

COASTAL SERVICES

SPECIAL EDITION

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LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

HURRICANES: Impacts on Gulf Coast Managers

Going Through
Katrina

The Storms'
Effect on Coastal
Management Jobs

Lessons Learned:
Preparing for the
Next Big One



FROM THE DIRECTOR

“It will never happen to me.”

It's easy to have that thought when you are reading these articles about how coastal resource management staff members and their agencies on the Gulf Coast were impacted by hurricanes over the past two years.

But it had never happened to these coastal managers either.

Sure, they had been through hurricanes or tropical storms before, but never so many in so short a time and never with the destructive consequences felt from the Caribbean to Texas.

Hurricanes, typhoons, and nor'easters have the potential to impact almost the entire U.S. coastline, as can other natural disasters, such as tsunamis, floods, earthquakes, landslides—the list is long and frightening.

I would encourage every coastal manager to learn from the stories of their colleagues in this special hurricane edition of *Coastal Services*. To think about how you and your family, co-workers, and community would be impacted by a major disaster. To develop a plan so that if the worst—

whatever that may be—does happen, you can pick up the pieces and jump into your role as quickly as possible.

Your ability to do this is just one of your many contributions to creating resilient coastal communities.

Creating resilient communities goes beyond just being prepared for hurricanes or other natural disasters. Resilient communities are able to adapt and maintain an acceptable level of functioning and structure in the face of adversity in all areas—economically, culturally, socially, and environmentally.

This requires all levels of government and society to work together to learn from the past and each other to reduce risks, to plan and prepare for a better future, and to be ready to respond and rebound if the worst does happen.

The well-being of the coast is a national issue. We have not done a good job of representing it as such, but the issues that are important for our coastal communities are important for the nation.



Margaret A. Davidson

The mission of the NOAA Coastal Services Center is to support the environmental, social, and economic well-being of the coast by linking people, information, and technology.



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NEWS AND NOTES

Coming Together to Create Resilient Communities

Tsunamis, hurricanes, floods, earthquakes—the list of natural disasters that can impact coastal communities is long and frightening. “Resilient communities” is a term that describes efforts focused on helping communities adapt and maintain an acceptable level of functioning and structure in the face of adversity.

Strong natural ecosystems are an important component of communities that are broadly resilient. One of the lessons from Katrina is that wetlands, woods, dunes, nourished beaches, and even barrier islands proved to be effective at helping protect levees and coastal infrastructure. Researchers are calling this the “greenbelt defense,” and it may provide coastal managers with additional ammunition in their efforts to protect and restore habitat.

There are many roles coastal resource managers play in the development of resilient communities. The following list outlines some of the tools developed by the National Oceanic and Atmospheric Administration's (NOAA) Coastal Services Center to assist in this effort.

Risk and Vulnerability Assessments

Products featured on this Web site include an easy-to-use process that helps users assess the risk and vulnerability index of areas in their community. This information is helpful when identifying and prioritizing mitigation activities.

Also included is a 3-D model demonstrating how storm surge could inundate specific areas, and the Hazard Locator Tool, which is used to quickly determine an area's level of risk for being hit by storm surge, flooding, winds, and erosion. Visit www.csc.noaa.gov/rvat/ to get this information.

Web Portal for Storm-Related Data and Tools

Storm-related data and tools (forecasts and advisories, wind speeds, storm surge measurements, high-resolution data, tide levels, post-storm impact data, shoreline change, etc.) are available from one on-line resource, the Storm Data Resource Guide. See the guide at www.csc.noaa.gov/storm_info/.

Impervious Surface Analysis Tool

This Web-based tool is used to calculate the percentage of impervious surface areas in a region. This information is helpful for officials who want to incorporate projected runoff rates into their development decisions. To get the tool, visit www.csc.noaa.gov/bins/tools.html

Tool for Determining Potential Hazards

American Samoa is using the Tutuila Hazard Assessment Tool (T-HAT) to uncover potential hazards in the early phases of the development

permitting process. Different data layers in a geographic information system (GIS) come together to indicate a project proposal's potential risk for flooding, mud slides, and other hazards. Project plans can be adjusted before the permits are issued. While developed for American Samoa, the site is adaptable for other coastal regions.

Get your copy of T-HAT at www.csc.noaa.gov/t_hat/.

High-Resolution Elevation Data

High-resolution elevation data are available for download and can be used in storm surge and inundation modeling. This information can help coastal managers more accurately plan for inundation from hurricanes and coastal storms, an essential element when planning evacuation routes and ensuring the operability of critical facilities during a hazardous event. Available elevation data can be downloaded from www.csc.noaa.gov/crs/tcm/.

These and many other Center tools help communities join together to begin the vital task of creating resilient communities. ❖

For additional information about the Center's resilient communities efforts, contact Sandy Eslinger at Sandy.Eslinger@noaa.gov.

COASTAL MANAGERS FEEL IMPACT OF KATRINA

The day before Hurricane Katrina destroyed much of the Gulf Coast, Tina Shumate, director of the Comprehensive Resource Management Bureau of the Mississippi Department of Marine Resources, received a telephone call that her husband, David, was having a heart attack and had been rushed to the hospital.

During Katrina, the Shumates, doctors, nurses, and other patients and their families rode out the storm in the hospital hallways while windows blew out in the outer rooms. Hundreds of people filled the hospital during the height of the storm as storm surges washed buildings, bridges, and people away.

Joan Murphy, projects officer for the Mississippi Department of Marine Resources' Comprehensive Resource Management Bureau, rode out the storm at one of her sons' homes with eight other people, seven dogs, and many cats.

"It was a nightmare," Murphy recalls. "One tree fell through the roof, but we were fortunate that it fell through the garage and demolished a car."

LaDon Swann, director of the Mississippi-Alabama Sea Grant Consortium, sent his wife, two boys, and family dog from their Dauphin Island, Alabama, home, but he chose to stay. While his home only lost five shingles, the western end of Dauphin Island was devastated by the storm.

"We're moving," Swann notes. "After Ivan and Katrina, we feel like it's in the best interest of our family to move off the island."

Katrina's destructive path impacted many coastal resource management staff members in Mississippi, Alabama, and Louisiana, damaging or destroying homes and belongings, and disrupting all their lives.

"It's indescribable," says Marcia Garcia, staff officer for the Mississippi Department of Marine Resources' Comprehensive Resource Management Bureau. "You can't begin to describe the destruction. The destruction is still everywhere you turn."

"If all you had was one tree in your house and you lost your car, you felt like one of the chosen few."

*Joan Murphy,
Mississippi Department
of Marine Resources*

The Days After

Once Katrina passed, Tina Shumate's thoughts were on finding out the condition of her 16-year-old son, who was staying with her parents in Pascagoula, Mississippi—normally about a 45 minute drive from the hospital where her husband was receiving care.

But cell phones and landline telephones were down, and the entire region was without electricity, meaning that fax machines and computers were not an option. After two days with no news of how her family, friends, and colleagues had fared during the storm, Shumate was beginning to feel frantic. "I prayed, 'God, give me a sign that they're OK.'"

Shortly after, she began receiving text messages on her cell phone from her younger sister, but Shumate's phone was not equipped to respond. By reading the messages, she learned that her son, parents, and Garcia were OK.

"It kept me from losing my mind in the hospital," Shumate says. "To me that was huge."

A Change in Perspective

Shortly after Katrina ended, Joan Murphy was able to survey the damage to the surrounding subdivision where she was staying. "Everybody was walking

around at first like zombies. We were in shock." But it wasn't too long before residents fired up chain saws to cut trees and limbs from roofs, cars, and roads.

Murphy was able to get to her home that evening and considers herself lucky that she had "only" a tree through her roof and a demolished car.

"Your perspective completely changed the day of Hurricane Katrina," Murphy explains. "If all you had was one tree in your house and you lost your car, you felt like one of the chosen few."

To illustrate, Murphy says the day after the storm, her oldest son ventured out to find that his home and data communications business were "nothing but a pile of debris."

Over in Alabama, LaDon Swann was able to survey the damage on the rest of Dauphin Island shortly after the storm ended. "The damage on the west end was as bad as I've ever seen. It might as well have been another planet."

The next day, he was able to leave the island, but all means of communication were down in that region, too, and Swann was having trouble locating his staff.

"As far as my staff, what bothered me the most," says Swann, "was that we had a very good hurricane preparation plan, and we followed it to the tee.

But the reality is that it took me over a

week before I finally tracked down all of my staff. Ultimately, in some cases, I had to drive to their homes in order to find them."

Assessing the Damage

When Swann did find his staff, he discovered that the homes of half his staff members had significant damage. "There were only two of us who didn't have damage," he says.

Garcia's home also was severely damaged, as were the homes of a number of Mississippi coastal program staff members, including Jan Boyd, director of Coastal Ecology in the Mississippi Department of Marine Resources.

"My yard was full of other people's stuff," says Boyd. "We got three feet of water in the house. We had a waterline on the wall in back of the couch, and the roof was gone. The neighbors said the water came in and left within 20 minutes, but saltwater ruins everything. My wife's car and my work vehicle were totaled. The water picked them up and floated them into the neighbor's yard."

He notes that several other Department of Marine Resources staff members "lost everything they had."

Grant Larsen, a geographic information system (GIS) specialist for the Comprehensive Resource

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Management Bureau, was a newlywed who had just bought and refurbished an 1898 house that he was scheduled to move into the weekend Katrina hit. Larsen lost both his apartment with all his belongings and his new home in the storm.

Similar Stories

Two days after the storm, Shumate's husband was released from the hospital. With no working vehicle, they set out walking home. "So much was blown away it was disorienting. All the landmarks were gone," she says. They walked for two hours in the August heat before realizing they were going in the wrong direction.

"It was hot—hotter than you can imagine," Shumate recalls.

But losing her car was the only property damage Shumate sustained. When they were finally able to reach her parents' home, it was to discover they'd had five feet of water in the house and a tree through the roof.

Similar stories abound among coastal resource managers working in the coastal areas of Mississippi, Louisiana, and Alabama. While Katrina may have been the most destructive hurricane, the blitz of storms in the Gulf region since the summer of 2004 has left coastal management staff members from the Caribbean to Texas storm weary, and in the worst cases has left people without homes and offices. ❖

"By the time Wilma hit us, we were already pretty tattered and our emotions were pretty raw."

*Billy Causey,
Florida Keys National
Marine Sanctuary*

STORM-WEARY STAFF MEMBERS' EMOTIONAL HEALTH A MANAGER PRIORITY

While Katrina is the most notorious storm, an onslaught of hurricanes since the summer of 2004 has impacted coastal resource managers in every state and territory from the Caribbean to Texas.

The homes and belongings of many staff members, or their immediate families, have been destroyed or severely damaged, and their lives disrupted. Coastal management office buildings have been flooded, equipment and files have been lost, and natural resources damaged.

Coastal management staff members have not been immune to the emotional toll that the repeat hurricanes and the resulting destruction have had on many Gulf Coast residents. In some cases, staff members who evacuated to other areas decided not to come back.

"You can't be surrounded by so much devastation and not be emotionally impacted," says Kerry St. Pé, program director of the Barataria-Terrebonne National Estuary Program in Louisiana. "It's taken a serious emotional toll on every coastal resident."

"I'm really concerned with our staff," says L.G. Adams, manager of the Weeks Bay Reserve in Alabama. "This past year Tropical Storm Arlene, Hurricanes Cindy, Dennis, and then Katrina all came through our neighborhood. . . We're storm weary."

Staff members in Louisiana's Coastal Management Division headquarters have been emotionally impacted by Katrina, even though their homes and offices are located in Baton Rouge—80 miles inland from New Orleans—and damage to the area was primarily downed trees and power outages, says Jim Rives, acting administrator for the division, which is part of the Louisiana Department of Natural Resources.

"It's stressful when you don't know where your mother is, like I didn't," says Rives. Many people had evacuees staying with them and had friends and family who lost homes and belongings.

"You almost have survivor's guilt," Rives says. "You don't want to show how much it bothers you when so many are worse off than you are."

Addressing staff members' stress is a priority for many coastal managers in hurricane-prone areas.

"You've got to be patient with your staff," advises Jan Boyd, director of Coastal Ecology in the Mississippi Department of Marine Resources.

Boyd notes that Mississippi coastal program staff members are requiring additional time off, flexibility with time schedules, and even a more relaxed dress code. "I'm much more lenient," he says.

"People need a little extra consideration during these times. It's put our priorities in a different place."

Staff members at the Florida Keys National Marine Sanctuary had to evacuate, or prepare to evacuate, for Hurricanes Dennis in July, Katrina in August, Rita in September, and Wilma in October. "By the time Wilma hit us, we were already pretty tattered and our emotions were pretty raw," says Billy Causey, sanctuary manager.

Wilma did significant damage to the sanctuary and many employee homes, including flooding Causey's.

"People can be stressed emotionally and not know it," says Causey. "Some of our early healing work is to bring our team together and focus on getting our staff members' homes and personal lives back in order as quickly as possible."

Causey adds, "The big thing is to get people to talk about it and share their stories. It's important to hear what your people's greatest concerns and challenges are, and then try to get them the assistance that they need."

"Human resources are just that—human," advises Adams. "Their emotions and stress are factors that shouldn't be ignored." ❖



THE IMPACT ON COASTAL MANAGEMENT JOBS

Katrina's waves and winds destroyed and damaged many coastal resource management offices in Mississippi, Louisiana, and Alabama, and changed the focus of numerous coastal management jobs—some believe forever.

"It's changed my job for the rest of my career," says Mike Liffmann, associate executive of the Louisiana Sea Grant College Program and project leader of the Louisiana Sea Grant Extension Project. "It's hard to see nonpoint source pollution in marinas as a priority when the marinas no longer exist."

"Coastal hazards are a big topic for us now."

*L.G. Adams,
Weeks Bay Reserve*

It's also challenging to do work of any sort when your office, computers, and files have been obliterated. Coastal managers in the impacted areas, however, continued to meet deadlines, issue permits, and provide leadership and support to communities reeling from Katrina's destructive blow.

"Katrina was totally catastrophic to our offices," says Tina Shumate, director of the Comprehensive Resource Management Bureau of the Mississippi Department of Marine Resources, who is still mostly working out of her car. "We lost everything."

Other hurricanes in the past two years, including Ivan, Dennis, Rita, and

Wilma, damaged coastal management facilities across the Gulf Coast, dislocating staff members and creating headaches for managers battling resulting red tape, as well as providing some opportunities.

Like a Bomb

On August 27, two days before Katrina hit, Mississippi Department of Marine Resources staff members gassed up the Biloxi headquarters' fleet of vehicles and moved it to high ground. Computers and files were elevated, moved to the middle of the building, and wrapped in plastic. Some staff members worried that they didn't use enough plastic, or that perhaps it wasn't bound tightly enough, recalls Shumate.

A few days after the storm, David Ruple, manager of the Grand Bay National Estuarine Research Reserve, navigated damaged and dangerous roads with a limited gasoline supply to get to the agency headquarters of all the state's coastal programs.

What Ruple found was "the whole bottom floor blown out. It looked like a bomb had gone off."

"Nobody saved anything," says Shumate, including the agency's fleet of state vehicles. "We didn't even have paper and pencils."

Grand Bay Reserve facilities in Moss Point fared little better. Even though the reserve office is elevated six feet, three feet of water from the storm surge ruined most of the equipment in offices, as well as an outside storage area containing sampling equipment, four-wheelers, and other gear. The reserve's boats were piled against a fence.

Physical Impacts

Louisiana Coastal Management Division field offices along the state's coastline were damaged, and the New Orleans field office is still closed, says Jim Rives, acting administrator for the division.

Louisiana Sea Grant field offices also were damaged or destroyed, and the Mississippi-Alabama Sea Grant Consortium lost three buildings, a hatchery, and the air conditioning in its remaining office building on Dauphin Island.

This was a significant issue for staff members trying to work in the building after the storm because the "weather after Katrina was hotter than Hades," says LaDon Swann, consortium director.

The Hits Keep Coming

Katrina exacerbated damage at the Weeks Bay Reserve in Alabama caused by Hurricane Ivan the summer before. Damage wrought by Ivan, says L.G. Adams, reserve manager, included a tree crashing through the roof of the reserve's laboratory, causing \$20,000 worth of damage, and the destruction of a 120-foot fishing pier. The reserve had completed \$30,000 of the \$40,000 worth of repairs needed on the pier when "along came Katrina."

In addition to destroying the repaired pier, Katrina damaged four reserve structures. Adams notes that Katrina had a higher storm surge than had ever before been recorded at the reserve, which was more than 90 miles east of the storm's eye. The surge missed damaging the reserve's

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interpretive center—which has a 10-foot elevation—by only 10 inches.

A month after Katrina, Hurricane Rita devastated the western half of the Louisiana coastline all the way into Texas. Eddie R. Fisher, director of the Coastal Stewardship Division of the Coastal Resources Program Area in the Texas General Land Office, says the division's La Porte field office was evacuated along with all of metropolitan Houston and that the state's oil spill office near Beaumont was "completely out of service for months."

In October, Hurricane Wilma flooded the offices of the Florida Keys National Marine Sanctuary for the first time, says Billy Causey, sanctuary manager.

"We weren't able to get back into some of the offices due to safety issues," says Causey. "We eventually had to move out of our Lower Region office, and the Lower Keys team remains spread out, working from several makeshift facilities."

Staff members in the Eastpoint offices of Apalachicola National Estuarine Research Reserve in Florida had to abandon their building for an expected six months so that the mold caused by the storm surge from July's Hurricane Dennis could be addressed. Everything from drywall, ductwork,

and insulation to carpet and furniture is being replaced, says Seth Blitch, reserve manager. Files, a vehicle, and other equipment also were lost.

Back in Business

Within a week of Katrina's landfall, the Mississippi Department of Marine Resources was gearing back up.

The first order of business was to replace the agency's vehicles, says Jan Boyd, director of Coastal Ecology. "The director over our business office didn't have any damage, so she set up her office in her house and did all the paperwork for the vehicles." The agency had \$400,000 worth of new vehicles within a week.

"Once we had a car, we had our office," says Shumate. "We started with a cell phone and a van."

Three weeks after the storm, office trailers were set up in the agency's parking lot. About a week later, computers arrived. "The time-consuming thing," Boyd notes, "was getting the power turned on."

Once set up, 20 coastal program staff members began working "in one big room of a double-wide trailer," Boyd says. "Anytime I want to have a quiet conversation, I get in my truck and go somewhere."

Unsafe for Occupation

Meanwhile, Grand Bay Reserve staff members began clearing out their office building and storage shed and salvaging anything they could. All the reserve

vehicles and boats were saved except for one boat motor. Once it was cleaned up, the office building was determined to be unsafe for occupation. "You can imagine that by this time there was a great demand," Ruple says. "Everybody needed temporary office space."

A double-wide office trailer was delivered to the reserve in November, and it was another two months before it was set up with power, telephones, water, data lines, and furnishings. During that time, staff members worked out of their or Ruple's home, or shared offices in other state facilities. "We made do the best we could," he says.

Change in Focus

While many are adapting to less than ideal work environments, many coastal management staff members also are having to adapt to changing job duties and priorities, as well as workloads.

"We're still in response mode," says Louisiana Sea Grant's Liffmann. "It's a completely different mind-set."

Liffmann and his Sea Grant colleagues are now focused on helping get damaged or abandoned boats out of the water, finding housing and office space for staff members and partners, and "being bombarded with requests for information and generous offers of help."

"It's 24/7," he says. "We see our role as serving the community and working to help solve needs. This is the immediate need. We're still very much in the early recovery."

Helping Others

Mississippi's Shumate also sees the post-storm role of the Comprehensive Resource Management Bureau as "helping with anything people need."

The Saturday after the storm, Shumate and the bureau's staff members began contacting their community partners and asking how they could help. They worked to provide storm-ravaged communities with everything from food and water to grants from the U.S. Department of Labor.

"We were even passing out our own food supplies to workers clearing the road so they could keep going," recalls Marcia Garcia, staff officer for the bureau. "The damage was so bad, the crew had been out there seven days and had only gone 21 miles."

Both the bureau's and Mississippi-Alabama Sea Grant's staff members participated on the Mississippi Governor's Commission for Recovery, Rebuilding, and Renewal, an exhaustive four-month process to develop a comprehensive recovery plan for the state.

Louisiana Coastal Management Division staff members have been working with the Louisiana Recovery Authority to restore the state's economy and to develop better defenses against disasters.

Deadline Pressure

Even with the storm damage they received, Mississippi-Alabama Sea

Grant Consortium staff members "needed to get back to work right away," LaDon Swann says. "We had the deadline for our two-year omnibus proposals to meet."

Consortium staff members also worked with agency-funded scientists who lost significant amounts of research data, providing funding and other support. Education staff members worked to create outreach materials for the many Vietnamese-speaking fishermen in the area whose livelihoods were destroyed in the storm.

Red Tape

L.G. Adams at the Weeks Bay Reserve says he's still dealing with state and federal paperwork for replacing equipment and completing repairs from damages caused by both Ivan and Katrina.

"It's been a mess," Adams says. "My workload due to Ivan probably increased 20 to 40 percent. Things were just starting to get manageable when along comes Katrina. That's not even counting Dennis, Cindy, and Tropical Storm Arlene."

He notes that in the month of April 2005, three 100-year floods also impacted the area around the reserve.

Even a category one hurricane coming through the area, he says, impacts their jobs—from the extensive preparations staff members have to take to massive cleanup efforts afterwards. "We have bottom hardwood forest, and every square foot of parking area, sidewalks, boardwalks, and trails have debris on them."

Adams adds, "Coastal hazards are a big topic for us now."

Environmental Cleanup

J. Scott Brown, chief of the Mobile Branch of the Alabama Department of Environmental Management, also has seen an increase in activity as a result of Ivan and Katrina.

"I had different staffers doing different things in the aftermath of the storms, doing everything from making environmental assessments to actually helping with cleanup," Brown says. "For example, immediately after the storm we looked at emergency repairs of docks and piers, emergency

dredging for navigation, and solid waste disposal and recovery. . . It's been an extra burden to our limited staff."

Seizing Opportunity

In addition to increased permitting activities after Hurricane Rita, Texas' Eddie R. Fisher, also is

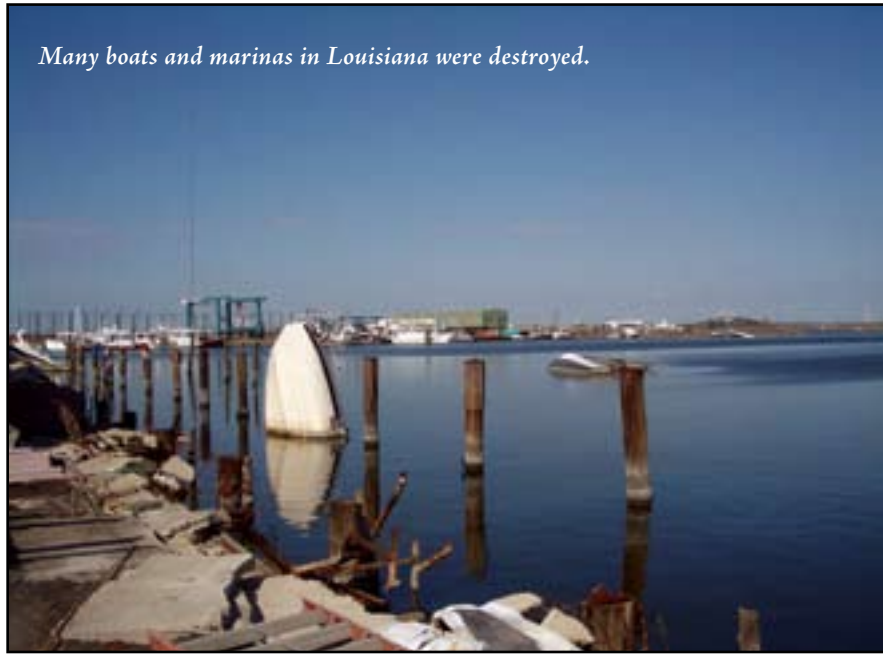
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LESSONS LEARNED: PREPARING FOR THE NEXT BIG ONE

DEFINING DISASTER

Many boats and marinas in Louisiana were destroyed.



Almost every coastal state and territory has the potential to be threatened at some point by a destructive hurricane, typhoon, or nor'easter, as well as many other natural disasters. Over the past two years, coastal resource managers on the Gulf Coast have learned a few lessons about preparing for and responding to Mother Nature's fury.

These lessons include the following:

Work with cities and counties to educate them about Smart Growth—or as some are now calling it, Safe Growth—principles, implement international building codes, and develop community hazard mitigation and disaster recovery plans.

"Before a storm even hits, you have to have the groundwork in place," advises Carl Ferraro, natural resource

planner with the Alabama Department of Conservation and Natural Resources, State Lands Division Coastal Section.

Roles for coastal resource managers include educating communities about available funding and planning tools, ensuring the participation of all relevant stakeholders, and supporting the use of geographic information systems (GIS), particularly within small municipalities.

Not only will local communities be better prepared through these efforts, but the personal relationships developed as a result will speed up everything from post-disaster permitting to redevelopment efforts.

Educate people and communities about the hazard risks they face.

People flock to the coast because of its beauty and natural resources, but few home buyers and developers

understand the risks associated with living and building near the ocean.

Coastal resource managers can make natural hazards a factor in the permitting process and can educate local planners, builders, and realtors about the dangers.

Develop relationships with emergency managers.

Coastal resource managers may be reluctant to contact emergency managers, but first responders may benefit from data, maps, and even regulatory or resource knowledge that coastal managers have. This interaction provides the opportunity to identify and communicate coastal priorities.

The time to make this contact, however, is not during a disaster, says Billy Causey, manager of the Florida Keys National Marine Sanctuary, who has a role in the Key's Emergency Operations Center whenever a hurricane threatens.

"Counting and recording abandoned vessels, tracking the leading edge of the storm using the ocean observing buoys, helping to analyze the threat of oil spills—there's a role for communication and collaboration at times like that, and coastal managers bring their own set of assets and skills to hurricane preparation and response," Causey says.

Being in communication with federal, state, and local emergency managers before a storm also helps ensure that managers understand the emergency process and can take advantage of mitigation grant moneys and other opportunities.

"Before a storm even hits, you have to have the groundwork in place."

*Carl Ferraro,
Alabama Department of
Conservation and
Natural Resources*

Collect FEMA-required monitoring data.

To take advantage of Federal Emergency Management Agency (FEMA) mitigation grants, monitoring of projects and beach profiles must be done in advance of a disaster, says Eddie R. Fisher, director of the Coastal Stewardship Division in the Coastal Resources Program Area of the Texas General Land Office.

"I can't stress enough that you have to have the knowledge and programs in place on how to apply for the grants before a hurricane hits, or any other disaster," Fisher says.

Utilize technology in the permitting process.

Trying to locate a street or address after a disaster can be almost impossible when there are no houses left in a neighborhood, or entire community.

Having permits in a GIS program where every structure and setback line has been documented using the Global Positioning System (GPS) can significantly ease the permitting process, as well as land-use planning and hurricane recovery.

Using pre- and post-lidar (light detection and ranging) imaging can assist in documenting environmental changes.

Create and protect wetlands and other natural barriers.

The first lines of defense against the destructive waves of a hurricane are trees, marshes, and other natural features.

Louisiana State University researchers have found that New Orleans levees with a buffer of wetlands had a much higher survival rate than those that stood unprotected against Katrina's assault.

Managers found that beach nourishment projects in Alabama helped protect infrastructure, and dunes were an effective first line of defense in Texas.

Develop and practice a hurricane preparedness plan.

Having a detailed plan of the steps your staff members will have to take to prepare your office, agency, or site for an impending storm can help save equipment and files.

"You don't want to lose the basic things you'll need in order to operate after a storm," advises Gary Lytton, manager of the Rookery Bay National Estuarine Research Reserve in Florida.

Key items Gulf Coast managers say should be in preparedness plans include

- ♦ **Evacuating vehicles off-site to several inland locations. Hauling vessels from water and securing them at an inland location should also be done, if possible.**
- ♦ **Securing all office equipment by breaking down and elevating**

An issue that Gulf Coast coastal resource managers note is a tendency for community and elected officials, members of the public, and others to confuse flooding and storm surge.

Below are a few common terms defined.

- **Storm Surge:** An abnormal rise in sea level accompanying a hurricane or other intense storm determined by the difference between the height of the observed water level and the predicted tide. Storm surge from hurricanes is the element that has the potential to cause the most deaths. It can be 50 or more miles wide and sweeps across the coastline to the east side of where the hurricane makes landfall. Typically, the stronger the hurricane, the greater the storm surge.

- **Coastal Flooding:** The inundation of land areas along the coast caused by higher than normal tides.

- **Flood:** The inundation of a normally dry area caused by an increased water level in a river, stream, or other watercourse, or the ponding of water at or near the point where rain has fallen. While storm surge has been the number one cause of hurricane-related deaths in the past, many people have also died from inland flooding associated with tropical systems over the past 30 years.

For more information on hurricanes and other natural disasters, point your browser to www.nhc.noaa.gov/HAW2/english/intro.shtml.

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Coastal resource managers in the Gulf have been busy since Katrina. Their efforts include removing abandoned vessels and hazards to navigation, helping to re-establish the commercial fishing industry, helping communities with redevelopment plans, and issuing emergency permits for rebuilding coastal homes and businesses.

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- computers and covering all equipment with plastic.
- ✦ Securing files—creating backups of backups and distributing them to a number of locations off-site, preferably out of state. Take important paper files with you when you evacuate.
- ✦ Creating a detailed communications plan. In addition to having a list of staff members' telephone and cell phone numbers, delegate one staff member to be in charge of tracking evacuation locations and contacts for next of kin. Have all staff members contact one out-of-state person to report their whereabouts both before and after the storm. Invest in cell phones with text messaging options, or satellite phones. Have a rendezvous plan for staff members who may not be able to make outside contact.
- ✦ Having extra food, water, batteries, and other supplies as a backup for staff members

- whose home supplies might be wiped out during the storm.
- ✦ Keeping staff members in mind when deciding to implement the plan. Implement your agency's plan early enough so that individuals still have time to secure their homes and evacuate.
- ✦ Having drills to practice the plan.

Develop a disaster recovery plan.

A recovery plan for getting your office back on-line as soon as possible after the storm also is critical. This plan should include

- ✦ Coordinating staff members into teams to help get their homes and property cleaned up as soon as possible.
- ✦ Coordinating staff members into teams to clean up office and site.
- ✦ Having a petty cash fund for staff emergencies.
- ✦ If possible, alerting staff members who evacuated to the status of their homes and property before they return to



- ease the shock, and to inform them of the equipment (chain saws, etc.) they will need to bring back.
- ✦ Having a contingency plan of where your agency will operate if your existing facility is destroyed.
- ✦ Reviewing and updating your disaster preparedness plan.

Plan for emergency permitting and other post-disaster activities.

Environmental damage assessments, water quality testing, research monitoring, emergency permitting, removing abandoned vessels and hazards to navigation—not only must work started before the hurricane be continued, but the hurricane will create additional work.

Planning the activities you will need to conduct after a worst case disaster—and how you will conduct them—is an important exercise.

The bottom line, says Causey, is “be prepared as much as you can as early as you can.” ❖

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seizing an opportunity. His agency is applying for \$3 million in Federal Emergency Management Agency (FEMA) hazard mitigation grant moneys to fund dune restoration.

“This is one of the funding programs that become available after a disaster,” Fisher says. From the time Rita hit to the deadline on January 27, Fisher and his staff were gathering the extensive data FEMA required on existing dune projects that needed repair.

While beach nourishment is not considered a mitigation activity that meets grant requirements, Fisher says it can be funded if it's part of an existing public project. They requested additional moneys for such projects.

To take advantage of these types of opportunities, Fisher believes it's crucial for coastal resource managers to partner with state emergency managers before a storm hits.

“You have to have an awareness of how the system works and get your priorities on the same level as everybody else's,” he says. “You aren't going to qualify for funding if you don't already have things in place before a disaster. It's a huge process.”

Road to Recovery

As recovery progresses, Louisiana's Liffmann sees his program as never being the same.

All the traditional programs undertaken by the state's Sea Grant Extension, such as nonpoint source pollution, fisheries, seafood, and smart growth “are gone—disappeared,” he says. “We're going to have to get back to basics and help people answer the question of ‘does the community come back?’ and trying to refocus attention on what it should look like at the end of the day.”

He adds, “The whole experience has been tremendously interesting. Even if we wanted to move on and do something else, we can't until we are past dealing with hurricane recovery issues.” ❖

Official source for federal funding opportunities.

NOAA's competitive grant announcement is expected in June and will be open for at least 45 days. See James.L.Free@noaa.gov for additional information about NOAA Coastal Services Center grant opportunities.

www.grants.gov



Attend the Annual Conference of the Association of State Floodplain Managers.

June 11 to 16, 2006
Albuquerque, New Mexico
www.floods.org

Learn about tools used to manage hazard risks and preview the new No Adverse Impact coastal handbook. The NOAA Coastal Services Center is a conference sponsor; please visit our booth and attend our special training session.

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