

Mitigation Action Plan

A Companion Report to “Mitigation
Lessons,” released 2015.



Funded by:



Prepared by:

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Firm Descriptions:

The Gulf Coast Community Design Studio (GCCDS) is a professional service and outreach program of Mississippi State University's College of Architecture, Art + Design. GCCDS was established in Biloxi, Mississippi in response to Hurricane Katrina to provide architectural design services, landscape and planning assistance, educational opportunities and research to organizations and communities along the Mississippi Gulf Coast. GCCDS works through close, pragmatic partnerships with local organizations and communities in and beyond the three Mississippi coastal counties, putting professional expertise to work in order to shape vibrant and resilient Gulf Coast communities.

The Steps Coalition (STEPS) is a grass roots, locally governed coalition of 45 non-profit, community, and civic organizations and leaders whose mission is to build a democratic movement to create a healthy, just, and equitable Mississippi Gulf Coast. Steps advances its mission by developing local leadership, supporting communities to advocate for their needs and by facilitating communication, coordination, and collaboration among our membership. STEPS aim is to create communities worth calling home. Creating livable communities for all residents along the coast hinges on a commitment to five essential values: affordable housing, economic justice, environmental justice, preservation of historical communities, and human rights.

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Introduction

The aim of the project is to develop a strategic action plan that includes a plan to strengthen community resilience, stakeholder education and coalition building, and an advocacy campaign for non-structural policies and programs. The planning project was accomplished with a series of monthly stakeholder meetings organized and conducted by Steps Coalition. The meetings took place from October 2016 to April 2017. The Gulf Coast Community Design Studio, a research and outreach arm of Mississippi State University participated in the planning process and was asked to compile the results of the work in this final report.

The Mitigation Action Plan documented in this report includes the hopes and concerns relative to the resilience of Gulf Coast com-

munities, identification of current relevant mitigation activity, descriptions of some primary activities and final a list of recommendations. The recommendations are organized around three goals that evolved from the planning process. The three organizing goals are:

- Increase disaster mitigation awareness
- Promote collaborative resilience planning
- Advocate for mitigation programs

Each of the recommendations is followed by “Next Steps” and points ahead for things that can be done to continue the collaborative effort to advance the goal of strengthening community resilience.



Figure 1. FORTIFIED Home™ inspector checks nailing pattern in roof sheathing. *Image courtesy of Habitat for Humanity of the Mississippi Gulf Coast.*

Background

Steps Coalition received a grant from Oxfam America to convene a series of planning meetings to develop an education and advocacy campaign for equitable, non-structural policies and programs that mitigate flood and wind hazards for residents and communities along the Mississippi Gulf Coast.

The planning work builds on the Mitigation Workshop held February 11, 2016 in Biloxi. The workshop was organized by Oxfam in cooperation with Mississippi State University's Gulf Coast Community Design Studio. Around twenty-five stakeholders representing various public, private and nonprofit agencies attended the workshop. The workshop was a presentation and discussion of research done by the Gulf Coast Community Design Studio, which was titled: *Mitigation Lessons: A Comparison of Flood and Wind Risk Reduction Programs for Coastal Communities*.

Mitigation Lessons is a report of research done by the Gulf Coast Community Design Studio that explores the needs and policy options for effective and equitable nonstructural programs and processes to mitigate flood and wind hazards for residents on the Gulf Coast. Both wind and flood risks and responses are rapidly changing. Repeated losses throughout the Southeast and increased insurance cost are leading to changes in both risks. The changes in wind risk management are encouraging and are leading to innovation. The changes in flood risk management are not encouraging and are

leading to increased community concerns. The encouraging changes in wind risk management are the emergence of programs that apply the Insurance Institute of Business and Home Safety's (IBHS) FORTIFIED Home program. This program has become the practical standard for the Southeast US and is on track to be the basis of a national standard. Mitigation programs following the FORTIFIED Home program are able to make certified improvements, which lead to much needed insurance premium reductions. Flood risk management is not on the same encouraging path. NFIP rates are predicted to increase for all property owners, more dramatically for some, with ongoing NFIP reform. According to a 2014 US Government Accountability Office report, NFIP has accrued \$24 billion in debt, highlighting increasing concerns about the NFIP burden on taxpayers. The Biggert-Waters Flood Insurance Reform Act of 2012 moves NFIP toward charging full-risk rates. Flood mitigation options are limited to elevating or relocating houses, both of which are costly and out of reach of low-income households without assistance.

The research evaluated seven mitigation programs that have been applied in the past decade throughout the South. The seven programs are considered for their effectiveness and funding sources. The lessons learned from these programs led to four recommendations to guide future mitigation programs.

The recommendations are:

1. Use FORTIFIED Homes as a uniform wind mitigation standard, which will result in predictable insurance savings that can be counted upon to offset mitigation costs.

2. Change the use of federal flood mitigation funds from disaster recovery to disaster preparation, following the general rule of thumb that one dollar of mitigation equals four dollars of recovery.

3. Focus both flood and wind mitigation programs on assisting low-income households, recognizing that low-income households are especially vulnerable to disasters because they do not have the resources to recover.

4. Create perpetual funding mitigation programs that will run efficiently because they don't have startup costs.

The four recommendations that were made in the Mitigation Lessons report were used for a group discussion about moving forward. It was clear from the group discussion that there is both need and opportunity to continue the conversation about hazard mitigation programs and to build on the participa-

tion of the workshop to further advance the work of community resilience. The need to advance the community conversation forward led to the Oxfam grant to the Steps Coalition.

The goal of the Steps Coalition planning work that followed-up on the Mitigation Lessons workshop is to:

Develop a strategic action plan that includes a plan to strengthen community resilience, stakeholder education and coalition building, and an advocacy campaign for non-structural policies and programs.

From October 2016 to April 2017 a group of stakeholders met monthly to create the action plan. In June 2017, with changes in personnel at the Steps Coalition, the Gulf Coast Community Design Studio was enlisted to compile the output of the stakeholder meetings and to produce this report of the action plan in order to move the work of community resilience forward.

Planning Process

The four Mitigation Lessons recommendations are specific to mitigation programs and even though they provided a good starting point it became clear in the first stakeholder meeting that the strategic action plan has a broader scope and the goals for the plan should come from the planning process. The planning process engaged the workshop participants over the course of seven monthly meetings to define goals and determine strategies to accomplish the goals.

The seven meetings followed the process briefly explained below:

Meeting one (October 25, 2016):

Goal setting activity. Participants were asked to identify their hopes and their concerns for the Mississippi Gulf Coast.

Meeting two (November 17, 2016):

Goal defining activity. Participants worked together to create SMART goals (specific, measurable, attainable, relevant, and time-bound). Four goals were defined.

Meeting three (December 15, 2017):

Assessment of Target Audiences. Participants completed a worksheet for each of the four goals answering the questions: Who are the primary target audiences; and what are the needs of the target audience to accomplish the goals.

Meeting four (January 19, 2017): Self-assessment to find niche. Participants identified unique expertise and contribution to the needs of the target population and discussed

how the strategic action plan can add value to what is already being done.

Meeting five (February 16, 2017):

Goal strategies. Participants discussed for each of the four goals what is currently being done, what information is needed by key decision makers, and what type of activities would have the best outcomes for improving resilience and reducing flood and wind insurance cost.

Meeting six (March 16, 2017):

Determine strategies to meet SMART objectives. Participants used the “if-then” test to ensure a cause and effect connection between the strategy and the desired outcome.

Meeting seven (April 21, 2017):

Evaluate goals and strategies. Participants reported on relevant conference activities at GOMA (Gulf of Mexico Alliance) and Gulf Coast East Coast Coalition. Participants evaluated goals and discussed combining four goals into two goals.

The following lists the workshop participants:

- Patrick Bonck, Harrison County Zoning
- Jennifer Crosslin, Steps Coalition
- Stephen Deal, MS-AL SeaGrant Consortium
- Johanna deGraffenreid, Gulf Restoration Network
- Kristen Greger, City of Biloxi Floodplain Management
- Rosa Herrin, Oxfam America
- Gordon Jackson, Biloxi NAACP
- Marcia Kruse, Steps Coalition
- Everett Lewis, Back Bay Mission
- Howard Page, Gulf Restoration Network and Steps Coalition
- David Perkes, Gulf Coast Community Design Studio
- Rick Stickler, City of Biloxi Flood Plain Manager
- Ruth Story, EEECHO
- Daphne Viverette, MS Department of Marine Resources GOMA Resilience Team



Figure 2. C-HOST public outreach activity. *Image courtesy of Stephen Deal.*

Goal Development

Following meeting two, four goals were defined based on the hopes and concerns of the stakeholder participants. The four goals are:

Goal # 1. Improve stakeholder and public awareness and engagement for mitigation strategies and resiliency planning.

Goal # 2. Improve collaboration among stakeholders at all levels, neighborhood or city planning to regional, for future disaster risk planning and decision-making.

Goal #3. Advocate for perpetual publicly funded flood and wind mitigation programs that benefit low to moderate income households and require little to no upfront costs to homeowners.

Goal #4. Reduce wind and flood insurance costs and improve coverage.

In meeting seven Goals #3 and #4 were merged into a single goal acknowledging that reducing wind and flood insurance costs is an expected outcome of mitigation programs so a separate goal is not needed. There was discussion to merge Goal #1 and Goal #2. However, after further consideration the two goals were kept separate in order to make a distinction between activities that aim to increase awareness and activities related to planning.

The three refined goals are explained below and used to organize the input of the workshop stakeholders.

Goal #1: Increase disaster mitigation awareness

Improve stakeholder and public awareness and engagement for mitigation strategies and resilience planning.

The list of hopes and concerns that relate to the goal to increase disaster mitigation awareness is included here.

Hopes for the Gulf Coast relative to mitigation awareness:

- All Gulf Coast residents become resilient
- Equitable, sustainable communities in the coast
- Cities and neighborhoods can properly sustain themselves for a short period of time after a disaster until comprehensive help can arrive
- Build livable high standard of living for low-income residents who can stay in place and are climate resilient
- Plan to ensure eligible persons access and information to address the problems they face
- Ensure that flood-proof, elevated homes are constructed in a way that that are accessible for elderly and disabled residents
- Educate all communities on their flood risk to make informed future decisions
- Elevate or relocate to open space
- Buy-out properties that are repeatedly flooded and damaged
- Encourage people to move to non-flood hazard areas
- Value wetlands, riparian areas and barrier islands as natural systems with social value

Concerns for the Gulf Coast relative to mitigation awareness:

- Complacency
- Old-School resistance to change
- Not realizing the sense of urgency
- Resistance to change and moving away from neighborhood

Current Relevant Activities

The organizations listed below were identified by stakeholders as entities that are currently working on mitigation awareness and/or environmental stewardship. A selected number of activities are explained below:

- Climb CDC Conservation Corps
- EEECHO – Education, Economics, Environmental, Climate and Health Organization
- GOMA – Gulf of Mexico Alliance
- Grand Bay National Estuarine Research Reserve
- Gulf Coast Community Design Studio
- Land Trust for the Mississippi Coastal Plain
- Mississippi Alabama Seagrass Consortium
- Mississippi Department of Environmental Quality
- Mississippi Department of Marine Resources
- Mississippi Environmental Focus Group
- MSU Extension Service Master Naturalist Program
- The Nature Conservancy
- Pascagoula River Audubon Center
- Sierra Club
- Smart Home America
- Turkey Creek Community Initiative
- USM Gulf Coast Research Laboratory

Smart Home America

Smart Home America is actively working in Mississippi to promote FORTIFIED Homes program. Mississippi is currently second in the nation in total designations (561) and leads the nation in retrofits. (Alabama is first in the nation with 3379 designations.) The reason Mississippi rates high is due to legislation enabling insurance discounts and leadership from both Gulf Coast Habitat for Humanity organizations. In the summer of 2017 Smart Home America will launch “Don’t Goof when you Re-Roof,” a PSA campaign that will be broadcast along the Mississippi and Alabama coast. The PSA was successful last year and is being revamped to have an even greater impact.



Figure 3. FORTIFIED Home™ Standards.

GOMA – Gulf of Mexico Alliance

The Gulf of Mexico Alliance is a five-Gulf-State regional partner network of agencies, academic organizations, businesses and other non-profit organizations with the goal of increasing regional collaboration to enhance the environmental and economic health of the Gulf of Mexico. One of GOMA's priorities is Coastal Resilience. The Coastal Resilience team is led by the State of Mississippi Department of Marine Resources. Daphne Viverette is the Restoration and Resiliency Coordinator and has participated in the strategic planning workshop sessions.

GOMA's Coastal Resilience team has several programs and resources that are important to the goal of increasing awareness of disaster mitigation. The resource that best targets the general public is the Mississippi Homeowners Handbook. The 84 page handbook is available to download and was created to help homeowners prepare for a natural hazard and reduce risk to both family and property. The handbook explains the local hazards of tornado, hurricanes and flooding, provides practical guidance on how to protect individuals and families with emergency kit and evacuation advice, offers detailed advice on protecting property as well as addresses insurance questions. The Mississippi Homeowners Handbook is a useful resource and should be promoted and distributed to help families become more resilient.

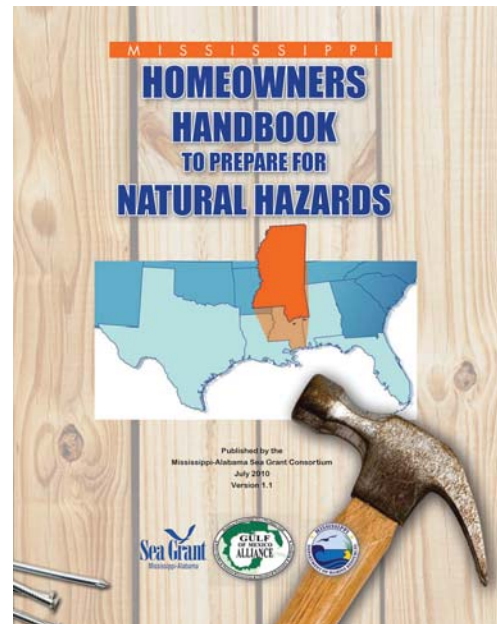


Figure 4. GOMA Homeowner Handbook.

Recommended Actions

- Write and publish articles on hazard mitigation in newspapers, magazines, journals and social media.
- Produce a one-page write-up on hazard mitigation and what individual property owners can do, which could be placed on the back of municipality meeting documents.
- Distribute Homeowner Handbook and Disaster Preparedness at building related retail stores such as Lowes, Home Depot, etc.
- Encourage municipalities to engage citizens in the revision and implementation of their Comprehensive Plan with a focus on hazard mitigation.
- Produce and distribute a tool for developers to guide site and building design decisions that will improve flood resilience.
- Expand on Smart Home America's campaign for FORTIFIED Homes with social media links of local organizations and municipalities.
- Map current activities as it relates to hazard mitigation awareness to identify gaps and make recommendations that could be used to create programs to accomplish the goal.
- Educate homeowners on ways to reduce insurance rates and how they can make their property more attractive to the insurance market.

Goal #2: Promote collaborative resilience planning

Improve coordination and collaboration for disaster risk consideration and resilience planning among stakeholders at all levels, from neighborhood to city planning and regional planning.

The list of hopes and concerns that relate to the goal to promote collaborative resilience planning is included here.

Hopes for the Gulf Coast relative to collaborative planning:

- Equitable, sustainable communities on the Coast
- Cities and neighborhoods can properly sustain themselves for a short period of time after a disaster until comprehensive help can arrive
- Build livable high standard of living for low-income residents who can stay in place and are climate resilient
- Involve many people in the effort
- Consensus for the best practices and/ or policy recommendation to make flood and wind protection a priority for the region
- Ensure that flood-proof, elevated homes are constructed in a way that are accessible for elderly and disabled residents
- A district of neighborhood centered model in which communities can take on the challenges of disaster preparedness in a collaborative manner
- Revise view of the Gulf Coast with density that aligns with flood risks
- Create a coast-wide plan to ensure structural and non-structural protections
- Elevate or relocate to open space
- Better use of land
- Buy-out properties that are repeatedly flooded and damaged
- Less flooding in the future
- Value wetlands, riparian areas and barrier islands as natural systems with social value
- Combine green and grey technologies that buttress communities against adverse environmental challenges

Concerns for the Gulf Coast relative to collaborative planning:

- Conflicting Standards and visions over the creation of resilient communities and determining a baseline for resilience
- Integrating various initiatives into a systematic approach
- Industry will not be held to the same standard as residential communities for resilience
- Lack of federal money for local zoning and state-wide community planning and resilience
- Complacency
- Old-School resistance to change
- Lack of big picture view of threats
- Not realizing the sense of urgency
- Influence of money on decision makers
- Ossified practices from some cities
- Lack of political will

Current Relevant Activities

The organizations listed below were identified by stakeholders as entities that are currently working on collaborative resilience planning. A selected number of activities are explained below:

- Flood Plain Managers Monthly Meeting
- GOMA – Gulf of Mexico Alliance
- Gulf Coast Community Design Studio
- Gulf Regional Planning Commission
- Mississippi Alabama Seagrass Consortium
- Mississippi Department of Environmental Quality
- Mississippi Department of Marine Resources
- Southern Mississippi Planning and Development District
- Turkey Creek Community Initiative

Mississippi Alabama SeaGrant Consortium – Community Resilience Index

As part of its commitment to building a more resilient Gulf Coast, the Mississippi Alabama Sea Grant Consortium created and has been using the Community Resilience Index (CRI) self-assessment tool to help municipalities and counties determine their strengths and needs in the resilience arena. The Resilience Index exercise brings many departments and other sectors of the community together to discuss resilience issues and plan together. To date, nearly 50 municipalities, counties and parishes in Mississippi, Alabama and Louisiana have participated in a Community Resilience Index workshop, led by one of nearly 100 trained facilitators. In a 2014 evaluation of the Index, 50 percent of respondents from participating communities reported their community had acted to improve resilience after participating in the index. Actions resulting from the index include identification of businesses that provide critical post-storm needs, better partnerships with state and federal agencies, and better integration of community departments in planning and response.

Six of the eleven municipalities in Mississippi have participated in the Community Resilience Index: Bay St. Louis, Biloxi, Pass Christian, Ocean Springs, Pascagoula, and Moss Point.

The purpose of the CRI assessment is to provide community leaders with a simple and inexpensive method of predicting if their community will reach and maintain an acceptable level of functioning after a disaster. Experienced local planners, engineers, floodplain managers or administrators complete the

self-assessment using existing sources of information from their community. The goal is for every community to become highly resilient. The assessment helps community leaders identify problems that should be addressed before the next disaster and where resources should be allocated. Results of the assessment are presented as a Resilience Index that estimates the adaptability of a community to a disaster.

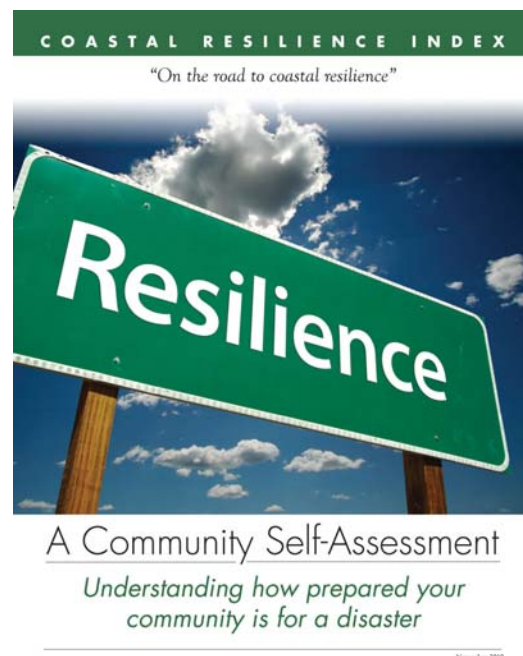


Figure v. Coastal Resilience Index.



Figure 6. Dedication of high water mark plaque. Image courtesy of Mississippi-Alabama Sea Grant.

C-HOST and the Flood Plain Managers Monthly Meeting

The Mississippi Coastal Hazard Outreach Strategy Team (C-HOST) was established in 2008 to coordinate the work of the Mississippi Gulf Coast Flood Plain Managers as well as other government officials and community stakeholders. The focus of C-HOST and the monthly meetings that have continued since its establishment are the three goals of the National Flood Insurance Program Community Rating System (CRS), which are: flood loss reduction, facilitating an accurate flood insurance rating, and promoting awareness of flood hazards and insurance. The aim of the work is to improve the overall rating in the CRS program for each community represented. The practical benefit of the monthly meetings is the sharing of information between jurisdictions and providing a meeting in which all of the floodplain managers can receive useful information.

Gulf Regional Planning Commission

Gulf Regional Planning Commission (GRPC) provides general planning support to fifteen-member governments which include all twelve cities and the three coastal counties. GRPC is administered by an appointed Board of Commissioners from across the coast that meet monthly. In its capacity as a regional governmental planning agency GRPC works closely with the local public agencies and the citizens of the MS Gulf Coast to provide tools and information that support the regional decision making process. GRPC has been a leader in resilience planning for the Gulf Coast with the Plan for Opportunity, a regional plan supported by HUD's Office of Economic Resilience. Along with the regional planning effort, the Plan for Opportunity resulted in two tools that have proven to be useful to collaborative planning: a complete parcel-based map of land use and aligned zoning notation for the entire Gulf Coast; and a scenario planning tool that is being used to inform zoning and transportation planning. An ongoing activity of GRPC that is a primary part of collaborative resilience planning is regular meetings of the region's planning officials who make up GRPC's Technical Advisory Committee. In recent years GRPC has used their convening programs to address regional resilience planning and to provide a venue for the planning officials of the various municipalities to communicate and coordinate their efforts.



Figure 7. Gulf Regional Planning Commission meeting. *Image courtesy of Gulf Regional Planning Commission.*

Recommended Actions

- Expand upon the Flood Plain Manager's monthly meeting with a scheduled additions of municipal planning, zoning, and building inspection officials to encourage peer to peer learning and exchange.
- Regularly include resilience planning agenda items in Gulf Regional Planning Commission Technical Advisory Board Meetings.
- Map current activities as it relates to resilience planning to identify gaps and make recommendations that could be used to create programs to accomplish the goal.
- Align green infrastructure planning with Community Rating System in order to reduce flood insurance rates.
- Develop a model for neighborhood scale approach to resilient community design that can inform local, state and federal policies.

Goal #3: Advocate for mitigation programs

Advocate for perpetual publicly funded flood and wind mitigation programs that benefit low to moderate income households in order to reduce risk, lower wind and flood insurance costs and improve coverage.

The list of hopes and concerns that relate to the goal to advocate for mitigation programs is included here.

Hopes for the Gulf Coast relative to mitigation programs:

- All Gulf Coast residents become resilient
- Most vulnerable families and communities have the resources they need to adapt and recover from the hazards of climate change
- Equitable, sustainable communities on the Coast
- Cities and neighborhoods can properly sustain themselves for a short period of time after a disaster until comprehensive help can arrive
- All homes on the coast are afforded the ability to avoid storm damage
- Insurance and flood protection is affordable for all residents
- Build livable high standard of living for low-income residents who can stay in place and are climate resilient
- Allow those concerned and interested, help, and access to materials and supplies
- Ensure that flood-proof, elevated homes are constructed in a way that are accessible for elderly and disabled residents
- Elevate or relocate to open space
- Buy-out properties that are repeatedly flooded and damaged

Concerns for the Gulf Coast relative to mitigation programs:

- Lack of funding
- Complacency
- Old-School resistance to change
- Resistance to change and moving away from neighborhood
- Influence of money on decision makers
- Trusting Mississippi to implement mitigation programs
- Cost and benefit formula doesn't work
- Affordability of mitigation programs

Current Relevant Activities

The organizations listed below were identified by stakeholders as entities that are currently working on advocating mitigation programs. A selected number of activities are explained below:

- EEECHO – Education, Economics, Environmental, Climate and Health Organization
- Gulf Coast Community Design Studio
- GOMA – Gulf of Mexico Alliance
- Habitat for Humanity – both Bay Waveland and Mississippi Gulf Coast affiliates
- Institute for Business and Home Safety
- Mississippi Alabama Seagrant Consortium
- Renaissance Community Loan Fund (Ready Loan Fund)
- Smart Home America
- Steps Coalition

Gulf Coast Community Design Studio – Flood Plain Mapping

In 2016, GCCDS embarked on an ambitious venture to conduct an analysis of the remaining vulnerability of populations living in Mississippi’s coastal floodplain. The research focused on the high-risk flood zones within Hancock, Harrison and Jackson Counties and sought to identify the following:

- Residential buildings below the current Base Flood Elevation (BFE), therefore making them more susceptible to future flooding and increases in flood insurance rates;
- Concentrations of more vulnerable populations including seniors, lower-income households, minorities, persons with disabilities, etc.; and
- Other flood-hazard issues as identified by floodplain managers and code officials in the jurisdictions across

the coast.

One of the first undertakings was to meet with local officials in the 15 cities and counties across coastal Mississippi. Over the summer, GCCDS met with floodplain managers, code officials, planners, public works employees and the elected leadership to identify current flood-related challenges and priorities. During these meetings attendees marked up maps that displayed parcels; building footprints; water and drainage ways; and high-risk flood zones. Many of the jurisdictions shared common challenges. Key findings from these meetings are summarized below:

- None of the jurisdictions on the coast have a comprehensive inventory of what residential buildings that are out-of-compliance in terms of the post-Katrina FEMA Digital Flood Insurance Rate Map (DFIRM) and revised BFE’s. Many jurisdictions have

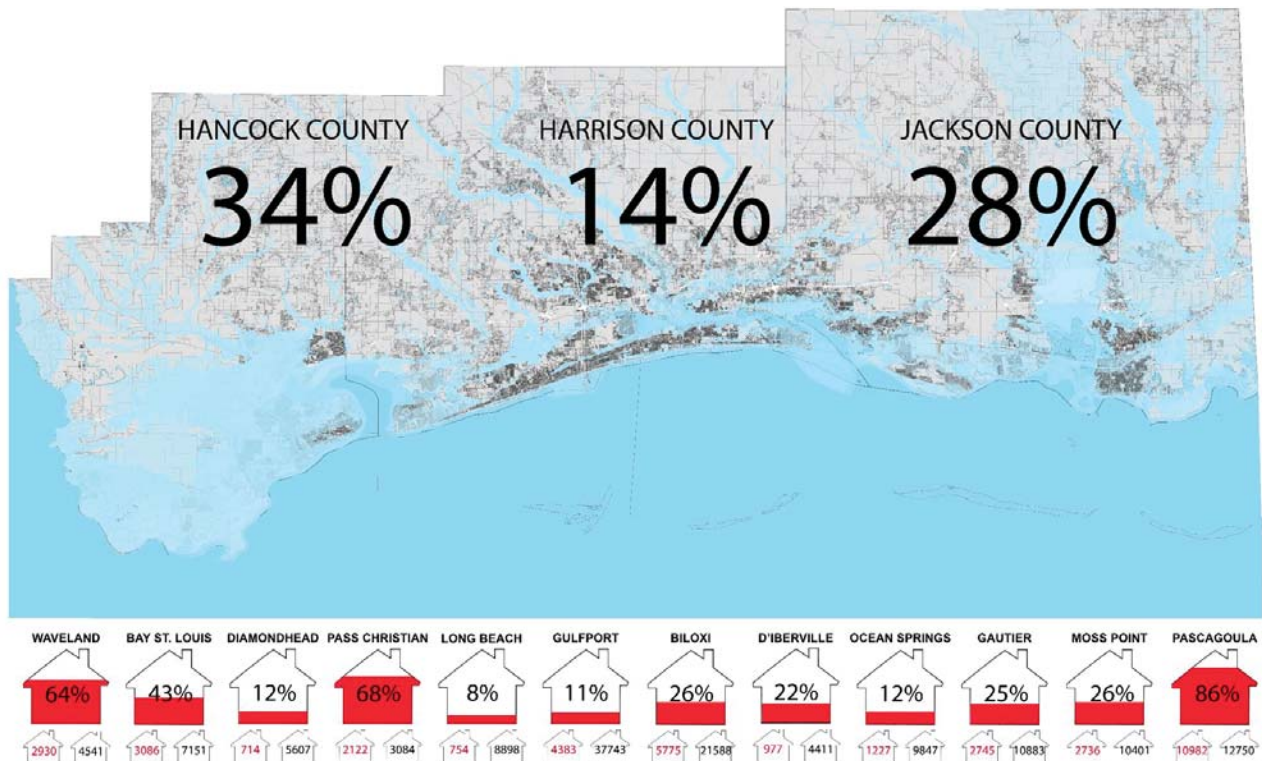


Figure 8. Percentage of Homes in flood zone.

SURVEY- Snapshot of Diamondhead

- **496 Single Family homes in high-risk flood zones (just under 13% of residential)**
- **Overall, 55% not in compliance and 17% unverifiable**
- **87% slab-on-grade (34% fill)**
- **79% of slab-on-grade not in compliance/ unverifiable**
- **11% pier foundations**
- **30% of pier foundations not in compliance/ unverifiable**

Figure 9. Diamondhead flood zone map.



an intuitive understanding of where homes that are out-of-compliance are located, but not a systematic record of the number of homes and where they are concentrated.

- Adopted freeboards range from not having any at all due to perceived political infeasibility to two feet.
- Coastal and riverine flood-related challenges are being increasingly complicated by drainage and development-related flooding and aging or inadequate infrastructure.
- All expressed challenges with redevelopment, both commercial and residential, in their flood zones. In many areas these flood zones overlap with historic downtown areas and/or perceived high-value beachfront properties – areas where the jurisdictions expected more development.

After these working sessions it became apparent that capacity to deal with flood and

drainage issues, in addition to residents' concerns related to flooding and flood insurance, varied greatly. While many jurisdictions have a highly trained Certified Floodplain Manager (CFM) whose sole responsibility is to move the jurisdiction forward in terms of flood resilience, others do not and struggle to keep up with the increasing demands of the National Flood Insurance Program (NFIP), new development, and residents' concerns. Addressing this inconsistency in knowledge of flood-hazard mitigation and connections to insurance premiums, as well as building better partnerships between jurisdictions and residents, seem to be priorities for increasing resilience on the coast.

Following the meetings with jurisdictions, GCCDS began to do an analysis of the extent to which a jurisdiction's current housing stock was located in a high-risk flood zone. See Figure viii. Hancock County has the highest percentage of residential buildings in the floodplain at 34%, followed by Jackson County

COMPONENT	NAME	DOMINANT VARIABLES
1	Female-headed households, Race [Black], and Class	QBLACK
		QFHH
		QPOVTY
		QFEMLBR
2	Working Class Families, Gendered Labor [Female]	QFAM
		PPUNIT
		QFEMALE
		QFEMLBR
		QESL
3	Lack of Education and Unemployment	QHISP
		QED12LES
		QCVLUN
		QMOHO
		QEXTRACT
		PERCAP
4	Age [Elderly]	MDGRENT
		MEDAGE
		QSSBEN
		QAGEDEP
		MHSEVAL
5	No Transportation, Race/ Ethnicity [Native American], Renters	PERCAP
		QNOAUTO
		QNATAM
		QRENTER
6	Race [Asian]	QSERV
		QASIAN
7	Special Needs	QESL
		QSERV
		QNRRES

Left: **Figure 10.** Demographic data used in Social Vulnerability Index.

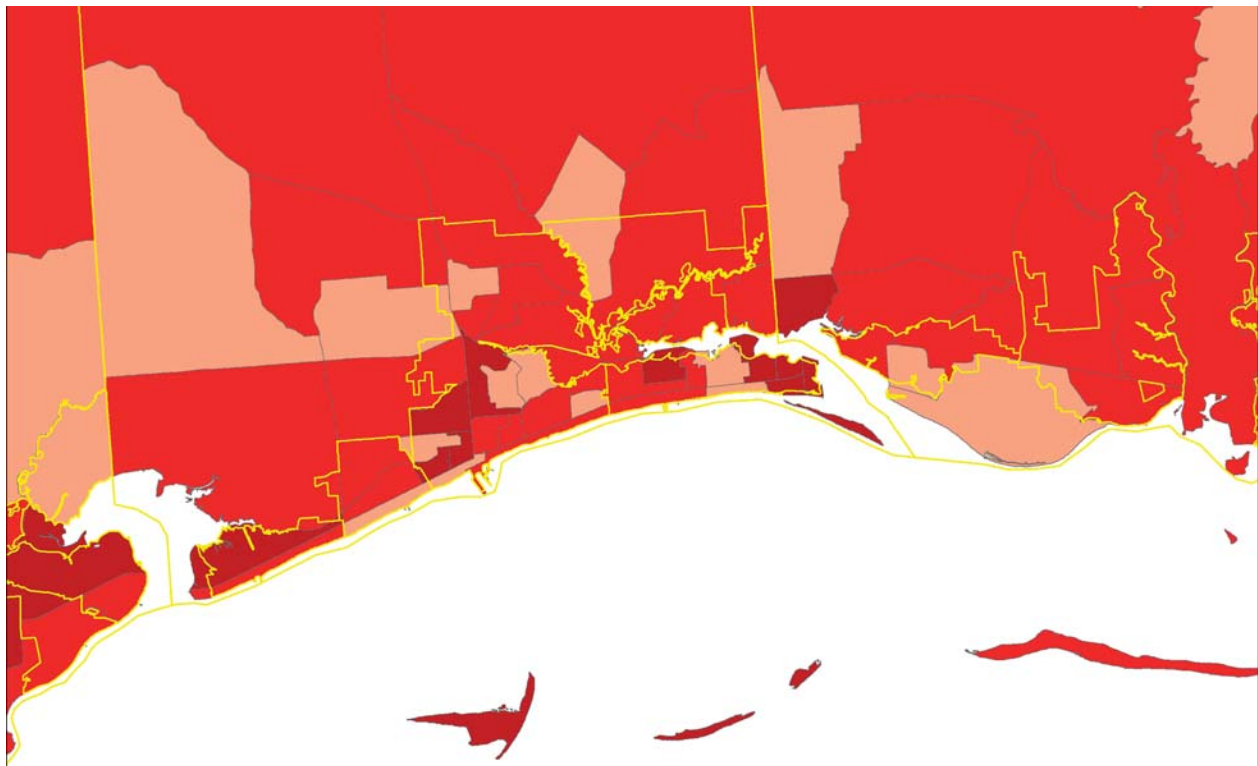


Figure 11. Map of Social Vulnerability for Mississippi Gulf Coast.

at 28% and Harrison County at 14%. Each of the counties has one city, in particular, with a significantly higher percentage of homes in the floodplain. Pascagoula has the highest for Jackson County and the Mississippi coast overall at 86%, followed by Pass Christian at 68% in Harrison County, and Waveland at 64% in Hancock County. Of the total 246,342 residential buildings in the three coastal counties 55,990 (23%) are in a high hazard flood zone.

Following Hurricane Katrina, when the FEMA flood zones were expanded, many residents found that their homes were now below the required BFE making them more susceptible to both flooding and increases in insurance premiums. Being below BFE also presents a barrier to resale and can prevent a homeowner from getting the necessary permits to complete significant renovations or repairs. Since none of the jurisdictions had a clear understanding of the extent of the problem, GCCDS staff began conducting a windshield survey of homes within high-risk flood zones. One of the first jurisdictions surveyed was the City of Diamondhead. With only 12% of homes located in high-risk flood zones this area provided a manageable area to test survey methods. Information about whether a home was slab-on-grade or built on piers was recorded, in addition to whether there was fill present and if the home was above or below BFE. The type of building (i.e. slab-on-grade vs. pier) was noted because slab-on-grade homes cost significantly more to elevate than homes built on piers. This survey method proved to be too time consuming and resource intensive given the available funding, but was incredibly informative. A snapshot of the findings from the Diamondhead survey are in *Figure ix*. GCCDS has since devised a virtual method for

conducting the same survey which dramatically reduced the transportation resources needed, but not the significant man-hours needed to survey all three coastal counties.

While working on the survey of homes below BFE, GCCDS began research on concentrations of more vulnerable populations in terms of flood hazards. The University of South Carolina's Hazards and Vulnerability Research Institute developed the well-regarded Social Vulnerability Index (SoVI®) using census-tract-level data starting in 2006. After an extensive literature review, SoVI seemed to be a good lens through which to look at concentrations of vulnerable populations. See *Figure x* for a summary of data points considered in the SoVI Index. GCCDS was able to purchase the 2010 to 2014 SoVI dataset. From this dataset it is clear that concentrations of more vulnerable populations lie (from west to east) within the more recently incorporated areas of Waveland and Bay St. Louis, much of Pass Christian, the southwestern part of Gulfport, East Biloxi and portions of Moss Point and Pascagoula. See *Figure xi*.

Should more funding become available it would be extremely beneficial to continue the survey of homes that are below current BFE and overlay that data with the SoVI data on concentrations of vulnerable populations and other relevant data such as supporting infrastructure to begin to identify location-specific recommendations for flood-hazard mitigation. This geographic information and analysis will allow the jurisdictions and other partners to discuss more productively what can be done at the household, city and state-level, both in the short- and long-term, to address flood vulnerability in coastal Mississippi.

Recommended Actions

- Use flood plain risk and vulnerability information compiled by the Gulf Coast Community Design Studio to quantify flood mitigation needs and to identify neighborhoods with greatest need.
- Assist local homeowners with things they can do to decrease flood and wind insurance costs.
- Follow up with representatives from the state legislature regarding work that was started to initiate a tax-lien-structured financing program for wind mitigation improvements.
- Convene the region's four entitlement communities to explore efforts to designate a portion of Community Development Block Grants to support mitigation projects.
- Promote and coordinate efforts of both Habitat for Humanity chapters, Smart Home America and the Renaissance Corporation to support FORTIFIED Homes program implementation.

Mitigation Actions

The recommendations associated with the three goals were organized into the following tables. A workshop of stakeholders was used to identify organizations and next steps to address each recommendation.

Goal #1: Increase disaster mitigation awareness

	RECOMMENDED ACTIONS	POTENTIAL LEAD ORGANIZATION	POTENTIAL SUPPORT ORGANIZATIONS	NEXT STEPS
1.1	Write and publish articles on hazard mitigation in newspapers, magazines, journals and social media.	STEPS Coalition	Gulf Coast Community Design Studio MSDMR GOMA Community Resilience Team	Create schedule and topics. Reach out to media outlets.
1.2	Produce a one-page write-up on hazard mitigation and what individual property owners can do, which could be placed on the back of municipality meeting documents.	MSDMR GOMA Community Resilience Team	Gulf Coast Community Design Studio	Meet to work out content. Coordinate with municipalities.
1.3	Distribute Homeowner Handbook and Disaster Preparedness at building related retail stores such as Lowes, Home Depot, etc.	MSDMR GOMA Community Resilience Team	Mississippi-Alabama Sea Grant Consortium	Reach out to stores.
1.4	Encourage municipalities to engage citizens in the revision and implementation of their Comprehensive Plan with a focus on hazard mitigation.	Mississippi-Alabama Sea Grant Consortium	Gulf Coast Community Design Studio	Reach out to cities to plan engagement strategy.
1.5	Produce and distribute a tool for developers to guide site and building design decisions that will improve flood resilience.	Gulf Coast Community Design Studio	Mississippi-Alabama Sea Grant Consortium	Secure additional funding to cover cost of creating guide.
1.6	Expand on Smart Home America's campaign for FORTIFIED Homes with social media links of local organizations and municipalities.	Smart Home America	County and city government Gulf Coast Community Design Studio	Meet to create a plan of action.
1.7	Educate homeowners on ways to reduce insurance rates and how they can make their property more attractive to the insurance market.	Smart Home America	Gulf Coast Community	Meet to create a plan of action.

Goal #2: Promote collaborative resilience planning

	RECOMMENDED ACTIONS	POTENTIAL LEAD ORGANIZATION	POTENTIAL SUPPORT ORGANIZATIONS	NEXT STEPS
2.1	Expand upon the Flood Plain Manager's monthly meeting with a scheduled additions of municipal planning, zoning, and building inspection officials to encourage peer to peer learning and exchange.	Mississippi-Alabama Sea Grant Consortium	County and city government	Discuss idea with flood plain managers.
2.2	Regularly include resilience planning agenda items in Gulf Regional Planning Commission Technical Advisory Board Meetings.	Gulf Regional Planning Commission	Gulf Coast Community Design Studio	Schedule presentation with Gulf Regional Planning Commission.
2.3	Map current activities as it relates to resilience planning to identify gaps and make recommendations that could be used to create programs to accomplish the goal.	Mississippi-Alabama Sea Grant Consortium	Gulf Coast Community Design Studio STEPS Coalition	Secure additional funding to cover cost of doing the analysis
2.4	Align green infrastructure planning with Community Rating System in order to reduce flood insurance rates.	County and city government	Gulf Coast Community Design Studio MSDMR GOMA Community Resilience Team	Discuss idea with flood plain managers.
2.5	Develop a model for neighborhood scale approach to resilient community design that can inform local, state and federal policies.	Gulf Coast Community Design Studio	MSDMR GOMA Community Resilience Team	Secure additional funding to cover cost of planning work.

Goal #3: Advocate for mitigation programs

	RECOMMENDED ACTIONS	POTENTIAL LEAD ORGANIZATION	POTENTIAL SUPPORT ORGANIZATIONS	NEXT STEPS
3.1	Use flood plain risk and vulnerability information compiled by the Gulf Coast Community Design Studio to quantify flood mitigation needs and to identify neighborhoods with greatest need.	Gulf Coast Community Design Studio	<p>STEPS Coalition</p> <p>NAACP</p> <p>Gulf Restoration Network</p>	Secure additional funding to cover cost of doing the analysis.
3.2	Assist local homeowners with things they can do to decrease flood and wind insurance costs.	STEPS Coalition	<p>Gulf Coast Community Design Studio</p> <p>MSDMR GOMA Community Resilience Team</p>	Meet to create a plan of action.
3.3	Follow up with representatives from the state legislature regarding work that was started to initiate a tax-lien-structured financing program for wind mitigation improvements.	Smart Home America	<p>STEPS Coalition</p> <p>NAACP</p> <p>Gulf Restoration Network</p>	Organize a meeting of stakeholders.
3.4	Convene the region's four entitlement communities to explore efforts to designate a portion of Community Development Block Grants to support mitigation projects.	Gulf Regional Planning Commission	<p>Gulf Coast Community Design Studio</p> <p>MSDMR GOMA Community Resilience Team</p>	Organize meeting and develop presentation.
3.5	Promote and coordinate efforts of both Habitat for Humanity chapters, Smart Home America and the Renaissance Corporation to support FORTIFIED Homes program implementation.	Smart Home America	Gulf Coast Community Design Studio	Organize a meeting of organizations.

Conclusion

The Mississippi Gulf Coast stakeholders who provided input into the planning effort already have experience and understanding of the desired outcomes and actions to achieve greater resilience. The stakeholders were able to generate a list of recommendations to increase disaster mitigation awareness, promote collaborative resilience planning and advocate for mitigation programs. Refining and organizing the recommendations was a useful exercise to be able to have a comprehensive view of possible mitigation and resilient activities. In short, the planning exercise clearly showed that the people involved in resilience work understand and are in agreement regarding what should be done. The challenges come in moving from a planning effort among like-minded stakeholders to actions that reach the entire community.

One reason that getting mitigation and resilience actions into the community is challenging is due to the fact that even among the stakeholders mitigation and resilience work is not anyone's full time job. What's more, for elected officials and other city and county officers mitigation and resilience make up an even smaller part of their day-to-day concerns. Expanding to a typical head of household and these concerns may not show up at all. Therefore, in any community, at quiet times between disasters, the work of mitigation and resilience needs champions who can bring attention to the value of the old adage that an ounce of prevention is worth a pound of cure.

Along with the need for leadership to bring attention to mitigation and resilience, there is a need for funding. Most of the recommendations listed above require the work of professionals that need to be paid. Many of the recommendations are discrete projects that could make an incremental difference in the overall effort of community resilience. Creativity is needed to match available funding with the organizations that have the capacity and standing in the community. A missing expert in the stakeholder group was a person with experience and knowledge of fund raising. Much good could be accomplished in a community that could bring in the financial resources to address mitigation and resilience needs.

Finally, even if the recommendations in this report only spur a few actions, the benefits are well worth the effort. Often good work advances not because someone starts from scratch but when someone doing good can add to what they are already doing. The hope of this work is that the recommendations will reinforce the good work being done and continue the effort to build more resilient communities.

