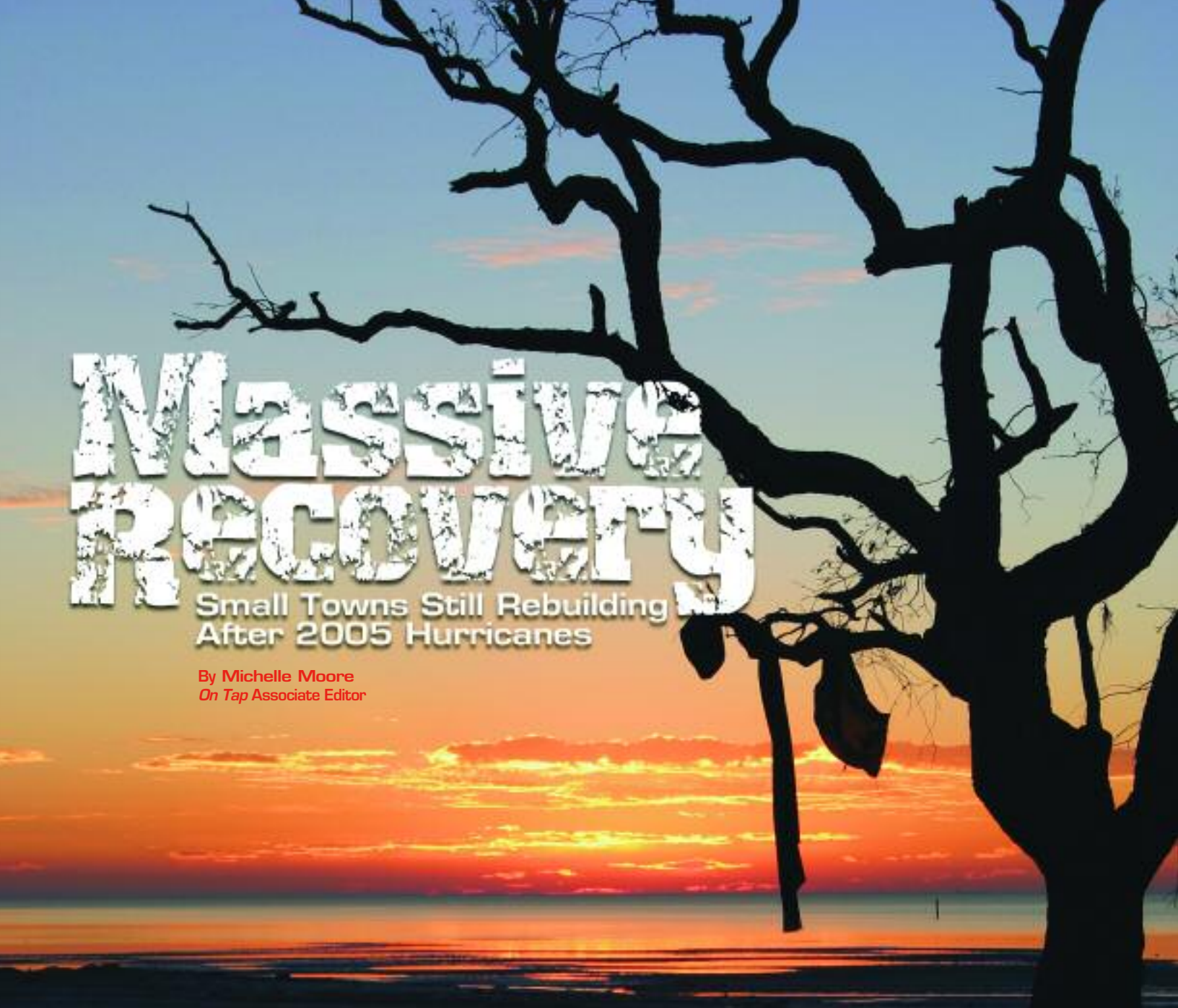
Massive Recovery

Small Towns Still Rebuilding After 2005 Hurricanes

By Michelle Moore
On Tap Associate Editor



Remember Hurricane Dennis? If not, don't feel bad. Dennis hit Florida in early July, causing more than $1 billion in damages, the first of four major hurricanes to strike the U.S. coast last year. Next came the catastrophic Katrina in August, and memories of previous hurricanes were washed away in the ensuing tragedy.

Katrina and 12 other hurricanes roared through the tropical waters off our southern coast in 2005. Florida, Texas, Alabama, Mississippi, and Louisiana lost homes and businesses by the thousands. More than 3,000 people died, 1,400 of them residents of the U.S. And, as of this writing, approximately 6,500 people were still missing. In the worst hurricane season since 1928, Katrina caused the most destruction and death.

Damages from Katrina have been estimated at more than $100 billion in the Gulf coast states. The destruction of New Orleans and Mississippi's coastal gambling towns filled the news. But hundreds of small communities, out of the spotlight, were affected, devastatingly so.

Cleanup from Katrina had hardly begun when the next monster storm, Rita, brewed in the Gulf. After the chaos and devastation caused by Katrina, people fled the coast in droves. When Rita was downgraded to a category three and hit the U.S. in a predominantly rural area, the country breathed a collective sigh of relief. Compared to Katrina, Rita's impact seemed small. But the people who survived its 120-mile-per-hour winds have a different view of the severity.

Photo courtesy of Chris Metzgar

The storm hit the western part of Louisiana, slamming into the bayous, forests, and small towns along the coast. Damage reached a hundred miles inland, destroying Cajun communities far up into the swamps. Lives were irreversibly changed; towns were destroyed; and the people who lived there experienced the same pain and anguish as Katrina survivors.

Like towns in the rest of the storm-ravaged Gulf states, these Louisiana folks face the same struggle to rebuild what was left of their homes, their lives, and their communities. Unfortunately, they have to do it without the focused attention of the rest of the country, their hardships taking a backseat to the needs of the more populated urban centers. But, true to the determined nature of the men and women who settled this country, they continue, piece by piece, putting their world back together.

Louisiana: Devastation East and West

Pat Credeur, executive director of the Louisiana Rural Water Association (LRWA), coordinated efforts to help community water systems in his state following both hurricanes. He said that when Katrina hit, LRWA set up their command center in Livingston Parish, northeast of Baton Rouge, in the local fairground's parking lot. Credeur rented a trailer and rounded up 20 cots for the staff.

"I used my motor home as an office and put all the staff sleeping in the trailer," Credeur says. "Before we knew it, EPA moved in; department of health moved in; FEMA moved in; insurance adjusters moved in. The fairground became a collection center for clothes, water, generators. You name it, it came in there.

"One night we went to bed, there was not an 18-wheeler in the yard," he continues. "We woke up the next morning, and there were 62 18-wheelers there with equipment, clothes, poly tanks to put potable water in."

The first thing LRWA did was to organize teams in each water district, Credeur said. Crews of rural water circuit riders came in from many states to help—Oklahoma, Texas, Arkansas, Kentucky, Tennessee, Georgia, Pennsylvania, Virginia, and New York, to name a few.

"We made up teams, and we put these teams in each one of these communities," Credeur says. "We helped the operators from one end of town to the other to shut off valves, shut off meters, because homes weren't there anymore."

They got water flowing, but initially, they weren't concerned about getting it to a potable state. Most important was getting the leaks fixed and the lines pressurized. Credeur says they fixed hundreds of leaks in each town. Then, once the distribution systems were contained, the lines had to be disinfected.

"We started super chlorinating these systems," he says. "We flushed and flushed and flushed and flushed. We did Bac-T samples, and we even took some chemical analysis on some of the systems because they were inundated by storm surge water."

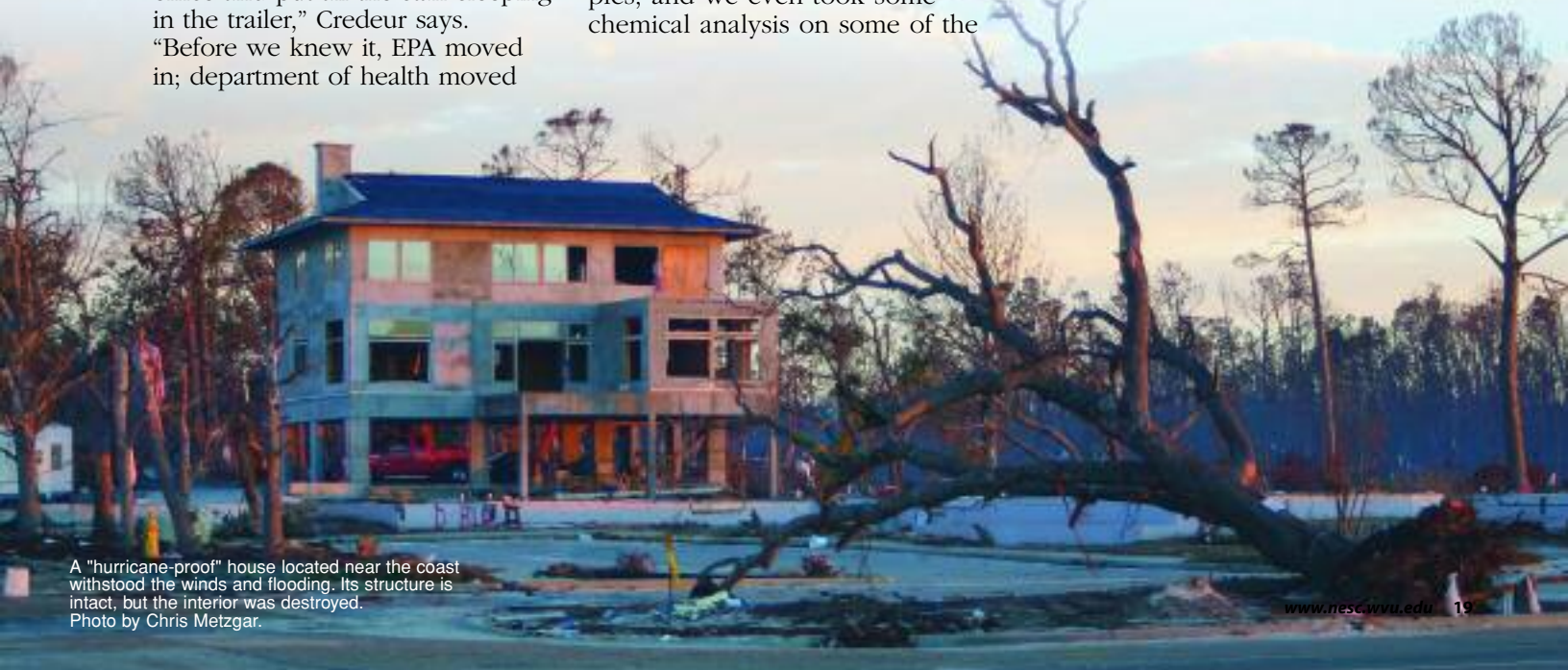
Getting water flowing was the primary goal. Homes and other structures that withstood the hurricanes, but were flooded, had "four, five, six inches of marsh mud in them," Credeur says, "All that had to be washed out."

Cameron Parish Wiped Out

Cameron Parish sits on the coast of Louisiana, just east of the Texas border. Rita hit it nearly dead on. Entire towns disappeared, and people there lost everything, same as the folks in the eastern part of the state did from Katrina's wrath. Much of the telephone communication system was still out by the time of this *On Tap* issue's publication deadline.

"Communication down there is still bad," Credeur says. "When I'm down in the lower part of Cameron Parish, I usually have to climb up on a ground storage tank to get clearance to make the phones work. That's what we've been going through."

No phones, no electricity, no water, and for many, no shelter. Credeur says the operators in Cameron Parish "have really had it tough, losing their homes; their families have been evacuated to other states. Some of them have not seen them in weeks. We've brought clothes into some of these operators, because they had no clothes left. Nothing. You know, you're at your home this morning, and you go back the next morning and it's gone."



A "hurricane-proof" house located near the coast withstood the winds and flooding. Its structure is intact, but the interior was destroyed. Photo by Chris Metzgar.

A camper blew into this waterway and sunk near Bay St. Louis, Mississippi. Photo by Chris Metzgar

The week after Rita struck the coast, some of the LRWA team traveled to a water plant in Cameron Parish to offer their help. There hadn't been electricity or phones for a week by this time.

"When we drove up the Monday morning after Rita hit to Cameron Parish number nine and 10," Credeur says, "these two operators were standing in front of their water plant, which was just tore up. I can't even explain to you their facial expressions. One of them said, 'Thank God, Rural Water is here.' Both Rusty and Dennis Sternberg from Arkansas got a hug from these two guys. They just needed somebody to hang on to and vent. After that, it was over with, and it was work."

FEMA brought trailers into the area so that the utility workers had a place to stay. Credeur said that some of them had been having to drive an hour and a half after working until nine or 10 o'clock at night to find a place to sleep.

"From the first day we walked in, although they had tears in their eyes because they had no homes, these operators were ready to work with us to get their water systems back running. And we've been doing it ever since," says Credeur.

Alabama Got Slammed

Dauphin Island, a breezy, semi-tropical paradise, sits about three miles off the coast of Alabama. It's sort of stuck out there, a long, thin barrier island, just daring a hurricane to blow its laid-back beach town off the map.

Jeff Caldwell, manager for Dauphin Island Water and Wastewater Department, knows about hurricanes. When Katrina crashed in, he was watching the action from the safety of Mobile, far enough inland to feel secure. With water on both sides of your town, people there take hurricane warnings very seriously.

When a hurricane threatens, the water system gets prepared, Caldwell says. They lay out the evacuation plan, and then when they return to the island, they've got a plan for re-entry.

"When they have a mandatory evacuation of the west end, we shut the valves off," he says, "because the water surging starts breaking water lines to the houses. So we shut it off to keep from losing what water we've got."

The water system has two storage tanks, each holding a million gallons. Caldwell says they valve one of those tanks off so they don't use any water from it. Then they leave the transfer pumps on, and the generators are turned off so they don't come on automatically, "because there's no sense in pumping water out on the ground."

Upon re-entry to the island, Caldwell says, they've got certain areas they valve off, making it easier to get the central, higher part of the island's water and sewer systems back to normal.

The populated section of Dauphin Island runs about seven miles east to west, and the widest point is two miles, at most. Its population swells from 2,400 to around 10,000 in the summer.

The island lost approximately 300 houses in Katrina's fury. Most of the damage occurred on the west end, which also happens to be where most of the beach houses are. Caldwell says that about a three-miles stretch of land suffered devastation due to the storm surge. Water mains buried three feet deep were washed out of the ground.

"There were areas where the water would go under the road and swirl," he says. "It dug six- to eight-foot trenches and washed out sections of main. Further out on the west end, there were water mains laying, just scattered all around. Basically, we're having to build the water mains from a certain point on."

Caldwell says the town's two water plants came through the hurricane with minimal damage,

although electricity was off for about a month. One of the treatment plants uses reverse osmosis (RO), and they were able to operate it using a generator.

As a consequence of damage to housing, water usage dropped substantially. So although the system was runnning way below capacity, the utility was able to keep up. Caldwell says the RO plant produces about 230,000 gallons per day.

The second treatment plant is fed by a series of shallow wells, and while the plant doesn't use pumps to bring the water to the surface, they needed a generator to pump the water up to the elevated tower. The maintenance crew had that part of the system up and working fine within a few days after Katrina.

But out at the other end of the island, things were far from fine. Most of the beach houses were destroyed. Water eroded the beaches and scoured the sand from beneath everything. Aside from water lines being damaged, a 100,000-gallon tank was undermined. Caldwell says that even though they had pilings driven 10 feet down, the ground washed out under the tank and tipped it over about 30 degrees. He said the purpose of the tank was to augment the supply from the single, six-inch main feeding the beach houses. Because all the distribution lines were torn up and so many of the houses were gone, Caldwell says they're going to change the distribution system to the west end. The booster tank is going to be eliminated, and two eight-inch mains are being installed instead. All of this work is going to take a long time and a lot of money.

More than debris floated into this yard. This Californa sea lion washed in from the Marine Life Oceanarium in Gulfport, more than three miles away.
Photo by Michael C. Mulligan

Dauphin Island's water and wastewater department employs six field staff, and at this writing, they were seriously overworked. Caldwell says they received aid from many sources, including Alabama Rural Water (ARWA), who helped find a generator to run the RO water plant. Even though they had some generators for other purposes, they also had to rent some, because the power was off for so long.

"Our guys have really put in a lot of overtime during the time the power was off," he observes, "because we had to maintain those generators and fuel them. Seems like they break down a lot, so we had to stay with them."

Hurricane Katrina came upon Dauphin Island at a tough time for the water department. Caldwell said that they no longer had the generator that they used following Hurricane Ivan last year. It didn't run very well then, after having gotten flooded, but, Caldwell says they "doctored it along." The town also didn't get FEMA money from Ivan until two weeks or so before Katrina hit, so they didn't have time to replace the generator before they lost power from the storm. The generator ARWA helped them get was a good break.

Costs for repairs have Caldwell worried. "FEMA picks up 75 percent of the expenses and the state comes by and picks up 10 percent," he says. "That's our tax money. That's not anything special, although it seems like they've spent a lot here on the coast recently. But even still, we have to come up with 15 percent, which is tough for us. When we have a million dollars worth of repairs, you know, that's $150,000, and that hits pretty hard. But we've been able to handle that in the past. We're talking about $5 or $6 million, so that's really going to hurt."

A homemade sign informs residents of this neighborhood that their drinking water supply, once contaminated, is safe to drink.
Photo by Win Henderson/FEMA

Dauphin Island's utilities are making good progress with their repairs, but 'there's still a lot going on and there will be for a long time for us," Caldwell says. "If we continue to repair the water and sewer all the way out to the west end of the island, it's probably going to be another eight months."

Mississippi Coast Nearly Washed Away

When Katrina hit the Mississippi coast on Monday August 29, 2005, it slammed onto shore, leveling beach communities such as Waveland, Bay St. Louis, Gulfport, and Biloxi. The storm surge reached more than 30 feet in some places and, depending on who you talk to, lasted for an hour or so to most of the day.

Mississippi Rural Water's (MsRWA) staff was scheduled for a hurricane training relief program the next week, but they never made it. Instead, they lived the nightmare they were hoping to prepare for. One thing everyone interviewed for this article said over and over was that there was absolutely no way they could ever have prepared for the massive destruction wrought by the hurricane season of 2005.

Three circuit riders with MsRWA described what they'd seen and experienced while working to help get their state's community water systems running. Kirby Mayfield, Tom Abernathy, and Joey Vaughn spoke of canvassing the state immediately after Katrina hit, discovering which water systems needed help and then coordinating crews to help them get the water systems repaired.

"We started there in the office on the second day and went two to a vehicle," Abernathy says. "We just swept the state until we got to the coast, locating generators, finding out what the needs were."

The circuit riders worked all day and drove many miles back to their command center in Raymond, Mississippi, every night. Eventually, MsRWA moved their headquarters further south to Perry County, closer to the heavily damaged areas, but still 75 miles from the coast. Assistance groups from Florida and elsewhere had joined their efforts by then, and Abernathy said that they'd discuss the following day's assignments each night at their headquarters.

"Every night we'd sit around the campfire, meeting and discussing whatever the new needs were and where this crew needs to go and that crew and give everybody their assignments for the next day," he recalls. "That worked really good."

As much as two-thirds of Mississippi had significant damage, Abernathy says. He had been on vacation when Katrina hit and had to drive south from Tennessee. He began to see downed trees and other wind damage 400 miles inland.

The wind and storm knocked phone lines and cell phone towers offline, so there was no way to communicate anywhere, let alone with the hardest hit parts of the state. Of course not only phone service, but electricity was out over much of the state. The power outages had water systems scrambling to find generators.

"I'd say 85 percent of them [systems] were without electricity that first two or three days," Abernathy says. "We had our staff at the office that were calling, locating generators. Then they were coordinating with us finding out who needs what, and getting the generators to them. We just worked our way south. As they got power to the north, they'd say, 'I've got power, who needs this generator now?'"

According to Abernathy, the crews were constantly in contact with the MsRWA office, their command center. "All of us were calling in saying, this system needs this and this system needs that, this system needs a vacuum truck, this system needs a crew. With all the tree damage, it uprooted so many water lines. That was a big issue, getting all the water lines repaired so the pumps wouldn't just be running 24 hours."

Once the generators had water pumps operating, they had to be fueled, which proved to be a challenge.

"We had lots of systems with generators up and running," Mayfield says. "But they still had the problem that they couldn't get a tank of diesel when they were out. We got some trucks in, and we were hauling diesel to them all, just making the rounds, filling them up."

Equipment was destroyed, facilities were leveled, and wells were contaminated. Volunteers came from Mississippi, surrounding states, and from rural water associations and volunteer groups from all parts of the U.S. to help.

Sixty-plus miles inland and four months after Katrina, blue tarps on roofs remain a common sight. Photo by Chris Metzgar

Municipal systems from undamaged parts of Mississippi sent crews.

"Booneville, Olive Branch, Pontotoc, West Point, Starkville, Tupelo, and Oxford—all we had to do was to pick up the phone and call somebody that we knew and dealt with on a daily basis," says Abernathy. "We'd call 'em, talk to 'em, and they'd say, 'what do we need to do?' We'd say, you need to bring a bed roll, a limited amount of groceries, and come on."

Disappointments were many as well as successes. Mayfield, Abernathy, and Vaughn spoke of several communities that were confident they would receive promised FEMA-delivered generators. But the scale of the storm was so overwhelming, the federal agency couldn't keep up with the needs. After days of waiting for equipment that never appeared, these facility employees finally resorted to requesting help from neighboring towns.

One system close to Kirby Mayfield's home had been without water for five days when MsRWA came to see what the town needed. The rural water guys had a generator that they could lend the utility that night, saying that it was going to be sent back home if they didn't speak up. But the operator said that FEMA was bringing a generator that they could use and then keep after the emergency was over with. A few more days passed, and that system's operator called back saying they needed help; no generator had arrived.

The red tape of dealing with government services and FEMA reimbursement got under some people's skin. Rural water and town folks who were used to taking care of themselves were more inclined to get moving to restore water service with whatever they had at hand rather than to wait to be assigned a number then wait some more for official approval. For the most part, though, the MsRWA fellows said that people just wanted to help and had no concern for payment.

"All these people that we had, they came down there not expecting any reimbursement in any way," Abernathy says. "I doubt if they'll ever get it. And, they're still coming. Right now, today, we've got five or six municipals and other big water associations just sitting on the radio. All we got to do is call them and say, go here and be here at this time and be prepared to stay a week or whatever."

Who could prepare for this?

The recovery teams found storm damage growing more extensive closer to the coast. And on the coast, the devastation was

Water damage to homes promotes dangerous mold growth, making the houses uninhabitable and requiring costly mold remediation. Photo/collage by Chris Metzgar

indescribable. In some places, nothing was left. Whole communities were gone. Buddy Zimmerman, assistant public works director for Bay St. Louis, Mississippi, rode out the storm at his house with his extended family and all of their pets. Zimmerman thought his place would be safe; he lives a couple of miles inland from the coast. Besides, he was worried for some of the older people who live around his place who he knew would never leave.

Zimmerman built his house on land 25 feet above sea level, thinking that was plenty high enough to avoid flooding. He was wrong. The storm surge swept over Bay St. Louis and neighboring Waveland, covering both towns with 30 feet of water. On top of the surge, he said, there were waves crashing 15 to 18 feet above that onto the structures, which demolished everything.

Whole sections of Bay St. Louis were flattened. "We've lost between 40 and 50 percent of all the homes in Bay St. Louis," Zimmerman says. "In the middle of town, we have a high spot and that's the area that didn't get much water damage. Our public works department yard and the police department and fire department were all high and dry, just barely. There was water in the yard, but it never did get up on the slabs."

The adjacent towns of Waveland and Pass Christian had even worse damage, Zimmerman observes, because they "don't have the high spot in the middle of town like we do, and they are devastated. The worst areas of our town look like their whole town. It looks like an atomic bomb hit it."

The Bay St. Louis public works office may not have been damaged by floodwater, but the wind tore off most of the slate roof. The rain poured in. They lost computers, all the information stored on the computers, many files and as-built drawings. About every one of the public facilities had some degree of damage, roof damage being most abundant.

After the storm stopped, Zimmerman said the devastation was massive. Movement about town was impossible. But with his role in the public works department, he had to get out there to assess damage to the public utilities. Gas leaks were his first concern. In the middle of the storm he had tried to make his way out, but the high winds kept him at home. He said that as soon as the winds dropped down to around 100 miles per hour, he jumped into a dump truck to head out again to try to get the gas system turned off.

"I couldn't get out of sight of my home," he says. "I tried eight different ways . . . trees, power lines, power poles, electric cables, houses, debris, you name it, it was out there. There was a business that had a big storage shed, a big wood framed building about a hundred feet long. It was laying across Highway 90. Sixty to 70 percent of the power poles were down on the ground, not to mention the trees and stuff that were down.

"I finally tried to go around some power lines, and when I tried to go around, the truck hit one of the limbs," Zimmerman says. "When it did, the whole tree fell on top of the truck."

He eventually contacted a work crew that was about a mile away that had a backhoe, a chainsaw, and a couple of pickup trucks. "It took them two hours to get me, to go one mile took them two hours. That's how bad the debris was on the main highway."

HELP Is Still Needed

Recovery efforts continue in the worst damaged areas of the Gulf States and may go on for months, if not years. Here are some organizations that are accepting donations:

American Red Cross
(800) HELP-NOW
www.redcross.org

Alabama Governor's Emergency Relief Fund
(877) 273-5018
www.servealabama.gov

Bush-Clinton Katrina Fund
www.bushclintonkatrinafund.org

Louisiana Disaster Recovery Foundation
(877) HELPLA1
www.louisianahelp.org

Mississippi Hurricane Recovery Fund
(866) 230-8903
www.mississippirecovery.com

Network for Good
www.networkforgood.org

The USA Freedom Corps has a database of volunteer opportunities that include hurricane relief in the Gulf States. Visit their Web site *www.usafreedomcorps.gov* for more information.

Planning Didn't Solve Problems

These towns on the coast have weathered tropical storms and hurricanes before, some of them, many times before. Staffs of these utilities have plans in place; of all the people in the world, they are probably the most prepared for disasters. But this storm was different, bigger than anyone could anticipate and stronger than any hurricane proofing that, up to this time, man had invented.

"On a normal basis, you have parts and personnel and equipment in stock to handle your everyday needs, and you do things to your system that protect yourself from disasters," Zimmerman says.

"You have back-up generators and diesel power to run your water wells, automatic switch overs to generate power on your lift stations to make everything function in case of loss of electricity. This storm here, when Katrina came in, was so devastating that all of the backup components we had in place all got ruined.

"There's no way to stock enough parts to cover something like this," he says. "We would have 15, 20 water meters in stock and that would last us for two months, and we could use that up in a day. Your small parts, you can't prepare for it. There's no way you can be ready for something this size. We had no phone communication, no electricity, no power, no ice, no water, no emergency needs, the hospital was under water. I realized the dire conditions we were in."

Although they remained standing, the two 110-foot water towers that service Bay St. Louis suffered a lot of surface damage from flying debris.

"On the east side of the towers that were facing the wind," Zimmerman says, "it looks like somebody sandblasted them. The shingles and pinecones and whatever else that was flying around in the air that hit them took a lot of the paint coating off."

The town is hoping that FEMA will help recoat the 250,000 gallon towers. They've been in use for more than 30 years, and they're still in good condition, Zimmerman says. The whole system works off a probe up in the tower that kicks the water on and off, so it's critical to have them functioning correctly.

Bay St. Louis has four water wells. One of the well houses was totally destroyed. Nothing remained but the wellhead sticking out of the ground.

Another well near his house on the northwest end of town is on higher ground, but its diesel engine was still flooded. On the day after the storm, he and a neighbor tore the motor down, cleaned all the parts and put it back together so the well was pumping by Tuesday morning. It didn't maintain much pressure, but he said that they got it up to five or 10 pounds. The water wasn't drinkable, although Zimmerman says that at least people could "wash somewhat and try to clean up a little bit." If nothing else, that water gave people some hope. They drove up in four-wheelers with a tank on the back to take water to parts of town that had none.

Having gotten some water flowing, Zimmerman knew that the next thing

A well-known American brewery provided more than four million cans of drinking water for the hurricane relief effort. Photo by Chris Metzgar

A Long Road to Recovery...

These images of a home in Long Beach, Mississippi, illustrate how slowly and costly rebuilding is.

Before Katrina

After Katrina–August 28, 2005

Not only must a home's exterior be repaired, but water damage necessitates total remediation to the interior as well.

Photos by Michael C. Mulligan

to be done was to valve off the parts of town that were gone. But, he said all sorts of people—emergency responders, EPA, DEQ, the department of public safety, government officials—needed to speak with him, wanting to assess damage and see what needed to be done.

"I felt like a rag doll, everybody pulling me in a different direction," Zimmerman recalls. The Bay St. Louis public works department has a crew of four men who helped shut off water to the areas with broken lines. Zimmerman used them, plus whoever else he could, whenever he could, but it still took three days to get to all the valve boxes. They worked from nine o'clock to about three in the morning with the help of firemen and flashlights to get the last valve shut off.

After that, they set off to tackle the other wells and get them working. The town has two well houses that can run on diesel power, but a gear drive needed to power one well broke the week before the storm. The gear drive was shipped off to north Mississippi for repair. In those first few days, Zimmerman didn't realize that power was off in most of the state, not to mention that nearly all the phone lines were down, so "you couldn't just pick up a phone and say, hey, bring me my 90-degree gear drive," he says.

"So, I finally got the police chief to go to a ham operator and got him to call another ham operator and call the man that had my 90-degree drive," he continues. "And basically, the message was bring me my damn gear drive! I didn't realize that he didn't have his place of business functioning where he could even repair it. It was a couple of weeks before we could finally get the gear drive back."

They resorted to a generator, but it was a week before they had water back on in most locations in town, even though a good bit of the town was gone.

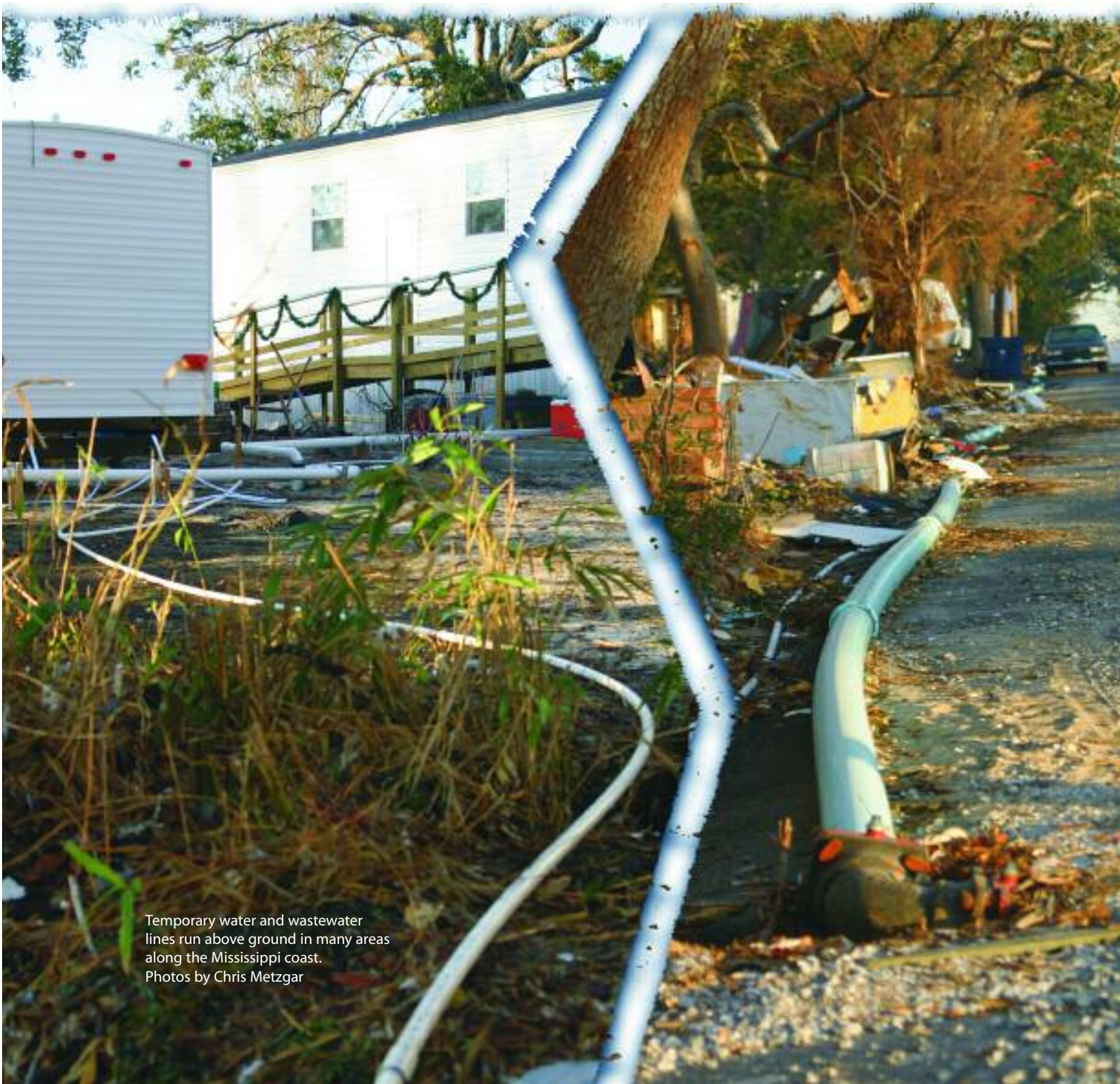
About a mile of road along the beach is no longer there. Zimmerman says there was a high point along the beach, a cliff, that was 30 or so feet above sea level. That cliff is eroded to 150 feet further inland now. The houses that were along the beachfront road are sitting down in the hole. He said manholes are upside down, and water lines are broken, exposed. Gas lines are in the same fix. They cut all of that section of line off the system and capped it at every street location.

"We probably have 30 locations along that area that are just capped off," he says. "And we're not serving that area; there's no houses in there that's livable."

Help Pours In

Zimmerman says the town would never have progressed to where they are without the many people who came to help. He mentioned the crews organized by Tom Abernathy and Kirby Mayfield and their director Pete Boone. Crews from various other state rural water associations helped too. Zimmerman says that "four, five, as many as 15 at a time came down with tools. They have performed miracles," fixing leaks and isolating water lines so that they could get the water pressure up.

Ironically, some of the help was creating problems while they were trying to do a good thing. Contracted clean-up crews were using hydraulic skid loaders with clampers on the front and track



Temporary water and wastewater lines run above ground in many areas along the Mississippi coast. Photos by Chris Metzgar

hoes with "thumbs" on the front. These big machines scooted along picking up trash and debris by the truckload.

As you can imagine, the amount of debris is tremendous, millions of cubic yards of debris. In the process of removing all this mess, the machines were breaking off water meters and fire hydrants. These breaks caused new leaks that the public works crew then had to go back and repair. At one time, the clean-up crews were breaking approximately 40 to 50 water meters a day, and they had torn seven fire hydrants out of the ground.

The public works department didn't let that go on for long. They devised a method whereby they marked each repaired meter or service line with a two by four painted bright orange with the words "water meter" written on it.

"The first phase of the cleanup was the street and 15 feet either side of the street," Zimmerman says. "The second phase of the cleanup, they're going to go up on the properties and take and remove all the debris off of the properties. They're going to be crossing back and forth over the locations where the water meters are again. So we're trying to mark it and protect it so we don't have repeats callouts on the same location."

The town's distribution system also suffered damage. Trees that fell pulled water mains right up out of the ground. There were also a couple of times when power poles were being re-set after the storm and the utility workers didn't use the one-call system. The reason for that? There were no phones from which to make that call. The power companies hit the water lines setting the power poles, which, Zimmerman says, was understandable. "It wasn't their fault. They were in the same condition we were, trying to get power back on. "

Is my water on yet?

People were anxious to get moved back to their homes, whether there was an actual dwelling on the site anymore or not. Previously, trailers were prohibited in Bay St. Louis, but the ban has been temporarily lifted. Now people can live in trailers for 18 months while they rebuild their homes and their lives.

For More Information

NESC Offers Emergency Preparedness, Emergency Response, and Health Effects of Water Contamination Products

The National Environmental Services Center has a number of different products and publications to help small systems recover from disasters. The following resources may be beneficial:

DWFSPE57	Emergency Disinfection of Water Supplies	$0.00
DWBLOM05	Shock Chlorination of Wells and Springs	$0.00
DWFSPE204	Water for Emergency Use	$0.00
DWBLMG69	Response Protocol Toolbox: Planning and Responding to Drinking Water Contamination Threats and Incidents	$0.00
DWPKOM59	Emergency Response Planning Pack (ERPP)	$0.00
DWBLPE58	Water Testing	$0.00
DWBLPE97	Water Testing Scams	$0.00
DWFSPE140	Bacteriological Contamination of Drinking Water	$0.00
DWBLPE183	Mycrobacteria: Drinking Water Fact Sheet	$0.00
DWBLPE112	Interpreting Drinking Water Quality Analysis: What do the numbers mean?	$0.00
DWCDMG64	Emergency Response Tabletop Exercises for Drinking Water and Wastewater Systems	$0.00
SFPLNL30	How to keep your water "well"	$0.40
SFPLNL06	Wastewater treatment protects small community life, health	$0.40
GNBKGN12	Community-based Environmental Protection —A Resource Book for Protecting Ecosystems and Communities (Book on CD-Rom)	$10.00
SFPLNL11	Basic Wastewater Characteristics	$0.40
TRBLGN25	Emergency Response Planning Resources for Small Water and Wastewater Utilities	$2.55
TRBLGN26	Emergency Response Plan Guidance for Small and Medium Community Systems	$8.00
TRPMCD62	Due Diligence—Small Water System Security	$32.00
TRPMCD56	Preparing for the Unexpected: Security for Small Water Systems	$39.80
TRBKMG03	Protecting Your Community's Assets: A Guide for Small Wastewater Systems	$15.00
TRCDMG05	Protecting Your Community's Assets: A Guide for Small Wastewater Systems (CD-Rom)	$10.00

To order any of these publications, call NESC at (800) 624-8301 or e-mail us at *info@mail.nesc.wvu.edu*. If you have any questions, our technical staff is available to help you with your water and wastewater needs.

Not surprisingly, Zimmerman says, when those people come back to their home site, they're going to want to find their utilities up and running, business as usual. He said that it's been another big problem, adding to the stress of getting all the repairs made. [OTOL: An emergency contact list template is available on the NESC Web site at www.nesc.wvu.edu. The template may be useful for homeowners or public works personnel.]

"It's some of the things I lay up late at night thinking about," he says. "I was dog tired, but at midnight I was still sitting on the sofa staring at the ceiling, thinking about how to handle this and how to handle that. It's a desperate situation, and so many people have so much damage. I think that what we're going to have to do is to go to the outside and ask for help and ask for volunteer plumbers to come down and try to help.

"My wife and I are very lucky, but you've got people who are in the same condition as we are funding-wise, and they have a lot more damage," Zimmerman says. "So they can't afford $300 for a plumber to come in and check this, and they can't afford $500 to have an electrician come in and do that. I think that's what we're going to have to do. We're starting to get cool weather down here now and people don't have heat. . . .We need some plumbers and stuff to come down here and donate their time or set up a group where you can come in and apply for free help to come in and they help you. I think it can be done, but it's just not going to happen fast enough. Everything's slowed way down."

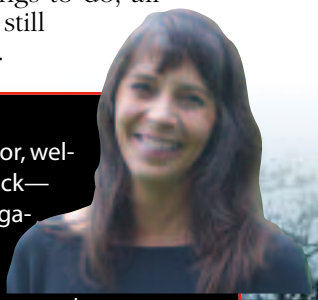
Advice to Others

Although being fully prepared for a catastrophe of this dimension may be nearly impossible, there are some things that a community water system can do to make recovery somewhat less difficult. Zimmerman suggests installing GPS [geographic positioning system] for locating all the water valves and meters throughout the community. This kind of technology eliminates the need for above-ground, physical locators that may be wiped out in a disaster, such as a hurricane. Like other forms of disaster preparation, GPS isn't foolproof, especially in circumstances where the ground is literally washed away. But it establishes location points that may prove invaluable in the long run.

"I have seen, since this storm, a backhoe and a three-man crew, spend three hours looking for a water meter to shut water off that was flowing," he says. The meter previously may have been right by the sidewalk, but there's no sidewalk anymore. Or it may have been by the tree, and the tree's gone. "You have no way of having anything to relate the location of things. If you can afford GPS location on stuff, it would be a huge asset in a time of disaster like this."

Zimmerman also suggests keeping mapping and as-built drawings up to date. But, he says, there is no way to stock enough parts to "cover something like this." Ordinarily, their utility would have 15 or 20 water meters in stock and they would last for two months. But, with having to rebuild the town's entire water system, they could use that many up in a day.

"There's no way you can be ready for something this size," he said. "And, there's no one that's going to come out, back to normal where they were before. . . . People in these areas are going to need help for probably a year to a year and a half. There are still going to be things to do, all kinds of things are still needed down here.



Michelle Moore, *On Tap* associate editor, welcomes reader feedback—both positive and negative—on her articles. Contact her at *michelle.moore@mail.wvu.edu*.

Photo by Chris Metzgar.