

## NHMA Fact Sheets about Nonstructural Hazard Mitigation Best Practices

Summer 2011

Community	State	Characteristics	Featured Projects	Partners	Funding Sources	innovations	Sources / Contact Information
Charleston	SC	Atlantic Coast, large coastal city; flood & hurricane risk	"Build a Dune" program: volunteers erect beach fencing that creates dunes	Charleston Project Impact, SC Dept. Health & Environmental Control	Small grants and local fundraisers such as cookbook sales	Creative use of volunteers to reduce disaster losses and improve environment	Carl Simmons, Charleston Project Impact, <a href="http://www.charlestoncounty.org/departments/buildinginspections/projectimpact.htm">www.charlestoncounty.org/departments/buildinginspections/projectimpact.htm</a>
Galveston	TX	Gulf of Mexico, barrier island, small city & county; flood & hurricane risk	Elevation, acquisition, strong codes. Bolivar Blueprint recovery plan	Galveston County, FEMA, Texas SHMO, local business owners & citizens	FEMA funds for acquisition, planning, & related projects	Recovery plan. Hundreds of beachfront properties cleared in voluntary acquisition project	Frank Billingsley, Houston's KPRC-TV. <a href="http://www.FEMA.gov">www.FEMA.gov</a> , <a href="http://www.gcoem.org">www.gcoem.org</a> , <a href="mailto:conniej.dill@dhs.gov">conniej.dill@dhs.gov</a> . John Simsen, emergency mgr, Galveston County.
Louisiana House	LA	Baton Rouge, coastal Louisiana; flood & hurricane risk	Demonstration house showcases how to build safer, stronger, smarter	Public-private partnership, university based	Construction & education funded by grants, cash gifts & donated materials	Home & exhibits show scores of safe & sustainable building techniques	Pat Skinner, <a href="mailto:pskinner@LSUagcenter.org">pskinner@LSUagcenter.org</a> ; "Safer, Stronger, Smarter Louisiana House," <a href="http://www.LSUagcenter.com/lahouse">www.LSUagcenter.com/lahouse</a>
Seattle	WA	Northern Pacific coast, large coastal city; earthquake & flood risk	Earthquake retrofit program: volunteers teach home owners & builders how to retrofit to withstand earthquakes	Neighborhoods, emergency managers, building officials, contractors, & others	FEMA Project Impact grant as 1998 seed money; now carried on by volunteers	Self-perpetuating multi-disciplinary team of volunteers provide free training for building retrofits.	Roger Faris, volunteer. <a href="http://www.Seattle.gov/emergency/prepare/personal/home.htm">www.Seattle.gov/emergency/prepare/personal/home.htm</a>
StormSmart Coasts	MA	Resources for coastal management. Now active in 7 states and growing.	Website of information and networking among communities.	State, communities, experts, and a constellation of federal and state agencies.	EPA, NOAA, the Gulf of Mexico Alliance, and others.	Communications tools to create peer-to-peer network. Melds environmental management with hazard mitigation.	Wes Shaw, lead developer, <a href="http://StormSmartCoasts.org">StormSmartCoasts.org</a>
Hillsborough County (Tampa)	FL	Florida western coast, urban coastal county; flood & hurricane risk	Resiliency projects include surge markers, stronger codes, recovery planning.	Hillsborough County, Florida Dept. of Community Affairs, FEMA	Recovery planning grants from FL Dept. Community Affairs, FEMA	Recovery plan identifies 'priority redevelopment areas' for growth incentives after a disaster	Gene Henry, hazard mitigation manager, <a href="http://www.hillsboroughcounty.org/pgm/hazardmit/">http://www.hillsboroughcounty.org/pgm/hazardmit/</a>

## Charleston volunteers create beachfront sand dunes for hurricane protection.

Volunteers in South Carolina are building fences for defense against hurricanes.

They're installing beachfront fences that create protective dunes by capturing sand swirled by wind and water.

Sand dunes are nature's first line of defense along coasts. They moderate waves and flooding and, in addition, provide life-sustaining habitat for wildlife. But, as anybody knows who ever tried to build a sand castle, dunes are fragile and need protection, too, from wind and wave action and damage by invading human beach visitors and inhabitants.



Volunteers install fencing to capture sand and create protective dunes on Folly Beach, SC.  
-Charleston Project Impact

### Build-A-Dune, Dude!



Carl Simmons

"Our volunteers love these quick and fun projects for whole families, who enjoy a great morning at the beach," said Carl Simmons, executive director of Charleston Project Impact. "More important, they get deep satisfaction from helping protect sea turtle habitats, improve public safety, and preserve our environment."

Charleston-area volunteers are working in the Charleston Project Impact program, an initiative to reduce disaster losses through volunteer and partnership activities, and the South Carolina Build-A-Dune project. Build-A-Dune work has modest cost, which Charleston Project Impact sponsors through small grants and grassroots fund-raisers such as cookbook sales.

### Build, plant, protect

Build-A-Dune volunteers obtain necessary permits, notify nearby owners, and install sand fencing in "V"-shaped sections parallel to the ocean. The V shape protects turtle nests. After enough sand accumulates, usually in 6 to 12 months, they plant vegetation, such as sea oats, to help stabilize the dunes.

The dunes need to be aligned with neighboring dunes but not interfere with public access. And they must also be protected, so volunteers post signs to discourage people from walking on the dunes.



### Quick and lasting benefits

Within a year sand buildup hides the sand fencing. "The first one we did 6 years ago had added 85 feet of dunes that have been hit by 3 storms and 2 close calls," Simmons said, "and yet still has 62 feet of dunes created by these volunteers who are helping make Charleston a disaster-resistant, sustainable community."

### For more information

See <http://www.charlestoncounty.org/departments/BuildingInspections/projectimpact.htm>

## Galveston County recovery from Hurricane Ike has lessons to share.

Galveston County, TX, is no stranger to storms. More than 75 big storms and hurricanes have been recorded there in the past 135 years. In fact, Galveston was the scene of the nation's worst natural disaster in 1900, when a surprise storm killed between 6,000 and 12,000 people.

Galveston folk have learned a lot to share about how to live with Mother Nature's bad moods.

They're adapting to their coastal homeland by elevating and strengthening homes, planning together, educating themselves, safeguarding their unique environment, and pulling back from the coast.



Elevating his home above the Hurricane Ike storm surge saved the house of this Galveston County home owner. -FEMA photo.

**Build high and strong.** That's the advice from Frank Billingsley, chief meteorologist with Houston's KPRC-TV. "And build back smarter and better," he told Galveston County residents after Hurricane Ike in September 2008. Before the hurricane, when he custom-built his first Galveston home, Frank followed his own advice for storm-smart coastal building: Use cement pilings; build higher than the minimum standard and stronger than the code; use hurricane straps, inside and out, and storm-resistant windows; clear out the ground level; and raise your utilities.

**Green up.** Neighbors are planning together to "green up," in more than one way. In the worst-damaged areas, they're working through their landmark recovery plan called the Bolivar Blueprint to restore storm-destroyed native habitat, work to become an eco-tourism destination, and lure in businesses to boost the local economy.



Hurricane Ike left little more than slabs and stilts on Bolivar Peninsula in Galveston County. -FEMA photo.

**Back up a little.** With help from FEMA and the State of Texas, Galveston County is buying and clearing hundreds of houses on Bolivar Peninsula that were decimated by Hurricane Ike. The idea behind the purchases, which are entirely voluntary, is to move back a bit from the coast to open up the beach, while elevating and strengthening other buildings, said Greg Pekar, Texas State Hazard Mitigation Officer. "If Ike's brother comes back in 10 years, will we have more or less damage?" he said. "Our assessment is that, after the buyout, there will be a lot less damage because the county will have acquired these most vulnerable properties."

**For more information.** See *Breaking the Disaster Cycle on Bolivar Peninsula, Texas* (FEMA 2010); [www.gcoem.org](http://www.gcoem.org); and [KPRC.org](http://KPRC.org).

## 'Louisiana House' shows how to build safer, stronger, smarter

Smart homeowners in the southeast can rest easier the next time a hurricane churns in the Gulf of Mexico, if they have heeded the advice of building experts at Louisiana State University.

The LSU AgCenter's Louisiana House (*LaHouse*) showcases ways to build well in a land where floods, high winds, heavy rains, mold, and termites are common challenges. *LaHouse* exhibits scores of solutions for living with hurricanes, floods, and other hazards in ways that are healthy, practical, and safe.



The Louisiana House showcases ways to build wisely in the state's challenging environment. –LSUagcenter.com



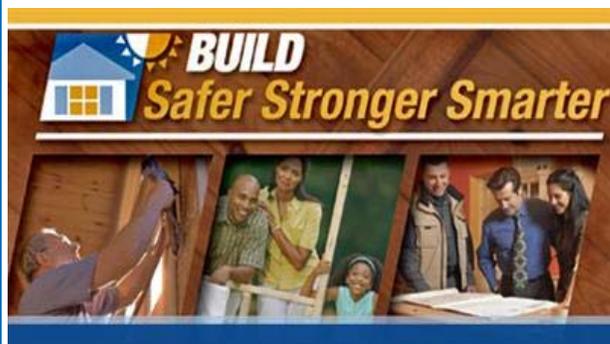
Pat Skinner

"As you build, restore, or rebuild in South Louisiana, take the time to understand what is happening along our coast and what that means to you," says Pat Skinner, disaster recovery and mitigation specialist at the LSU AgCenter. Their *Build Safer, Stronger, Smarter* campaign is simple: "Do it right, accept that hurricanes are a fact of life in South Louisiana. Get the facts about the risks you face in your location. And make the choice to build to reduce your vulnerability to these hazards," she said.

**Build strong, live well.** *LaHouse* is a working model that puts into practice the concepts recommended by LSU experts. Visitors to *LaHouse* can learn how to build "Fortified" homes using standard or advanced framing, SIPS (structural insulated panels), and ICF (Insulating concrete forms). They can see how to manage crawl spaces, piers, and slab foundations, and how - even during a storm - to hold on to their "hip," impact-resistant roofs of metal or concrete tile that looks like clay.

**Refuge from the storm.** The house is elevated 3 feet above the regulatory flood level; the teaching center is dry-floodproofed. The master bedroom closet is a storm shelter (engineered to 150 mph). Sheathing, hurricane straps and anchor bolts connect roof to walls to foundation, holding the whole house together, even in a stiff wind. Windows and doors are impact-resistant or shuttered. Landscaping is planned for low impact and sustainability.

**Saving energy, money, and trouble.** Recommendations for durability create energy-efficient buildings, too, and may even result in insurance premium discounts. "By following these and other ideas, homeowners will likely have more money in their pockets," Skinner says, "because their smart construction avoided expensive damage, saved energy and helped protect the priceless Louisiana environment."



The LSU Ag Center and *LaHouse* have excellent, free educational materials. –LSUagcenter.com

Learn more by visiting [www.lsuagcenter.com/LaHouse](http://www.lsuagcenter.com/LaHouse)

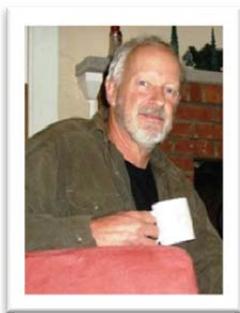
## Seattle volunteers train home owners to make homes earthquake safe.

Since 1998, Seattle volunteers have been teaching home owners how to retrofit their homes to withstand earthquakes.

Thousands have taken free classes in libraries throughout the region. Hundreds of buildings were retrofitted with both structural and nonstructural improvements in the first few years of the project.



Volunteers and home owners have reduced earthquake damage in the Seattle region by retrofitting homes. – Seattle.gov/emergency



Roger Faris

### The 2001 earthquake

A test came without warning when the 2001 Nisqually earthquake hit the area and proved the value of the retrofits. Not only was damage prevented, but lives were saved as a direct result of the work, says Roger Faris, who helped organize and manage the project.

“We saw quickly that not only was damage successfully prevented, but lives had been saved as a direct result of the work of these volunteers, energetic home owners, and trained contractors,” Faris said.

### The power of partnerships

“While our group was inspired by the proof that the work is critically important, we were also confronted with growing evidence that our region will experience even bigger earthquakes in coming years,” Faris said. There is a long-term need to make homes and buildings stronger and safer.

The Seattle home retrofit program started with federal seed money through the FEMA-sponsored Project Impact initiative. Now it’s continued by the volunteers and other partners. “It’s a cooperative effort by emergency managers, building officials, technical experts, and experienced contractors who freely share their time, even if they’re training their potential competition,” Faris said.

### The value of hazard mitigation

A visitor today might well find once-quiet neighborhoods echoing with rotohammers drilling into concrete and air-powered equipment firing common nails into shearwall panels, Faris said. Thirteen years after the project began, the free classes continue throughout the Puget Sound area, as volunteer experts teach homeowners and contractors alike how to anchor, brace, and take other steps to improve the safety of homes, schools, and day care centers.

“In the Pacific Northwest, the value of true public and private hazard mitigation – actions to reduce disaster losses – has become a well-established fact,” Faris said.

“It demonstrates the importance of long-term commitment and sustained action to cut the destruction and disruption – and even death – that disasters cause.”

**For more information:** See [seattle.gov/emergency/prepare/personal/home.htm](http://seattle.gov/emergency/prepare/personal/home.htm)



## 'StormSmart Coasts' offers how-to tips and peer-to-peer networking.

Looking for information about living wisely in harmony with a coastal zone environment? A good place to start is a free service called *StormSmart Coasts*.

Formed in Massachusetts, *StormSmart Coasts* is now active in Florida, Alabama, Mississippi, Louisiana, Texas and Rhode Island, and will be coming soon to other states.

The *StormSmart Coasts* program is designed to help coastal communities address the challenges arising from storms, floods, sea level rise, and climate change. Sponsored by the EPA, NOAA, the Gulf of Mexico Alliance, and others, the program provides a menu of tools for successful coastal floodplain management.



Living on the water's edge can be challenging in beautiful sites such as Mattapoissett, MA. –*StormSmartCoasts.org*



Beach plum –*Mass.gov/CZM*

**Coastal Landscaping.** Wind, salt spray, waves, and marshlands are part of the excitement of living on the coast, but they present special challenges. Using the right plants can not only reward the gardener but also help stabilize and protect the environment, according to *StormSmartCoasts*. Wisely selected and placed plants can reduce maintenance cost, enhance wildlife habitat and natural beauty, and provide erosion control and pollution buffers.

**National communications network.** For more information and the invaluable benefits of communicating with your peers across the nation, *StormSmart Coasts* has established a free networking service called StormSmart Connect. Those who sign up at <http://stormsmart.org/> can share contacts, knowledge, and inspiration across the miles. The network is a resource to help coastal decision makers connect, collaborate, and share the latest and best information on how to protect their communities from weather and climate hazards. Available communication tools include forums, groups, and hosted community or group websites.



The site shows benefits of "freeboard," raising a coastal house above flood levels. – *StormSmartCoasts.org*



**Nonstructural mitigation.** One way to reduce disaster damage is to elevate homes above flood levels. Elevating a home can reduce flood insurance costs, substantially decrease the chances a home will be damaged by storms and flooding, and help protect against sea level rise, according to *StormSmart Coasts*.

For more information, see <http://stormsmartcoasts.org/>

## Tampa area is planning now to survive & recover from next hurricane

When the next hurricane comes toward Tampa, Gene Henry will be as ready as humanly possible.

As hazard mitigation manager for Hillsborough County, FL, which includes Tampa, Henry has been working for years with his community to reduce the death, damage, and destruction from storms and other disasters.

Other vulnerable coastal areas can learn a lot from the forward-thinking Hillsborough County. This fact sheet describes some of their programs.

### Evacuation Zones and Surge Markers

Hillsborough County communities have identified five evacuation zones, all subject to storm surge.

“Coastal storm surge could extend as far as three miles inland,” Henry said, “and could be as much as 13 to 17 feet above ground level. That’s high enough to completely cover a one-story house.”

To demonstrate what this means, Hillsborough County has posted 30 storm surge signs in prominent locations in areas of its jurisdiction with major storm surge risk. The signs are part of an aggressive public education campaign about preparedness and hazard mitigation.

### Building codes and safer buildings

Hillsborough County encourages homeowners and builders to build safer, stronger homes and businesses. “We encourage people to install hurricane straps to secure their roofs and walls,” Henry said. “Storm shutters can prevent damage from flying debris. We also recommend elevating the main breaker or fuse box above flood levels, keeping drains clear, maintaining flood insurance in floodprone areas, and developing personal preparedness plans including business continuity plans.”

### Priority Disaster-Recovery Areas

Hillsborough is planning now for the community’s recovery from its next big disaster.

“As we watched New Orleans struggle with very difficult decisions after Hurricane Katrina, it was clear to us that we need to pre-plan how we will recover during the terrible times after a disaster,” Henry said. “Our plan identifies how our community will redevelop and recover. It emphasizes seizing opportunities for building back better and improving our community.” This landmark plan recognizes that there will not be enough resources to redevelop all areas simultaneously, so it targets Priority Redevelopment Areas, in areas with the least risk, where rebuilding will be incentivized for sustainable and holistic recovery. They will also target resiliency for Vulnerable Priority Redevelopment Areas projects to encourage safe, sustainable recovery.

**For more information:** See <http://www.hillsboroughcounty.org/pgm/hazardmit/>



Hillsborough County, Florida, encourages hazard mitigation, including elevation of homes in safe sites, planning, and public education. -HillsboroughCounty.org