The View from the Coast

LOCAL PERSPECTIVES AND POLICY RECOMMENDATIONS ON FLOOD-RISK REDUCTION IN SOUTH LOUISIANA

CENTER *for* PLANNING EXCELLENCE

Acknowledgements

/// Authors

Camille Manning Broome, *Center for Planning Excellence*

Jeannette Dubinin, *Center for Planning Excellence*

Pam Jenkins, PhD, *University of New Orleans*

/// Editors

Elizabeth "Boo" Thomas, *Center for Planning Excellence*

Jessica Kemp, PhD, *Center for Planning Excellence*

/// Designers

Tim Basilica, *Center for Planning Excellence*

/// Coastal Resilience Advocacy Group Members:

Derek Brockbank, *Restore the Mississippi Delta Coalition*

Craig Colten, PhD, *The Water Institute of the Gulf*

Michelle Erenberg, *Ocean Conservancy*

Brian Jackson, *Environmental Defense Fund*

John Lopez, PhD, *Lake Pontchartrain Basin Foundation*

Telley Madina, *Oxfam*

Simone Maloz, *Restore or Retreat*

Doug Meffert, PhD, *Audubon Society, Louisiana Chapter*

Corey Miller, *Coalition to Restore Coastal Louisiana*

Margaret Reams, PhD, *Louisiana State University*

Cynthia Sarthou, *Gulf Restoration Network*

Maura Wood, *National Wildlife Foundation*

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MISSION

The Center for Planning Excellence (CPEX) helps create highly functional, equitable communities throughout Louisiana that capitalize on their unique qualities through community-driven planning and implementation.

We advocate for a more livable Louisiana through visionary planning.

FIRM DESCRIPTION

CPEX is a non-profit organization that coordinates urban, rural and regional planning and implementation efforts in Louisiana. We provide best-practices planning models, innovative policy ideas, and technical assistance to individual communities that wish to create and enact master plans dealing with transportation and infrastructure needs, environmental issues, and quality design for the built environment. CPEX brings community members and leaders together and provides guidance as they work towards a shared vision for future growth and development.

This report is part of a series providing model tools and policies towards reducing flood risk in coastal Louisiana.

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Preface

Natural and historical forces mount an overwhelming challenge to Louisiana, as we work to restore and protect our coast. But we have not shied from the task. The State has secured and invested billions of dollars, and we have begun to profoundly re-engineer the coastal landscape to make Louisiana's working coast both more resilient and more sustainable.

Hurricanes Katrina and Rita demonstrated that levee protection itself is not enough, and therefore it is now widely recognized that additional "lines of defense" are needed. Even as the State moves forward on massive earth-moving restoration and protection projects, this report hopes to keep our collective attention also on "nonstructural" risk reduction: flood-proofing, elevation, acquisitions, building codes, land use planning, regulation, hazard mitigation planning, and public education. These provide critical last lines-of-defense, and a comprehensive coastal approach requires that they be coordinated, funded, and implemented.

This report is a synthesis of input gathered from stakeholders. It is intended to drive forward actions that promote nonstructural measures. It is directed to elected leaders and other policy makers at all levels of government across Louisiana, as well as to the millions of Louisianians for whom they work.

To date, local communities have been in the lead on nonstructural initiatives – they are the ones "in the trenches," making land use and risk-reduction decisions everyday. So this report explores and documents the perspectives of local residents, property owners, and leaders towards nonstructural efforts.

"The View from the Coast" recognizes that many state agencies already play roles in supporting nonstructural risk reduction. It therefore provides a framework for coordination for these efforts and discussions with the relevant agencies targeted in this report have already begun. "The View from the Coast" proposes nonstructural strategies that both support local government and are supported by local communities; and it recommends dedication of resources to support state and local efforts, as they advance the difficult work of managing the flood risks inherent to life in South Louisiana.

Introduction

South Louisiana faces a crossroad

AT ISSUE:

Protecting and restoring the state's coast, in order to manage the region's grave risk from floods. Daunting challenges threaten the Gulf Coast. Hurricane winds and storm surge, relative sea-level rise, salt-water intrusion, land loss, and damage from drilling and resource extraction – the negative impacts of these events have been accruing for decades.

But Louisianians now recognize that coastal protection, restoration, and flood risk-reduction are interconnected. Across all sectors, Louisianians understand that their Gulf Coast is home to irreplaceable economic, human, and ecological resources.

This working coast leads the nation in crude oil extraction and is second for production of both natural gas and seafood (fish and shellfish). Louisiana's coastal cultures are unique, characterized by generations-old folkways deeply connected to the bayous and marshes. The natural environment that harbors these economic and cultural assets also provides an invaluable habitat for fowl, fish, and wildlife; it also provides a crucial barrier against hurricane winds and storm surge. And Louisianians understand that it is at risk of washing away.

State leaders were spurred to action by hurricanes Katrina and Rita and the BP Deepwater Horizon blowout. They asserted the political will to take forceful action, and as a result, funding is coming into the state on a scale unlike anything before. The state has also become a national leader in coastal science and engineering, including top programs at Louisiana universities and the creation of the Water Institute of the Gulf.

Over the last eight years, the State, through Louisiana's Comprehensive Master Plan for a Sustainable Coast (Coastal Master Plan), has focused on building levees, and restoring coastal marshland and barrier islands. Billions have been secured to continue progress on these efforts to restore and protect Louisiana's coast. But amidst these early successes, there is a growing recognition among many experts – and increasingly, among people living on the coast – that the large, earth-moving restoration and structural protection projects mandated by the Coastal Master Plan cannot alone provide a complete solution to flood risk. In order to have the greatest impact on risk, structural projects such as levees need to be augmented and supported by broader actions and strategies – "nonstructural" initiatives – that address where people live in the landscape and how they build their homes.

Some nonstructural solutions involve some level of land planning or regulation. In Louisiana, these are often seen as being in conflict with property rights. Before Katrina, in fact, community planning was rare beyond metropolitan areas. Moreover, because land use is a predominantly local issue, it is challenging for the State to exert leadership in this arena. But since 2005, demand for planning has risen in communities across the state, and especially on the coast.

Right now, Louisiana's leaders have a unique opportunity to help ensure the success of coastal protection, restoration, and flood-risk reduction efforts by integrating nonstructural approaches into existing plans and developing a truly comprehensive approach to saving our coast, our economy, and our communities.

The CPRA's Coastal Master Plan and "Nonstructural" Strategies

In late 2005, following Katrina and Rita, the State Legislature established the Coastal Protection and Restoration Authority (CPRA). Since then, the State has taken a necessarily aggressive approach to protecting its coastal population and assets and reversing wetland loss and coastal erosion.

The CPRA released Louisiana's Comprehensive Master Plan for a Sustainable Coast (the Coastal Master Plan) in 2007, and its first five-year update was completed in 2012. The updated Coastal Master Plan is the most comprehensive plan for restoration and protection Louisiana has ever had, and it stands as a model for other coastal regions. The 2012 Coastal Master Plan lays out restoration and structural protection projects over the next 50 years, across Louisiana's Gulf Coast.

The 2012 Coastal Master Plan also recognizes that the success of these structural initiatives is contingent upon complementary implementation of nonstructural strategies. The Coastal Master Plan specifically includes three types of "physical" nonstructural measures in its 50-year implementation horizon: flood-proofing, elevation, and acquisitions. The plan also notes the need for "programmatic" nonstructural strategies, including building codes, land use planning, regulation, hazard mitigation planning, and public education. The physical nonstructural measures are however presented in a generalized, conceptual fact sheet form only (in Appendix A2); programmatic elements are addressed only at a strategic

Since 2007, the State succeeded in:

- Moving more than **200 projects in 20 parishes** into design and construction
- Building or improved more than **159 miles** of levees
- Benefitting over **19,500 acres** of coastal habitat
- Constructing **32 miles** of barrier islands and berms
- Securing approximately **$17.5 billion** in funding for protection and restoration projects
- Developing the **Flood Risk & Resilience Viewer**

level (in Appendix F2). (For more detail on CPRA's methodology and recommendations, see below under "Recommendations," p.44.)

Since the 2012 plan was published, efforts to strengthen CPRA's capacity to implement nonstructural approaches resulted in the establishment of the Nonstructural Subcommittee of the CPRA Board and the CPRA Flood Risk & Resilience Advisory Group. These actions represent an important step towards securing the future of the coast, and they make possible implementation of the first phase of nonstructural recommendations in the Coastal Master Plan. By advancing nonstructural initiatives, the Flood Risk & Resilience Program has the potential to enhance both the effectiveness of the CPRA's structural projects and the overall viability of Louisiana's coastal communities into the future.

At present, however, these new groups' potential remains only partially realized due to resource constraints. CPRA is focused on the structural protection and restoration components of the Coastal Master Plan, and there is a pressing need for additional capacity to be dedicated to active advancement, coordination, and implementation of nonstructural initiatives across coastal Louisiana. Specific details on the framework and implementation of the Flood Risk & Resilience Program are currently not available but are slated to be incorporated into the next update of the Coastal Master Plan. CPEX's "The View from the Coast" is an important step towards strengthening nonstructural initiatives across Louisiana.

CPRA's recently released Flood Risk & Resilience Viewer is another tool which displays information on coastal land change flood risk, and impacts to communities. It integrates the results of CPRA's 2012 Coastal Master Plan along with coast-wide data including infrastructure, social vulnerability, and other elements of the built environment. This resource is provided by CPRA to enable individuals to have a better understanding of their flood risk.

CPRA is currently administering large-scale, multi-year structural projects. Simultaneously, and on their own, sometimes independent paths, local communities are using recovery funds from hurricanes and the Deepwater Horizon spill to implement their own risk-reduction projects and programs – structural and nonstructural, physical and programmatic. At the same time, various state agencies (including the Department

Methodology

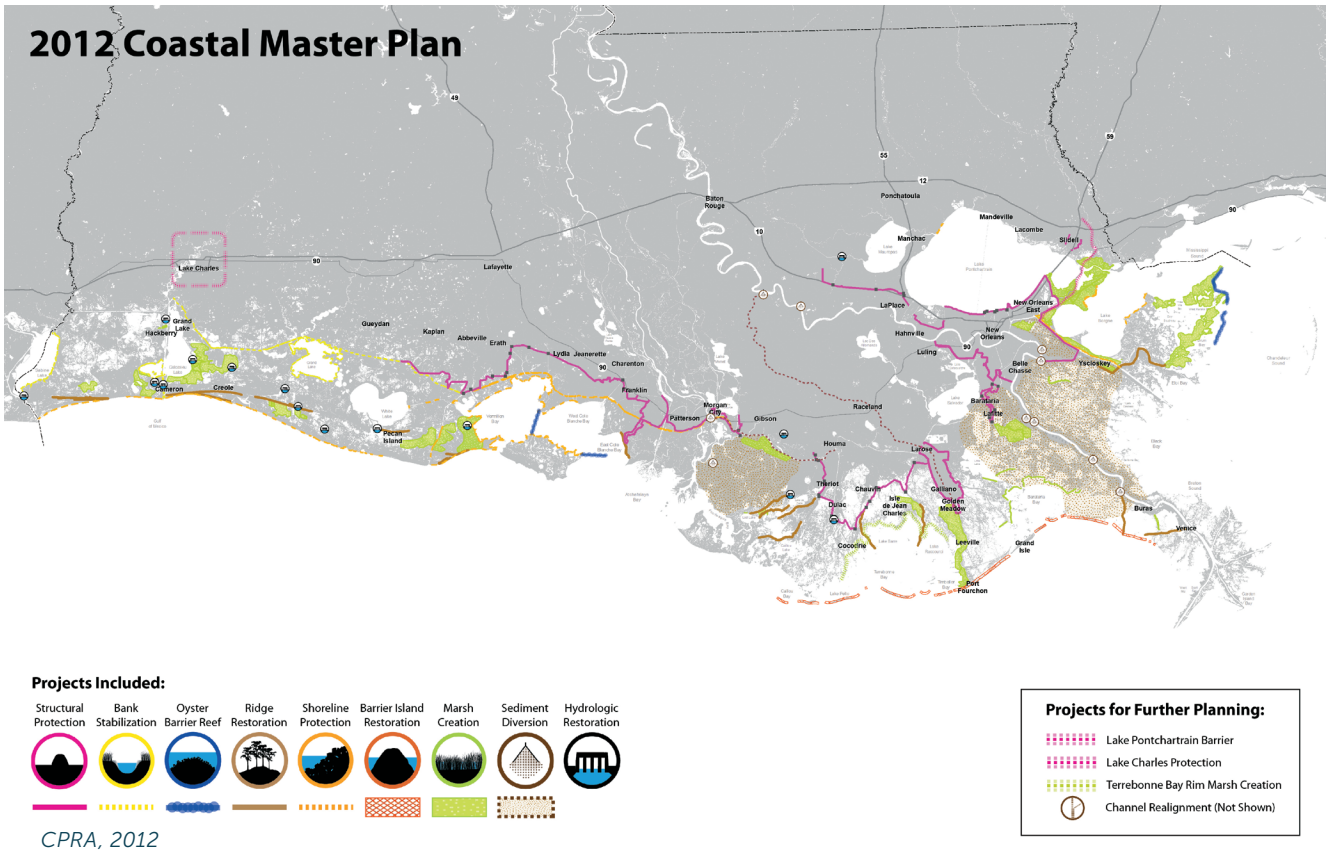
For this research, we used a multi-pronged methodology.

This included interviews and focus groups with officials representing coastal parishes and municipalities, and a poll of residents living in the coastal zone. Additionally, the findings and recommendations of this report were developed, discussed, and vetted through workshop discussions the Coastal Resilience Advocacy Group.

56 INTERVIEWS + FOCUS GROUP PARTICIPANTS

800 COASTAL RESIDENTS POLLED

8 WORKSHOP DISCUSSIONS



CPRA, 2012

of Transportation and Development, Department of Natural Resources, and the Governor's Office of Homeland Security and Emergency Preparedness) are administering their own ongoing nonstructural risk reduction programs. These state-led plans and programs are often not as well-coordinated with each other or local priorities as they could be, in part because state government never has had a robust infrastructure in place to facilitate inter-agency coordination. This is especially problematic for areas planned for large CPRA protection projects. To strengthen the elements of the Coastal Master Plan and advance restoration and structural and nonstructural strategies in tandem, more concerted efforts are needed.

"The View from the Coast"

In 2009, to begin to address the gap in support for and coordination of nonstructural initiatives, the Center for Planning Excellence (CPEX) offered support for CPRA's nonstructural program through the development of guidance and resources for local communities: the Best Practices Manual for Development in Coastal Louisiana and the model ordinances contained in the Louisiana Coastal Land Use Toolkit.

In 2012, CPEX continued its support for CPRA's nonstructural efforts by launching a research initiative across south Louisiana to capture local perspectives risk-reduction efforts and the challenges to implementing them. A key goal was to answer a Coastal Master Plan's recommendation to "identify the needs of Louisiana residents and encourage the development of those projects, programs, and tools that meet these identified needs and gaps," including financial support where appropriate to "support parish level implementation" (pp. 157-8). The perspectives, resources, and information gained from

CPEX's research intend to inform CPRA's Flood Risk & Resilience Program.

This research was the basis for the present document, "The View from the Coast: Local Perspectives and Policy Recommendations on 'Nonstructural' Flood-Risk Reduction in South Louisiana."

"The View from the Coast" examines local perspectives from across coastal Louisiana, related to nonstructural risk reduction. It considers local attitudes, ongoing nonstructural initiatives, efforts, and existing needs and challenges. The document provides quantitative and qualitative research results, and it provides recommendations to CPRA and other state and federal agencies related to policy, programs, and legislation.

The research presented in "The View from the Coast" reveals that local governments and populations are in many instances working hard to implement nonstructural strategies, but also that they often feel frustrated by challenges and barriers – among them state and federal programs that seem poorly aligned to help.

Separately, this paper's authors – supported by a team of experts from state and national non-profit organizations, many of whom also participated in the development of the 2012 Coastal Master Plan – offer recommendations related to existing or new policy, programs, legislation, and coordination at the local, state, and federal levels. In offering these recommendations, the authors were informed by locals' experience and opinions, but the recommendations are intended to make system-wide improvements towards implementation of nonstructural measures; they are not intended to convey changes specifically sought by local stakeholders.

It should be noted that many of this report's recommendations deliberately echo and reinforce those developed in the Nonstructural Implementation Strategy (Appendix F2) of the CPRA Coastal Master Plan. In fact, much of the content of these recommendations can be seen as pressing for concrete implementation of concepts that were initially advanced in the CPRA's 2012 plan. Certainly, the most significant new recommendation is that the State dedicate funding to implementing nonstructural programs.

The necessary initiatives have been proposed. The question is when.

Summary

Research Findings

- Elected officials do not necessarily distinguish between structural and nonstructural risk reduction measures
- Elevation is the most frequently used and desired of all nonstructural strategies, but it has significant challenges related to cost and grant-program design
- Implementation of elevation is inconsistent across the coast and within communities
- Cost and coverage uncertainties related to the National Flood Insurance Program and the Biggert-Waters Reform Act of 2012 are major concerns for local governments
- NFIP reform and rules are pushing local officials away from nonstructural strategies that they would otherwise consider

- Many parishes and municipalities lack capacity to participate in NFIP's Community Rating System
- Officials are hesitant to regulate real estate development for fear of constituent backlash, and they believe that state initiatives are less controversial for them
- Coastal Louisianians are increasingly motivated to invest in their community's safety — in ways that sometimes surprise their own leaders
- There is useful guidance and data on nonstructural and mitigation options available, but decision-making is stalled by "information overload"
- Parishes and municipalities want to have more public education available, but find challenges in making it effective and inclusive
- Parishes and municipalities are challenged to attain (or maintain) adequate capacity and training for implementing nonstructural measures
- Residents are already – slowly – moving out of southern coastal areas, leaving communities in those areas to struggle for their existence
- Acquisition is an extremely cost-effective way to reduce risk, but can also be difficult and unpopular to implement

Recommendations

- Fulfill 2012 Coastal Master Plan recommendations by establishing a dedicated funding stream for physical and programmatic nonstructural risk-reduction initiatives
- Establish stronger coordination for agencies working on nonstructural issues
- Establish or designate a lead coordinating entity for local governments' work on nonstructural issues
- Meaningfully and specifically engage nonstructural risk reduction in Coastal Louisiana in the 2017 Coastal Master Plan update
- Enhance the Coastal Zone Management program
- Continue to require compliance with the Uniform Construction Code
- Enhance Community Rating System participation by increasing incentives and reducing barriers
- Enhance information and interactions related to the National Flood Insurance program and Flood Insurance Rate Maps
- Advance strategies that integrate local Hazard Mitigation Plans more closely with local comprehensive and land use planning
- Support efforts to streamline and integrate local applications for FEMA Hazard Mitigation Assistance grants
- Develop best practice guidelines for hazard mitigation and land use plans in Coastal Louisiana
- Develop and promote public-information and education resources related to nonstructural risk reduction
- Develop best practice guidelines for elevation and for construction behind levees

Interviews

First, we identified elected officials representing the 20 parishes in Louisiana's Coastal Management Zone. Then, nine municipalities were added to get the perspective of cities and towns. These were selected to solicit a variety of views based on location, size, and coastal risk; they spanned southern Louisiana.

Using the case-study design (Creswell, 2013; Yin, 2009) we investigated the dimension of nonstructural mitigation through semi-structures interviews (Kvale and Brinkmann, 2009) with elected officials and decision makers. We used a pre-set and uniform outline of topics and questions, but also probed for follow-up details, allowed for open exchange and discussion among participants, and were free to follow interesting tangents or new topics.

Our questions were organized topically, in part using CPRA's 2012 Coastal Master Plan as a guide .

We met with elected officials and staff in 16 coastal parishes and five municipalities. Each interview or focus group lasted one to two hours and we documented them using longhand notes. We edited the notes for clarity and then returned them to the participants for review and validation. Once the participants completed their reviews, we coded the comments by topic (Saldana, 2013).

Quotes presented in this report should be understood to be accurate and validated expressions of what participants said, although they may not be word-for-word transcriptions. We received written consent from interview participants to use their words.

Participants

Calcasieu Parish

Shannon Spell, *Police Juror, District 1*

Laurie Cormier, *Coastal Zone Manager*

Wesley Crain, *Director of Planning and Development*

Pam Mattingly, *Floodplain Manager (ret.)*

Jennifer Wallace, *Assistant Director of Planning and Development*

Cameron Parish

Ryan Bourriaque, *Parish Administrator*

Earnestine "Tina" Horn, *Parish Administrator (ret.)*

Iberia Parish

Carmen Judice, *Floodplain Manager (former)*

John Raines, *Director Planning and Zoning*

Jefferson Parish

John Young, *Parish President*

Kazem Alikhani, *Department of Public Works Director*

Michelle Gonzales, *Floodplain Manager*

Mitch Theriot, *Director of Drainage*

Fred Trowbridge, *Assistant to the COO*

Lafourche Parish

Kerry Babin, *Director of Public Works (ret.)*

Archie Chiasson, *Parish Administrator*

Darla Duet, *Floodplain Manager*

Patricia Matherne, *Planning Manager*

Amanda Penick, *Permit Coordinator, Coastal Zone Management*

Gary Washington, *Department of Public Works Supervisor*

Livingston Parish

Mark Harrell, *Director, Livingston Parish Office of Homeland Security and Emergency Preparedness*

Brandi A. Janes, *Deputy Director, Livingston Parish Office of Homeland Security and Emergency Preparedness*

Orleans Parish / City of New Orleans

Charles Allen, *Director Mayor's Office of Environmental Affairs (former)*

Kristin Gisleson Palmer, *Councilmember (former)*

Jerry Sneed, *Deputy Mayor for Public Safety and Director for the Office of Homeland Security and Emergency Preparedness*

Nicole Webre, *Legislative Director (former)*

St. Bernard Parish

Jerry Graves, *Parish Administrator (former)*

David Peralta, *Parish President*

Candace Watkins, *Floodplain Manager (former)*

St. Charles Parish

Kim Marousek, *Director of Planning (former)*

V.J. St.Pierre, *Parish President*

St. James Parish

Jody Chenier, *Director of Public Works*

Timmy Roussel, *Parish President*

St. John the Baptist Parish

Kristi Muller, *Zoning Regulatory Administrator*

Natalie Robottom, *Parish President*

St. Martin Parish

Guy Cormier, *Parish President*

Beth Guidry, *Executive Director, Economic Development Authority*

St. Tammany Parish

Patricia Brister, *Parish President*

Gina Campo, *Chief Operating Officer*

Tangipahoa Parish

Alyson Lapuma, *Director of Planning*

Terrebonne Parish

Doug Bourg, *Executive Assistant*

Michel Claudet, *Parish President*

Jennifer Gerbasi, *Recovery Planner*

Pat Gordon, *Department of Planning and Zoning Director*

Geoffrey Large, *Assistant Director of Planning and Zoning*

Chris Pulaski, *Senior Planner and Zoning Administrator*

Vermilion Parish

Carolyn Bessard, *Assistant Parish Administrator*

Linda Duhon, *Parish Administrator*

Nathan Granger, *Police Jury President (former)*

City of Abbeville

Charlene Beckett, *Main Street Manager*

Mark Piazza, *Mayor*

City of Lake Charles

Randy Roach, *Mayor*

City of New Iberia

Hilda Curry, *Mayor*

City of Slidell

Tara Hunter, *Director of Planning*

Timothy Mathison, *Chief Administrative Officer*

Town of Jean Lafitte

Timothy Kerner, *Mayor*

Partners

We hosted three workshops at various points in the research. The Coastal Resilience Advocacy Group comprised of representatives (acknowledged on Page 1) of various area and national non-governmental organizations working in Louisiana's coastal zone. Each session lasted approximately two hours. The first workshop brought together the Coastal Resilience Advocacy Group for "The View from the Coast" to identify key concepts for a flood risk-reduction program. The second workshop was focused on reviewing and honing the preliminary findings. The third was devoted to reviewing and improving the draft recommendations that the project team developed.

Document development and validation

Following the research and analysis, the text of "The View from the Coast" was developed, comprised of two main components: findings and recommendations. The draft findings were reviewed internally, by CPRA staff, and by the non-profit stakeholder Coastal Resilience Advocacy Group. Once the recommendations were developed, we held five workshops across the coast to present this work to the interview participants to gather their feedback and input. We had a 85% re-participation rate at the workshops and received feedback from 25% of the participants. The feedback from all sources was incorporated into this report.

Poll Sample

To understand how Louisiana residents in the coastal zone perceive quality of life, plans to relocate, risk perception, and disaster preparedness, we worked with consultant, American Strategies, to conduct a poll. The independent pollster's services were made available through a partnership with area Realtors' associations across south Louisiana and the National Association of Realtors. We worked closely with American Strategies to formulate the poll questions and to develop the analysis. American Strategies carried out the poll via telephone; 800 residents were involved, representing a broad cross-section of the population. The outcomes from the residents' poll helped to establish the findings in "The View from the Coast," as well as to inform the report's recommendations.

Research Findings

The research for "The View from the Coast" found that local communities in coastal Louisiana perceive a growing disconnect between themselves and the State in regard to their various efforts to reduce risk. It also revealed locals' frustration at trying to make state and federal programs work well for them, and their perceived inability to coordinate nonstructural efforts, both locally and regionally.

This section describes the research team's findings; it is grouped by significant areas of local concern, as identified during the analysis of the interviews, focus groups, and polling data.

Overview

Defining nonstructural measures

Elevation

Flood Insurance

Community Development Plans + Standards

Knowledge Sharing

Relocation + Voluntary Acquisition — and their Impact

KEY FINDING

Elected officials did not distinguish between structural and nonstructural risk reduction measures.

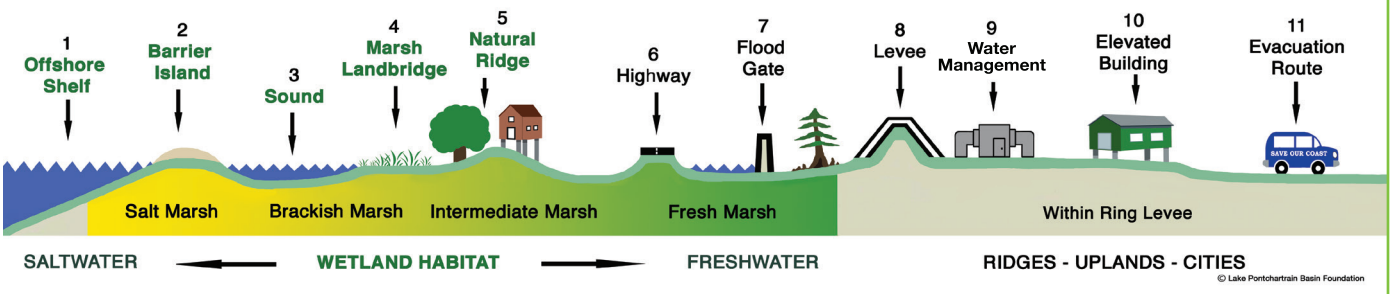
In fact, many of those we interviewed responded by using a process of elimination. They stated what structural measures are to conclude that other risk-reduction measures were nonstructural.

The US Army Corps of Engineers (USACE) coined the term "nonstructural" to distinguish "structural" protection measures that create physcial barriers - levees and floodwalls - from all other activites that also reduce risk. The State of Louisiana, through the Coastal Master Plan, further distinguishes risk reduction measures into restoration projects and structural protection projects — narrowing the definition of nonstructural activities intended to reduce risk.

The terms "structural" and "nonstructural" are frequently used in state and federal programs and by the bureaucracies that administer them, but at the local level, the activities and measures to reduce risk are not so clearly differentiated. Some local officials simply define nonstructural as anything that is "not structural", without really considering what all that might include; others define it as programs or initiatives driven by people, rather than physical solutions. When asked what they associated with the term "nonstructural", interviewees listed many risk reduction measures. Those individuals who are directly and professionally involved with the implementation of risk reduction measures readily distinguished between structural and nonstructural, but higher-level local decision-makers made no such distinction.

Rather than concerning themselves with distinctions between "structural" and "nonstructural, local officials showed an overwhelming desire simply to protect their communities — in any manner available.

Multiple Lines of Defense



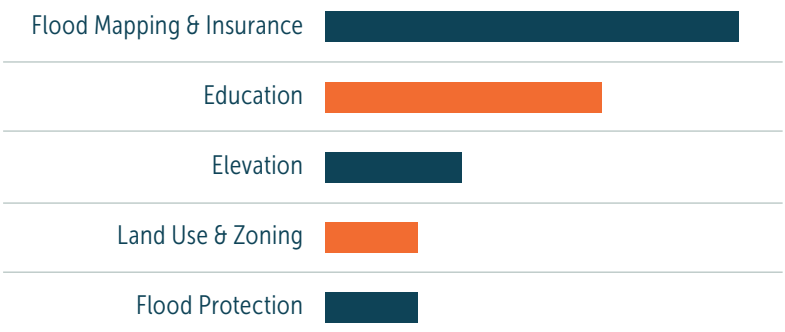
Defining nonstructural at the local level

A common vocabulary is needed for effective communication and collaboration, however, the common interest in risk reduction may be undermined if communication challenges prevent state and local stakeholders from understanding one another. CPRA has taken an important step towards resolving this problem by establishing the Flood Risk & Resilience Program. While there are important technical distinctions made between structural and nonstructural risk reduction measures in state and federal programs, they are not as likely to be differentiated at the local level — particularly not by local government or civic leaders.

There is a general awareness that both structural and nonstructural measures will reduce risk. For example, the value of a "multiple lines of defense" approach, developed by the Lake Pontchartrain Basin Foundation, is widely recognized at the local and state levels. This approach utilizes both structural and nonstructural measures to decrease risks for those living in the challenging coastal environment.

Local interview participants indicated that they take a holistic view of risk mitigation, focusing on outcomes and results, more than the means — or programmatic category — by which they are achieved. At the local level, most interviewees felt that structural protection measures provide better protection than nonstructural measures. But there was also a recognition that levees are less able to address the nuisance effects of non-catastrophic floods; that if (and when) levees fail, there needs to be a backup "line of defense"; and that levees can take years or decades to fund and build.

Relative importance of nonstructural measures to interview participants:



In the Coastal Master Plan, structural protection measures specifically include earthen or other engineered barriers such as levees, concrete walls, floodgates, and pumps.

Nonstructural protection measures, meanwhile, are divided into "physical" and "programmatic" measures. These measures are often implemented at the local level.

PHYSICAL

- Elevation
- Flood Proofing
- Voluntary Acquisition

PROGRAMMATIC

- Land Use Planning
- Zoning
- Land Use Ordinances
- Building Codes
- Higher Regulation Standards
- Public Education
- Adaptation
- Mitigation

For an excellent and comprehensive history and typology of nonstructural risk mitigation measures, including discussions of the advantages and challenges of various measures, see the National Hazard Mitigation Association's 2012 white paper, *Safe, Secure, and Sustainable: Advancing Nonstructural Hazard Mitigation in Coastal Louisiana.*

KEY FINDING

Elevation is the most frequently used and desired of all nonstructural strategies, but it has significant challenges related to cost and grant program design.

In fact, many whom we interviewed stated that there are more people who want to elevate than there are available funds and that elevation is currently cost prohibitive.

We live and die with the levee. If there is a levee failure, a flood event could be catastrophic, even for those living outside of the floodplain.

— JERRY GRAVES

Elevation refers to the practice of raising a new or existing building to or above a calculated 1%-chance annual flood elevation (also known as the "base flood elevation" or BFE) or the historical flood of record.

This strategy reduces vulnerability to flooding by placing both real and moveable property above the height of potential floodwaters.

Elevation is the most frequently used of the nonstructural strategies, but local officials have a number of concerns about its use. Representatives of every parish and municipality that were interviewed mention cost as a key challenge for elevation.

The cost issue arises in two ways. First, for many parishes, there are more residents who want their homes elevated than there are funds available. Second, residents often have difficulty meeting the match for elevation. Depending on the grant, a property owner will have to contribute up to 25% towards the cost of elevation. Depending on the type of home, elevation can exceed the value of the house — costing upwards of $100,000. This is a significant challenge for many homeowners, according to local officials.

Also, program design and human nature tend to steer the implementation of elevation programs to be reactive, rather than preventative. Key federal funds that can be used for elevation only become available after a federally declared disaster. Oftentimes, state and local program administrators favor properties that have suffered substantial damage to receive such funds, even though they can be applied more broadly. And although other Federal Emergency Management Agency (FEMA) mitigation

Average elevation cost per square foot **$74**

with federal programs requiring a match of up to **25%**

funds are available to elevate properties that are at risk but have not recently suffered flooding, such funds are limited and highly competitive — and often property owners with no history of flooding are less eager to invest in elevation.

Local officials also expressed increasing concern about the effectiveness of existing grant-program design — which is implemented on a property-by-property basis — for reducing aggregate risk to the larger neighborhood and community.

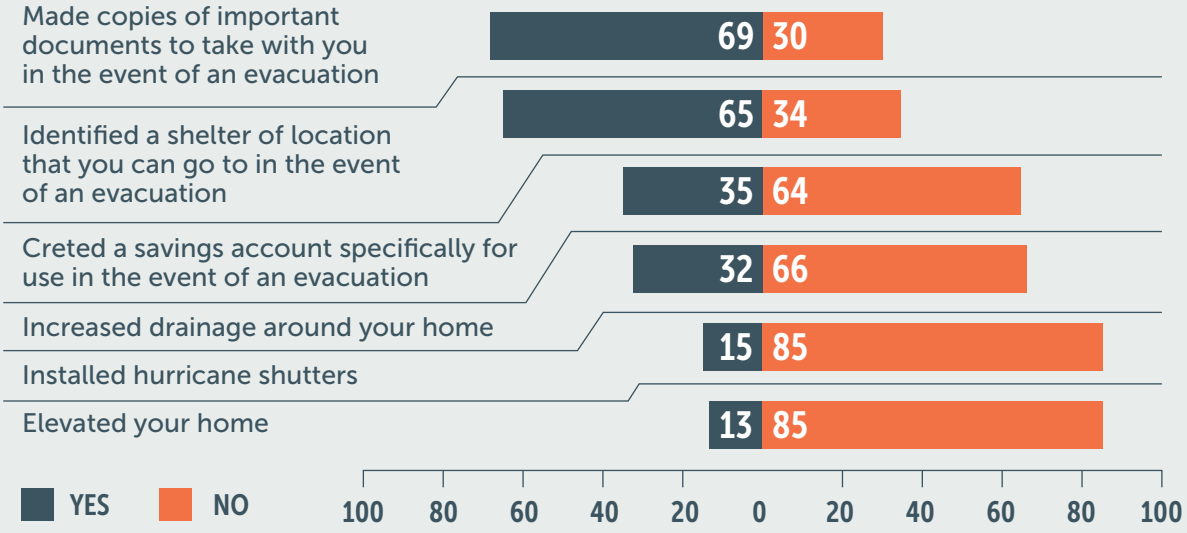
Finally, local officials relayed that the process by which contractors for home elevation are reimbursed was too lengthy. As a result, contractors will delay working until they are reimbursed for the work performed. This in turn caused a long wait period for homeowners to elevate their home and reduce their risk.

These findings are supported by our polling results.

Coastal residents were much more likely to engage in less costly risk reduction measures.

After Hurricanes Katrina + Rita and the BP spill, have you done any of the following to prepare yourself for another hurricane or industrial accident?

Preparedness Actions



Challenges

Elevation remains the least controversial, most popular, and most commonly implemented nonstructural risk reduction strategy.

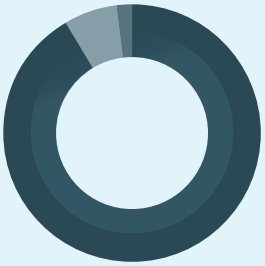
However, implementation is not without hurdles for communities and homeowners.

Current challenges include:

- Limited and insufficient financial resources to elevate
- Cost of elevating structures can exceed the value of the home
- Lack of coherent, established metrics for the State or locals to prioritize elevation projects
- Elevation height requirements change as flood maps shift
- Second homes are not required to meet UCC standards
- Elevation requirements do not address impacts on local hydrology and drainage
- Local governments have limited staff capacity to enforce existing regulations and assist homeowners to meet requirements

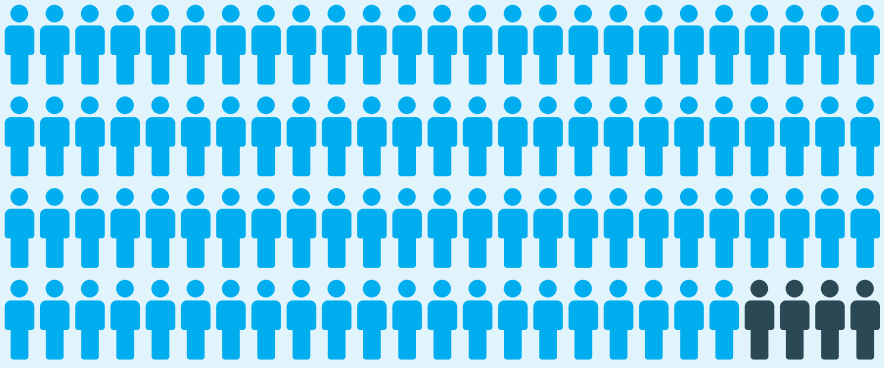
Total Funds Dispersed to Date Through the **Road Home Program**

$8,999,148,572.75



96% of the funds were awarded to residents of the coastal management zone

92% The vast majority of coastal parish residents who received assistance decided to **keep their home**



LA OCD Homeowner Assistance Program Report #438, January 2015

KEY FINDING

Implementation of elevation is inconsistent across the coast and within communities.

In fact, many of the interview participants reported that people don't want to elevate and will do only what is necessary to meet requirements.

Across coastal Louisiana, homes have been elevated using many different techniques. Some are built on piers, others on fill, and still others have complex designs that use breakaway bricks or lattice. The height of elevation also varies. Some homes are elevated to the BFE, others to some additional measure ("freeboard") above the BFE, and others to historic flood levels — which may be above or below the BFE.

FEMA sets the baseline elevation standard — the BFE, or 1%-chance annual flood elevation — through the development of the Flood Insurance Rate Maps (FIRMs) that drive the National Flood Insurance Program (NFIP). Many other FEMA and state program requirements then cite the BFE as a benchmark elevation for responsible risk mitigation.

However, although FEMA provides guidance and best practices, the technique and structure by which a home is elevated is not actually regulated by anyone. Some methods — particularly the use of fill — can adversely affect local hydrology and drainage. Some municipalities and parishes are now enacting requirements and regulations related to elevation for lot development and redevelopment.

Some municipalities and parishes are also requiring new construction and elevation projects to provide freeboard above the BFE. Interview participants noted that because the FIRMs are periodically updated to reflect new risks, it is important to add freeboard to stay ahead of elevation requirements. Doing so reduces uncertainty about meeting elevation requirements and thus risking insurance premium increases if the BFE changes on revised FIRMs.

Several other issues emerged in our conversations about elevation. All of these concerns point to the complexity of this nonstructural mitigation strategy. These include:

- Officials reported that many people do not want to build on piers because they do not want to give their home the appearance of a "camp".

We introduced and implemented the concept of Case Managers. When you go into a community, we have a Case Manager who everyone knows. Residents know where and whom to go to.

— DAVE PERALTA

- Following an elevation, some homeowners eventually fill in the first floor and use it as additional living space — without wet floodproofing measures. Therefore, the new "first floor," rather than being a pass-through for water as intended, puts the property at risk anew during an event.

- Some community leaders questioned the long-term impact of elevated houses — or of a partly or completely elevated neighborhood — on residents. As homes move away from the street and become isolated from each other, some fear that community, sociability, and neighborliness will atrophy.

- As the population ages, elevated homes and trailers become difficult to use. They are also challenging for those with disabilities. A structure elevated 16 or 20 feet above ground-level poses a clear impediment to anyone who has trouble climbing stairs.

During the interviews, participants described the programmatic and policy strategies they had utilized in hopes of streamlining the permitting process and elevating homes more efficiently. For example, St. Bernard Parish assigned "case managers" to help guide elevation projects through permitting end establish some standards. Another strategy employed frequently across the coast was for local government officials to have pre-application meetings with developers and homeowners to discuss — and educate — regarding permit requirements and elevation options. Officials report that after pre-application meetings, developers and homeowners are more likely to exceed minimal elevation requirements.

The Most Common Types of Elevation

Stilts

Mounds

Stilts/Mounds Combination

KEY FINDING

Cost and coverage uncertainties related to the National Flood Insurance Program and the Biggert-Waters Reform Act of 2012 are major concerns for local governments.

In fact, the topic of flood insurance came up in every single interview even though we did not specifically ask about it.

Flood insurance in Louisiana is available to homeowners, renters, and business owners through the NFIP, which was created by Congress in 1968. NFIP coverage is not — strictly speaking — a federal requirement. However, mortgage lenders require borrowers to obtain flood insurance to protect their assets if the property is prone to flooding according to NFIP's maps; this effectively makes coverage mandatory for anyone who does not own their home outright.

Flood insurance is written by commercial (private) insurers, but the federal government underwrites the policies and subsidizes the premiums. Flood coverage extends to both the building and its contents.

NFIP coverage is generally necessary for properties in "special flood hazard areas" on an NFIP FIRM. The crucial elevations on a FIRM are the BFEs. These are the computed elevations to which floodwater is anticipated to rise at a particular location during the "base flood," or the flood with a .01, or 1%-chance of happening in any given year. (This flood level is sometimes called the "100-year flood," but this term is misleading, because a "100-year flood" can happen at any time.) The relationship between the BFE and a structure's elevation determines the flood insurance premium, and any structure on land below the BFE will be in a special flood hazard area.

Flood insurance is inherently unsound in an actuarial sense, because the "risk pool" is too small to cover losses — only those with a high and identified risk buy the coverage. This is why the federal government underwrites and subsidizes the program.

However, this arrangement has long been criticized on fiscal grounds.

Clearly at that point, any type of levee protection will reduce the risk, the alignment will have to be completed and approved for funding in DC. Until the levee is constructed, we won't really see any risk reduction.

— NATALIE ROBOTTOM

We have more than 20,000 properties that are currently not covered at actuarial rates. It is mostly those that will be affected. With properties moving into the flood zone according to the new maps, the real estate market will collapse. People won't know where to buy, when, and what.

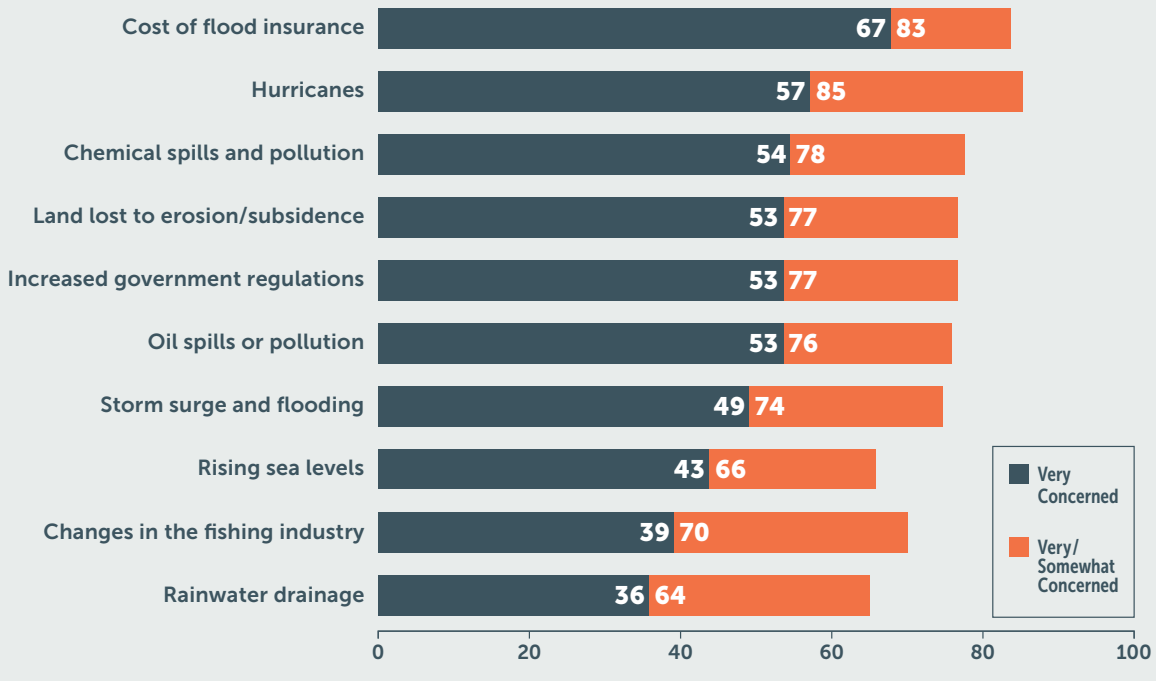
— MICHELLE GONZALES

The Biggert-Waters Flood Insurance Reform Act of 2012 (BW-12) responded by allowing NFIP premiums to better reflect actuarial flood risks. Premiums would increase as a result, and coverage would be restricted. The implementation of the Reform Act has been a much-discussed topic by officials and residents across the coast.

The initial reaction by elected officials to BW-12 was to band together to oppose it. All the elected officials from the 18 parishes interviewed signed a resolution against the implementation of BW-12. The resolution was submitted to the Louisiana federal legislative delegation. Greater New Orleans Inc., a regional economic development alliance serving the 10-parish region of Southeast Louisiana, facilitated periodic phone conferences for local government officials to coordinate and collaborate on a strategy to revise and amend BW-12. Several officials interviewed stated that they could benefit from a stronger State-led

How concerned are you personally about each of these issues?

Risk Perceptions



initiative that would support opposition to BW-12.

Partly as a result of local efforts, in 2014, Congress passed the Homeowner Flood Insurance Affordability Act. It softened some aspects of BW-12 and delayed enactment of others. However, the underlying concerns related to the 2012 reform remain. Despite the modifications and delays to BW-12 that were passed in 2014, uncertainties related to cost and coverage of flood insurance remain. For example, doubt surrounds long-term coverage and premiums for existing buildings that once met elevation requirements but now do not due to updated FIRMs. It is also anticipated that actuarial premiums will be substantially higher than what policyholders now pay. Increasing cost of insurance is of great concern to coastal residents and officials alike.

Many local officials interviewed worried that the BW-12 would cause a crisis in the real estate market, even triggering the relocation of coastal communities.

It should be noted that in the locals' view, it is not the hazards themselves that would force such an exodus. They generally agree that natural disasters can happen anywhere, and thus that hurricane and flood exposure is not a reason to leave the coast. In their view, it is the punitive cost of flood insurance that may drive residents from their homes.

KEY FINDING

NFIP reform and rules are pushing local officials away from nonstructural strategies that they should otherwise consider.

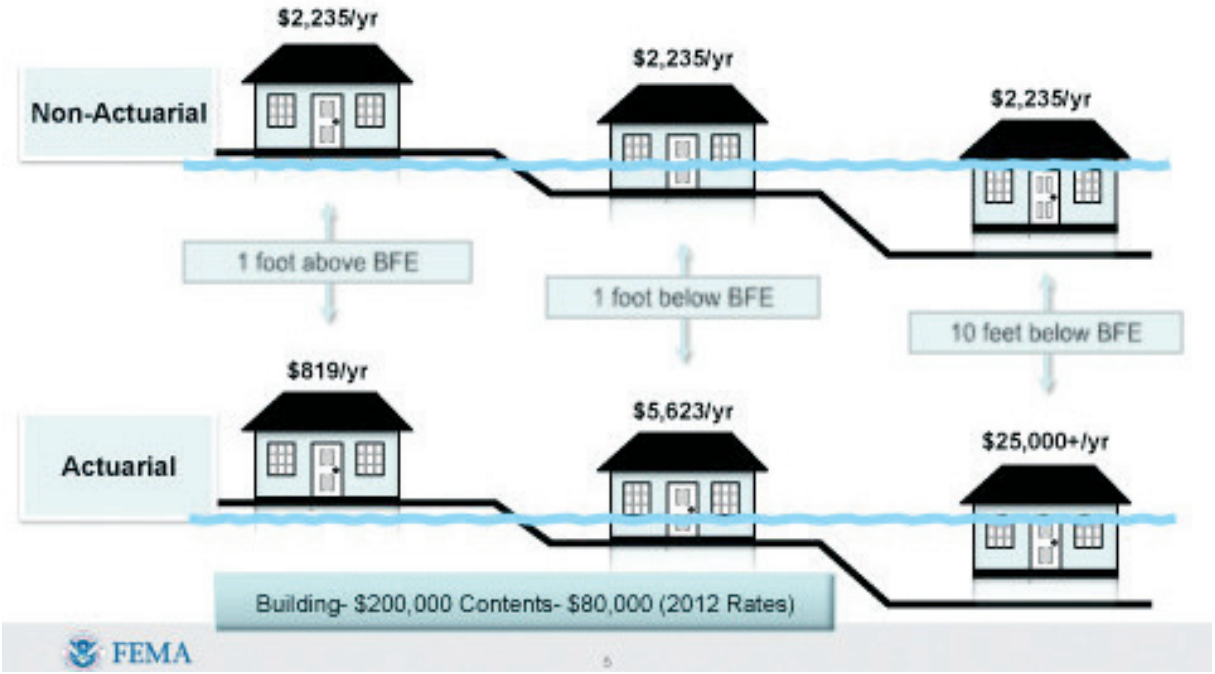
In fact, many felt that the NFIP reform will make elevation requirement a moving target and thus harder for homeowners to be in compliance in the long-term.

The NFIP BW-12 reform act brought to the forefront issues related to the costs and risks of development in the floodplain. What is a fair way to monetize the risk associated with living in the floodplain? What risk-reduction activities should be rewarded via lower NFIP premiums, and how does current NFIP policy skew local priorities away from nonstructural investments? Is the current CRS system, which relies on significant commitments of staffing and capacity, fair or reasonable for local governments in South Louisiana?

Uncertainty about increases in NFIP rates, tougher program policies, and more expansive FIRM special flood hazard zones are generating anxiety in coastal communities, and particularly in their real estate markets. Doomsday scenarios about mass exodus from the coast — with residents under pressure not from natural hazards per se, but from NFIP premiums — seem increasingly plausible from the local vantage point.

To reduce the cost of flood insurance, many officials from communities without levees are altering their priorities on risk reduction measures. NFIP premiums are far more responsive to levees than they are to nonstructural initiatives ("excluded zones" behind levees are not

Flood Insurance Premium Comparison



We spent several millions on risk reduction measures that are not being recognized by the federal government for flood rate maps. If we were to adopt the DFIRMs as they stand right now, they wouldn't recognize those nonstructural features.

— GINA CAMPO

required to buy flood insurance at all). As a result, interviewees reported a shift away from nonstructural strategies, in favor of pursuing levees as a sole means to reduce both risk and NFIP premiums. This is in spite of the fact that — as one official from a parish with new storm-surge protection system remarked — levees can create a false sense of security.

Although NFIP and FIRMs recognize the value of elevation via premium reduction, it is the only nonstructural approach that results in direct premium reductions to individual policyholders. NFIP does not directly monetize the risk reduction benefits of other physical nonstructural measures (such as flood proofing), nor of any programmatic nonstructural hazard mitigation measures. Whereas these are investments that individuals and communities make, this results in increasing distrust and animosity about FIRMs and the accuracy of their depictions of risk. Officials interviewed voiced their frustration that FIRMs do not include local efforts — even including structural projects — that the officials believe have reduced flood risk; several parishes have openly disputed their FIRMs. NFIP's failure to recognize the value of nonstructural measures also pushes local officials to see federally recognized structural investments as the only

way to prevent increased premiums. Currently, only levees accredited by FEMA are taken into consideration during the development of DFIRMs even though non-accredited, local levees could provide sufficient flood risk reduction. FEMA has acknowledged that some levee systems that do not meet the accreditation requirements (44 CFR 65.10) may still provide flood risk reduction, and they are working with communities to support their local risk management strategies. This is not only relevant to assess risk but also for receiving credit through the Community Rating System (CRS) program.

Areas with non-accredited levees are mapped as if the levee system provided no flood hazard reduction, however there is now a pilot program in place with 25 pilot projects to evaluate non-accredited levees and their protection value.

To develop the pilot program, FEMA convened members of FEMA, the Army Corps of Engineers, and academic and engineering experts to evaluate technical options for non-accredited levees, and sought feedback from communities.

FEMA's new approach to levee analysis and mapping will include alternative procedures created to comply with all NFIP regulations, be cost-effective, replicable, and flexible; it will leverage local input, and consider unique levee and flooding characteristics of southern Louisiana.

4 Primary Categories for CRS Activities

- Public information
- Mapping and Regulations
- Flood Damage Reduction
- Flood Preparedness

KEY FINDING

Many Parishes and municpalities lack capacity to participate in the NFIP Community Rating System.

In fact, many of those interviewed stated that the current benefits are too low compared to the effort needed to participate in the CRS program.

While NFIP does not provide direct premium reductions for most nonstructural efforts, such measures can reduce NFIP premiums at a jurisdiction-wide level, if the jurisdiction participates in NFIP's CRS program. CRS is a voluntary program that awards communities "points" towards a class rating from 1 to 10 for implementing floodplain management and other planning, regulatory, and public information practices that exceed the minimum requirements of the NFIP. CRS-participating communities can reduce their premiums by as much as 45% if they earn enough points for Class 1, though much smaller reductions are more typical.

CRS is certainly a great system but it takes a tremendous amount of time that we just don't have the capacity for.

— JOHN RAINES

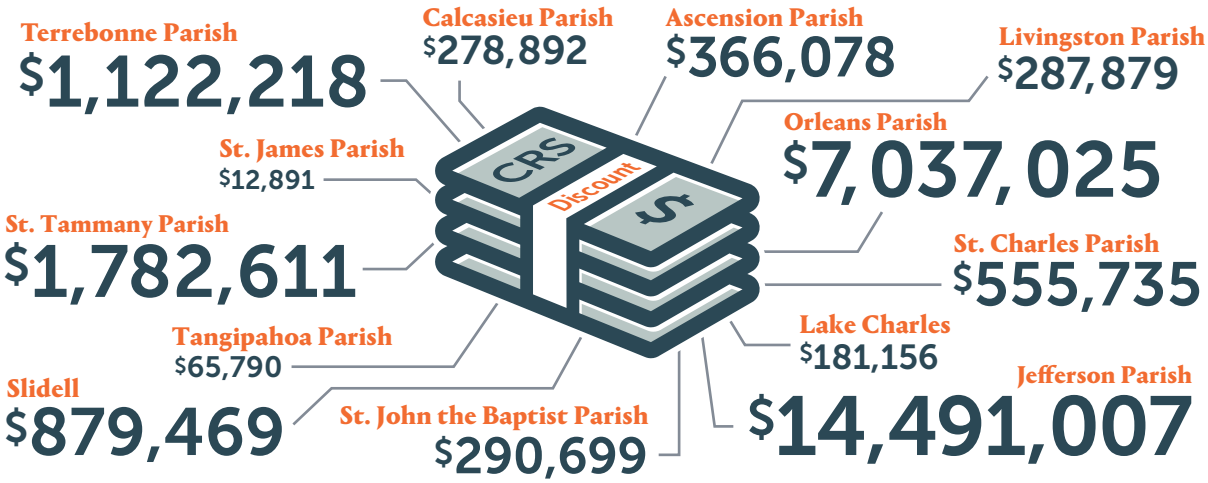
As of 2013, 11 parishes and 2 municipalities among those interviewed participate in CRS; the maximum premium reduction reported was 20%. This was in reward for various nonstructural efforts, including: flood protection information, outreach, and assistance; open space preservation and storm water management; flood protection and drainage system maintenance; flood warnings; and other activities.

However, officials explain that despite CRS's obvious appeal, limited capacity at the local level — both to enter into the program and to maintain point-earning activities — presents a daunting challenge for participation. Local budgets and staffing are scarce, and CRS activities require a high and continuous level of commitment, documentation, and program management.

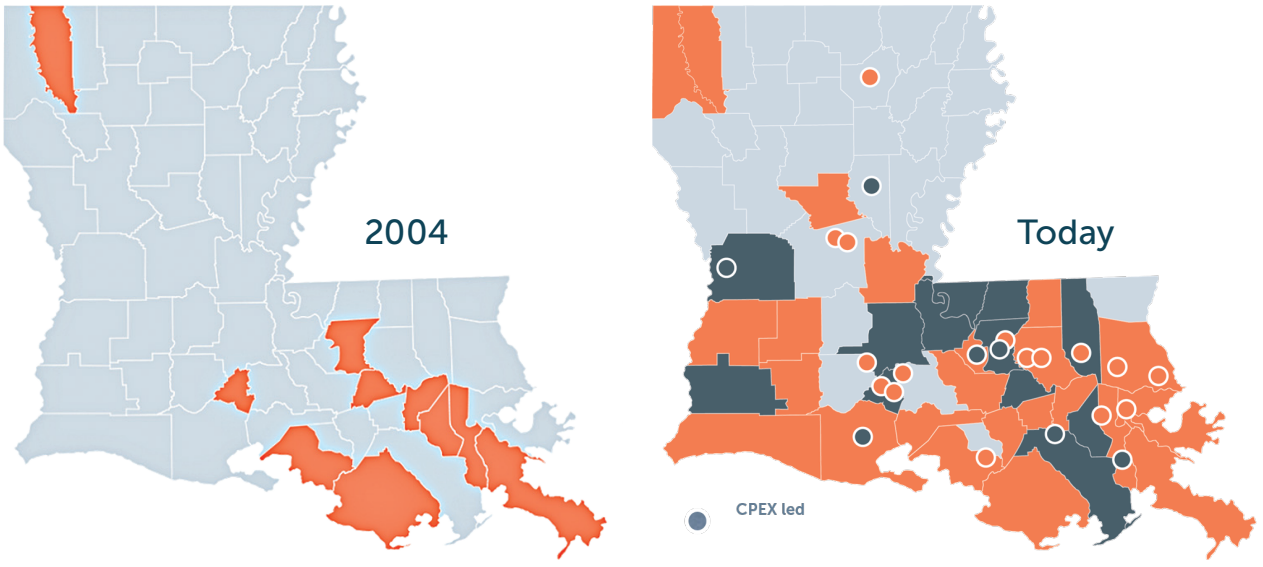
Having the funding to bring someone in and help communities with things like getting into the CRS is not only good for parishes to get a good rating and points and reduction in flood insurance but also to put in some good flood plain management practices that are good for everyone anyway.

— JERRY GRAVES

Annual Community-wide Savings on Flood Insurance Premiums



Comprehensive Planning in Louisiana



KEY FINDING

Officials are hesitant to regulate real estate development for fear of constituent backlash, and believe state initiatives are less controversial for them.

In fact, many officials state their worry about negatively affecting economic growth with the implementation of development standards.

Development standards — including land use plans, floodplain management rules, zoning and building codes, and other tools — help direct where and how construction occurs within a jurisdiction. These tools generally intend to provide predictability for homeowners, business owners, and the real estate industry by providing reliable guidelines for growth, development, and redevelopment. Some of these tools (such as comprehensive land use plans) are currently defined in state law but not required; some (such as Hazard Mitigation Plans) are nominally optional but universally adopted in Louisiana due to funding incentives; while others (such as the state Uniform Construction Code (UCC)) are mandated by state law to be adopted and enforced at the local level. In some cases (such as zoning codes for coastal communities) best-practice models have been developed by CPEX and are promoted by CPRA.

In many states, comprehensive plans or other risk-related plans — including coastal management plans or redevelopment plans — are state requirements; in others, they are optional, but commonplace. In Louisiana, however, land use planning and regulation are the exception — not the rule.

Many coastal leaders recognize the value that community plans and regulations can have in managing risk. But at the same time, a strong "property rights" culture in the Louisiana electorate reflexively chafes at any government regulatory action.

Overall, public officials in Louisiana — especially elected officials — feel caught between their desire to advance commonsense regulation to manage risk on the one hand, and the political reality of property rights on the other. In the words of one official,

People want regulations, but still do what they want to do.

— DARLA DUET

As a result, many coastal leaders are reluctant to enact or even promote land use regulations or zoning codes to help guide development. They worry about real or perceived impacts on economic development, and about their re-electability.

Significant portions of the general public, according to local officials, are opposed to planning and regulation of any sort, whether locally-led or adapting best-practice models. Similarly, officials report that most developers and property owners are opposed to regulation of the real estate development, considering this an intrusion into private property rights. And many local leaders themselves believe that regulations and economic development are opposed in a zero-sum way — even if they concede that some regulation is necessary.

This is not to say that leaders are not trying to advance some planning and regulation to reduce risk. Community planning has significantly increased across the coast since hurricanes Katrina and Rita, but getting from planning to implementation of regulatory requirements or even strong guidance has been difficult. In some reported instances, parish-led planning efforts were interrupted, and in some cases they were abandoned due to public outcry about property rights and government over-reach.

However, officials noted that when regulations are mandated by the State, as was the case with the UCC, resistance and opposition are less severe and politically charged. Local residents do not perceive their leaders to be taking sides for or against regulations or property rights, and everyone — regardless of their actual position on the issues — is freed to say, "blame Baton Rouge." As a result, several officials said they would like to see state government take on a more active role in land use regulations and standards, whether through requirements or through support for local initiatives.

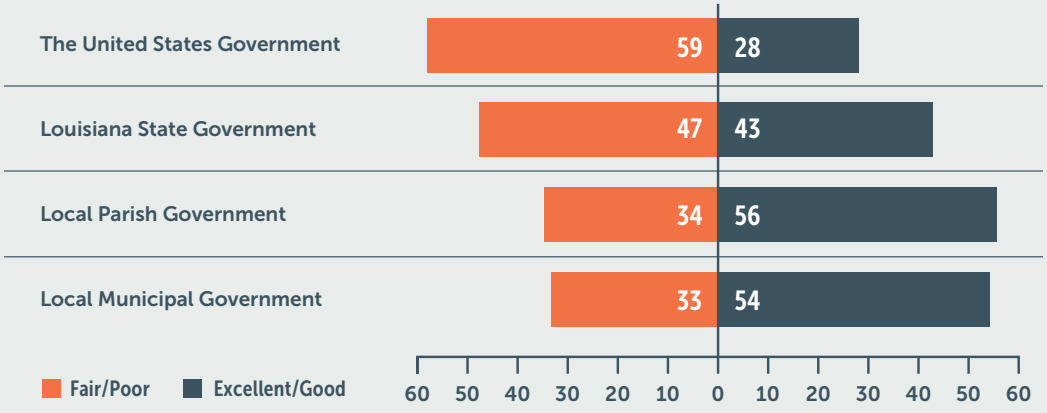
Polling for "The View from the Coast" strongly supports local officials' perceptions of their electorates' politics. When asked, coastal residents perceived increased government regulations to be a threat equal to land loss to erosion or subsidence.

We sit down with permit applicants and go though the process step by step. Eventually they understand.

— CARMEN JUDICE

In your opinion, how are these entities doing in terms of better preparing Louisiana for hurricanes and natural disasters?

Readiness and Leadership



KEY FINDING

Coastal Louisianians are increasingly motivated to invest in their community's safety — in ways that sometimes surprise their own leaders.

But with each disaster, homeowners are learning more about the value of nonstructural efforts, and their attitudes are evolving — especially on individual-initiative, voluntary measures such as elevations. Some officials expressed surprise about homeowners' willingness to pay for raising their houses, and many are optimistic that they are seeing a change in how homeowners think about their risks and act to mitigate them.

I talked to a developer in the southern part of the parish, and he wanted to put all the houses on the ground, but because there is no ditch on the back of the property, he was going to have problems. So I talked him into putting them on piers. That way he can sell it faster, the insurance will be cheaper, and you don't have to worry about water. He decided this is how the subvision is going to be developed. — DARLA DUET

KEY FINDING

Useful guidance and data is out there, but decision-making is stalled by dispersed information and "information overload."

In fact, many stated frustations with navigating the different rules and requirements for the various programs available to reduce risks.

Increasingly, both governments and residents understand the risks they face — either from studying the issue, or from harsh experience. And while progress is slower, coastal Louisianians also appear to be getting savvier about what can be done — in addition to structural solutions such as levees — to protect themselves and their property. But getting from that realization to actual implementation of nonstructural risk reduction can be daunting, confusing, and dispiriting.

A lot of times the information is out there in a lot of different systems and it needs to be brought together in a way that makes sense and to make decisions.

— KEN DAWSON

Local leaders have a variety of federal and state programs available to help them mitigate risks, but each has its own rules and requirements to navigate. There is also a wealth of information at leaders' disposal to guide decision-making, but the reality on the ground is that there is too much information, and it is too disconnected; the programs and resources are housed in multiple agencies that do not coordinate efforts in a way that eases the user's interactions. Local leaders expressed frustration with the difficulty of making sense of and utilizing all the information that is out there.

Officials believe that residents have equal or greater difficulties finding, processing, and utilizing all the disparate information about risks and mitigation options so that they can make good make decisions.

Despite the overload of disparate information, local officials are heartened by the general increase in knowledge and efficacy around coastal risks, and around the programs and projects that intend to address them. Public education takes time, but officials believe that continuous public discussions, engagements, and other means to reach out to people and talk about risks and responses contribute to what one called a "slow evolution of thoughts."

KEY FINDING

Parishes and municipalities want more public education, but find challenges in making it effective and inclusive.

In fact, everyone interviewed felt that public support for implementing many nonstructural measures to reduce flood risk is dependent on how well the residents are informed about the measures and their impacts.

I would love to have the funding to go to schools and hand out pamphlets to send home with students to educate the community. The kids bring home that information.

— CARMEN JUDICE

Successful implementation of nonstructural measures depends in part on how well residents are informed about risks and mitigation options. Nearly all of the local leaders interviewed identified the need for a more comprehensive, better-funded risk-education program. This education program would address actions that both government and homeowners can do to reduce risks.

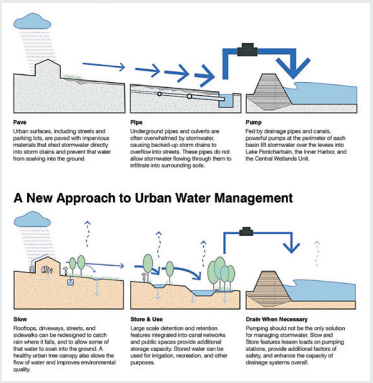
Officials in coastal Louisiana have reached out to the public and requested their input on numerous local and state-led plans and projects. As Katrina and Rita recede into the past, however, officials have observed a decline in public participation. Due perhaps to fatigue, cynicism, or distrust of outside experts, local officials report increasing difficulty in getting residents involved.

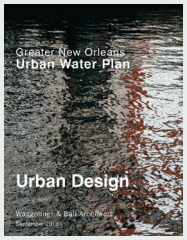
What happens is that people know bits and pieces of topics but not the whole story. We need to continuously educate ourselves; others need to be continuously educated and get the whole story. — JERRY SNEED

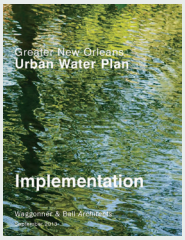
Some officials also cite the nature of the typical public engagement process. If there is a series of public meetings with sequential content, residents who do not attend all meetings may not get all the information (or else the meetings must be extremely repetitive — which then frustrates those who have been continuously involved). Some officials are therefore using more innovative and proactive methods — and even incentives — to get the public involved. These include use of the Internet and social media, outreach to existing groups, and intense engagement with builders and developers.

By providing risk and mitigation information to the public, parishes and municipalities that participate in CRS earn points that help reduce flood insurance premiums. Typically, the governments that are able to do this have significant capacity, allowing them to dedicate staff for outreach.

Living with Water ®







David Waggoner has been coming to St. Bernard Parish talking about water resource management strategies for years.

Back in 2006, Andres Duany presented similar ideas that at the time were infeasible for the Parish to implement, including using the drainage canals as neighborhood amenities.

In 2011, the same concept was presented in a different way and people started to be open to those concepts. Fast forward to 2013, people love and support the concepts and are ready to implement them.

It was a combination of experts coming in and getting some people who are recognized as leaders to rally for those ideas. It has come a long way.

— JERRY GRAVES

KEY FINDING

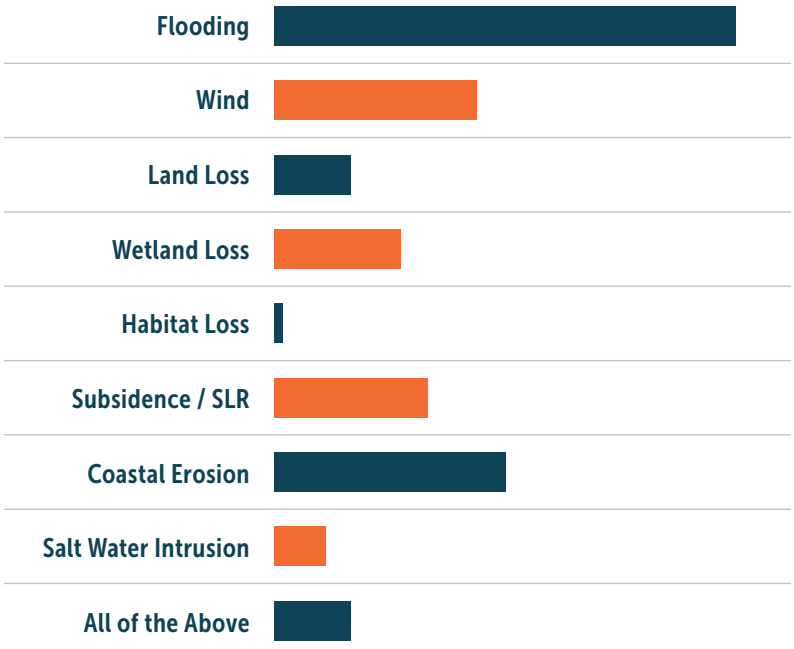
Parishes and municipalities are challenged to attain and maintain adequate capacity and training for implementing nonstructural measures.

In fact, most responded that a significant portion of their work day is spent on reacting to immediate needs of the community, a large portion of this stemming from drainage issues.

Local governments need knowledgeable and trained staff if they are to manage the planning and implementation of nonstructural measures. Of course, the reality of local government — especially in smaller or less affluent communities — is that the same person has several job functions. The emergency manager may also be the mitigation planner, the flood plain manager, and the volunteer fire chief. As staff members carry out different responsibilities, they acquire institutional knowledge. However, this is often a slow process. Most officials agree that their education on issues of risk and mitigation is mainly gained "on the job." Moreover, as seasoned and knowledgeable veteran public servants move around or retire, this institutional knowledge goes with them — and it is hard to replace.

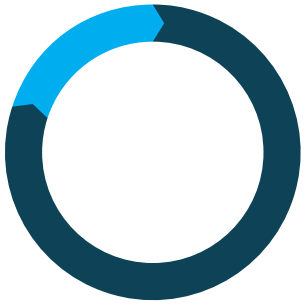
Local leaders therefore recognize the need to train their staff to maintain institutional knowledge, increase capacity, and be equipped to educate area residents.

Most Relevant Hazards to Interview Participants



There is no class that can teach this, we have to live it. I came from a farming family and own an oil field service company. I became Parish President thinking this is just another business. Keep in mind that I came in [office] nine months before [Hurricanes] Katrina/Rita. Then we had Gustav, Ike, and Isaac. Since I have taken office, just in the last nine years, we have had five major hurricanes, three tornadoes, eight high water events; two in one year where the river starts backing up through St. Mary Parish and comes down and floods lower St. Martin; two train derailments, tremendous amount of large water events, Morganza spillway opening up. I never imagined that I would have to learn about coastal protection and restoration. I knew it was important, but now it is a whole new different perspective, the council has a different perspective on what it means to be a coastal community.

— GUY CORMIER



Elected officials spend **20-100%** of their professional time on flood related issues

KEY FINDING

Residents have begun slowly moving out of the most southern coastal areas, leaving communities in those areas to struggle for their existence.

In fact, many parish officials reported population increases in communities further north but within the parish.

Relocation away from coastal Louisiana is already occurring. Sometimes this is facilitated by grants and mitigation programs; sometimes it is simply a factor of individual cost calculations (including NFIP premiums).

As currently configured, relocation is fiscally sound in terms of direct reduction of risk, but it is politically unpopular and creates long-term costs via property maintenance, liability, and tax loss. More strategic, ambitious uses of acquired properties are possible. These include projects like large-scale flood control or storm water management projects that double as recreational amenities. Indeed, these are a primary intent of acquisition/relocation programs, and have been implemented across the US, but such initiatives require political will, proactive planning, and close project management.

In Southern Louisiana, relocation is seen as an extreme response to risk, and is most commonly undertaken in direct response to a disaster that is catastrophic in the local context. Sometimes, such relocation is involuntary. Hurricanes Katrina and Rita displaced residents from across coastal Louisiana; nearly one-third of the populations of Orleans and Cameron parishes have yet to return, and some may never do so. In other cases, however, people are reluctantly making cost calculations and moving northward, independent of a specific precipitating event.

These population losses force municipalities and parishes to manage both sudden and gradual changes. There may be sudden fluctuations in housing demand, infrastructure needs, tax base, and inventory of abandoned properties.

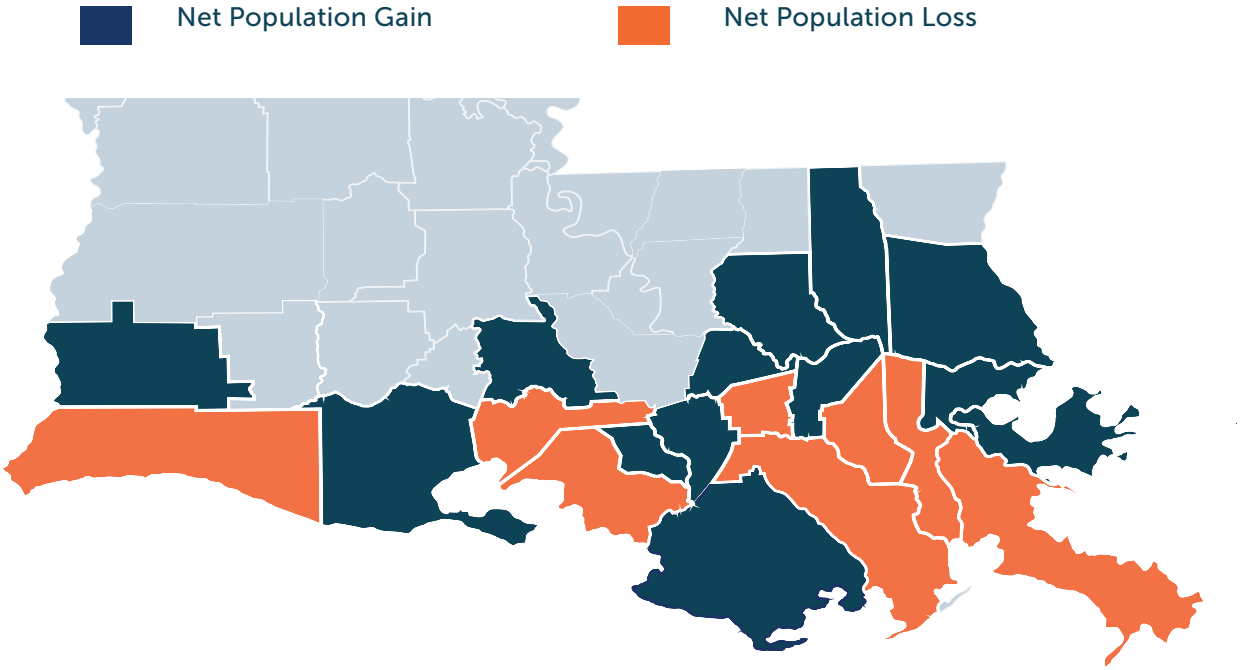
As a result of these concerns:  **One in four has considered relocation and ... 79% of those who have considered relocation would move away from the Gulf Coast entirely.**

If coastal erosion, subsidence, and relative sea-level rise continue along current trends, more than 2 million people will be affected (CPRA, 2012) and many may gradually be forced to relocate by 2050. Many locals are hard-pressed to plan for and accommodate these disorienting changes.

Relocation is, understandably, a difficult topic for community leaders to discuss. But local officials have observed that population and institutional infrastructure are already beginning to move away from the most exposed areas of south Louisiana, towards the northern portions of coastal parishes, or beyond. Officials in southwestern Louisiana report that many evacuees from previous disasters have decided not to return. Across coastal Louisiana, local leaders report that people are voluntarily moving away from the southern parts of coastal parishes.

Quantitative data from the 2010 US Census, The Data Center's Coastal Index study, and the resident poll for this research study support these observations.

Population Shifts in Coastal Parishes (2008-2012)



Census Flows Mapper, 2013

Relocation + Voluntary Acquisition

The Coastal Index study documents population migration away from the lower parts of Lafourche, Terrebonne, and Plaquemines parishes. The 2010 Census shows that there is movement both within coastal parishes and northward across the state. Furthermore, according to the poll for this report, 25% of respondents have thought about leaving their homes since 2005. Another 25% report that a family member has already left the Louisiana coast, and 40% know a friend or neighbor who has left.

To assist people with moving away from disaster-damaged homes, the State has used several types of FEMA grants for property acquisition — and demolition. After Katrina and Rita, for example, the Road Home program (housed under the Office of Community Development — Disaster Recovery Unit) provided the option for homeowners to sell their properties and relocate within their home community or elsewhere. Other mitigation programs also offer funds for acquisition/demolition projects.

Non-disaster-related relocation tends to happen slowly in coastal Louisiana, because the attachment to place makes it difficult for individuals to leave. Even after Katrina and Rita, state Office of Community Development data show that more than 90% of homeowners chose to stay put and mitigate their structure, rather than take advantage of the relocation option.

But relocation is happening, and as people and families one-by-one decamp from their longtime homes, vital institutions such as grocery stores, schools, churches, and public institutions and offices also begin to falter, fail, and eventually follow their populations northward. Coastal communities also lose tax base as populations and businesses leave, making it ever-more difficult to provide basic services. Meanwhile, unless entire neighborhoods relocate in a coordinated manner, communities are left with partially depopulated districts that are cost-inefficient to supply with services and infrastructure — as well as becoming blights. Such communities must struggle mightily to remain viable.

KEY FINDING

Acquisition is an extremely cost-effective way to reduce risk, but can be difficult and unpopular to implement.

In fact, officials were very outspoken about the challenges of acquisition. Many see elevation as an interim solution to reduce risk.

While elevation reduces flood damage, land aquisition to preserve open space may permanently reduce flood damage risk (Highfield & Brody, 2013). (When FEMA funds are used for relocation, the demolished property must be permanently taken out of commerce.)

But even though relocation has strong appeal in theory, most parishes in this study do not seek to acquire lots. In part this is due to the politics of relocation, but is also because of procedural and administrative challenges and costs. Governments can acquire land (involuntarily) through eminent domain or adjudication, or (voluntarily) through FEMA-funded or other hazard-mitigation programs.

Condemned and adjudicated properties require long processes before they can be acquired and demolished, and the property owner typically is entitled to fair market value of the parcel and improvements. These costs are borne by the local government. FEMA grant programs can support the cost of purchasing properties — individually or in groups — where multiple flood-insurance claims have been filed ("repetitive loss" or "severe repetitive loss" properties), but typically they cover only a percentage.

FEMA grants also require that such properties be used as open space in perpetuity; typically properties that are condemned and adjudicated for mitigation are similarly removed from commerce, because the point of a mitigation acquisition is to reduce the vulnerability that the structure represented. In any case, local governments eventually become responsible for these lands. Since the storm season of 2005, the Road Home program reverted ownership of many properties to parishes. In parishes such as St. Bernard and Orleans, the numbers of these properties are in the hundreds.

Most officials view acquired properties as a burden to local government, because they have to be maintained, entail potential liabilities, and do not generate property taxes. Some governments are working to offload mitigated parcels, implementing innovative measures such as the Lot Next Door program, which sell isolated acquired parcels to neighboring homeowners. This returns the parcels to tax rolls, although they remain undevelopable.

A number of interviewed officials proposed more strategic uses for acquired property, including targeting larger tracts or assemblages of land and utilizing them for storm water management. In many parts of the US, flood-zone acquisitions are already used for purposes such as these.


Poppy's Boy

Recommendations

We organized the recommendations and their action items into eight topics:

- Dedicated Funding
- Coordination & Convening
- 2017 Coastal Master Plan Updates
- Existing Regulatory / Permitting Programs
- National Flood Insurance Program and Community Rating System
- Hazard Mitigation, Land Use and other Planning Tools
- Public Information and Education
- Guidance, Best Practices, and Conditions for Grant Funds

During the process of developing this report, implementation at the state level has already begun. A number of action items are in the process of being implemented.

CPRA's Methodology and Planning for Nonstructural Issues

The context for the recommendations in "The View from the Coast" is strongly influenced by the CPRA's 2012 Coastal Master Plan. Therefore, it is worth pausing here to examine that plan, and particularly how it develops and treats nonstructural risk reduction measures.

The 2012 Coastal Master Plan is the first analysis that attempts to comprehensively quantify the costs and benefits of a coast-wide nonstructural program. This analysis, though necessary, is exceedingly difficult from a state-level perspective. Such efforts are typically comprised of myriad "micro-projects" executed at the scale of an individual property; the programs are developed and administered at the local level, typically with idiosyncrasies tied to local conditions; and in many cases, objectives are met via regulatory, planning, training, and public education programs that resist straightforward risk-assessment or cost-benefit analysis.

In order to model nonstructural initiatives alongside projects such as levees and river diversions, the CPRA planners established a generalized, conceptual stand-in to represent real-world nonstructural risk reduction projects. This conceptual model is comprised of a "suite" of three physical nonstructural elements that were uniformly applied to all project areas:

- Floodproofing: Recommended for residential and non-residential structures in areas with current 100-year flood depths of 0-3 feet (based on FEMA flood maps) above the structures foundation height.
- Elevation: Recommended for residential structures in areas with current 100-year flood depths between 3-18 feet (based on FEMA flood maps); Elevation is recommended fto FEMA's BFE +1, or to one foot above the BFE which is considered the 100-year flood depth.
- Voluntary Acquisition: Recommended for residential structures which would need to be elevated greater sthan 18 feet to reach the BFE+1 based on FEMA's flood maps.

The 2012 Nonstructural Projects were based on the structure type (residential or nonresidential) and the level of flooding an area was subject to as determined by FEMA's most currently available flood maps. This nonstructural approach was analyzed at two target elevation levels of BFE+1 foot and BFE +4 feet, and it was applied to 58 project areas, including every parish in the coastal region. CPRA assumed nonstructural programs to be voluntary. (Coastal Protection and Restoration Authority, 2012, p. A36-44; A72-80).

CPRA's conclusions are sweeping and unambiguous: "The [Coastal] Master Plan analysis has confirmed that implementation of a comprehensive coast wide nonstructural program can effectively reduce risk" (p. 158). Furthermore, the plan calls for "a large

investment in nonstructural projects across the coast" (p. 138) in order to reach its targets of 500-year protection for major cities and 100-year protection for smaller ones. Based on its modeling, CPRA estimates that approximately $10.2 billion – more than 20% of the total funding for its 50-year plan – should be allocated to nonstructural efforts, more than half of this prior to 2032 (p. 34).

The Coastal Master Plan proposes wide implementation of nonstructural solutions. It slates nonstructural initiatives for every parish in the coastal region of the state (p. 31). The plan notes that in many smaller cities, achieving the Coastal Master Plan's goal of 100-year-protection will only be possible "through structural protection augmented by nonstructural measures," and in many rural areas, "coast wide nonstructural projects" may be the only viable risk-reduction strategies (p. 143). It notes that nonstructural strategies can in some cases provide risk reduction more quickly than levees, and in some cases more efficiently (p. 158).

CPRA also states that implementation "must include both physical and programmatic measures" (p. 158), describing the programmatic element as "an essential component" (p. F2-2). Programmatic initiatives include land use planning and ordinances, hazard mitigation planning, higher regulatory standards, building codes, flood insurance requirements, and public education.

CPRA was not, however, able to address programmatic measures in its risk assessment model (p. F2-2), and therefore – unlike with the physical nonstructural strategies – CPRA does not assign funding or implementation timelines to programmatic initiatives in the Coastal Master Plan or specific implementation timelines for them (see Appxs. A, A1, and A2). Recognizing the need for additional investment in the nonstructural portion of the plan, CPRA does dedicate an entire appendix – the "Nonstructural Implementation Strategy" (Appendix F2) – to these issues, and promises, "We will add to and refine this program in coming years" (p. 73).

Much of the content of "The View from the Coast" is designed to support and accelerate implementation of nonstructural concepts that are outlined in the Coastal Master Plan. Concurrence of the recommendations in "The View from the Coast" with CPRA's implementation strategy is noted below.

In developing the Coastal Master Plan's nonstructural components, CPRA was advised by a 14-member Framework Development Team working group, including representation from local-government regulatory and elected officials, Louisiana DOA OCD (LRA), US EPA, and USACE; the National Wildlife Foundation, Environmental Defense Fund, Lake Pontchartrain Basin Foundation, Nature Conservancy, and Coalition to Restore Coastal Louisiana, as well as real estate professionals and the Tulane School of Architecture (p. H10). Approximately half of these same individuals participated in "The View from the Coast," either as local-government stakeholder interviewees or as members of the Coastal Resilience Advocacy Group.

Overview

The following recommendations intend to enhance risk reduction in South Louisiana. They were developed by the Coastal Resilience Advocacy Group for "The View from the Coast." This group was informed by the above findings, and thus by the interests and opinions that were expressed by local South Louisiana leaders with whom we spoke over the past year.

The recommendations are intended to make system-wide improvements towards implementation of nonstructural measures. They are not intended to convey changes specifically sought by local stakeholders.

It should be specifically noted that many of this report's recommendations support those of the "Nonstructural Implementation Strategy" (Appendix F2) of the 2012 CPRA Coastal Master Plan; instances of this report's direct support and/or proposed implementation of CPRA's recommendations are cited parenthetically in this chapter.

The recommendations in "The View from the Coast" were also directly informed by previous work on this issue by the National Hazard Mitigation Association, National Wildlife Federation, and others. In many cases, the recommendations also deliberately echo and reinforce recommendations already offered by these groups.

These recommendations are designed to leverage existing programs or concepts wherever possible, rather than creating new burdens or bureaucracies. They are also designed to incrementally reduce risk independently of each other, rather than one recommendation relying on another for its success.

Dedicated Funding

The State should fulfill 2012 Coastal Master Plan recommendations by establishing a dedicated funding stream for physical and programmatic nonstructural risk-reduction initiatives

The Coastal Master Plan recognizes that its risk reduction targets "cannot be met through structural protection projects only." These will also require "a comprehensive coast-wide nonstructural program that utilizes both physical and programmatic measures" (p. F2-2). These efforts must be funded.

As noted previously, the CPRA plan estimates that approximately $10.2 billion – 20% of all funding over 50 years – must be applied to physical nonstructural programs and investments (p. 34). The Coastal Master Plan broadly notes, "Grants, technical assistance, and other resources should be made available to those parishes and communities desiring to plan, design, implement, and maintain nonstructural programs and projects" (Rec. c.iii, p. F2-16). But that $10.2 billion figure has not been allocated to support programmatic nonstructural efforts – land use planning and ordinances, hazard mitigation planning, higher regulatory standards, building codes, flood insurance requirements, and public education – to which the Coastal Master Plan also commits.

Funding nonstructural efforts makes good fiscal sense. According to a landmark 2005 study by the National Institute of Building Sciences, for every $1 in mitigation spending, there is a $4 savings in recovery costs. (Note that the NIBS study focused on FEMA-funded mitigation, which are limited to nonstructural initiatives; as a rule, FEMA mitigation programs cannot be used to fund levees.)

The question, therefore, is: How can an appropriate and reliable flow of funding be vouchsafed for investment in nonstructural (both physical and programmatic) initiatives – the importance of which CPRA has repeatedly and forcefully asserted?

Dedication of funds towards nonstructural projects and programs

Although the 2012 Coastal Master Plan estimates the need for approximately 20% of all restoration and protection funds to go to nonstructural projects, CPRA as a matter of practice does not generally dedicate a percentage of anticipated future funds toward specific project types. Funds are instead dispersed in a systematic manner to address restoration and structural protection objectives across the coast.

Therefore, as part of the 2017 Coastal Master Plan update, CPRA has committed to conducting a financial analysis, in which multiple funding sources will be examined to determine available funding for future nonstructural protection projects.

"The View from the Coast" further recommends that, rather than have nonstructural initiatives competing directly against structural projects in every budget cycle, a dedicated fund for nonstructural work be established as soon as possible, with funding sources identified to support it on an annual basis. Funding might come from – for example:

- Direct allocations to specific nonstructural projects or programs from recovery, mitigation, or other funds.
- A standard nonstructural increment to support structural projects.
- A standard increment for a "maintenance program" (cf. the Barrier Island Maintenance Program).
- A state budget line-item; or other means to be determined.

Year-by-year target allocations to this fund should approximate 20% of the total annual outlay. Each annual plan should report on whether these targets are being met.

Grant-making

The nonstructural allocation described above should be banked in an interest-bearing state nonstructural fund, to be administered on a competitive-grant basis in order to advance nonstructural risk reduction strategies.

The CPRA Board – under advisement from the Nonstructural Subcommittee and the Resilience Advisory Group – should

Estimates suggest that 20% of all funding should be applied to non-structural investments

THAT MEANS ...

$10.2 Billion would be applied to physical non-structural investments

designate a single state agency, establish a designated inter-agency office, or otherwise establish a defined inter-agency organization via MOU in order to review, award, and administer nonstructural grants. This (inter-)agency structure should be aligned with that described under "Coordination and Convening: Streamlining state agencies' nonstructural activities," (see below).

Funding for both immediate needs and "rainy days"

This state nonstructural fund should be utilized to address immediate needs as well as to provide a "rainy day" resource to support post-disaster mitigation after future flood events. To accomplish this goal, approximately 85% of funds allocated during a given year should be expended within five years, while the remainder (approximately 15%) of funds collected within a given year must be reserved for post-disaster mitigation uses. These post-disaster state nonstructural funds must be used to compliment future incoming FEMA PA, HMGP, and other disaster recovery funds.

Funding physical nonstructural risk reduction and program support

A set percentage (85% to 95%) of the nonstructural risk reduction set-aside funds should be available to local governments (municipal, parish, or tribal), on a competitive grant basis, for the purposes of physical nonstructural risk reduction, including:

- Elevations
- Wet- or dry-waterproofing
- Acquisitions, relocations, and resettlement assistance

Such funds would also support physical nonstructural efforts indirectly, via:

- Ongoing capacity for administration of programs related to nonstructural risk reduction (supports Rec., p. 158).
- Planning directly related to nonstructural initiatives, including redevelopment planning, acquisitions/relocation planning, relevant elements of comprehensive land use planning, flood plain management, and hazard mitigation planning (where other sources have already been explored and/or exhausted).
- Providing local match against state or federal grants for nonstructural initiatives.

Funding programmatic nonstructural risk reduction and capacity-building

The remainder of the nonstructural risk reduction funds (5%-15%) would be available to local governments (municipal, parish, or tribal), for the purposes of providing state support (funding, technical assistance, training, etc.) in order to augment local capacity or as it relates to planning or administration of nonstructural risk reduction (supports Rec. c.ii, P. F2-16).

The following programmatic nonstructural areas are specifically recommended for capacity support in the Coastal Master Plan (p. 158):

- Code enforcement
- Comprehensive land use planning
- Flood plain management

Comprehensive land use planning in particular is repeatedly singled out for support in the Coastal Master Plan (rec. c.i, p. F2-16).

Other areas worthy of similar support include:

- Grant application support
- Public outreach, education, and information
- CRS administration
- Hazard mitigation

The intent of the nonstructural risk reduction funds would be to close gaps between existing resources and existing capacity needs. Therefore, in order to be eligible for capacity-support in program-areas where funding already exists through specific state agencies (e.g., floodplain management via DOTD), local governments would have to demonstrate efforts to secure such capacity through other avenues.

Furthermore, municipal and parish governments applying for such support should be required to demonstrate relative need, in order to prioritize allocation of scarce resources to jurisdictions that would not otherwise be able to pay for such capacity on their own.

Preference for comprehensive, regional, and plan-concurrent projects

The overall CPRA Flood Risk & Resilience Program Framework is currently being developed by the CPRA's planning team, with input from the CPRA Board Nonstructural Subcommittee, Resilience Advisory Group, and 2017 Master Plan Focus Groups.

Through this process, strong preference – through weighted scoring – should be given to grant applications that:

- Present a regional alliance of local governments and/or positive regional impacts (supports Rec. a.iii, p. F2-15)
- Can demonstrate consistency/ concurrency with the Coastal Master Plan or a direct linkage to past, ongoing, or future structural investments under the Coastal Master Plan (supports Rec. b.iv, p. F2-16)
- Can demonstrate consistency/ concurrency with local land use, storm water, redevelopment, economic development, emergency response, hazard mitigation, and evacuation plans (supports rec. on pp. F2-7; rec. b.i, p. F2-15).

Defining "comprehensive land use plan"

Certain new funding streams specifically require that grant recipients in Louisiana "shall certify to the Governor of the State that the parish has completed a comprehensive land use plan" (HR 4348, Subtitle F (the RESTORE Act), p. 187). Through the State's rule-making process and/or through CPRA's development of the program, the obvious legislative intent of this language should be enforced, such that "comprehensive land use plan" is interpreted as the equivalent of "master plan" under La. RS 33:108.

Inclusion of nonstructural program implementation status into annual plan

The status of nonstructural funding and planning appropriations, as well as project implementation status, should be addressed in each annual plan.

Coordination & Convening

There are many opportunities to increase coordination and information-sharing related to nonstructural risk reduction, both within state government and with other levels of government.

State agencies working on nonstructural issues should have stronger coordination.

As the Coastal Master Plan notes, "No other state … has a nonstructural program that is as comprehensive or as large as the approach described in the 2012 Coastal Master Plan. In order to effectively implement a nonstructural program of this nature and make this program easy for citizens and communities to use, there should be a single working group or entity to act as a clearinghouse and point of contact."

The plan also calls for "Increase[d] coordination among the many state and parish agencies working on nonstructural issues in Louisiana" (p. 158), even going so far as to call for a "single … designated state agency" coordinate all nonstructural-related activities (F2-15). At present, the oversight and administration of nonstructural programs is dispersed across multiple state government agencies, including CPRA (Coastal Master Plan), DOA (OCD/LRA), GOHSEP (mitigation grants), DOTD (CRS), DNR (CZM/CUP), etc.

CPRA is presently taking the lead on identifying key areas where nonstructural mitigation activities (pre- and post-disaster) should occur within the context of the Coastal Master Plan, and GOHSEP will likely play a leadership role in distributing funding to local parishes that will be implementing projects.

The below recommendations press to implement the Coastal Master Plan's recommendations on this issue.

Resolution for engagement and collaboration with stakeholders

The CPRA Board should continue to work with its member agencies to define the role of a nonstructural program in support of the Coastal Master Plan.

In order to provide structure to CPRA's efforts, the State Legislature should pass a resolution calling for specific action to implement the Nonstructural Subcommittee of the CPRA Board. This resolution should call for the Nonstructural Subcommittee – with advisement from the CPRA Resilience Advisory Group – to develop a formal organizational/ strategic plan, including mission, objectives, strategies/tactics, tasking, evaluation metrics, and timeline for roll-out of a broad, inter-agency nonstructural program. This plan should be submitted to the CPRA Board for approval and action. The legislative resolution might further specify minimum number of meetings for the Nonstructural Subcommittee in this work, the format of the deliverable, specific interim and final deadlines, etc.

In this planning effort, consideration should be given to honing and refining the missions of the CPRA Resilience Advisory Group and the Nonstructural Subcommittee of the CPRA Board, and also narrowing, expanding, or otherwise altering their make-up as indicated to support their missions. For example, the Nonstructural Subcommittee might be limited to only those agencies with direct roles in nonstructural program design and implementation: CPRA, GOHSEP, DOA OCD, DOTD, and DNR.

Streamlining state agencies' nonstructural activities

The CPRA Board – under advisement from the Nonstructural Subcommittee and the Resilience Advisory Group – should designate a single state agency, establish a designated inter-agency office, or otherwise establish a defined inter-agency organization via MOU in order to coordinate all hazard mitigation and community resilience activities including: hazard risk assessment, planning, research and project implementation, and hazard mitigation and community resilience project funding (supports Recs. a.i and a.ii, p. F2-15).

"A number of state agencies, academic institutions, non-governmental organizations, and local governments are actively engaged in research and developing projects to address risk reduction. However, no single entity coordinates or links these activities together ... To assure a common vision informed by the [Coastal] Master Plan, an ongoing forum among a variety of stakeholders, including state and local agencies responsible for hazard mitigation and community resilience, for discussion and exchange of information related to nonstructural mitigation coast wide should be supported."

2012 Coastal Master Plan

This (inter-)agency structure should be aligned with that described under "Dedicated Funding: Grant-making," (see pg 50).

The designation of a unified structure for these purposes will help assure that all state activities related to mitigation and nonstructural risk reduction are supporting a common mission and common goals; this realignment should be supported by {process TBD}

Local governments' work on nonstructural issues should have a lead coordinating entity

At present, convening local governments on coastal issues is done on an ad hoc basis only. There is no stable and recognized convening organization to provide coordination and "clearing house" information regarding nonstructural risk reduction issues.

The Coastal Master Plan explains, "A number of state agencies, academic institutions, non-governmental organizations, and local governments are actively engaged in research and developing projects to address risk reduction. However, no single entity coordinates or links these activities together. ... To assure a common vision informed by the [Coastal] Master Plan, an on-going forum among a variety of stakeholders, including state and local agencies responsible for hazard mitigation and community resilience, for discussion and exchange of information related to nonstructural mitigation coast wide should be supported." (p. F2-12-13)

The below recommendations press to implement the Coastal Master Plan's recommendations on this issue.

☐ Strengthening of outreach and coordination for local efforts

An invigorated, engaged, and outward-facing Resilience Advisory Group – or alternatively, a new group targeted specifically to the concerns of local governments – should take the lead as a permanent coordinating organization for all local governments in the coastal zone on issues related to nonstructural risk reduction. Recommended activities are described in detail in the following recommendations, below (but do not include disbursal or management of project funds).

The activities of this group should be accessible to and directly supportive of all local governments in the coastal zone, not just a representative few. A single agency or non-profit organization should be identified to staff this group and thus to provide organizational stability, continuity, and accountability. Representatives of key federal and state agencies and non-profit organizations should also participate, whether in an ex officio or direct capacity (as they currently do on the Resilience Advisory Group).

Provision of training and education

This group – be it the existing Resilience Advisory Group or a new group with a more explicit local-government focus – should hold regular meetings or conferences (periodicity TBD), featuring participant briefing, discussion, and open exchange of information related to nonstructural mitigation coast wide (supports Rec. a.iv, p. F2-15), including:

- Current and planned projects
- Ongoing concerns
- Available funding with potential nonstructural programs and projects
- Education regarding best practices
- Technical training, and
- Other content as indicated by the local governments.

Establishment of a "clearing house" for information and opportunities related to nonstructural initiatives

This group – in coordination with the Nonstructural Subcommittee of the CPRA Board and the designated state agency(ies) described under the recommendation "Streamlining state agencies' nonstructural activities" above – should serve as a clearinghouse to direct jurisdictions to appropriate funding sources (Supports Rec. a.iii, p. F2-15), and will actively "connect … available funding with potential nonstructural programs and projects" (p. F2-12-13).

This group should also provide a venue for identifying coordination opportunities among participants, including opportunities to leverage funding by one jurisdiction in collaboration with other jurisdiction(s) (supports Rec. a.iii, p. F2-15).

Facilitation of peer-to-peer technical communication and education

Finally, this group should connect experienced coastal political leaders and civil servants – on an informal "mentorship" model – with newly elected or appointed local officials, so as to introduce the latter to the issues facing coastal communities and the opportunities and challenges associated with nonstructural initiatives.

2017 Coastal Master Plan Update

The next five-year Coastal Master Plan update should meaningfully and specifically engage nonstructural risk reduction in Coastal Louisiana

The Coastal Master Plan is comprehensive, robust, and specific in its treatment of structural risk reduction in coastal Louisiana. The next plan update presents an opportunity for the treatment of nonstructural measures to be given the same level of rigor, as part of the Flood Risk & Resilience Program. This would provide a basis for coordination of state agency programs that have nonstructural components, so as to support a common mission and common goals. It would also provide prioritization for grant-making to proposed local nonstructural programs and investments.

Strengthening of the Resilience Program

As an element of the 2017 Coastal Master Plan update, the CPRA's planners should continue to work towards a robust, substantive, and concrete Resilience Program, including both strategic-level planning (i.e., what, why, and how nonstructural risk reduction should generally be conducted in Coastal Louisiana) and tactical-level planning (i.e., which specific sites, projects, and programs should be undertaken for nonstructural risk reduction in a given timeframe).

Nonstructural support for existing and planned structural investments

The update should directly align nonstructural initiatives in support of specific Coastal Master Plan structural protection and restoration investments.

Prioritization of nonstructural investments

The update should identify specific geographical areas or project sites that are in the greatest need of nonstructural initiatives to reduce risk, inclusive of areas that meet either of the following criteria:

- Those that will receive or have already received structural investments – such as levees– that require nonstructural program support in order to maximize their utility

- Those that have not been addressed via structural investments, nor are planned for in the Coastal Master Plan, and therefore are left with unacceptably high risk that may best be mitigated via nonstructural means.

Requiring nonstructural risk reduction as a pre-condition for structural investments

Consistent with the recommendations in the 2012 Coastal Master Plan, the 2017 Coastal Master Plan update should consider "requiring implementation of certain nonstructural programmatic measures to coincide with implementation of structural … projects" (p. F2-10)

Risk assessment and cost-benefit analysis of nonstructural initiatives

As an element of the plan update, the CPRA's planners should provide generalized but credible risk assessment and cost-benefit analysis that isolates the marginal benefits of the specific nonstructural risk reduction measures proposed in the 2017 plan. This might be achieved by examining the delta between a modeled structural-projects-only alternative and a structural-plus-nonstructural alternative. This comparison would be in addition to the comparison of a no-action alternative versus a structural-plus-nonstructural alternative, which was presented in the 2012 plan (cf. p. 86, et seq).

Additionally, smaller-scale "expected annual damages" modeling of "representative communities" (cf. p. 143) could be presented, again isolating the marginal benefits of nonstructural measures.

As an important step, CPRA has already developed project fact sheets for specific nonstructural initiatives (2012 Coastal Master Plan; Appendix A2).

Flood Risk & Resilience Viewer

CPRA's Flood Risk and Resilience Viewer displays information for the public on coastal land change, flood risk, and the impacts to communities. The viewer is a web-based resource that integrates the results from CPRA's 2012 Coastal Master Plan along with coast-wide data including infrastructure, social vulnerability, and other elements of the built environment. The information can then be used by state agencies, coastal stakeholders, and community advocates in coastal planning and hazard mitigation efforts. In addition, a variety of resources are provided to enable individuals to take steps towards reducing their flood risk.

Available at: http://coastal.la.gov/flood-risk-resilience-viewer/

Existing Regulatory and Permitting Programs

The existing regulatory and permitting framework should be leveraged to most effectively promote risk reduction.

The Coastal Zone Management program should be enhanced.

At present, the Louisiana Coastal Resources Program's (LCRP) primary regulatory instrument is the Coastal Use Permit (CUP). State and federal laws also allow Louisiana parishes to develop and get approved a local coastal management program. These programs assist the state in managing the conservation and restoration of coastal wetlands to address coastal land loss in Louisiana. Consistent with this goal, the State's policy is to balance coastal land development and conservation of coastal resources. The LCRP is currently exploring a variety of opportunities that can assist in promoting coastal zone development consistent with risk-reduction goals.

The LCRP ensures that there are no net losses of coastal resources from developmental activities without appropriate compensatory replacement. This affords the opportunity for the State to assist in generating the funding for Coastal Master Plan priorities.

☐ Assert proactive regulatory role

The LCRP should continue to explore options within its established parameters to allow a more proactive role in regulating uses that harm wetlands or increase flood risk in Louisiana coastal wetlands.

☑ Extension of programmatic purview

The uses of concern addressed by both state and parish LCRPs should include consideration of (e.g.) drainage impacts on neighboring properties; project compliance/consistency with the Coastal Master Plan; and project compliance/consistency with local storm water management, hazard mitigation, and comprehensive land use plans.

To date, the state DNR has already developed and integrated the Hydrological Modification Impact Analysis Guide into the CUP application process.

Extension of geographic purview

The LCRP should also cover uses of land at above five ft. of elevation if:

- Relative sea level rise is predicted to place that land below five ft. within 50 years, or
- That land has direct impacts on properties falling within the Coastal Zone, in terms of drainage and/or storm protection.

Promote mitigation bank and fee in-lieu options for compensatory mitigation

Presently, when compensatory mitigation is required through the CUP application process, the following options are available:

- An individual mitigation plan/project
- Purchase of mitigation bank credits
- Contribution to the Mitigation Trust Fund with an *in-lieu* fee options.

Although participants may opt for individual mitigation plan/projects, this option is the most difficult to align with Coastal Master Plan priorities, represents a net drain on State resources, and is the most difficult to monitor. Therefore, the mitigation bank and in-lieu options should be encouraged and enhanced.

Efforts to continue to make compensatory mitigation more flexible and streamlined should be continued and expanded. Also, the compensatory mitigation program should enhance its option to pool resources through a State-operated fee in-lieu system for use in major ecosystem restoration eforts.

Ensuring consistency of compensatory mitigation actions with the Coastal Master Plan

The state DNR has recently taken action to provide more flexible options for mitigation of coastal habitat impacts, including ensuring that compensatory mitigation measures are consistent with the Coastal Master Plan to the greatest extent practicable. Additionally, DNR should strive to ensure that the location of individual mitigation projects and mitigation bank projects support the Coastal Master Plan, and should develop a specific set of guidelines, consistent with the Coastal Master Plan, that would be used to evaluate mitigation options for all projects.

The State should continue to require compliance with the state Uniform Construction Code.

Adoption of the International Building Code and related codes into the state Uniform Construction Code (UCC) was a watershed achievement in statewide risk reduction following hurricanes Katrina and Rita. This accomplishment should be defended against all challenges.

The Coastal Master Plan's Nonstructural Implementation Strategy specifically recommends: "The Louisiana State Uniform Construction Code Council should continue to maintain existing standards and consider new higher standards related to hurricane and flood

protection in the State's Uniform Construction Code" (b.ii, p. F2-15).

Continuation of requirement with UCC compliance

For new construction and major rehabilitation of residential (primary owner-occupied, single-family renter-occupied, and multi-family renter-occupied), commercial, and institutional buildings, the State should continue to require local adoption and enforcement of the UCC.

Establishing consequence for non-compliance or non-enforcement

Any state agency making grants related to nonstructural project funds should engage and collaborate with the Code Council to tie compliance with and enforcement of current State-adopted codes to local eligibility. This would establish clear consequences for not adopting or failing to enforce current codes, as already required by existing state law.

Extension of UCC requirements to certain non-primary residences

The UCC should be extended to include any secondary residences (including "camps") that are located near any primary residence or commercial structure, and therefore present risk to their neighbors from wind- or water-borne debris. (Note that this recommendation deliberately does not extend UCC coverage to camps to those that pose no risk to neighboring property; i.e., isolated rural camps would remain exempt from the UCC).

Provision of resources for UCC-compliance

The State should continue to provide training and certification for reviewers, inspectors, and permitting authorities (supports rec. d.iii, p. F2-17), and expansion of such programs should be considered, as indicated by existing gaps (supports rec. p. F2-11). There should also be resources made available for augmentation of local capacity, as indicated, for enforcement, inspections, and property-owner and public education related to UCC compliance. These resources should be identified by the CPRA Nonstructural Subcommittee, with advisement from the Resilience Advisory Group. Funding might be identified from existing agency budgets, existing federal or state grant sources, existing or new non-governmental grantor relationships, and/or via the new dedicated funding stream described above (see pg 51 "Dedicated Funding: Funding programmatic nonstructural risk reduction and capacity-building") (supports Rec. p. 158).

National Flood Insurance Program (NFIP) and Community Rating System (CRS)

The existing framework of federal flood insurance underwriting should be leveraged to most effectively promote risk reduction.

The NFIP should account for all nonstructural efforts in determining premiums

At present, although elevation is rewarded by NFIP and other programmatic nonstructural measures are recognized by CRS, floodproofing (whether wet or dry) is not considered when determining premiums, nor is it an allowable cost for substantially damaged or improved structures.

☐ Inclusion of the benefits associated with floodproofing

NFIP should consider wet or dry floodproofing in its premium calculations, as these reduce the exposure of real and moveable property to flood damage.

☐ Coverage of expenses associated with floodproofing

NFIP should also allow for the coverage of costs associated with wet or dry floodproofing, whereas these reduce the exposure of property to flood damage

FEMA should enhance CRS participation by increasing incentives and reducing barriers.

One effect of Biggert-Waters is to raise many NFIP premiums. Therefore, FEMA has more leverage to encourage CRS program participation, and thus to increase sound planning and effective structural and nonstructural flood mitigation. In recent years, CRS has worked to ensure that program "points" directly correlate to risk-reduction impacts, and it has attempted to reduce the administrative burden of program participation. But more can be done.

Increased premium incentives for CRS program participation

FEMA should increase the potential NFIP premium offsets through CRS participation by increasing the savings in percentages (i.e. from 45% to 55%).

Encouragement and other incentives for CRS program participation

Whereas the administrative burden of maintaining an effective CRS program can be challenging, especially for smaller and/ or less affluent communities, FEMA should encourage participation in CRS and understanding of the new CRS Coordinators Handbook with the following measures:

- Assigning specific FEMA NFIP liaison staff to support participating localities, so as to create ongoing, trusting relationships and institutional memory
- As indicated, also providing direct technical advising expertise (i.e., staff support) to communities in support of their CRS activities
- Allowing multiple communities to participate jointly in CRS, thus pooling their resources and technical expertise.

Provision of resources for CRS program participation

There should be state resources made available for augmentation of local capacity, as indicated, to public education and administration of activities supporting CRS participation. These resources should be identified by the CPRA Nonstructural Subcommittee, with advisement from the Resilience Advisory Group. Findings might be identified from existing agency budgets, existing federal or state grant sources, existing or new non-governmental grantor relationships, and/or via the new, dedicated funding stream described above (see pg 51 "Dedicated Funding: Funding programmatic nonstructural risk reduction and capacity-building").

CPRA should leverage its Cooperating Technical Partner status to support the development of accurate Digital Flood Insurance Rate Maps.

The CPRA has recently been identified as a Cooperating Technical Partner (CTP) with FEMA. This means the State is now empowered to enter into agreements regarding the development of Digital Flood Insurance Rate Maps (DFIRMs) and risk reduction actions.

Ensuring state data and priorities are represented in DFIRM development

The CPRA's CTP status with FEMA should be utilized to actively engage in the development of accurate DFIRMs (supports Rec. a.vi, p. F2-15). CTP status should also be used to show hazard areas identified by CPRA.

FEMA should enhance information and interactions related to NFIP and DFIRMs

The NFIP is a complex and – for premium payers – sometimes unpopular program. As such, it is subject both to honest confusion on the part of local communities and property owners, as well as to deliberate obfuscation and misinformation.

Enhanced outreach and education

FEMA should enhance its outreach and education around NFIP and DFIRM updates, including:

- Assign specific FEMA NFIP liaison staff to support participating localities, so as to create ongoing, trusting relationships
- Hold community workshops (in partnership with local non-profit organizations and parishes) at public libraries
- Train public library staff to act as NFIP liaison staff for the public and property owners
- Create more accessible and more user-friendly on-line and hard-copy resources explaining both the NFIP and DFIRM mapping (and map modernization) processes

Support for resources and resource development

Support for public education programs on the importance of flood insurance should be continued (supports Rec. d.i, p. F2-16), and all parties should support and promote FEMA's ongoing development of user-friendly "RiskMAP" products and tools, including the new Community Engagement and Risk Communication (CERC) program. These RiskMAP offerings help property owners and community leaders to better understand flood risks and therefore to make more informed decisions.

Hazard Mitigation, Land Use, and Other Planning Tools

Coastal Louisiana has an opportunity to reduce its overall vulnerability by enhancing planning efforts related to mitigating hazards and reducing risk.

FEMA and GOHSEP should advance strategies that integrate local Hazard Mitigation Plans more closely with local comprehensive and land use planning

Often, local hazard mitigation plans are developed and implemented by emergency managers, while land use and local comprehensive plans are developed by community planners; both plans would have greater efficacy if they were integrated, so as to be informed by and leverage each other. This integration will reduce duplication of effort, and thus reduce administrative burdens on local government agencies.

☐ Provide Guidance for collaboration and integration

The FEMA Local Mitigation Plan Review Tool (PRT) - sometimes known as the mitigation plan "crosswalk" - requires documentation of coordination between land use planning and mitigation planning. In order to make this requriement more robust and useful for localities, the PRT shoudl provide specific and concrete guidance for how to:

- Ensure meaningful, in-depth collaboration between emergency managers, land use planners, public works/ engineering professionals, flood plain managers, and building officials.
- Integrate (both spatially and strategicly) local Hazard Mitigation Plans and local comprehensive plans (referred to as "master plans" in Louisiana statute, and "land use" plans in the Coastal Master Plan), zoning codes, flood plain management plans, capital improvement plans, economic development plans, and other relevant plans that the jurisdiction may maintain.

Guidance for Risk Assessment

FEMA, together with local Emergency Preparedness Offices and Planning Offices should develop a methodology to assess risk for the development of Hazard Mitigation Plans.

Concurrency across plans

In Louisiana, GOHSEP should augment the FEMA PRT to require documentation demonstrating that local Hazard Mitigation Plans do not contravene the Coastal Master Plan (consistent with Rec. b.iv, p. F2-16). Local initiatives that exceed measures proposed in the Coastal Master Plan and have no adverse effects should be allowed.

Hazard Mitigation Planning Grants to local planning offices

In regions or parishes with adequate community planning capacity, GOHSEP should consider awarding mitigation planning grants (and thus the responsibility for developing and maintaining local hazard mitigation plans) to the planning office, with the requirement that this office develop the hazard mitigation plan in partnership with the local emergency management agency.

Updating the statutory definition of local "Master Plan" to include mitigation

The State should amend its statutory definition of a local "Master Plan" (RS 33:106) – i.e., a local comprehensive or land use plan – to require a Hazard Mitigation element, which would be excerpted from the local Hazard Mitigation Plan and integrated into the comprehensive future land use plan and zoning map or code (or, the local Hazard Mitigation Plan could be inserted in its complete form).

Linking future mitigation grants to inclusion of a mitigation element in local comprehensive land use plans

All future planning grants made by any state agency that are related to hazard mitigation or other nonstructural measures should "require that all [local] land use plans contain a section specifically addressing flood risk reduction measures" consistent with the Coastal Master Plan (Rec. b.iii, p. F2-16)

Resources for integrated local planning

There should be state resources made available for integrating comprehensive and mitigation planning efforts at the local level. These resources should be identified by the CPRA Nonstructural Subcommittee, with advisement from the Resilience Advisory Group. Funding might be identified from existing agency budgets, existing federal or state grant sources, existing or new non-governmental grantor relationships, and/or via the new, dedicated funding stream described above (see Rec pg 51 "Dedicated Funding: Funding programmatic nonstructural risk reduction and capacity-building").

GOHSEP and other state agencies should support efforts to streamline and integrate local applications for FEMA HMA grants

FEMA makes funding available for many nonstructural flood mitigation opportunities. Such funding is generally termed Hazard Mitigation Assistance (HMA), and it comes through several specific programs sources including the post-disaster hazard mitigation grant program (HMPG), and pre-disaster programs such as the Pre-Disaster Mitigation (PDM) and Flood Mitigation Assistance (FMA) programs. Any parish or municipality with an approved Local Hazard Mitigation Plan can annually apply for PDM and FMA grants. HMGP funds become available following a major disaster and are dispered at the discretion of the governor, via GOHSEP to local jurisdictions ("sub-applicants"). As the Coastal Master Plan notes, however, "City, town, or parish governments prepare hazard mitigation plans and use federal funds to implement the local plan. This process, while effective on the local level, often lacks regional coordination" (p. F2-3).

Coordination of local grant-seeking

Municipal and parish governments should coordinate at the parish level to prioritize and integrate both structural and nonstructural mitigation grant requests to GOHSEP and FEMA. Such coordination should be strongly encouraged by GOHSEP and other state agencies. In much of the US, normally requests for HMA and other related grants are coordinated at the county, regional planning commission, or Urban Area Security Initiative (UASI)-region level. Standing committees at this scale, with representation from all impacted jurisdictions, typically meet on a regular basis, and prospective nonstructural mitigation projects are thus able to be vetted, coordinated, and prioritized before applying for State funding.

Expansion of the State's role as mitigation-information clearing-house

Local officials should be provided information and education related to mitigation funding sources and cycles (supports rec. d.ii, p. F2-16). The Coastal Master Plan further advises that the State – meaning GOHSEP in cooperation with other CPRA Board member agencies – "Creat[e] a clearinghouse to direct jurisdictions to appropriate funding sources and to identify opportunities to leverage funding by one jurisdiction in collaboration with another jurisdiction should be considered" in support of mitigation and other nonstructural initiatives (p. F2-10).

Establishing mitigation line-items in local budgets

The Coastal Master Plan also recommends that locals take action: "In order to fully leverage mitigation grant programs, local jurisdictions

should consider a budget item for hazard mitigation project planning and implementation and identify specific projects and potential funding sources in their local hazard mitigation plans" (p. F2-10).

Provision of resources to access and utilize mitigation grants

Resource should be made available for augmentation of parish or regional planning capacity, as indicated, for application to, administration of, and monitoring/maintenance of FEMA HMA grants. These should be identified by the CPRA Nonstructural Subcommittee, with advisement from the Resilience Advisory Group. Funding might be identified from existing agency budgets, existing federal or state grant sources, existing or new non-governmental grantor relationships, and/or via the new, dedicated funding stream described above (see pg 51 "Dedicated Funding: Funding programmatic nonstructural risk reduction and capacity-building").

Creation of "Redevelopment Plans" should be encouraged in Louisiana

The Coastal Master Plan observes, "Many Gulf [of Mexico] states are now considering not only traditional land use planning as a nonstructural measure, but also 'redevelopment planning.' Redevelopment plans set a course of action for how to rebuild after a disaster and include relocation planning" (p. F2-13-14).

Redevelopment planning (also known as "recovery" or "reconstruction" planning) is also now commonly developed – prior to disasters – in other parts of the US that are subject to various hazards. These locations include Los Angeles, Seattle, metro-New York, metro-Washington DC, the Atlantic coast of Florida, Georgia, and the Carolinas, and elsewhere. Such plans aid in accelerating and guiding recovery after disasters.

Promotion of "redevelopment planning" in Coastal Louisiana

All parties should promote redevelopment planning as a crucial element in coastal Louisiana communities' plans (supports recommendation on p. F2-6), whether as an element of a comprehensive plan or as a stand-alone effort.

The State should develop best practice guidelines for hazard mitigation and land use plans in Coastal Louisiana

As the Coastal Master Plan observes, "Effective land use plans can direct development away from high hazard areas and help preserve the natural functions of floodplains and other critical areas" (p. F2-6). But effective planning requires resources and technical expertise that not all communities

Coastal Development Resources

These publicly available resources contain strategies at the building, site and community scale level that can reduce flood risks. They also contains development standards that can be implemented cafeteria style.

These are available at:

coastal.cpex.org

have. The development of model plans and best practices that address coastal hazards would lift a significant fiscal and administrative burden from local coastal jurisdictions as they develop their own plans. It would also allow the CPRA and allied organizations to efficiently disseminate best practices for comprehensive land use planning.

"Communities need ... resources to implement a successful nonstructural program," states the Coastal Master Plan. These include "planning guides, model ordinances, accurate digital mapping, and access to computerized data sources are necessary tools." The plan specifically lauds CPRA and CPEX's joint efforts on the "Best Practices Manual for Development in Coastal Louisiana" and the model ordinances that are part of the "Coastal Land Use Toolkit." It also points to the LSU Department of Civil and Environmental Engineering's Research Group for Water Environment Sustainability, which educates on low-impact development practices (p. F2-8).

Additionally, it should be noted that CPRA is particularly concerned about "induced development" and "induced risk" stemming from the construction of new protection infrastructure (levees in particular); CPRA recognizes that comprehensive land use planning with supporting regulations (e.g., zoning) are the most effective way to address this. "We do not want construction of new hurricane protection systems to encourage unwise development in high risk areas, as has occurred in the past," the Coastal Master Plan states. "Such development increases overall levels of risk and diminishes the effectiveness of the protection structures themselves. This phenomenon is called 'induced risk,' and it runs counter to the [Coastal] Master Plan's objectives" (p. 159).

Establishing models for planning and regulations related to nonstructural risk reduction in Coastal Louisiana

Under advisement from the CPRA Nonstructural Subcommittee and the Resilience Advisory Group, the CPRA

Board should task one or several of its member agencies – in coordination with other stakeholder state agencies, non-profit organizations, professional experts, and local officials – to develop model hazard mitigation plans, local comprehensive plans, redevelopment plans, and zoning codes for adaptation, adoption, and implementation by local communities.

Generally, these model plans and regulations should strive to "limit … induced development in potential high risk areas. … This recommendation may be accomplished through tools such as land use planning [or] creating stricter development standards for areas protected by levees" (p. F2-12)

Supported by model plans, "Communities should be encouraged to adopt higher regulatory standards such as increased freeboard, additional levels of protection for structures behind levees, or cumulative substantial damage tracking requirements" (supports Rec. b.iii, p. F2-16).

These model plans should also consider the following:

- Adoption of "No Adverse Impact" standard
- Participation in CRS
- Establishment of a line item in local government budgets for nonstructural/ mitigation measures
- Increased support for evacuation

In addition to being a good practice, this recommendation supports NFIP CRS premium discounts.

Public Information and Education

The Coastal Master Plan cites the need for education and training activities of many types, including clarifying funding opportunities and teaching officials how to leverage them, making individual homeowners aware of changes in flood insurance, and training building contractors on flood-proofing and elevation techniques. Since 2005, many entities have developed training materials and methods using established best practice models. Building on these practices, a coordinated training and education program related to coastal flood risk can be established in Louisiana.

The following tools and programs should be considered:

- A one-page fact sheet/ flow chart to guide residents as they recover from a flood or storm;
- A website that serves as a clearinghouse of information about programs and funding available to individuals and local governments;
- An integrated outreach campaign leading into hurricane season that uses a variety of media to explain options for funding and implemention of adaptation measures (including fact sheets, online news articles, radio and TV talk shows, web chats, email blasts, and other tools);
- An expo for parish employees, residents, vendors, and state agencies to share ideas and progress made on implementing nonstructural measures.

As the Coastal Master Plan notes, "Educating the general public, businesses, organizations, and local decision makers regarding their existing and future risks and the … effectiveness of nonstructural programs can help with effective implementation. Outreach aimed at explaining the benefits of nonstructural programs and the implementation process are needed. Local decision makers should also be educated on the benefits of nonstructural programs and opportunities to obtain funding for nonstructural projects" (F2-7-8). This is what the Coastal Master Plan calls "train[ing] those responsible for the program's success" (p. 158).

The State should develop and promote public information and education resources related to nonstructural risk reduction

☐ Development and dissemination of public information related to nonstructural risk reduction

Under advisement from the Nonstructural Subcommittee and the Resilience Advisory Group, the CPRA Board should designate one or several of its member agencies – or an allied state agency or non-profit organization – to take the lead on distilling and coordinating information on adaptation measures into targeted outreach tools. GOHSEP, DOTD, DOA OCD, LSU Ag Center, and LSU Sea Grant all already have some initiatives begun that advance this recommendation, and so may be in a position to lead on all or part of this effort. Non-profit organizations, businesses, and local communities should promote and share these tools with their networks throughout south Louisiana.

Regardless of the leadership of the effort, the result must be a coherent and cohesive State public-information initiative, which digests and clearly presents needed informational resources to local stakeholders. Locals should not have to wade through "information overload."

Development and dissemination of formal training and curricula related to risk reduction

Under advisement from the Nonstructural Subcommittee and the Resilience Advisory Group, the CPRA Board should designate one or several of its member agencies – or an allied state agency or non-profit organization – to lead development of classroom and professional-training curricula and presentation resources that focus on the value and practice of nonstructural risk mitigation. This work should leverage existing efforts by state agencies, professional membership organizations, colleges and universities (especially LSU Ag Center and LSU Sea Grant), non-profit organizations, and other, one of which may already be in a position to lead this effort. Such educational materials should be customized for many audiences.

Fostering a train-the-trainer model

Under advisement from the Nonstructural Subcommittee and the Resilience Advisory Group, the CPRA Board should task one or several of its member agencies – in coordination with other stakeholder state agencies, non-profit organizations, professional experts, and local officials – to take the lead on establishing a train-the-trainer program. This would allow local communities to build on and transfer their own expertise, and it would empower local people (rather than outsiders) to train each other. Such a program would help ensure that non-structural mitigation issues will be included in each community's culture.

General interest audiences:

- Local elected officials
- Civic groups, grassroots organizations, and other formal or informal community gatherings
- High school students

Professional (non-technical) audiences:

- Bankers
- Real estate professionals
- Insurance professionals

Professional (technical) audiences:

- College students in relevant course of study
- Engineers, architects & planners
- Local appointed civil servants (including engineers, planners, code inspectors, emergency managers, etc.)

Guidance, Best Practices, and Conditions for Grant Funds

There are numerous opportunities for the State to empower local governments and property owners by providing them with better information, and to incentivize local approaches that reduce risk so as to safeguard state infrastructure investments.

The State should develop best practice guidelines for elevations.

Currently, elevations are happening across South Louisiana in an haphazard manner; there is little established authority on what methods work best – or work at all – for which types of buildings and for how long a design life. The State should empower local governments and property owners by providing them with better information.

☐ Technical analysis of residential structural elevations

Under advisement from the Nonstructural Subcommittee and the Resilience Advisory Group, the CPRA Board should task one or several of its member agencies – in coordination with other stakeholder state agencies, non-profit organizations, professional experts, and local officials – to conduct a cost and structural integrity analysis, typed by elevation structural methodology, for all major types of residential structures in Louisiana (including slab-on-grade). This analysis should:

- Include recommendations for preferred engineering method(s) for elevation, given different criteria such as housing structure type, soil composition, hydrology, and others as indicated
- Specifically address safety and integrity of elevated structures, including high wind and extreme flood conditions, and recommend appropriate hardening

- Include recommendations for preferred first-floor elevations, including provision of freeboard, considering: BFE, historical floods, NFIP premiums, and predicted relative sea-level rise
- Include recommendations related to community character and quality, including design, aesthetics, and consistency.

☐ Publication of elevation analysis findings

The State should publish the results of this analysis in at least two distinct formats:

- A user-friendly (non-technical) version aimed at public officials and property owners; and
- A technical version aimed at architects, structural engineers, and building code officials.

These should be available for free in hard copy and on the Internet.

☐ Provision of training and certification in elevation techniques

Training and certification opportunities should be provided to building contractors and tradespersons regarding sound elevation techniques (supports Rec. d.iv, p. F2-17).

☐ Address elements of this analysis through updates to the UCC

To the degree that elements of this analysis are not already addressed in the UCC, the State should augment the UCC to specifically address concerns related to elevated structures; local building code officials should enforce these.

☐ Linking grant awards to compliance with state guidance on elevations

Grant funding (including direct federal or state funds, or use of state funds as match) for elevations should be limited to elevation projects that comply with preferred criteria (consistent with Rec. b.iv, p. F2-16).

The State should develop best practice guidelines for construction behind levees

Currently, although FEMA and others recognize that structural protections such as levees do not completely mitigate risk, and although they recommend mitigation measures in NFIP-excluded zones behind USACE-certified and FEMA-accredited levees, there are no regulations controlling what happens on such lands. As the Coastal Master Plan acknowledges, the status quo leaves no option for the State to safeguard its investment in structural protection.

☐ Establishment of guidelines for construction behind levees

Under advisement from the Nonstructural Subcommittee and the Resilience Advisory Group, the CPRA Board should task one or several of its member agencies – in coordination with other stakeholder state agencies, non-profit organizations, professional experts, and local officials – to develop and promulgate guidelines for areas that are currently or are planned to be protected by federally certified/accredited levees within 10 years; these should include (e.g.):

- Recommendations for additional nonstructural mitigation measures, including wet and dry flood-proofing, in high-risk areas
- Land use planning and zoning that discourages "induced development" in potential high risk areas (supports Rec. a.vii, p. F2-15), potentially by favoring resilient multipurpose uses (parks, open space, etc.) in the highest risk areas.

☐ Linking funding for structural investments to compliance with guidance for construction behind levees

Funding (including direct federal or state funds, or use of state funds as match) for levee projects under the Coastal Master Plan should be limited to communities that adopt and enforce the guidelines for construction behind levees (consistent with Rec. b.iv, p. F2-16).

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