Florida. Luis Aguiar of WASA claims that association members responded more quickly than the federal government. Nearby sections supplied workers and equipment, and AWWA and the Florida Section collected more than \$40,000 to help personnel in the area. "It's important," says Tom Segars, "that everybody who contributed to the fund understands what that relief fund meant to people who had lost everything. The money enabled people to make a down payment on a car or have enough cash to pay a rental deposit."

Thanks to assistance from other communities and their own hard work and determination, the water systems crippled by Hurricane Andrew gradually came back on line. The north part of WASA's system was operating within three days; the last of the system came back on three and a half weeks after the storm.

Although many service areas actually had potable water 10 days after the storm, the boil-water advisory remained in effect longer. Before the advisory could be lifted, every water facility had to collect two consecutive days of bacteria samples throughout the entire system. Among problems encountered by laboratory personnel was difficulty locating sampling sites.

Water potability was a lingering issue for two reasons. First, service areas affected by the storm existed in close proximity. Houses across the street from each other might be served by two different systems. Second, communications remained limited after the hurricane and there was concern about how to inform selected portions of the population that the water in their area was safe to drink.

Some water professionals believe the boil-water advisory lasted too long, but Segars explained why it remained in effect. "Agencies thought it better to wait until all areas were potable. With some potential for standing water, sewer contamination, and other problems, there was no point in stressing an already stressed infrastructure. The last thing the community needed was an outbreak of gastroenteritis."

FEMA criticized for its red tape

Water supply personnel are more unanimous in their criticism of another official entity: the Federal Emergency Management Agency (FEMA). The federal government provides reimbursement for costs incurred in disaster recovery, but all such costs must be documented in strict accordance with FEMA guidelines.

From that point on, we were getting a system back on line every day. By September 24, 13 days after Hurricane Iniki, all water systems were restored."

That restoration could be accomplished so quickly and in the face of such considerable obstacles as no power and communications may be attributed in part to knowledge KDW had gained dealing with Hurricane Iwa. In addition to its pre-existing contract for water-delivery trucks, the department had arranged for additional personnel. "After Hurricane Iwa," Sato notes, "water supply managers from Oahu, Maui, and Hawaii met to discuss the problems they'd encountered and what to do differently in another storm. I said the most critical issue, aside from generators, was the need for additional laborers. There's no point in generators starting up the system until the lines are repaired. Hurricane Iniki hit Friday and by Sunday morning, we had more than quadrupled the KDW workforce. We had arranged with civil defense for the military to fly essential personnel in from other utilities." KDW received assistance in the form of personnel, vehicles, and equipment from three neighboring islands and the mainland.

Planning after an earlier hurricane allowed KDW's workforce to be more than quadrupled less than two days after the storm.

As for his own employees, Sato believes that their fortitude and dedication after Iniki can be traced to Iwa. "Right after Hurricane Iniki, all staff came back even if their homes were badly damaged. A lot of very sincere people work for the water department, and they felt it was their duty to provide water to the public."

Sato believes that successful recovery depends largely on details. During Hurricane Iwa, relief crews working long days had to make do with military-type meals. After Iniki, a kitchen was set up in the base yard of the water department, and cooking power was supplied by canister stoves. Says Sato, "We made sure everyone assigned to us had hot meals throughout the ordeal. We had people working 15 to 20 hours at a time, and they were an important part of our recovery. Our people felt pride because we gave the workers hot lunches every day."

Iwa had even prepared the KDW for dealing with the intricacies of Federal Emergency Management Agency (FEMA) documentation. Sato



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