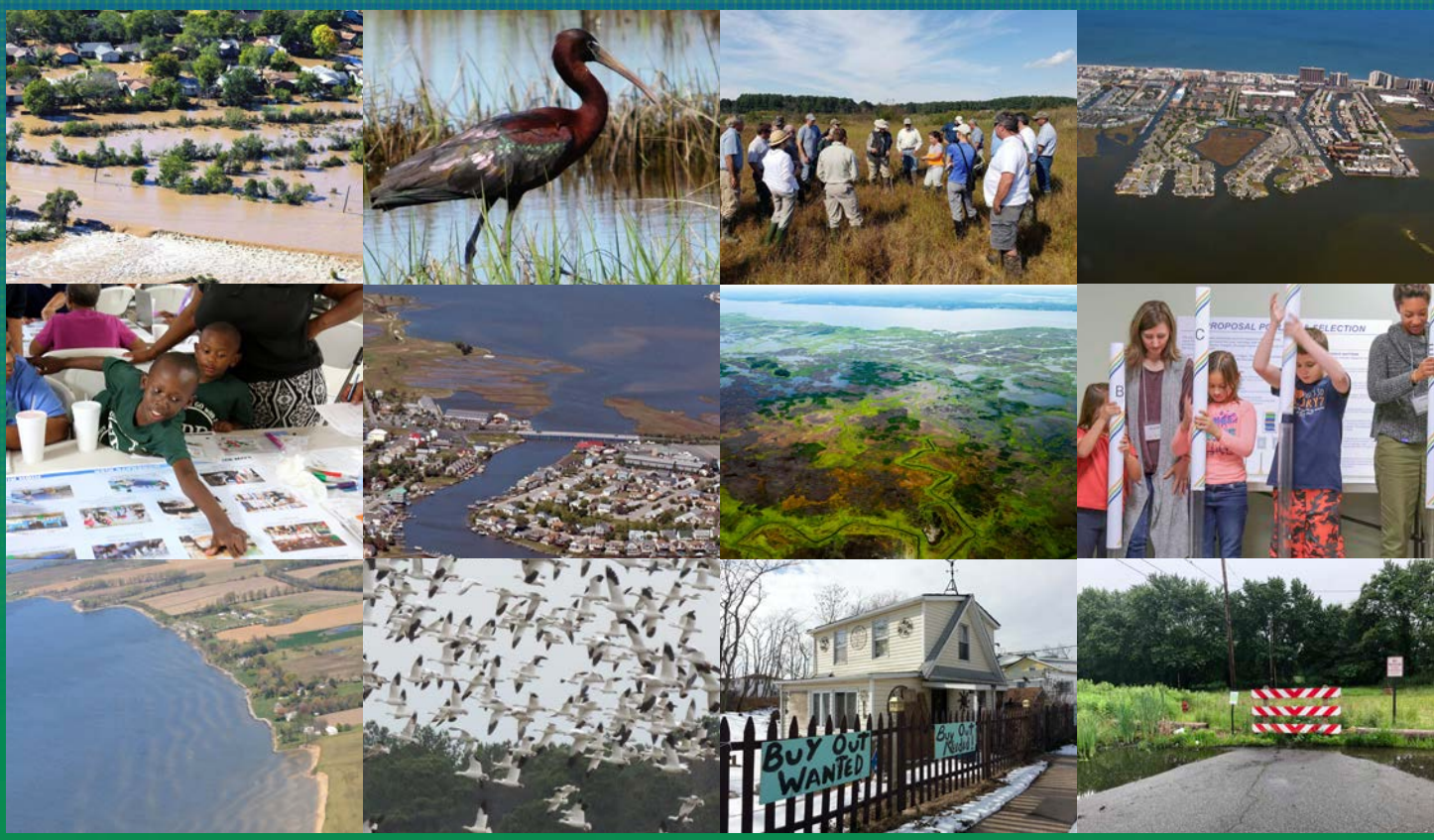
Managing the Retreat from Rising Seas

State of Louisiana: Louisiana Strategic Adaptations for Future Environments (LA SAFE)



GEORGETOWN CLIMATE CENTER

Authors

This report was written by Katie Spidalieri, Senior Associate, and Isabelle Smith, Research Assistant, Georgetown Climate Center at Georgetown University Law Center; and Jessica Grannis, Coastal Resilience Director at National Audubon Society. The *Louisiana Strategic Adaptations for Future Environments (LA SAFE)* case study was written by Jennifer Li, Staff Attorney, and Alex Love, student, Harrison Institute for Public Law at Georgetown University Law Center. Editorial and writing support were provided by Vicki Arroyo, Executive Director, and Lisa Anne Hamilton, Adaptation Program Director, Georgetown Climate Center.

Acknowledgments

The authors would like to thank the Doris Duke Charitable Foundation for its generous support and guidance, and without whom the Managed Retreat Toolkit and this case study report would not have been possible.

We are also grateful for the support of the Georgetown Environment Initiative that enabled us to bring together diverse, interdisciplinary stakeholder expertise and Georgetown University faculty to inform the development of the Managed Retreat Toolkit, including Professors Uwe Brandes, J. Peter Byrne, Beth Ferris, and Sheila Foster.

We would also like to specially thank and acknowledge the following individuals for taking the time to speak with us, review drafts, and provide insights that were invaluable in helping to inform the Managed Retreat Toolkit and these case studies: Erik Meyers, The Conservation Fund; Matt Whitbeck, U.S. Fish and Wildlife Service; Justine Nihipali, Hawaii Office of Planning Coastal Zone Management Program; Mitchell Austin, City of Punta Gorda, Florida; Kelsey Moldenke, Quinault Indian Nation; Charles Warsinske, Quinault Indian Nation; Deborah Helaine Morris, formerly New York City Department of Housing Preservation and Development, New York; Lauren E. Wang, New York City Mayor's Office of Resiliency, New York; Matthew D. Viggiano, formerly New York City Mayor's Office of Housing Recovery Operations, New York; Andrew Meyer, San Diego Audubon, California; Tim Trautman, Charlotte-Mecklenburg Storm Water Services, North Carolina; Pam Kearfott, City of Austin Watershed Protection Department, Texas; James Wade, Harris County Flood Control District, Texas; Fawn McGee, New Jersey Department of Environmental Protection; Frances Ianacone, New Jersey Department of Environmental Protection; Thomas Snow, Jr., New York State Department of Environmental Conservation; Dave Tobias, New York City Department of Environmental Protection, New York; Stacy Curry, Office of Emergency Management, Woodbridge Township, New Jersey; Sandy Urgo, The Land Conservancy of New Jersey; Joel Gerwein, California State Coastal Conservancy; Jay Diener, Seabrook-Hamptons Estuary Alliance, Hampton, New Hampshire; Kirsten Howard, New Hampshire Department of Environmental Services Coastal Program; Mathew Sanders, Louisiana Office of Community Development; Liz Williams Russell, Foundation for Louisiana; Joseph (Joe) Tirone, Jr., Oakwood Beach Buyout Committee, Staten Island, New York City, New York; and Megan Webb, King County Department of Natural Resources and Parks, Washington State.

Design:
Brent Futrell, Georgetown University Law Center Office of Communications.

Georgetown University Law Center
600 New Jersey Avenue, NW
Washington, D.C. 20001

GeorgetownClimate.org

Managed Retreat Toolkit

AdaptationClearinghouse.org

Cover Photo Credits:

(top row, left to right): Watershed Protection Department, City of Austin, Texas; U.S. Fish and Wildlife Service; U.S. Fish and Wildlife Service; Integration and Application Network, University of Maryland Center for Environmental Science.

(center row, left to right): State of Louisiana Office of Community Development; Integration and Application Network, University of Maryland Center for Environmental Science; Will Parson, Chesapeake Bay Program, U.S. Fish and Wildlife Service; State of Louisiana Office of Community Development.

(bottom row, left to right): Integration and Application Network, University of Maryland Center for Environmental Science; Betty Whetzel (Courtesy of U.S. Fish and Wildlife Service); Matt Green; Katie Spidalieri, Georgetown Climate Center.

Table of Contents for the Full Report

Managing the Retreat from Rising Seas: Lessons and Tools from 17 Case Studies

About This Report

As seas continue to rise and disaster events and extreme weather increase in frequency and intensity, climate change is driving state and local policymakers to evaluate strategies to adapt to various risks affecting many communities. In addition to protection (e.g., hard shoreline armoring) and accommodation (e.g., elevating or flood-proofing structures) measures, coastal governments and communities are increasingly evaluating managed retreat, where appropriate, as a potential component of their comprehensive adaptation strategies. Managed retreat is the coordinated process of voluntarily and equitably relocating people, structures, and infrastructure away from vulnerable coastal areas in response to episodic or chronic threats to facilitate the transition of individual people, communities, and ecosystems (both species and habitats) inland.

The aim of managed retreat is to proactively move people, structures, and infrastructure out of harm's way before disasters occur to maximize benefits and minimize costs for communities and ecosystems. For example, policymakers may maximize opportunities for flood and risk reduction by conserving wetlands and protecting habitat migration corridors and minimize the social, psychological, and economic costs of relocation by making investments in safer, affordable housing within existing communities.

This report is composed of 17 individual case studies. Each one tells a different story about how states, local governments, and communities across the country are approaching questions about managed retreat. Together, the case studies highlight how different types of legal and policy tools are being considered and implemented across a range of jurisdictions — from urban, suburban, and rural to riverine and coastal — to help support new and ongoing discussions on the subject. These case studies are intended to provide transferable lessons and potential management practices for coastal state and local policymakers evaluating managed retreat as one part of a strategy to adapt to climate change on the coast.

Collectively, these case studies present a suite, although not an exhaustive list, of legal and policy tools that can be used to facilitate managed retreat efforts. Legal and policy tools featured include: planning; hazard mitigation buyouts and open space acquisitions, as well as other acquisition tools like land swaps and reversionary interests; land use and zoning; and Transfer of Development Rights programs. The case studies also highlight various policy tradeoffs and procedural considerations necessitated by retreat decisions. Each jurisdiction is confronting different challenges and opportunities and has different, perhaps even competing, objectives for retreat. In addition, stakeholders in each of these cases are attempting to balance multiple considerations, including:

protecting coastal ecosystems and the environment; fostering community engagement and equity; preparing "receiving communities" or areas where people may voluntarily choose to relocate; and assessing public and private funding options and availability. The case studies included in this report were selected to reflect the interdisciplinary and complex nature of retreat decisions and underscore the need for comprehensive solutions and decisionmaking processes to address these challenging considerations.

Where possible, all of the case studies share a consistent organizational format to allow easier cross-comparison of strategies, processes, and takeaways:

- The **Background** section introduces state or local context for each case study, including the risks and hazards facing each jurisdiction and its road to considering or implementing managed retreat strategies.
- The **Managed Retreat Examples** section focuses on the legal and policy tools that have been designed and implemented to support managed retreat strategies on the ground.
- The **Environment** section highlights how floodplains and coastal ecosystems have been restored, conserved, and protected as a part of comprehensive managed retreat strategies to provide ecosystem and community benefits, like reducing flood risk and creating community assets such as parks and trails.
- The **Community Engagement** section summarizes how affected residents have been contributing to planning and decisionmaking processes for climate adaptation and managed retreat.
- The **Funding** section identifies how the programs, plans, and projects discussed have been funded by federal, state, and local government and private sources.
- The **Next Steps** section captures the anticipated future actions that jurisdictions may take in implementing these managed retreat strategies.
- The **Considerations and Lessons Learned** section concludes with the primary takeaways from each example that other coastal state and local policymakers and communities may consider when developing or implementing their own managed retreat strategies using these legal and policy tools.

The case studies in this report were informed by policymakers, practitioners, and community members leading, engaging in, or participating in the work presented in this report. No statements or opinions, however, should be attributed to any individual or organization included in the *Acknowledgements* section of this report. It is also important to note that the programs and planning processes described in each case study are ongoing and the content included in this report is current as of early 2020. Future updates about these case studies will be captured in Georgetown Climate Center's online resources on managed retreat.

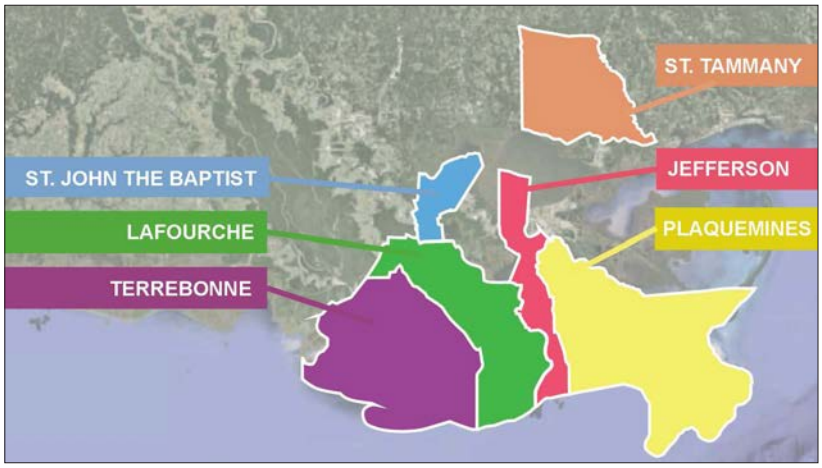
These case studies were written to support Georgetown Climate Center's Managed Retreat Toolkit, which also includes additional case study examples and a deeper exploration of specific legal and policy tools for use by state and local decisionmakers, climate adaptation practitioners, and planners. For future updates about these and other case studies and the Managed Retreat Toolkit, please visit the **Managed Retreat Toolkit** and the **Adaptation Clearinghouse**.

State of Louisiana: Louisiana Strategic Adaptations for Future Environments (LA SAFE)

Executive Summary

Louisiana Strategic Adaptations for Future Environments (LA SAFE) is a community-based planning and capital investment process that will help the state fund and implement several projects, including for managed retreat, to make its coasts more resilient. In 2016, Louisiana's Office for Community Development–Disaster Recovery Unit (OCD) received a nearly $40 million grant from the U.S. Department of Housing and Urban Development through the National Disaster Resilience Competition. With this grant and by leveraging additional state and nongovernmental funds, the state implemented LA SAFE and supported the design and implementation of resilience projects to address impacts in Louisiana's coastal parishes. LA SAFE is aimed at addressing the impacts of coastal land loss, sea-level rise, and land subsidence in the six coastal parishes most hard-hit after Hurricane Isaac in 2012: Jefferson, Lafourche, Plaquemines, St. John the Baptist, St. Tammany, and Terrebonne.

Facilitated through a public-private partnership between the state and the nonprofit Foundation for Louisiana, LA SAFE funded ten projects across all six parishes after an extensive, year-long community engagement process. The selected projects address goals, opportunities, and needs that were identified over multiple rounds of resident and stakeholder engagement. The projects were also designed to meet other regional priorities, including for housing, transportation, infrastructure, and economic development. Finally, projects were designed to address different adaptation goals in three different areas based upon flood risk: low flood risk areas that will receive populations migrating away from higher risk areas; moderate flood risk areas that will focus on measures to accommodate increasing flood risk; and high flood risk areas that anticipate future losses of land and population. LA SAFE provides a model that other states and local governments may consider for engaging communities in efforts to make long-term adaptation and resilience investments including for managed retreat.



LA SAFE Parishes.

This map shows the location of the six Louisiana parishes eligible to participate in LA SAFE.

Credit: State of Louisiana Office of Community Development.

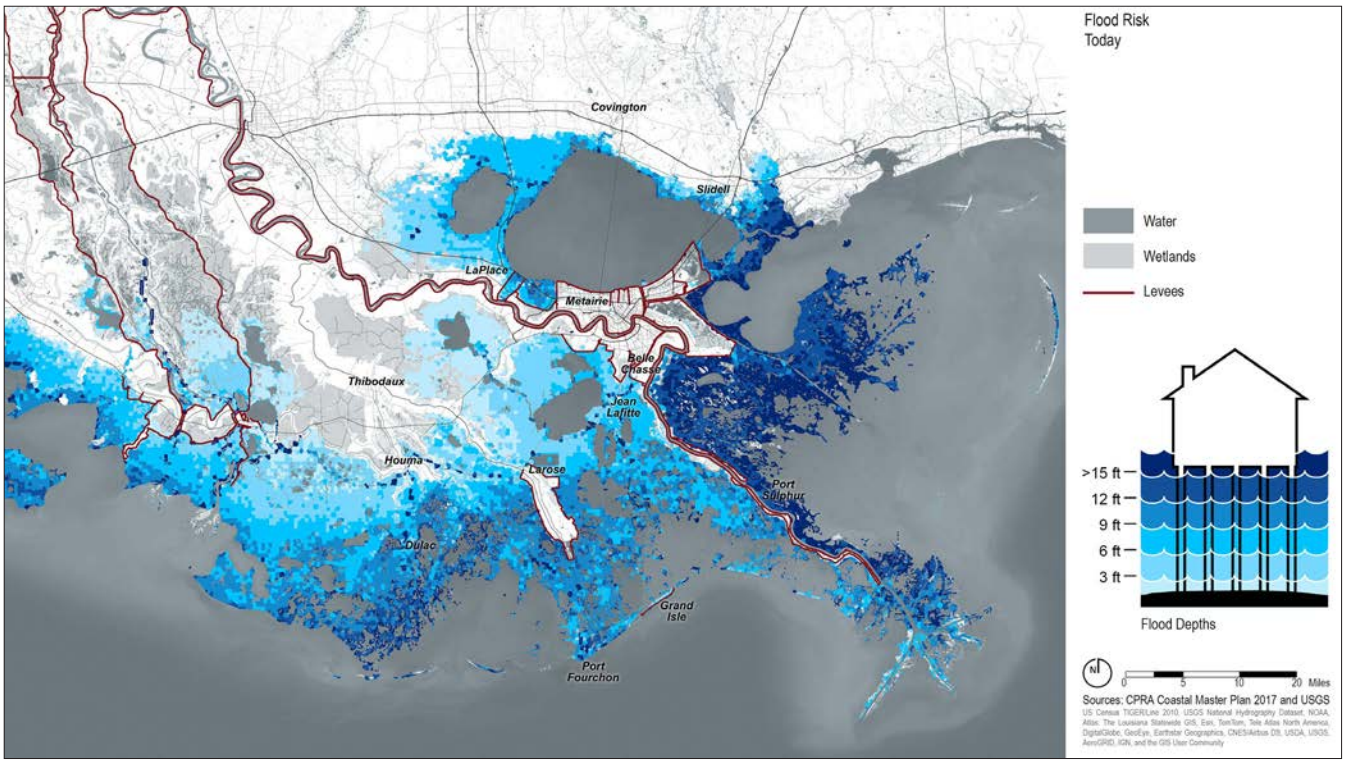
Background

Louisiana's coast is home to more than two million residents and supports nationally significant commercial industries for shipping, oil and gas production, and fishing.[1] The State of Louisiana is facing ongoing challenges protecting its coastal communities and industries against physical threats from sea-level rise, land subsidence, and flooding. Between 1932 and 2016, Louisiana lost over 2,000 square miles of its coastal plains; as much as an additional 2,250 square miles could be lost over the next 50 years.[2] These threats have been exacerbated by hurricanes and human coastal land uses and incidents like the BP Deepwater Horizon Oil Spill in 2010.[3]

In response to these ongoing challenges, some residents have already begun the process of migrating from the low-lying coast to safer, higher ground areas further inland.[4] In addition to physical risk, population changes raise additional social and economic challenges. Generally, inland areas have insufficient affordable and mixed-use housing stocks and critical infrastructure capacity to support population increases.[5] Individuals and businesses who choose to move may also face social (e.g., cultural, psychological) and economic impacts from leaving their original communities behind.[6] For example, tribal communities with cultural and economic ties to the water face unique challenges when deciding whether to relocate inland.

To make Louisiana's coast more resilient and help support population shifts, the state partnered with a diverse set of public, private, philanthropic, and nonprofit stakeholders to implement Louisiana Strategic Adaptations for Future Environments (LA SAFE) to adapt its vulnerable coastline to these impacts. LA SAFE is a planning and capital investment process designed to address coastal impacts and other community needs in six coastal parishes. Following Hurricane Isaac in 2012, the state developed LA SAFE to support disaster recovery efforts in Jefferson, Lafourche, Plaquemines, St. John the Baptist, St. Tammany, and Terrebonne parishes.[7] Four of the parishes (Jefferson, Lafourche, Plaquemines, and Terrebonne) extend inland from the Gulf of Mexico and have coastal communities that are experiencing high rates of land loss and increasing flood risk. In comparison, St. John the Baptist and St. Tammany parishes are located further away from the coast and adjacent to job centers in Baton Rouge and New Orleans.[8] In August 2012, Hurricane Isaac brought heavy rainfall and an 11-foot storm surge that inundated communities along Louisiana's coast that caused severe flooding across the parishes resulting in an excess of $600 million in damages across the state.[9] Impacts from Hurricane Isaac enabled Louisiana to participate in the National Disaster Resilience Competition (NDRC). Through NDRC, the state advanced the LA SAFE initiative and was one of thirteen winning applicants that received funding to implement innovative resilience projects in the six Isaac-affected parishes.

LA SAFE provides a model for regional approaches to address flood risks and shifting populations through public-private partnerships and robust community engagement.[10] In developing and implementing LA SAFE, the Louisiana Office



Regional Flood Risk in Coastal Louisiana (as of 2017).

This map shows the low (0–3 feet), moderate (3–6 feet), and high (over six feet) flood risk projected for Louisiana's coast as of 2017.

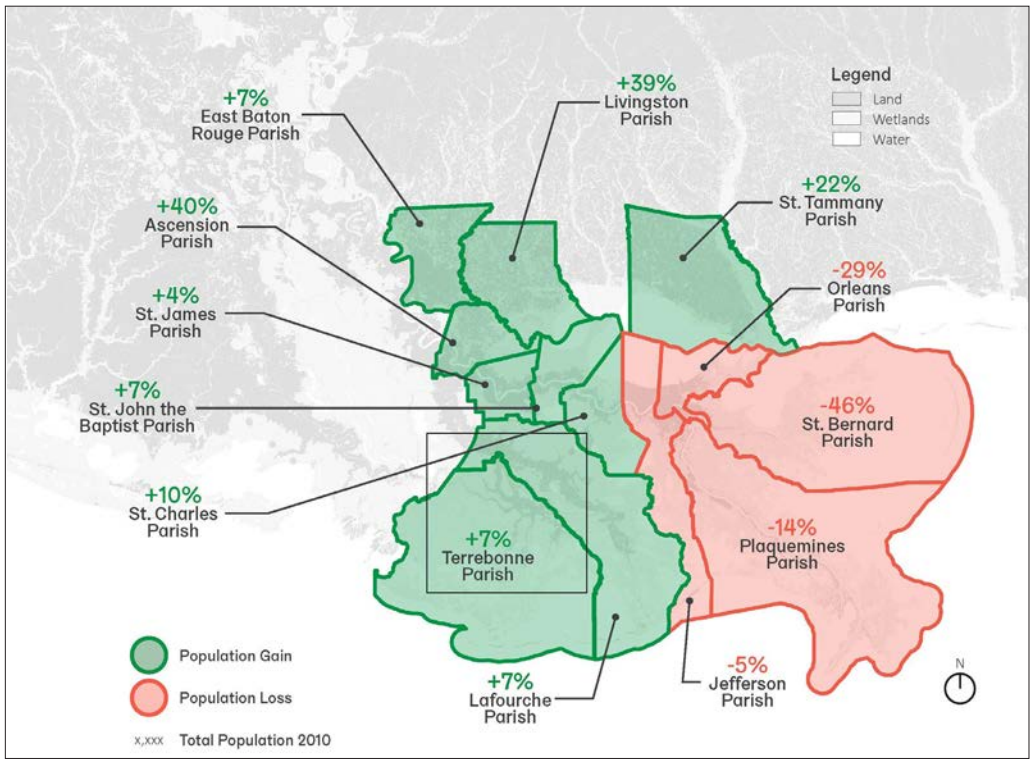
Credit: State of Louisiana Office of Community Development (The map is based on the Louisiana Coastal Protection and Restoration Authority's Medium Environmental Scenario, which projects 2.07 feet of sea-level rise and full implementation of the state's 2017 Coastal Master Plan).

for Community Development–Disaster Recovery Unit (OCD) partnered with Foundation for Louisiana (FFL) (a local nonprofit), and other local stakeholders who brought additional capacity and resources to the process. The community was engaged throughout all stages of the process including in developing plans and designing and selecting projects that, once implemented, will demonstrate how capital investments on a regional scale can be designed to accomplish different risk-based adaptation goals. Three primary goals guided the process:

- Develop strategies to enhance the resilience of coastal parishes against future flooding and environmental changes in the next 10, 25, and 50 years;
- Design community-driven development plans that are sensitive to the communities' cultural and social assets;[11] and
- Provide funding to increase the resiliency of at-risk communities and identify and design resilience-building models that are scalable and transferable.[12]

Managed Retreat Examples

In terms of managed retreat, LA SAFE developed a regional approach that addresses the needs of communities facing different physical risks and demographic changes. The LA SAFE framework shows how areas designated using flood risk and data on demographic and economic changes, community engagement, and project selection criteria — each of which are discussed in the following sections — can be used to plan for and develop projects that enhance overall coastal resilience across a broad geography. The process is helping the state make proactive investments in higher ground "receiving areas" to support and manage the ongoing and future transition of people away from vulnerable coastal communities. LA SAFE can serve as a model for other states, regions, and municipalities on how to empower residents to play an active and informed role in planning for retreat; and how to make proactive investments in projects to address population shifts in response to climate change and minimize the social and economic costs associated with relocation.



Population Changes Across the LA SAFE Parishes Between 2000–2010.

According to the state, upper parishes (in green) experienced a population increase while coastal parishes (in red) had a decrease in population. For that period, however, there are exceptions for two coastal parishes — Lafourche and Terrebonne — which each had a population increase of seven percent.

Credit: State of Louisiana Office of Community Development (Data prepared by ESRI and sourced from U.S. Census Bureau).

Flood Risk Areas

The LA SAFE process adopted a flood risk classification system to structure discussions with the community and to identify projects that could address the unique needs of communities in different areas of the Louisiana coast. To inform project selection, three typologies or areas were identified aligning with varying levels of flood risk (i.e., low, moderate, and high).[13] These areas helped residents inform the development and design of different types of projects, including for managed retreat, that would support thriving communities over longer-term 10-, 25-, and 50-year time horizons. By grounding project design and selection using a risk-based classification system, OCD and FFL could better facilitate meetings with residents while simultaneously advancing state and local coastal resilience goals.

Based on physical risk, demographic, and economic data, the state identified three levels of flood risk that correspond with different development principles to adapt to that flood risk:[14]

1. **Low risk areas.** Areas with relatively favorable future flood risk projections for 0–3 feet in a 100-year or one-percent-chance flood event in 2067. Low risk areas present new development opportunities, and have the capacity to receive populations and businesses supporting economic activities that are relocating away from moderate and high risk areas. Development principles guiding low risk areas include:

    a. Eliminate existing barriers to future development and future growth.[15]

    b. Adopt best practices for water management, energy conservation, wetlands restoration, and habitat preservation in order to prepare for future population and economic growth.[16]

    c. Account for the needs of local, existing populations, including communal and social interests.

2. **Moderate risk areas.** Areas with flood risk projections of 3–6 feet in a 100-year flood event in 2067. Moderate risk areas are expected to sustain current population levels and economic activity. Development principles guiding moderate risk areas include:

    a. Attempt to preserve current population levels and economic activity.[17]

    b. Consider the needs of industries to preserve their ability to operate under normal, emergent, and recovery conditions.[18]

    c. Adopt green or nature-based infrastructure practices to help reduce flood risk.[19]

3. **High risk areas.** Areas with flood risk projections over six feet in a 100-year flood event projected in 2067. High risk areas are likely to experience losses in population and economic activity. Development principles guiding high risk areas include:

    a. Resettle only when community-driven and voluntary, absent a clear and present risk to life.[20]

    b. Encourage resettlements within jurisdictional boundaries (i.e., same municipality or parish), when possible.[21]

    c. Envision conditions under which resettled communities retain access to abandoned lands in high risk zones for cultural, social, or economic reasons.[22]

The three flood risk areas provided OCD and FFL with a scientifically informed classification system to organize the community engagement and project selection components of the LA SAFE framework.

How LA SAFE Addresses the Development of Receiving Communities

Generally, receiving communities are areas to which individuals are relocating from flood-prone and otherwise vulnerable coastal communities in response to physical impacts like sea-level rise and coastal erosion. Neither the state nor FFL have developed a formal definition of "receiving communities" for purposes of implementing LA SAFE. Regardless, the state considers low risk areas that are predicted to have 0–3 feet of future flood risk and experience population growth in the future to be "ideal" receiving communities.[23] The state envisions supporting adaptation efforts in low risk areas, especially those that are underdeveloped, to accommodate anticipated growth in population and economic activity.[24] For example, St. John the Baptist is a parish with low flood risk where economic and population growth is anticipated over the next 50 years, due in part to its abundant natural resources and potential for job opportunities.[25] Similarly, St. Tammany is one of the state's fastest growing parishes, and has increased in population given the movement of people from other parishes after recent hurricanes.[26]

Meeting in Lafourche Parish.

Residents actively participated throughout all five rounds of the meetings held in each parish.

Credit: State of Louisiana Office of Community Development.

Project Voting in Lafourche Parish.

During the fifth and final round of parish meetings, residents voted for the projects they wanted the state to fund. Every person was given a first, second, and third choice token to indicate their top three project preferences, which allowed voting to remain anonymous. After everyone had a chance to vote, the results were revealed, as seen here in Lafourche Parish. LA SAFE also had an online poll available for three weeks after each parish meeting so that those who were unable to attend in-person could provide their input. In the end, resident preferences accounted for 20 percent of the weight of the final project selection criteria.

Credit: State of Louisiana Office of Community Development.

Community Engagement

In addition to the flood risk classification system, the LA SAFE framework drew upon extensive community engagement to integrate public preferences in project design and selection. In nine months, OCD and FFL convened over 3,000 participants in 71 meetings facilitated by community leaders and attended by residents, community stakeholders, and government officials. The 71 meetings were held over the course of five rounds in each of the six parishes. Collectively, the five rounds covered all stages of project design and selection, including interactive activities and roundtable discussions on social opportunities and community development needs. Government officials and community-based organizations participated in later rounds by guiding discussions on project feasibility and community impacts. During the final round of community meetings, residents ranked project options in each of the six parishes according to personal preferences. The community's preferences for project proposals were one of the six criteria used by the state to select the ten projects for funding, as described in the next section.

LA SAFE organizers were intentional about ensuring that meetings were accessible to all community members. Extra meetings and translated education materials were provided for Vietnamese and Cambodian residents, and welcome tables and stations were set up at each meeting to help situate both new and returning participants with foundational knowledge about the history of their communities as well as current and future flood risks. This commitment to providing foundational materials better enabled all residents to actively participate in and contribute to the process despite language differences. In addition, FFL offered childcare and held meetings after work hours to make it possible for more people to attend, and created a welcoming environment with local foods, music, and crafts.

In addition to maximizing meeting accessibility, FFL also sought to build local capacity to support adaptation decisionmaking and project selection in each parish. The meetings were facilitated by community leaders and residents, including over 60 participants from LEAD the Coast, a training program organized by FFL to build local knowledge and leadership. Through LEAD the Coast, FFL trained local community leaders to facilitate discussions with residents on coastal resilience issues and build resident capacity for residents to engage with and influence policymakers. FFL offered facilitators stipends to demonstrate the value of their contributions of time and skills to the LA SAFE process.

Project Selection

The five rounds of community engagement helped inform the design and selection of ten projects, which were finalized by a project selection committee composed of OCD and other LA SAFE team members.[27] The project selection committee finalized the project portfolio based upon a defined set of baseline criteria to qualify for Community Development Block Grant–Disaster Recovery

capital investments.[28] Projects were further narrowed according to weighted criteria, including public preference (as described in the preceding section), benefits to low-to-moderate income (LMI) populations, and a project's ability to decrease future flood risk.[29]

The selection committee was also intentional about attempting to fund projects evenly across all three flood risk areas to facilitate implementation of demonstration projects that could be replicated in other parishes with similar risks.[30] Finally, the project selection committee factored in the importance of funding a diverse portfolio of projects across several program areas, ensuring that projects could address multiple community needs and meet the goals established for each flood risk area.[31] Specifically, each of the ten awarded projects was required to address at least one of eight thematic program areas: (1) resilient housing; (2) resilient transportation; (3) resilient energy; (4) resilient infrastructure; (5) economic development; (6) community nonstructural mitigation/flood risk reduction; (7) planning; and (8) public services/education.[32] In the end, all of the priority projects selected for funding by individual communities were funded; the project selection committee largely helped to ensure that funding was equally distributed across the six parishes and project types. By factoring program priorities into project selection, OCD and FFL created a process to support adaptation projects that consider both physical risks and improve community well-being.

Funded Projects

In selecting the final projects, the project selection committee gave priority to the top scoring projects in each parish and projects that could demonstrate a diversity of resilience approaches to achieve goals for each type of flood risk.[33] Funding for each of the ten projects ranges from $475,000 (Louisiana Wetland Education Center in Jefferson Parish) to $7 million (Resilient Housing Prototype in Lafourche Parish).[34]

Each of the six parishes have areas with different flood risks and potential for new development. In terms of facilitating managed retreat, many of the projects chosen for funding were designed to accommodate resettlement of populations migrating from high to low flood risk areas (for more information about individual projects, see Table 1).

- **Jefferson Parish** projects focus on enhancing green and recreational space through green infrastructure projects and increasing environmental education and addressing wetland loss with a wetland education center.
- **Lafourche Parish** projects focus on expanding economic development initiatives to diversify the local economies affected by hurricanes and the BP oil spill. The selected projects (a Business Incubator and Resilient Housing Prototype) are responsive to community concerns about flood risk, changing populations, decreasing home values, and the need for affordable housing.
- **Plaquemines Parish** has experienced severe repetitive flooding along its low-lying communities near the Gulf of Mexico. Projects focus on maintaining the economic viability of the area's seafood industry through investments in fishing infrastructure (Harbor of Refuge project) and addressing mental and public health consequences from repetitive flood events and declining populations.
- **St. John the Baptist Parish** projects focus on enhancing stormwater infrastructure and transportation options in low flood risk areas that are already seeing gains in populations as residents migrate inland for jobs in the parish's chemical, petroleum, and agricultural industries.
- **St. Tammany Parish** projects will focus on accommodating the growing need for housing and social infrastructure in this fast-growing parish that has already taken in individuals and businesses migrating away from more vulnerable parts of the coast.
- **Terrebonne Parish** projects focus on accommodating seasonal workforce housing needs in a part of the state that is experiencing both rapid land loss and a booming economy due to the presence of oil and gas, fishing, and agricultural industries. The two funded projects include buyouts for a select number of homeowners outside of flood protection levees and large-scale marsh restoration to protect vulnerable residents from future 100-year floods.

LA SAFE PARISHES						
	Jefferson	**Lafourche**	**Plaquemines**	**St. John the Baptist**	**St. Tammany**	**Terrebonne**
Population	440,00 (est.)	98,500 (est.)	23,000 (est.)	43,500 (est.)	256,000 (est.)	112,000 (est.)
Local industries	Seafood, tourism	Oil	Oil, natural gas, seafood	Chemical, petroleum processing facilities	Healthcare, retail trade, construction	Oil, natural gas, seafood, agriculture
Challenges	**Physical challenges:** Flooding, stormwater management	**Physical challenges:** Subsidence, saltwater intrusion, flooding **Economic stagnation:** Lack of opportunity for young people, decrease in job opportunities due to oil and gas downturn	**Physical challenges:** Subsiding uplands and wetland areas, diminishing shorelines **Population loss:** Nearly 14 percent decrease between 2000–2010	**Underdevelopment:** Abundant low-risk areas that require planning and development in anticipation of population growth	**Spontaneous migration:** Receiving individuals and businesses **Sustained growth:** Growing need for housing and infrastructure	**Coastal erosion:** The major barrier islands protecting the parish interior are predicted to disappear within 50 years
Selected Project(s)	**Gretna Resilience District Kickstart:** $5.61 million to install green infrastructure and stormwater improvements and enhance recreational amenities **Louisiana Wetland Education Center:** $475,000 to promote education on coastal ecology in the town of Lafitte. The center will include research and meeting facilities, and outdoor recreation space	**Emerging Industry Business Incubator:** $3.5 million to create a program to develop new businesses, pair entrepreneurs with mentors, and provide co-working facilities **Resilient Housing Prototype:** $7 million to develop affordable, elevated housing resistant to flooding and wind damage to promote the development of medium-density, affordable residences in areas with low flood risk	**Harbor of Refuge:** $4.77 million to create a parish-operated harbor of refuge with docking facilities for distressed vessels to shelter in place during storms **Mental Health and Substance Abuse Program:** $1.87 million to maintain/expand existing programs for mental health and substance abuse services in order to alleviate the emotional impact of disaster events and anxiety about future increased flood risk	**Airline and Main Complete Streets:** $6.05 million to implement resilient street design improvements (green infrastructure and other enhancements to improve access for pedestrians and bikers) along the main commercial corridors in the town of LaPlace, which has various levels of flood risk	**Safe Haven Blue-Green Campus Trails:** $5.3 million to install green infrastructure and improve mental health and substance abuse services in the City of Mandeville	**Buyouts for Permanent Resident Households:** $2.85 million in relocation assistance to households in the high-risk area outside the levee system. **Lake Boudreaux Living Mitigation:** $3.6 million to create 300 acres of terraces and marshland within the levee system protecting the low-to-moderate income communities in Dulac and Grand Caillou (Morganza to the Gulf Flood Risk Reduction Project) from a 100-year/ Category 3 storm

LA SAFE Parishes.

For each of the six parishes that participated in LA SAFE, this table breaks down population, local industries, challenges, and projects selected for funding.

Credit: Jennifer Li, Georgetown Climate Center.

Funding

In 2016, following a series of federally declared disasters, the U.S. Department of Housing and Urban Development provided $1 billion in Community Development Block Grant–Disaster Recovery funding through NDRC to eligible state and local governments to stimulate the development of innovative resilience projects.[35] Louisiana received $39.75 million from NDRC and the state pledged an additional $250,000 during the application process, bringing the total to $40 million.[36] Later, the state added additional funds that totaled $47.5 million. FFL also contributed financial support to the process, which demonstrates LA SAFE's ability to leverage nongovernmental sources of funding to support community engagement processes.

Next Steps

Building on LA SAFE's community-driven framework for adaptation and the ten state-funded projects, the state is continuing to work with the six parishes to mainstream and institutionalize adaptation and resilience at both the regional and parish levels. In May 2019, the state released a regional adaptation strategy and six parish-level strategies to support long-term adaptation planning.[37] Each strategy follows LA SAFE's framework for identifying projects to meet different adaptation and development goals based on flood risk to ensure that future regional and local projects are similarly designed to advance comprehensive approaches. The strategies' goals include water management, housing and development, transportation, education, economies, jobs, and culture and recreation.[38]

Notably, to support parishes in reaching their housing and development goals, the strategies identify projects that direct growth to low risk areas and prepare receiving communities.[39] These strategies will assist the parishes to develop and invest in additional projects that will be more resilient to coastal impacts over the state's 50-year planning horizon and achieve multiple benefits for communities.

In September 2019, St. John the Baptist Parish was the first of the six parishes to adopt its adaptation strategy.[40] St. John aims to integrate its LA SAFE strategy into local policies and future development decisions.[41] The state is working with the five other parishes to officially codify their strategies as well. In 2020, the state anticipates beginning to construct the ten funded projects. Other projects included in the adaptation strategies may be implemented in the future based upon different factors like government prioritization, resident support, and funding availability.

Considerations and Lessons Learned

The LA SAFE framework can serve as a model for other state and local governments and regional entities contemplating long-term adaptation plans and investments to make coastal areas more resilient to the impacts of sea-level rise, flooding, and land loss. OCD and FFL developed a comprehensive approach to design projects to address varying degrees of flood, social, and economic risk and achieve different adaptation goals across multiple sectors. Other jurisdictions could benefit from similar comprehensive approaches to attain and leverage benefits for communities, the environment, and economies. Regardless, it is important to note that LA SAFE was funded through the National Disaster Resilience Competition, which was a one-time post-disaster funding opportunity. States and local governments seeking to replicate the LA SAFE framework will have to consider other potential funding sources for both community engagement and project design and implementation.

A comprehensive approach requires the development of different strategies that meet the needs of communities based upon flood risk and demographic changes over time. Different adaptation strategies are needed for low risk areas with growing population and high risk areas that may be losing population. LA SAFE shows how projects can be designed to accomplish these goals and proactively help communities adapt to flood risk as well as demographic changes. Early investments in low flood risk areas that can serve as receiving communities — for example in affordable housing, green space, and economic development — can facilitate easier transitions for coastal residents to safer, higher ground areas. Additionally, measures are also needed to help residents and businesses that will continue to live in higher flood risk areas. The moderate and high flood risk areas show how policies and programs can be designed to help communities transition and mitigate impacts from population losses and reduced tax bases — for example, by making investments to sustain communities by enhancing the resilience of homes and infrastructure (e.g., floodproofing or elevation).

An equitable approach to managed retreat necessitates that communities have an active role and voice in decisionmaking. The LA SAFE example shows how policymakers can engage communities in difficult conversations about managed retreat across multiple stages of the planning process for long-term adaptation projects. States, regions, and municipalities designing comprehensive adaptation approaches or long-term plans for retreat could deepen public engagement by training community members to facilitate public meetings, translating materials for non-English speakers, and offering childcare and other resources to increase the accessibility of the meetings for all community members. Meetings are also an opportunity to directly engage elected officials and government representatives, who could provide input on the feasibility of proposed programs or policies.

In addition to community engagement, the LA SAFE process benefitted from being administered through a public-private partnership. State and local governments should aim to work collaboratively to coordinate state, regional, and local actions and maximize government resources to achieve mutually beneficial coastal initiatives. Governments can also partner with nongovernmental organizations, like nonprofits and religious organizations, with existing ties in communities in order to increase resident participation and buy-in to support the implementation of important adaptation policies and projects going forward.

Endnotes

1 La. Office of Cmty. Dev.–Disaster Recovery Unit, LA SAFE: Louisiana's Strategic Adaptations for Future Environments 2-3, *available at* **https://s3-us-west-2.amazonaws.com/resilience-exchange/attachments/uploads/1024/original/LASAFE_Report_Final.pdf**. Louisiana is considered to be a working coast, which supplies 90 percent of the nation's oil and gas on the Outer Continental Shelf, handles 20 percent of the nation's annual waterborne commerce, and produces 26 percent (by weight) of the continental U.S. commercial fisheries landings. In addition, 500 million tons of cargo pass through the state's deep-draft ports and navigation channels, ranking first in the U.S. in total shipping tonnage. *Id.*

2 *USGS: Louisiana's Rate of Coastal Wetland Loss Continues to Slow*, U.S. Geological Survey, U.S. Dep't of the Interior (July 2017), **https://www.usgs.gov/news/usgs-louisiana-s-rate-coastal-wetland-loss-continues-slow**; Coastal Prot. & Restoration Authority of La., Louisiana's Comprehensive Master Plan for a Sustainable Coast ES-7 (June 2, 2017), **http://coastal.la.gov/wp-content/uploads/2017/04/2017-Coastal-Master-Plan_Web-Book_CFinal-with-Effective-Date-06092017.pdf** ("2,250 square miles could be lost if we take no additional action over the next 50 years.").

3 La. Office of Cmty. Dev.–Disaster Recovery Unit, LA SAFE: Louisiana's Strategic Adaptations for Future Environments 2-3, *available at* **https://s3-us-west-2.amazonaws.com/resilience-exchange/attachments/uploads/1024/original/LASAFE_Report_Final.pdf**.

4 Ted Jackson, *On the Louisiana Coast, A Native Community Sinks Slowly into the Sea*, Yale Environment 360 (Mar. 2018), **https://e360.yale.edu/features/on-louisiana-coast-a-native-community-sinks-slowly-into-the-sea-isle-de-jean-charles**; La. Office of Cmty. Dev.–Disaster Recovery Unit, LA SAFE: Louisiana's Strategic Adaptations for Future Environments 7-8, *available at* **https://s3-us-west-2.amazonaws.com/resilience-exchange/attachments/uploads/1024/original/LASAFE_Report_Final.pdf**.

5 LA SAFE Program Guidelines Operational Version 1.0 §1.3.1, p. 7-8 (Sept. 2018), *available at* **https://lasafe.la.gov/wp-content/uploads/2018/09/LASAFE_Guidelines_Operational_v1_09162018.pdf**.

6 *See* La. Office of Cmty. Dev.–Disaster Recovery Unit, LA SAFE: Louisiana's Strategic Adaptations for Future Environments 3, *available at* **https://s3-us-west-2.amazonaws.com/resilience-exchange/attachments/uploads/1024/original/LASAFE_Report_Final.pdf**.

7 *Frequently Asked Questions: Why These 6 Parishes?*, LA SAFE, **https://lasafe.la.gov/faqs/** (last visited Nov. 13, 2019).

8 Note that while these two parishes are located further away from the coast, they were two of the most heavily impacted parishes in Hurricane Isaac. St. John, specifically, was the most heavily impacted parish in the state, proportionally.

9 Robbie Berg, Nat'l Hurricane Ctr., Tropical Cyclone Report: Hurricane Isaac (AL092012) 21 August–1 September 2012 (Jan. 28, 2013), *available at* **https://www.nhc.noaa.gov/data/tcr/AL092012_Isaac.pdf**.

10 To confront the physical challenges facing the state's coastline, the Louisiana legislature created the Coastal Protection and Restoration Authority in 2005 as a means to develop, implement, and enforce a comprehensive coastal protection and restoration master plan. This mandate led to the development of the Coastal Master Plan (CMP); the most recent version of CMP was released in 2017. Updated every five years, CMP identifies coastal restoration and resilience projects the state is either implementing or seeks to develop and articulates the state's long-term program and adaptive management strategy. *See* Georgetown Climate Ctr., *Louisiana 2017 Coastal Master Plan,* Adaptation Clearinghouse (June 2, 2017), **https://www.adaptationclearinghouse.org/resources/louisiana-2017-coastal-master-plan.html**.

11 The first phase of LA SAFE discussed in this case study did not include the release of the community development plans noted for this goal; the state released these plans or what were eventually termed "strategies" (one regional and one for each parish for a total of seven) in 2019. For more information, see section on Next Steps, *infra,* and Georgetown Climate Ctr., *Louisiana Strategic Adaptations for Future Environments (LA SAFE) Adaptation Strategies,* Adaptation Clearinghouse (May 2019), **https://www.adaptationclearinghouse.org/resources/louisiana-strategic-adaptations-for-future-environments-la-safe-adaptation-strategies.html**.

12 *See Learn About Who We Are: Our Mission*, LA SAFE, **https://lasafe.la.gov/about-us/** (last visited Nov. 13, 2019).

13 In implementing LA SAFE, OCD and FFL abandoned terminology (as proposed during early phases of LA SAFE's design) that would have labeled each flood risk area as a different type of zone: "Reshape Zones" for low flood risk areas; "Retrofit Zones" for moderate flood risk areas: and "Resettlement Zones" for high flood risk areas. *See* LA SAFE Program Guidelines Operational Version 1.0 (Sept. 2018), *available at* **https://lasafe.la.gov/wp-content/uploads/2018/09/LASAFE_Guidelines_Operational_v1_09162018.pdf**. In modifying the LA SAFE framework to meet local needs, OCD and FFL found that a purely zonal approach to managed retreat is not viable because physical risks, land uses, and development patterns, among other factors, can vary within a larger spatial zone and adaptation strategies in any given place require more nuanced discussions. For purposes of this case study, guiding development principles for Reshape, Retrofit, and Resettlement zones were incorporated under their corresponding flood risk area and will not be referred to independently as "zones."

14 OCD used the Coastal Protection and Restoration Authority analytical model, the Coastal Louisiana Risk Assessment (CLARA), to estimate future flood risk over the next 50 years (i.e., from 2017 to the year 2067). LA SAFE Program Guidelines Operational Version 1.0 p. 5-6 (Sept. 2018), *available at* **https://lasafe.la.gov/wp-content/uploads/2018/09/LASAFE_Guidelines_Operational_v1_09162018.pdf**.

15 *Id.* at 9.

16 *Id.*

17 *Id.* at 12.

18 *Id.*

19 *Id.*

20 *Id.* at 15.

21 *Id.*

22 *Id.*

23 *Id.* at 7, 9.

24 *Id.* at 8.

25 *St. John the Baptist Parish Projects Selected for 2018 Funding*, LA SAFE, **https://lasafe.la.gov/engagement/st-john-baptist-parish/** (last visited Nov. 13, 2019).

26 *St. Tammany Parish Projects Selected for 2018 Funding*, LA SAFE, **https://lasafe.la.gov/engagement/st-tammany-parish/** (last visited Nov. 13, 2019).

27 LA SAFE Program Guidelines Operational Version 1.0 p. 22 (Sept. 2018), *available at* **https://lasafe.la.gov/wp-content/uploads/2018/09/LASAFE_Guidelines_Operational_v1_09162018.pdf**.

28 The proposed project must have been a Community Development Block Grant National Disaster Resilience Competition (or Disaster Recovery, as applicable) eligible activity, in addition to having met other baseline criteria specified in the LA SAFE program guidelines. *Id.* at 21.

29 The full list of scoring criteria included: (1) public preference for the proposal; (2) ability to supplement Community Development Block Grants with other funding; (3) benefit to low-to-moderate income (LMI) populations; (4) quantitative public benefit (e.g., number of jobs created); (5) qualitative public benefit (e.g., ability to be scaled or replicated in other localities); and (6) potential Community Rating System (CRS) score.

30 LA SAFE Program Guidelines Operational Version 1.0 p. 21 (Sept. 2018), *available at* **https://lasafe.la.gov/wp-content/uploads/2018/09/LASAFE_Guidelines_Operational_v1_09162018.pdf**.

31 *Id.* at 20.

32 *Id.* at 6-7.

33 For example, two of the final projects — the Wetland Education Center and Emerging Industry Business Incubator — were not among the highest scoring projects, but selected instead to diversify the project portfolio in observance of the additional criteria listed above.

34 *Gov. Edwards Awards Over $41 Million to Coastal Parishes for LA SAFE Flood-Resilience Projects*, St. John the Baptist Parish (Sept. 11, 2018), **http://www.sjbparish.com/news_details.php?id=2599**.

35 The National Disaster Resilience Competition was a year-long funding competition for states, like Louisiana, and local applicants that received presidential disaster declarations from 2011–2013. The competition was structured in two phases for applicants to develop innovative approaches to reduce future risks to natural hazards and build long-term resilience. In January 2016, thirteen winning projects were selected for funding. Georgetown Climate Ctr., *HUD National Disaster Resilience Competition*, Adaptation Clearinghouse (June 14, 2014), **https://www.adaptationclearinghouse.org/resources/hud-national-disaster-resilience-competition.html**; The Rockefeller Found., Program Overview Packet 1 (Dec. 2014).

36 LA SAFE Program Guidelines Operational Version 1.0 p. 5 (Sept. 2018), *available at* **https://lasafe.la.gov/wp-content/uploads/2018/09/LASAFE_Guidelines_Operational_v1_09162018.pdf**. The impacts of sea-level rise, subsidence, and erosion have already caused Isle de Jean Charles — a narrow strip of land located in the southern wetlands of Louisiana — to lose 98 percent of its land mass. In 2016, Louisiana received $48 million from the U.S. Department of Housing and Urban Development to relocate the members of the Biloxi-Chitimacha-Choctaw tribe still residing on the island. *See* Ted Jackson, *On the Louisiana Coast, A Native Community Sinks Slowly into the Sea*, Yale Environment 360 (Mar. 2018), **https://e360.yale.edu/features/on-louisiana-coast-a-native-community-sinks-slowly-into-the-sea-isle-de-jean-charles**.

37 Press Release, Office of Cmty. Dev.–Disaster Recovery Unit, State of La., Louisiana Releases Climate Adaptation Strategies Created Through LA SAFE Program's Regional Approach to Resilience (May 15, 2019), *available at* **https://s3.amazonaws.com/lasafe/Final+Adaptation+Strategies/Gov.%2BEdwards%2BReleases%2BStrategies%2Bfor%2BLA%2BSAFE%2BParishes_FINAL.pdf**; *Regional and Parish Adaptation Strategies*, LA SAFE, **https://lasafe.la.gov/** (last visited Nov. 13, 2019).

38 *See Regional and Parish Adaptation Strategies*, LA SAFE, **https://lasafe.la.gov/** (last visited Nov. 13, 2019).

39 *Id*.

40 *St. John the Baptist Parish First to Adopt State Developed Climate Resilience Strategy*, St. John the Baptist Parish (Oct. 4, 2019), **http://sjbparish.com/news_details.php?id=2727**.

41 *Id*.

GEORGETOWN CLIMATE CENTER

GeorgetownClimate.org

AdaptationClearinghouse.org