

# RESILIENT REGIONS

**Integrating Economic Development  
Strategies, Sustainability Principles  
and Hazard Mitigation Planning**

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# INTRODUCTION

Recovering from a natural disaster is no small task. Important decisions are made to restore livelihoods and ensure safety with little time to think of the long-term repercussions. Depending on the severity, the aftermath might require providing temporary shelter, clearing debris, pumping flood waters, or rapidly repairing damage to vital infrastructure such as roads, electricity and drinking water. Once damage is assessed and crucial infrastructure is restored, it is time to start rebuilding—a process that can take months and years.

Amidst the destruction, it is hard to see a disaster as an opportunity. But it can be exactly that—an opportunity to build back better. Too often in the rebuilding process, communities look backwards to try to replicate what they lost instead of looking forward to how they can rebuild more sustainably. Strategies for strengthening regions and communities in the wake of disaster not only mean reducing future risk, but can mean enhancing quality of place by guiding smart development, protecting natural resources, diversifying transportation options and fostering economic growth.

Across the U.S., regional development organizations (RDOs), local governments and communities have worked together to create hazard mitigation plans that incorporate long-term economic growth strategies and support sustainable development. For example, partners in the southwestern Wisconsin region embarked on an ambitious plan to save downtown Darlington after repeated flooding by supporting small business owners and creating a sense of place through historic preservation. And on the Gulf Coast of Florida, the Southwest Florida Regional Planning Council works to integrate disaster mitigation planning into a wider view of sustainable development.

Land use change is a powerful tool that can be used to build back better. Land use planning and growth management techniques can include environmental protection and sustainability initiatives at both the local and regional level. Policies related to zoning and site selection along with relocation incentives can encourage desired land use and transportation patterns. Land use and design regulations can promote hazard mitigation goals while advancing sustainable development and high-quality design, as in southern Mississippi towns after Hurricane Katrina. Large scale disasters can provide an opportunity to assemble multiple properties and/or re-zone them for redevelopment.



**Flooding in Ames, Iowa in 2010.**

Source: Jace Anderson, FEMA. [http://commons.wikimedia.org/wiki/File:FEMA\\_-\\_44988\\_-\\_Squaw\\_Creek\\_Floods\\_Main\\_Street\\_in\\_Ames.jpg](http://commons.wikimedia.org/wiki/File:FEMA_-_44988_-_Squaw_Creek_Floods_Main_Street_in_Ames.jpg).

While disaster recovery and mitigation projects are typically administered at the local level, many small communities lack the capacity and resources, pitting them against a daunting task. Mike Norris, Executive Director of the Southeast Iowa Regional Planning Commission in West Burlington, Iowa, says that RDOs can play an important role by “synthesizing resources, identifying needs, and concentrating all the information and resources in one place to guide a local community through a more efficient recovery.” Norris says disaster response and hazard mitigation in southeast Iowa benefit from “a regional approach with a local application.”

## **Disaster response and hazard mitigation in southeast Iowa benefit from “a regional approach with a local application.”**

Disasters are rarely confined to the boundaries of one municipality. In 1992, Hurricane Andrew ripped through counties in south Florida, Mississippi and Louisiana. Floods along the Mississippi River affect multiple municipalities along the riverbank. Since natural systems do not correspond with jurisdictional boundaries, planning for hazard mitigation and disaster recovery at the regional level becomes all the more important. Mitigation measures in one municipality, such as building a levee along a riverbank, can have a negative impact on the adjacent municipality, pushing more flood waters their way. RDOs often fill an important role in ensuring that disaster mitigation efforts are well-coordinated across municipal and county lines and help to shape stronger, more resilient regions.

**Regional Development Organization (RDO) is a universal term used to refer to a multi-jurisdictional, multi-purpose regional planning and development organization governed primarily by local government elected officials. RDOs are also known as Area Development Districts, Councils of Governments, Economic Development Districts, Planning and Development Districts, Regional Councils of Governments, Regional Development Commissions, Regional Planning Commissions and Regional Planning Councils.**



Pensacola, Florida, after Hurricane Ivan struck in 2004.

Source: Jocelyn Augustino, FEMA. [http://commons.wikimedia.org/wiki/File:FEMA\\_-\\_11092\\_-\\_Photograph\\_by\\_Jocelyn\\_Augustino\\_taken\\_on\\_09-18-2004\\_in\\_Florida.jpg](http://commons.wikimedia.org/wiki/File:FEMA_-_11092_-_Photograph_by_Jocelyn_Augustino_taken_on_09-18-2004_in_Florida.jpg).

## Costs and Benefits of Hazard Mitigation Planning

While it is impossible to prevent a natural disaster, regions can reduce its impact. Preparing hazard mitigation plans help communities avoid loss of life and protect investments. In the chaos that ensues after a disaster, having an updated hazard mitigation plan allows communities to prioritize recovery activities and seize opportunities to incorporate sustainability measures into the process. Pre-identifying key projects in hazard mitigation plans also helps secure federal funding.

California, Florida and coastal regions of other states are now required by state law to incorporate hazard mitigation into their comprehensive land use plans. The Stafford Act authorizes federal funding for disaster relief, recovery and hazard mitigation planning through the Federal Emergency Management Agency (FEMA). The Disaster Mitigation Act of 2000 emphasizes pre-disaster mitigation planning and incorporating principles of sustainability, and requires that all state and local governments prepare pre-disaster mitigation plans to be eligible for disaster assistance.<sup>1</sup>

The benefits of hazard mitigation are not always apparent when compared with the up-front costs until a disaster occurs. However, quantitative analyses of past disasters reveal the prudence of devoting resources to pre-disaster mitigation planning:

- The Great Floods of the Midwest (1993) taught many communities that buildings should be relocated from floodplains after the flooding caused 50 deaths and \$15 billion in damages.<sup>2</sup>
- After the Northridge Earthquake occurred in Los Angeles in 1994, causing 57 deaths and

\$40 billion in damage, officials learned that simple building regulations to make structures earthquake resistant could have prevented much of the damage.<sup>3</sup>

- The University of Colorado published a study that examined a sample of 5,500 FEMA mitigation grants between 1993 and 2003 and found that the overall benefit cost ratio of hazard mitigation is four to one—every \$1 spent in hazard mitigation brought a \$4 return.<sup>4</sup> The study estimated that the \$3.5 billion spent on mitigation projects nationwide between 1993 and 2003 prevented \$14 billion worth of damage.<sup>5</sup> To put this in perspective, the damage from Hurricane Andrew alone was \$30 billion.
- A study examining government expenditure on hazard mitigation projects in Colombia, Indonesia, Mexico and Nepal reveals that hazard mitigation measures allow governments more control over their budget and reduce unknown recovery spending after a disaster. Three of the countries, Indonesia, Mexico and Nepal, spent less on hazard mitigation spending than they did during post-disaster recovery.<sup>6</sup>
- Some protection measures, such as preventing development in natural wetlands, cost little. A World Bank study values natural wetlands at an average of \$8,240 per hectare a year, resulting in savings of \$23.2 billion a year in storm protection services.<sup>7</sup> Coastal wetlands are proven to provide a natural self-maintaining levee to protect homes from flooding.

## Southwest Florida Plans for Hazard Mitigation and Sustainability

Florida's coastlines have been ravaged by hurricanes for decades. In 1992, Hurricane Andrew caused \$30 billion of damage, leaving 15 dead and 250,000 people homeless; at the time, it was the most costly and destructive storm in U.S. history.<sup>8</sup> In 2005, Hurricane Wilma wreaked havoc in Florida—heavy winds and storm surges inundated the lower Florida Keys, causing \$20.6 billion in damage.<sup>9</sup> A number of other notable storms caused damage in Florida, including Hurricane Charley in 2004, and Hurricanes Rita and Katrina in 2005.

In response to repeated loss from disasters, and specifically Hurricane Andrew, the state created the Florida Division of Emergency Management and began requiring each county to create a Local Mitigation Strategy (LMS) in 1998—two years prior to the federal Disaster Mitigation Act. Each LMS must now meet guidelines provided by FEMA to be eligible for federal mitigation assistance. All LMSs are rolled into a comprehensive state mitigation plan through which funding is distributed.

The 11 Regional Planning Councils (RPCs) in Florida, as well as in many other states, are responsible for creating the LMS for the counties and municipalities in their region. Many of Florida's counties and municipalities do not have the capacity to prepare a hazard mitigation plan and rely on RPCs to provide assistance. The Southwest Florida Regional Planning Council (SWFRPC), for example prepares an LMS for Charlotte, Collier, Glades, Hendry, Lee and Sarasota Counties.

At the regional level, SWFRPC identifies funding sources for the mitigation and restoration components of each project

identified through the LMS process. The LMSs are generally implemented through the counties' Annual Work Plans and Capital Improvement Programs. Although funding is limited before a disaster, SWFRPC Planning Manager Dan Trescott notes that “having a plan up front with a wish list will help obtain funding when a disaster occurs.”

The LMS for Lee County was prepared in 2004 and updated in 2010. Almost 27,000 acres of Lee County are susceptible to a Category 1 storm surge and almost 39,000 acres are susceptible to a 100-year flood. In addition to hurricanes and tropical storms, 39,500 acres are susceptible to wildfires and 515 acres susceptible to sinkholes.<sup>10</sup>

### Southwest Florida Regional Planning Council approaches disaster mitigation and sustainability as a “no regrets strategy.”

With an estimated population of 618,000, Lee County is one of SWFRPC's largest coastal counties and includes the cities of Cape Coral, Fort Myers and Bonita Springs.<sup>11</sup>

Lee County experienced rapid population growth over the past few decades, growing from just 23,000 people in 1950 to over 618,000 in 2010.<sup>12</sup> Between 2000 and 2010, the county's population grew by 40 percent (in comparison, the total U.S. population grew by 10 percent over this period).<sup>13</sup> As the area's population increased, so did an unsustainable consumption of land—the built environment nearly tripled in land area over the last 20 years.<sup>14</sup> The LMS encourages growth to occur in a more considered manner, maintaining a clear distinction between urban and rural areas and protecting natural resources.

The LMS promotes enforcement of flood regulations and improvement to drainage systems and stormwater



The aftermath of Hurricane Charley in Punta Gorda, Florida, in 2004.

Source: Andrea Booher, FEMA. [http://upload.wikimedia.org/wikipedia/commons/d/d2/Effects\\_of\\_Hurricane\\_Charley\\_from\\_FEMA\\_Photo\\_Library\\_7.jpg](http://upload.wikimedia.org/wikipedia/commons/d/d2/Effects_of_Hurricane_Charley_from_FEMA_Photo_Library_7.jpg).

management. But in addition to hazard mitigation, it also provides an opportunity to incorporate sustainable development strategies. Trescott's team prepares maps to ensure that growth is guided, maintaining a clear distinction between urban and rural areas and protecting natural resources.

The updated LMS proposes an aggressive public land acquisition program to protect natural resources and to enforce cost-effective land use and environmental regulations. It supports implementing buffer zones between developed and undeveloped land and reassessing existing built-out property in the coastal high hazard areas.<sup>15</sup> If funded, these measures will reduce Lee County's damage risk while promoting long-term resiliency.

The relationship between the SWFRPC and Lee County in hazard mitigation planning has expanded into planning for sustainability. Since the 1980s, SWFRPC has conducted hurricane storm surge modeling and mapping, has developed sea level rise projections, and has collected and analyzed other data related to short- and long-term environmental change and hazard mitigation.

The region and local governments in the area have used these tools and data to guide land use decisions and infrastructure investments. Whitney Gray, Senior Environmental Planner at SWFRPC, notes, "Because of the work we've done for decades on hazard mitigation, people are more willing to understand the impacts of climate change and the need to plan for mitigation and adaptation."

Debate over climate change science and politics aside, SWFRPC's approach is to develop tools and strategies that can address a range of scenarios, from small-scale flooding after a summer thunderstorm, to hurricanes and other major storm events, and to other long-term changes in the region's ecosystem. Gray says they look at it as a "no regrets strategy."

SWFRPC is an Economic Development District (EDD), designated by the U.S. Economic Development Administration (EDA), and as such, prepares a Comprehensive Economic Development Strategy (CEDS). In 2009, the SWFRPC adopted the "Climate Prosperity Strategy" as a component of the CEDS, with the goal of promoting energy efficiencies and supporting innovative business opportunities that are conducive to sustainable development. SWFRPC also completed a comprehensive regional vulnerability assessment in partnership with the Charlotte Harbor National Estuary Program (CHNEP). This assessment analyzes current and ongoing climate change in southwest Florida and explores five future scenarios through 2200. The report, released in 2009, outlines techniques for "adaptation planning and implementation to avoid, minimize and mitigate the anticipated effects to the natural and man-altered areas of southwest Florida."<sup>16</sup>

In conjunction with the development of the regional assessment, SWFRPC has worked with local government

officials and other stakeholders to prepare climate change assessments and plans at the local level. Gray says that SWFRPC found that the devastation the area suffered from Hurricane Charley in 2004 allowed the community's mindset to be open to exploring the linkages among hazard mitigation and sustainability.

The City of Punta Gorda, a waterfront community of approximately 17,000 residents located north of Fort Myers on Charlotte Harbor, is regularly threatened with flooding from typical Florida thunderstorms in addition to coastal storms, tropical storms and hurricanes.<sup>17</sup> The city partnered with CHNEP and SWFRPC to undertake a climate change vulnerability assessment, modeled after the regional process, and adopted an adaptation plan prepared under the guidance of CHNEP and SWFRPC staff. The adaptation plan has since been integrated into the city's comprehensive planning and land development regulations.

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Similarly, SWFRPC prepared a Climate Change Resiliency Strategy (CCRS) and Climate Change Vulnerability Assessment specific to Lee County in 2010. The CCRS outlines coordination strategies for the county's departments and divisions and local governments to undertake to reduce the negative effects of climate change and prepare the county to maximize potential opportunities. The document is meant to be a toolbox that outlines the county's options and opportunities for a wide range of topics, including the built environment, emergency and hazard planning, land use planning, infrastructure investment and transportation.

In 2010, Lee County established an Office of Sustainability, charged with "providing leadership in the cultivation of a livable and resilient community where there is an unmistakable balance between social well-being and equity, economic prosperity and environmental resource conservation."<sup>18</sup> The county is now conducting a sustainability assessment and developing a county-wide sustainability plan, and is also updating its state-mandated comprehensive plan. The lessons drawn from the Climate Change Vulnerability Assessment and the strategies contained within the CCRS will be incorporated into the sustainability assessment and plan. Likewise, the findings of the sustainability assessment will be included in the comprehensive plan update. According

to Tessa LeSage, Director of the Lee County Office of Sustainability, it is an advantage that the comprehensive plan update process is happening simultaneous to the development of the sustainability strategy. “The comprehensive plan is

being updated to include sustainability, which it hasn't in the past. Public input indicated a strong desire for sustainability principles in the comprehensive plan.”

## Land Use Change as a Hazard Mitigation Tool

Land use planning can be used as a hazard mitigation tool to reduce vulnerability and simultaneously promote economic growth, ensure natural resource protection, or encourage livability initiatives. This is accomplished through regulations and incentives such as zoning changes, building regulations, design guidelines, development regulations, land acquisition and taxation. As a mitigation measure, land use changes are proactive immediate measures that can reduce the costs of disaster and enhance sustainability in the long term.<sup>19</sup> While land use tools are generally administered at the municipal level, RDOs can play a role in providing technical assistance, identifying risks, and designing programs to incorporate sustainability.

Relocating repetitive disaster properties to hazard-free sites is a measure commonly used throughout the U.S., and federal assistance is available under the 1993 update to the Stafford Act. Acquisition and relocation schemes can bring long-term benefits to a region or community, but issues of heritage, emotional attachment and equity are all critical components of a successful disaster recovery strategy. Community engagement and education become crucial to the success of a relocation scheme involving private property. Relocation was proposed in the early stages of recovery after Hurricane Katrina in New Orleans, but because of poor communication and lack of political support, the concept was abandoned. St. Bernard Parish was criticized for implementing a relocation scheme in a blighted area called Village Square that was heavily damaged by Hurricanes Katrina and Rita. The houses slated for acquisition were home to primarily low-income African-American renters in a predominantly affluent white town. The Parish's attempt to acquire and rehabilitate the 37-acre tract is still facing opposition and difficulties.<sup>20</sup>

In some instances, relocation after a disaster can help to achieve related regional transportation and land use planning goals, such as increased mobility and reduced traffic congestion. For example, the 1963 Skopje Earthquake in Macedonia damaged rail infrastructure. The City of Skopje built a new central rail station east of the city center, driven by regional economic needs. It was designed to allow through traffic over the rail-yard, which had previously been a major obstacle to traffic flow and caused heavy traffic congestion around the station, impacting the entire region.<sup>21</sup> The post-disaster reconstruction plan also relocated buildings along the Vardar River, which frequently floods. In their place, Skopje constructed parks, walking trails, playing fields and a sports stadium. New bridges were built to form a major road link to the regionally important Belgrade motorway.<sup>22</sup>

Development controls through zoning and building regulations can be used to prevent structures from encroaching on sensitive land. Siting regulations that limit development in floodplains or on steep slopes are mitigation strategies that affect development at the local level; broader measures may include policies that promote compact development on a regional scale in order to limit sprawling development patterns and reduce automobile dependency while simultaneously promoting hazard mitigation goals. In addition to limiting hazardous development, zoning practices can encourage a sustainable recovery process by providing guidelines for streetscaping and uniform set-backs. Codes can also be coordinated with zoning changes to incorporate sustainability measures such as requiring height limits or design regulations. However, building codes can do little if they are not properly enforced. Studies indicated that the building code in south Florida was adequate after Hurricane Andrew but construction practices indicated that codes were not enforced.<sup>23</sup>



Source: Jace Anderson, FEMA. [http://commons.wikimedia.org/wiki/File:FEMA\\_-\\_44988\\_-\\_Squaw\\_Creek\\_Floods\\_Main\\_Street\\_in\\_Ames.jpg](http://commons.wikimedia.org/wiki/File:FEMA_-_44988_-_Squaw_Creek_Floods_Main_Street_in_Ames.jpg)

## Greening Greensburg Post-Tornado

In Kansas, the Greensburg/Kiowa County Long-Term Recovery Plan was developed after a 2007 tornado devastated the town.<sup>24</sup> The plan focuses heavily on incorporating green building techniques into public works projects and suggests creation of a certification program called “Greensburg Green.” As a result, the community now requires that all buildings larger than 4,000 square feet be built at a LEED Platinum level and must reduce energy usage by 42 percent, or more than current building code requirements.<sup>25</sup>

As a result of the regulation, Greensburg has the most LEED Platinum buildings per capita in the world. Greensburg was given a Siemens Sustainable Community Award in 2011 for

its “commitment to rebuilding and reinventing itself through sustainable living and a healthy environment.”<sup>26</sup>



**Greensburg, Kansas reconstruction.**

Source: City of Greensburg, KS. [www.greensburgks.org](http://www.greensburgks.org).



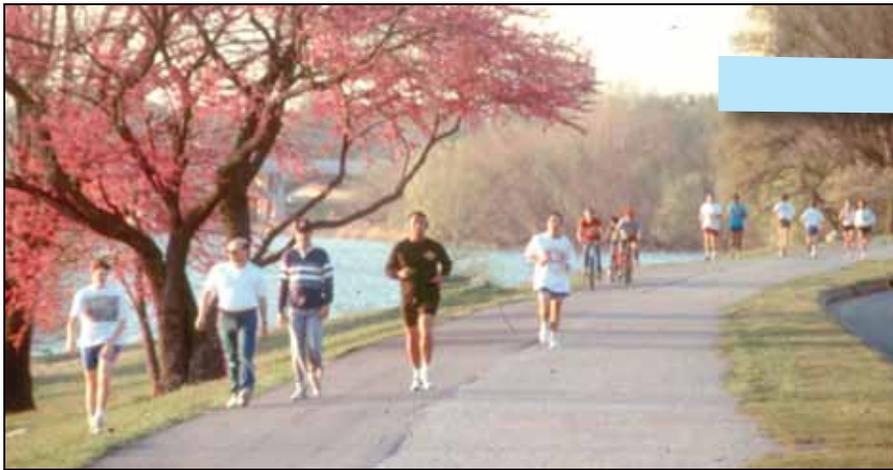
**Greensburg, Kansas, one month after the tornado hit.**

Source: Greg Henshall, FEMA. [http://commons.wikimedia.org/wiki/File:FEMA\\_-\\_33067\\_-\\_The\\_landscape\\_of\\_Greensburg,\\_Kansas\\_in\\_June.jpg](http://commons.wikimedia.org/wiki/File:FEMA_-_33067_-_The_landscape_of_Greensburg,_Kansas_in_June.jpg).

## Floodplain Acquisition Program in Oklahoma

Residents in Central Oklahoma are all too familiar with severe thunderstorms, tornados, and heavy flooding. An estimated 10 to 15 percent of the City of Tulsa is located in floodplains, mostly along the Arkansas River.<sup>27</sup> Following a series of major flood events, many Oklahoma municipalities designed land acquisition programs to purchase homes in repeated flood zones. The City of Tulsa implemented the largest buy out program, buying over 1,000 homes to ensure the preservation of green space along flood zones.<sup>28</sup> The cleared land is used for a mixture of flood management infrastructure and recreational space.

The Indian Nation Council of Governments (INCOG), a voluntary association of local and tribal governments in northeast Oklahoma, is an EDA-designated EDD and also serves as a Metropolitan Planning Organization (MPO) for the region. INCOG prepares regional multi-hazard mitigation plans that have become the basis for many of the region's land acquisition schemes. The plans identify which properties are at risk of future flooding and better off relocated. While INCOG cannot implement an acquisition program directly, they can provide technical assistance to communities to design programs. In some smaller municipalities such as Skiatook, INCOG provides a community planner to support an acquisition program. Like Florida's Regional Planning Councils, INCOG helps connect communities to federal and state grants to implement hazard mitigation projects.



Indian Nation Council  
of Governments

### Recreational trail in Tulsa floodplain.

Source: Ron Flanagan.

Tulsa, like many American cities, continued to sprawl outward through the 20<sup>th</sup> century, with little regulation along the Arkansas River's tributary streams. As a result, destructive floods began occurring every two to four years.<sup>29</sup> An area particularly prone to repeat flooding was along Mingo Creek, which was primarily pasture land until population proliferated in the 1960s. During the 1960s and 1970s, Tulsa had the most federally-declared flood disasters in the country.<sup>30</sup>

Tulsa began to regulate new growth in floodplains when it entered the National Flood Insurance Program after the 1970 flood caused \$1 million in damage.<sup>31</sup> Subsequent floods in 1974 and 1976 caused an additional \$20 million in damage and instigated debate among community members about flood control.<sup>32</sup> The 1984 Memorial Day flood caused \$180 million in damages, killing 14 people and damaging 7,000 buildings—the ninth and worst flood disaster in Tulsa in a 15-year period.

Before rebuilding in 1984 could begin, Tulsa decided to acquire 500 damaged properties from owners through a voluntary acquisition program. Just two years later, rainfall caused the levees to fail, leading to another \$67 million of damage to the region.<sup>33</sup> The city extended their program to acquire more damaged households along the river and, eventually, acquired more than a thousand buildings in floodplains, including many mobile homes.

The city actively integrated recreational space with flood management systems on the newly acquired land. Some parts of the cleared land are used for storage and conveyance of flood waters while other areas are used for recreational space such as soccer fields, hiking and bike trails, and parks. Cleared space along the 61-square mile Mingo Creek watershed now includes a 10-mile channelization system and 23 detention basins in addition to recreation facilities and amenities such as landscaping, pedestrian trails, stocked ponds, and outdoor sports facilities.<sup>34</sup>

Tulsa's flood management program has received widespread recognition for successfully reducing vulnerability and creating

open space. During the 1993 Great Midwest Floods, Tulsa was minimally impacted as a result of the mitigation measures. In fact, there are no reports of flooding in buildings constructed since the 1987 comprehensive flood regulations were adopted — indicating that the mitigation program is working.

## Economic Development and Historic Preservation in Southwestern Wisconsin

Darlington, Wisconsin is a small community of 2,200 residents located along the Pecatonica River in the southwestern part of the state. Darlington suffered through devastating floods in 1950, 1959, 1969, and 1990, and finally the Great Flood of 1993, which inundated 20 to 30 percent of the town.<sup>35</sup> The repeated flooding had negative economic impacts on the town, leading to closed businesses, reduced property values and damaged infrastructure and crops. The city embarked on an effort to address this issue while also considering historic preservation, economic revitalization and increased green space.

After the 1990 floods, then Mayor Bev Anderson sought collaboration with the Southwestern Wisconsin Regional Planning Commission (SWWRPC), EDA, FEMA, state officials, and other agencies to identify financing and resources for a flood mitigation effort. An interagency taskforce was formed to develop the city's (and Wisconsin's) first Flood Hazard Mitigation Plan to be approved by FEMA.<sup>36</sup>

When the 1993 floods occurred, SWWRPC helped Darlington to obtain funding from EDA and hired a flood recovery coordinator responsible for organizing flood mitigation efforts in Darlington and other affected communities. Sources for funding were more available after the 1993 flooding had



**As a result of the revitalization and flood mitigation, it is estimated that property values for commercial buildings along Main Street in Darlington nearly doubled.**

**Downtown Darlington flooded repeatedly in the early 1990s.**

*Source: Roxanne K. Gray, Wisconsin Emergency Management.*

Southwestern Wisconsin  
Regional Planning  
Commission

occurred because plans were already prepared. With the help of SWWRPC staff, the town secured funding through various channels including the Department of Housing and Urban Development (HUD)'s Community Development Block Grant program, FEMA Hazard Mitigation Grant Program (HMGP), and additional EDA grants.

Darlington's historic business center has several buildings of architectural significance along its main street which historically functioned as the central gathering place for area residents. As floods repeatedly washed over the historic buildings, their condition deteriorated and property values declined. The flooding was becoming detrimental to small business owners who had to close up shop to restore and replace damaged retail each time a flood hit.

In favor of preserving the historical significance and character of their downtown, Darlington stakeholders decided to flood-proof rather than relocate the historic buildings that were vulnerable to future flooding. Mayor Anderson firmly believed that they could accomplish more than just flood mitigation through the project and led the team to take a multi-disciplinary approach incorporating economic development, historic preservation, downtown revitalization and sustainability. The stakeholders recognized that revival of the



**Downtown Darlington after flood-proofing.**

*Source: Roxanne K. Gray, Wisconsin Emergency Management.*

business center could increase economic activity and reduce Darlington's dependency on the agricultural sector.

Engineers determined that increasing elevation would be the only effective method of flood-proofing while keeping the buildings intact.

Since the mitigation technique had to meet FEMA's HMGP requirements and conform to the local zoning ordinance by preserving the historic structure, the basements were filled with sand and other materials, first floor (storefront) windows were sealed, and utilities of 38 buildings were raised above the base flood elevation level. Interior vestibules were constructed with drainholes at the front of each building that allowed the space to be easily emptied and cleaned after a major flood.<sup>37</sup> The tile-lined vestibules allow flood water into the space, equalizing pressure and preventing damage to the building.

Aluminum shields were installed at the front doors and could be drawn down to add further protection from flood waters. Wheelchair accessible entrances were constructed in the rear to comply with current building code and act as an additional floodwall. Business owners provided additional funding to rehabilitate their structures and take historic preservation measures.

Fourteen properties along the river and railroad were identified for relocation. They included a mix of fuel companies, agricultural suppliers, and chemical suppliers that could cause

## The funds provided by EDA for flood mitigation were repaid and set the groundwork for the creation of the Regional Revolving Loan Fund managed by the SWWRPC.

harmful contamination if flooded, as well as car dealerships and mill and farm implement dealerships, which detracted from the historic character of the downtown. The relocation of the businesses with hazardous materials such as storage tanks, fuel oils, and natural gas to a business park significantly reduced threat of pollution or explosion after a flood. In addition, the town's wastewater treatment facility was relocated away from the flood zone.<sup>38</sup>

A 33-acre business park was constructed to the south of Darlington—outside the floodplain—using EDA funding to provide water mains, gravity sewer, an on-site sewage lift station, access roads and drainage improvements.<sup>39</sup> The 14 businesses were given priority to relocate to this business park and the acquired land was converted into a park and campground, greatly improving the aesthetics of the downtown. Additionally, an abandoned rail system was converted to a 39-mile multi-use recreation trail.<sup>40</sup>

The area where the relocations took place is now a fairground used for special events and an active Saturday morning farmer's market conveniently located directly across from Main Street. New baseball fields allow Darlington to host regional tournaments, drawing in out-of-town guests. These events attract residents to Main Street, creating a more vibrant downtown.

Darlington's campgrounds and outdoor recreational activities have become a regional tourist destination. There are now 32 designated camping sites equipped with electricity, group fire rings, restrooms, shower facilities and a canoe launch. The

recreational trails are popular with ATV riders and other off-road vehicles.

The team took great care to design the trails in a way that would increase the visibility of downtown businesses and chose to run the trail over the main bridge instead of underneath to allow more visibility for the downtown. Now, those using off-road vehicles such as ATVs and snowmobiles are forced to slow down as they pass by, allowing them full view of available businesses and retail.

The funds provided by EDA were repaid, and EDA contributed funding to start the Southwest Business Development Fund, a regional Revolving Loan Fund (RLF) managed by the SWWRPC. The fund targets regionally important job-creating business development and expansion projects by providing gap financing.

Mayor Anderson, who spearheaded the effort, says “collaboration, cooperation, and coordination” were crucial to the program's success. The multi-sector approach that Darlington and partners took has had a remarkable impact on the town. Rather than allowing it to deteriorate under the stress of repeated floods, it is now a tourist destination spot with a small but vibrant downtown. As a result of the revitalization and flood mitigation, it is estimated that property values for commercial buildings along Main Street nearly doubled.<sup>41</sup>

## Zoning Revisions in Southern Mississippi

Six weeks after Hurricane Katrina wreaked havoc on Mississippi's coast in 2005, Governor Haley Barbour called the Southern Mississippi Planning and Development District (SMPDD) and area mayors and local government officials to Biloxi for the Mississippi Renewal Forum. Influential architect and planner Andres Duany assembled 110 leading planners



After repeated flooding in downtown Darlington, some businesses were relocated and replaced with fairgrounds and a weekly farmer's market.

Source: Roxanne K. Gray, *Wisconsin Emergency Management*.





SmartCode uses a prototypical American rural-to-urban transect divided into six Transect Zones. This zoning system replaces conventional separated-use zoning systems to provide the basis for neighborhood structure. It may be customized to all scales of planning.

Source: Developed by Duany Plater-Zyberk & Company. Center for Applied Transect Studies, <http://www.transect.org/transect.html>.

and architects from across the country to lead an effort to draft recovery plans for the 11 affected communities.

The plans were heavily based on smart growth principles. Smart growth encourages compact building design, walkable neighborhoods, and mixed land uses, coupled with open space preservation and protection of natural beauty. It encourages community-led planning processes and concentrates on fostering a sense of place using predictable, cost-effective decisions.<sup>42</sup> The Mississippi Renewal Forum introduced the concept of the SmartCode to this region, a unified land development ordinance template for planning and urban design that is based on smart growth principles and combines zoning, subdivision regulations, urban design, and design guidelines into one document.

SmartCode is also known as form-based code. Instead of zoning lots by use, SmartCode has six transect zones ranging from the 'urban core' transect outward to open natural space transect. Each transect has set regulations and design

requirements. Communities can establish which transects fit their space—for example, a municipality may only adopt three transects because others do not apply.

The pattern of land use in coastal Mississippi towns is heavily dependent on car usage. Many zoning codes in Mississippi do not require sidewalks. Jeff Bounds, Planner with Pass Christian, said that after Hurricane Camille, “people had a tendency to set back their homes and build bigger units,” a style that was very different from the walkable beach town character Pass Christian was known for in the first half of the century.

Governor Barbour saw the SmartCode as an opportunity to reverse suburban sprawl and “rebuild the right way.”<sup>43</sup> As an incentive, he made state funding available for any community that wanted a plan. By February 2006, many towns had used the state funding to hold charrettes introducing concepts of smart growth to the community.

The concept was a hard sell to communities such as Gulfport, Long Beach and Waveland because of the extent of changes required or because they lacked the capacity or technical expertise to bring it forward. SMPDD, the regional development organization for the region and EDA-designated EDD, trained a staff member in SmartCode to provide assistance to communities adopting SmartCode. Some towns chose to adopt a portion of the SmartCode, but few were interested in moving away from their traditional zoning.

The small town of Pass Christian, on the other hand, welcomed the idea and went on to replace



A historic home on Scenic Drive in Pass Christian evokes the heritage that the SmartCode aims to support and enhance.

Source: Pass Christian municipal website, [http://www.ci.pass-christian.ms.us/photo\\_tour.html](http://www.ci.pass-christian.ms.us/photo_tour.html).

their original zoning code with SmartCode. By mid-2007, the community adopted an ordinance that replaced its existing zoning code with SmartCode. In 2008, new zoning maps were completed and officially adopted.

Pass Christian is a quiet beach town of 6,500 people of along the southern coast of Mississippi. Famous for its large antebellum homes along the waterfront, it was a popular second-home market and tourism destination for New Orleans residents. When Hurricane Katrina tore through the Gulf Coast in August 2005, the town was devastated: the majority of homes were either destroyed or damaged, including most of the historic mansions along the coast. Hurricane Camille also damaged practically every structure on the coast in 1969, but it was nowhere near the level of Katrina's destruction.

SmartCode in Pass Christian combines hazard mitigation with traditional building design. Regulations now exist on building heights and setbacks on lots in the downtown to maintain uniformity. A mix of uses is encouraged in the downtown, promoting a more walkable and vibrant environment. Designs of homes will favor traditional southern style architecture with porches in the front instead of garages for cars.

To address flood mitigation, the new code enforces lower densities in areas more prone to flooding. Building elevation requirements were changed to accommodate new base flood elevation maps, but as aesthetic measures, homeowners must enclose the elevated area under the house. Properties in new lower density flood zones have transferable development rights (TDR) under the new code, allowing property owners to transfer their development rights to an area with less flood hazard.

## **Allison Beasley, Planner with Southern Mississippi Planning and Development District says, “We are now planning with sustainability and hazard mitigation in mind.”**

In 2009, Pass Christian commenced construction on an \$8 million project funded by the state's Hurricane Katrina Recovery Package to improve its historic downtown.<sup>44</sup> The project includes street widening, parking areas, sidewalk repairs, decorative lighting and landscaping. At the same time, Pass Christian is repairing its city hall and library and making drainage improvements. Changes in Pass Christian will not be visible overnight. However, with enforcement, Pass Christian promises to be a more walkable, livable, and economically vibrant community.

The trend toward smart growth has led many Mississippi officials to start thinking more sustainably. Allison Beasley, Planner with SMPDD, says “We are now planning with sustainability and hazard mitigation in mind.” Through the HUD Sustainable Communities Initiative, SMPDD is part of group of organizations called the “Constituency for a Sustainable Gulf” that is reviewing all hazard mitigation plans, comprehensive plans, and any other planning document they prepared over the past five years to identify “whether sustainability or livability principles are a part of the plans” and, if they are not, how to incorporate them and set the groundwork for a more sustainable future.

## **EDA Tools Available**

EDA has various tools available to support EDDs in post-disaster long-term economic recovery, such as:

- Support to develop long-term recovery strategies and integrate recovery planning into the Comprehensive Economic Development Strategy (CEDS)
- Resources to hire a regional disaster response coordinator as a full-time EDD staff member
- Funds to establish revolving loan funds (RLFs)
- Assistance for public infrastructure improvements
- Technical assistance

## **Resources**

For more information about the regional development organizations profiled here, visit the following websites:

**Southwest Florida Regional Planning Council**  
<http://www.swfrpc.org>

**Indian Nation Council of Governments**  
<http://www.incog.org>

**Southwestern Wisconsin Regional Planning Commission**  
<http://www.swwrpc.org>

**Southern Mississippi Planning and Development District**  
<http://www.smpdd.com>

# Strategies for Incorporating Sustainable Community and Economic Development Principles into Hazard Mitigation Efforts



There are a number of ways in which RDOs can integrate hazard mitigation planning, economic development and sustainable development into their work programs. Regional entities can conduct a hazard vulnerability analysis to assess all potential disasters that could affect the businesses and population in a given area.

Once risks are identified, regional entities are well-positioned to conduct public outreach efforts and convene community members and stakeholders to review and prioritize mitigation options. Planners should review existing capital improvement projects to see if there are entry points for mitigation. Ultimately, mitigation strategies should be integrated with all other existing planning documents and capital improvements plans and programs.

In the longer term, hazard mitigation strategies provide an opportunity to create synergy with additional regional goals related to transportation planning, economic development, sustainability and other program goals. These can include linking hazard mitigation with downtown revitalization programs and support for small businesses, or developing post-disaster recovery efforts that sync with updates to comprehensive planning and land use regulations. By convening regional and local stakeholders, RDOs are instrumental to ensuring that hazard mitigation, sustainability, and economic development planning are integrated, complementary processes.

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