

Appendix:

A review of key resilience-related planning efforts in New Orleans

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RESILIENT NOLA



CITY OF NEW ORLEANS

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1. Introduction

In the last ten years since Hurricane Katrina devastated New Orleans and the surrounding region, city leaders, researchers, and policy analysts have examined the extent to which New Orleans is ready for the next set of natural disaster impacts and whether the city has an adequacy and appropriateness of plans and infrastructure to mitigate, adapt to, and recover effectively and efficiently. Further, many at the time commented that the storm merely served as a magnifying glass to illuminate entrenched issues of social vulnerability that had challenged New Orleans for decades (Chen, 2007; Pant, 2008). These issues had not received persistent action-action that embraced a long-term view and acknowledged the interconnectedness of the vulnerabilities. As a result of these two intervening discussions, New Orleans became a natural laboratory or community example to significantly contribute to national and global conversations about resilience:

- *When and how does a community develop the ongoing capacities and capabilities to withstand, adapt to, and recover from a range of stresses?*
- *How are a community's actions to equip populations for day-to-day, routine function leveraged during heightened stress?*
- *What were the factors that truly inhibited New Orleans' recovery post-Katrina, and what drivers and institutional supports can be embedded for constant cultivation of resilience?*
- *How did New Orleans achieve its current state of resilience and who contributed to these efforts?*

The seeds of the resilience discussion in New Orleans gave rise to a series of planning efforts, coming from all sectors and stakeholders, sometime mandated by federal interests, sometimes motivated and executed by local requirements or a coalitions of interested parties. Significant strides have been noted, such as the development of more robust water plans, but not across all sectors or domains of resilience capacity and capability. Two years after Hurricane Katrina, Nelson et al. (2007) conducted a review of the rebuilding and city planning processes. At that time, the authors concluded that there were tensions between the need for “speed vs. deliberation” in recovery planning as well as challenges from balancing professional and resident views in setting redevelopment priorities. Other researchers cited the uneven impact of the disaster and how pre-existing social vulnerabilities within New Orleans interacted with the

¹ This short review was completed by Anita Chandra and Elizabeth Thornton of the RAND Corporation to inform the New Orleans Preliminary Resilience Assessment.

level of flood exposure to produce inequities (Finch, 2010).

In addition, as is common in these planning efforts, not all plans had clarity of purpose, and when they did, the translation from plans to action was not always convincingly articulated or implemented. Moreover, in some cases, the plans and actions were overlapping without consideration of effort duplication or where synergies and alignment could have been more effectively coordinated. While this is often an issue in citywide planning, the limitations in alignment or nesting can have profound impacts in resilience planning or strategy because resilience is rooted in the principle that multiple sectors work in concert through a transdisciplinary lens and a shared accountability framework (NRC, 2011).

A decade since Hurricane Katrina, the city has realized remarkable progress in addressing these tensions and complexities as well as ensuring that there is a careful review of approaches and greater role and responsibility clarity in recovery planning. However, these conflicts have not been eliminated and continue to confront the city. This has been especially evident as the city develops a robust resilience strategy to improve its resilience to physical, social, and economic shocks and stresses as part of its membership in the 100 Resilient Cities Initiative (an initiative of the Rockefeller Foundation). New Orleans' resilience strategy seeks to balance multisectoral perspectives and acknowledges deeply rooted issues that have continued to plague the city, such as inequity.

In the next sections, we briefly outline the most recent New Orleans resilience-related planning efforts, summarize their objectives, and describe the sectors and stakeholders engaged. We further the analysis to consider the extent to which these plans and their efforts could be braided or interconnected in an upcoming citywide resilience strategy, and how New Orleans can use the elements of these plans to propel action, catalyzing and sustaining the motivation and collective interests of a broader and more diverse set of actors critical to the future of the city through a strategy. This brief analysis only offers an initial view on where the plans to date have focused on resilience and where the resilience strategy could have value. The analysis only focuses on plans developed since Hurricane Katrina and should be considered with other resilience assessment efforts currently underway.

1.2 Criteria for evaluation

Before further analysis of recent New Orleans plans and how they support or advance resilience strategy, it is helpful to step back and briefly review the core components of resilience used to review

and evaluate the New Orleans plans. There are many variations on the essential resilience components, all cited in a wide of range of studies and policies, but we use the following in this analysis based on work by Chandra et al. (2009, 2011, 2013), Norris et al. (2008), Aldrich (2010), Cutter (2003), Tierney (2008) among others as well as those rooted in national policy, including the National Health Security Strategy (2009, 2014) and the National Recovery Framework (2011. Further, these core components emerge from global analysis (Allen, 2006; Moore, Chandra et al., 2012):

- Acknowledgement and plans that integrate acute shock and chronic stress planning, or risk continuum considerations
- Orientation towards the linkage of asset and vulnerability analysis as well as elevation of community strengths for resilience capacity and capability development
- Discussion of dual-benefit or the potential that resilience orientation can be integrated into routine practice
- Reflection and integration of quality improvement and ongoing knowledge exchange for continuous monitoring and evaluation from one stress to the next

2. Summary of existing plans, actions/policy landscape

There are several activities in post-Katrina New Orleans that contribute to resilience development as well as ongoing mitigation of risks and adaptation to new environments and conditions. For the purpose of this short paper, we use some of the plans summarized in the city's Preliminary Resilience Assessment as well as some that are no longer in effect; however, we apply a critical view of each plan with attention to the core components of resilience described earlier. It should be noted that there are national policies and frameworks that have implications for resilience strategy in New Orleans going forward and have influence directly or via these local plans. That influence should also be considered as well, though those state and national plans are not a focus of this paper.

2.1 Unified New Orleans Plan (UNOP)

Adoption date	2006
Funding source	Greater New Orleans Foundation (GNOF) (with grants from the Rockefeller Foundation, the Bush-Clinton Katrina Fund and GNOF)
Governance	The New Orleans Community Support Foundation, a subsidiary of GNOF, was established as the fiduciary agent overseeing the dispersal of the planning money
Stakeholders	Government, academia, non-governmental organizations, citizens, and other groups in New Orleans with a shared interest in flood protection and the recovery and reconstruction of the city's infrastructure, health care and education facilities, and other essential services
Key vision	To serve as the definitive recovery planning process for New Orleans post-Hurricane Katrina and propose policy-oriented or regulatory mechanisms to prioritize rebuilding and promote safer development
Key resilience themes	Each recovery project included response to <i>acute events and long-term conditions</i> ; for example, the rehabilitation of low-income housing was coupled with comprehensive and permanent strategy for all displaced residents

Summary

The Unified New Orleans Plan (UNOP) was a comprehensive recovery plan that was designed to unify and avoid the pitfalls of FEMA ESF-14, Bring New Orleans Back (BNOB), and the Lambert Plan.

UNOP included broad resident engagement across the city and across the country to reach those families still displaced. UNOP was the framework used to develop the City's Strategic Recovery and Redevelopment Plan that guides the deployment of \$411 million in CDBG-DR funding for Long Term Community Recovery projects.

Stakeholder engagement

While this plan is older, its approach to community feedback is useful. The plan process used three feedback scenarios, which formed the basis for citywide conversations about priorities for flood protection and the recovery and reconstruction of the city's infrastructure, health care and education facilities, and other essential services. First, it was designed to unify plans for all of the city's neighborhoods into one singular plan—something that was meant to make recovery funding priorities consistent and align Orleans Parish with the other hurricane-damaged Parishes throughout the state. Second, BNOB and the Lambert Plan were to remain respected, with neighborhoods deciding how to incorporate earlier ideas into the final planning document. And third, UNOP was designed and implemented by a non-governmental entity to avoid potential complexities caused by politics—something that ultimately led to the failure of previous plans. From those scenarios, community residents argued for reduction of flood risk while maintaining wetland restoration, empowerment of neighborhoods to rebuild safer and stronger, the construction of affordable housing, the rebuild of public facilities, and investment in public education.

Definitions and uses of resilience components

Most of the recovery projects had some awareness of resilience components. Each recovery project included response to *acute events and long-term conditions*. For example, the rehabilitation of low-income housing was coupled with comprehensive and permanent strategy for all displaced residents. There was interest in broad economic strategy that links to the ProsperityNOLA plan to invest in bioinnovation and technology sectors. The UNOP incorporated consideration of existing *community strengths*, with particular inclusion of cultural heritage and consideration of the historical New Orleans population in planning. There was less incorporation of *dual-benefit* thinking as those recovery projects were developed, at least based on plan content. Finally, each plan category (e.g., economic development, flood management) included short-term, mid-term, and long-term metrics. However, the plan had less acknowledgment of the structures to ensure that there was integration across plan categories and some use of common or shared metrics.

2.2 The Greater New Orleans Urban Water Plan

Adoption date	2010
Funding source	Louisiana's Office of Community Development - Disaster Recovery Unit
Governance	Greater New Orleans, Inc.
Stakeholders	Those with a shared interest in the envisioned integrated water system and are likely play a role in its operation and management, such as water managers
Key vision	Vision for long- term urban water management in the 21st century and is effectively the first regional urban water plan of its kind in the U.S. The Urban Water Plan provides a roadmap for better management of flood and subsidence threats, while creating economic value and enhancing quality of life
Key resilience themes	Notions related to living with water, balancing nature, and acknowledging the value of adaptation

Summary

In 2010, Louisiana's Office of Community Development - Disaster Recovery Unit funded Greater New Orleans, Inc. to develop a comprehensive, integrated, and sustainable water management strategy for the east banks of Orleans and Jefferson Parishes and St. Bernard Parish using federal Community Development Block Grants, which are disaster recovery funds from the Department of Housing and Urban Development (HUD). Subsequently, Waggonner & Ball Architects, along with a team of local and international water management experts, developed such a strategy, now the Greater New Orleans Urban Water Plan, over the course of two years.

This action plan is a vision for long- term urban water management in the 21st century and is effectively the first regional urban water plan of its kind in the U.S. The Urban Water Plan provides a roadmap for better management of flood and subsidence threats, while creating economic value and enhancing quality of life. This plan was designed to work in congruence and create multiple lines of defense with the region's levee system and Louisiana's 2012 Coastal Master Plan. The objective of the Urban Water Plan is to position the Greater New Orleans region as a global leader in water management, exporting local expertise, technologies, and partnerships with other delta cities in climate change adaptation efforts.⁵

Stakeholder engagement

The action plan includes a framework for community-based action to engage New Orleans residents to meet goals in design and planning, research and development as well as outreach and education. In addition Urban Water Plan recommends collaboration among existing organizational structures and

stakeholders with shared interest. It identifies current water managers and their roles and illustrates the existing flood protection and drainage systems they govern in each of the three jurisdictions within the project area. Further, the plan identifies potential stakeholders, who may not have traditionally been involved in water management but will have a shared interest in the envisioned integrated water system and likely play a role in its operation and management.⁵

Definitions and uses of resilience components

The Urban Water Plan did not explicitly define resilience or sustainability, but the core components of the plan reflect resilience orientation through notions of living with water, balancing nature, and acknowledging the value of adaptation. While the plan is single element focused-water- it does carry through the *acute shock* of water through storm surge or hurricanes, and the ongoing or *chronic stress* of water by having working sewage and drainage infrastructure. The Adapting to Flow section of the Water Plan recognizes the *asset and vulnerability* associated with water, noting the economic benefits (e.g., fisheries, tourism) of the water industry in New Orleans. While not well articulated, the asset analysis does implicitly recognize the *dual benefit* opportunities in better water management, though more discussion of how to pair water planning with other social and economic benefits for the community could be better explained. Future resilience strategy could do better in crafting or outlining this linkage. Finally, this particular plan has some information on ongoing *quality improvement* or monitoring strategy, via an implementation-phasing scheme that incorporates the process of smart retrofits to ultimately the development of new policy. This includes an integrated process of stakeholder buy-in, innovation development, and ongoing water education and literacy. The Plan would benefit from clearer metrics on how water planning will lead to resilience capacity and capability development in New Orleans, but that relationship could be included in a broader resilience strategy for the city.

2.3 Plan for the 21st Century

Adoption date	2010
Funding source	The City of New Orleans
Governance	City Planning Commission and City Council
Stakeholders	Elected officials, appointed officials, and leaders of municipal agencies
Key vision	Designed to guide New Orleans' growth for the next 20 years through optimizing core systems, which shape the city's physical, social, environmental, and economic future
Key resilience themes	2030 objective for New Orleans to be one of the U.S.'s greenest cities by being resource-efficient and environmentally healthy

Summary

Commonly referred to as the Master Plan, the Plan for the 21st Century is a City Charter-mandated planning framework designed to guide New Orleans' growth for the next 20 years through optimizing core systems, which shape the city's physical, social, environmental, and economic future. The Master Plan builds on previous city planning efforts and is a culmination of the values and priorities, which emerged through an extensive community participation process. In 2010, the Plan was unanimously adopted by both the City Planning Commission and the City Council and was signed by Mayor Landrieu.³

Stakeholder engagement

As the New Orleans' primary policy and planning document, the Master Plan is designed for the use of: (1) elected officials, who adopt it and fund its implementation, (2) appointed officials, who use it as a guide to discretionary decisions, and (3) leaders of municipal agencies, who are charged with implementing the plan and revising other plans to conform with it. In addition, the Master Plan is of importance to: (1) government agencies that are not directly under City control, (2) all present and future civic leaders in framing their leadership roles and understanding their constituencies' objectives, and (3) city residents in understanding citywide trends, current and future opportunities, constraints, and critical issues that must be addressed in order for New Orleans to thrive as well as the role that each individual can play in achieving the goals of the Master Plan.³

The Master Plan was rooted in a stakeholder engagement plan that provides the foundation for future New Orleans resilience strategy. First, there was a City Advisory Group to serve as a sounding board during the planning and zoning process. The CAG met every 4–6 weeks from September 2008 through May 2009. A work group process further guided stakeholder input, organized into the following

categories- how we live (e.g. neighborhood reform), how we prosper (e.g., economic development), sustainable systems, and then how to move from plan to action. Once these work group processes concluded, there was a public comment period for the plan. Along the way, there was fairly intensive communication processes, namely through newsletter and other media. The themes that emerged from the Master Plan stakeholder engagement process are resonant today, including but not limited to:

How we live

- Address public safety
- Preserve neighborhood character
- Encourage a more holistic view of neighborhood preservation

How we prosper

- Expand workforce development
- Ensure neighborhood level commerce development

Sustainability

- Ensure protection from hurricane and flood
- Expand public transit including encouraging better bike and pedestrian transportation

From Plan to Action

- Ensure ongoing public input in planning and budgeting
- Creating more opportunities for government transparency

Definitions and uses of resilience components

The Master Plan considers resilience and related sustainability because it states that by 2030 the objective is for New Orleans to be one of the U.S.'s greenest cities; specifically that the city will be resource- efficient and environmentally healthy. Further, New Orleans' building and zoning codes will be national models for preservation and sustainability, and the city will successfully have drawn new regional growth into enhanced neighborhoods from Audubon to a thriving New Orleans East, reversing regional sprawl. Also by 2030, the Master Plan will have transformed New Orleans to be a global center of knowledge about managing natural and man-made systems to prevent flooding in low-lying cities, and the city will have state of the art landscaped canals, and parks with water features..³

Each of these features of the Master Plan rests on core components of resilience. First, the Plan includes recognition of a *range of shocks and stresses* to the social, economic, and environmental fabric

for New Orleans. For example, the elements of the Master Plan reflect this diversity from historic preservation to green infrastructure and health and human services. Further, there is credit to resilience with a dedicated chapter on the topic. However, this chapter mostly focuses on water management issues, including issues of elevation, storm water management, and related adaptation. There is limited relationship with the remaining chapters in the Master Plan, which characterize other social and economic stresses for New Orleans. Second, the plan has some *inclusion of assets* that New Orleans already possesses, but relatively little detail on how those assets would be leveraged against vulnerability to create resilience capacity and capability. There are some useful features of the Master Plan that explore assets, including the Park Plan and the recommendations on renewable energy, but that asset analysis is not well-integrated in a holistic vision or implementation protocol. Third, there is limited discussion of how investments and proposed plans might have the *dual benefit*—augmenting day-to-day community wellbeing while also protecting New Orleans from acute stress. Finally, there is a useful section of the plan that includes a set of metrics for *monitoring progress* and some discussion of governance structure. The metrics were categorized into four areas- public safety, opportunities for youth, continued recovery from Katrina and associated storms, and high performing government. In addition, the Plan outlines a structure for the City Planning Commission and how the work of that Commission feeds into the CIP budget process. The City Planning Commission is directed to integrate ongoing citizen participation, though the metrics for that inclusion are somewhat weak. Another section of the plan outlines an active process of neighborhood engagement or participation, but how that links to the full resilience planning process is unclear.

2.4 Hazard Mitigation Plan

Adoption date	Updated every five years; next plan to be release in 2015
Funding source	The City of New Orleans
Governance	City of New Orleans’ Office of Homeland Security and Emergency Preparedness
Stakeholders	Representation from neighborhoods, civic organizations, churches, businesses, environmental groups, governmental agencies, and nonprofit organizations that have an interest in hazard mitigation planning
Key vision	To provide a detailed evaluation of city risks and outlines New Orleans’ strategy to reduce hazard impacts on people and property
Key resilience themes	Hazards reviewed represent acute shocks (e.g., hurricane, lightning), other <i>long-term stresses</i> are included, such as coastal erosion, subsidence, and drought

Summary

The New Orleans Hazard Mitigation Plan is developed every five years by the City's Hazard Mitigation Office, which is a branch of the City of New Orleans' Office of Homeland Security and Emergency Preparedness, and then adopted by the City Council. The hazard mitigation planning process helps to lower the overall costs of damage from disasters, lessen their impact as well as the speed of the response and recovery process.⁴

As New Orleans is vulnerable to many natural and man-made hazards, such as hurricanes, other strong storms, levee failure, and chemical spills, the Hazard Mitigation Plan provides a detailed evaluation of city risks and outlines New Orleans' strategy to reduce hazard impacts on people and property. The Hazard Mitigation Plan also identifies and prioritizes mitigation strategies and proposes strategies for implementation. Moreover, by implementing these strategies, New Orleans can improve its ability to cope with the potential hazards it faces and emerge as a more resilient community.⁴

Stakeholder engagement

To develop the hazard plan, The New Orleans Homeland Security Emergency Preparedness (NOHSEP) Hazard Mitigation Office worked with consultants but received recommendations from the community, Planning Team, and Steering Committee to prepare the updated plan. Over 400 stakeholders from the community were encouraged to participate in the planning effort to develop the plan. The active stakeholder list included representation from neighborhoods, civic organizations, churches, businesses, environmental groups, governmental agencies, and non-profit organizations that have an interest in hazard mitigation planning.

Definitions and uses of resilience components

The Hazard Mitigation Plan, primarily based on title and direction, mostly focuses on mitigation rather than other aspects of resilience including adaptation. However, the plan does include elements from each of the four components of resilience included earlier. First, while most of the hazards reviewed represent acute shocks (e.g., hurricane, lightning), other *long-term stresses* are included such as coastal erosion, subsidence, and drought. Second, there is limited attention to *asset analysis* in the Hazard Mitigation Plan. Most of the analyses focus on vulnerability assessment, and where risks are greater across the city (e.g., low lying lands). However, there is a brief linkage to land use policy and historic preservation decisions at the end of the plan. This represents a bridge to consideration of how New

Orleans assets may need to be protected in light of the hazards, but more examination of how those assets and land use decisions could be protective or even adaptive may be warranted. Third, there is very little discussion in this plan of investment strategy for *dual benefit*. Presumably, that is because the data from this plan should feed into the Master Plan or CIP. But a crosswalk across policy documents may inform a more holistic strategy for resilience investment. Finally, the resilience component of ongoing *quality improvement* is not well represented in this plan. There are no clear resilience capacity and capability metrics.

2.5 ProsperityNOLA

Adoption date	2010
Funding source	The City of New Orleans
Governance	New Orleans Business Alliance
Stakeholders	200 stakeholders from business; government, education, philanthropy as well as the broader economic development community
Key vision	To develop a citywide economic development strategic plan to increase wealth and quality job opportunities for New Orleans residents
Key resilience themes	Addressed a key aspect of long-term stress by virtue of its five-year focus on economic development

Summary

ProsperityNOLA was developed out of a recommendation from the Economic Development Task Force, which was established as part of the transition team for the Landrieu administration. The task force called for the creation of a public-private partnership to assist the city's economic development efforts. Mayor Mitch Landrieu established this new entity in 2010, the New Orleans Business Alliance (NOLABA), as the city's official economic development agency. In 2011, the City charged NOLABA with the mandate to develop a citywide economic development strategic plan to increase wealth and quality job opportunities for New Orleans residents.⁶

Stakeholder engagement

In 2012, ProsperityNOLA was developed after more than 200 stakeholders from business; government, education, philanthropy as well as the broader economic development community came together. It is a comprehensive development plan, which was designed to be a catalyst for economic transformation to ensure the city's vitality for its tri-centennial in 2018 and beyond. This action plan was created through a comprehensive data-driven planning process that will foster the Mayor's vision of a diverse, sustainable,

and prosperous economy for New Orleans residents. ProsperityNOLA envisions New Orleans as a city that attracts robust investment and growth, aligning proactive efforts to make New Orleans more competitive.⁶

Definitions and uses of resilience components

The ProsperityNOLA plan addressed a key aspect of long-term stress by virtue of its five-year focus on economic development. The objectives of the plan are to create an innovative and sustainable business climate, design a roadmap to maximize growth in jobs and concurrent investment, and to build on city's strengths to retain and grow business along a focus on industry clusters based on competitive position. While New Orleans was one of the few places that did not experience the sharp downturn from the 2008 recession, economic challenges and entrenched income inequality continues to be a stress for the city. As such, the focus of the plan to recognize those *chronic conditions* aligns well with a resilience and broadly economic sustainability focus. The plan also leverages *assets* by building on what the city is doing well and identifies where there are focal points for market growth. Further, it uses a cross-cutting approach to consider the relative value proposition of each of these industry clusters. There are implicit nods to *dual-benefit* in the plan, by examining both foundational and emerging business together. In this context, foundational business includes advanced manufacturing, tourism, and trade, while emerging includes bioinnovation, creative digital media, and sustainable industries. Arguably, New Orleans will have to leverage the talents of advanced manufacturing and trade to evolve into sustainable industry. Further, tourism and creative media development are linked. A looming question relates to how bioinnovation will be nurtured with the current workforce in New Orleans, though the number of FTEs is the highest among these industry clusters (13,978 FTE in 2011). The *dual benefit* and *quality improvement* elements of resilience are reflected in themes that informed the ProsperityNOLA plan. Namely, there are elements of the plan that focus on ongoing coordination and collaboration to capture efficient processes for workforce development. Further, there are aspects of the brand repositioning component of the plan (i.e., the value of investing in New Orleans), which may inform further city resilience strategy. There is acknowledgement of plans for a city resilience center, which could attract international partnerships; not only to entice global investment, but also for ongoing learning collaborative value to advance resilience science locally and globally.

2.6 Louisiana's Comprehensive Master Plan for a Sustainable Coast

Adoption date	2012
Funding source	State of Louisiana
Governance	Coastal Protection and Restoration Authority
Stakeholders	Government, academia, non-governmental organizations, citizens, and other groups across the state and U.S
Key vision	To coordinate the local, state, and federal efforts to achieve comprehensive coastal protection and restoration
Key resilience themes	The entire approach to coastal master planning is built on resilience principles or components

Summary

Louisiana's 2012 Coastal Master Plan was developed by the Coastal Protection and Restoration Authority (CPRA), which was created in 2005 by the Louisiana Legislature to coordinate the local, state, and federal efforts to achieve comprehensive coastal protection and restoration. To accomplish these goals, the CPRA was charged with developing a Coastal Master Plan to guide our work toward a sustainable coast. The Coastal Master Plan uses science and engineering to examine Louisiana's options for coastal protection and restoration to improve decision-making. The plan proposes a series of projects that will sustain Louisiana's coastal ecosystem, safeguard coastal populations, and protect vital economic and cultural resources by reducing flood risks and rebuilding the wetlands on which Louisiana communities depend.⁸

Stakeholder engagement

The Coastal Master Plan provides the context needed to evaluate other activities in the coastal zone, including transportation, navigation, port projects, oil and gas development, ground water management, and land use planning. As the coastal land loss crisis demands a focused and coordinated effort by all stakeholders, CPRA proposed a framework to engage government, academia, non-governmental organizations, citizens, and other groups across the state and U.S.⁸ Further, the plan development included a wide variety of advisory teams that included community leaders, researchers, and policy makers.

Definitions and uses of resilience components

The entire approach to coastal master planning is built on resilience principles or components. First, the plan takes a long view on the *acute shocks and long-term risks* of coastal erosion. The models used to inform the plan incorporate inputs of protracted and enduring stress. The plan seeks long-term sustainability of the coast, while recognizing the need for immediate action. Second, because the teams informing the plan development included those interested directly in coastal protection as well as those focused on cultural preservation and economic development, the plan incorporated recognition of a wide range of *community strengths and weaknesses* for consideration. The plan includes a *dual-benefit* framework because it purposefully integrates systems analysis throughout, examining interdependencies among agencies and interlocking systems. The plan accounts for deep uncertainty as well. A collateral outcome of this approach is that it requires working through multiple scenarios where investments can be viewed through the lens of dual benefit or impact. There are also indicators that resource efficiency is incorporated, another hallmark of dual benefit. Finally, the 2012 plan builds on findings from the 2007 plan. As such, there are embedded principles of *continuous monitoring and evaluation* of what has worked and what has not.

3. Summary across plans and implication for future city resilience strategy

This brief review of prior plans offers keen insights into how historical efforts in New Orleans after Hurricane Katrina have attempted to integrate resilience components into plan development and implementation. From the earliest plans (e.g., UNOP recovery plans) to more recent efforts (e.g., Coastal Master Plan, ProsperityNOLA), there are representations of resilience principles, such as leveraging assets, inclusion of dual benefit opportunities, and recognition of the full risk continuum of acute shocks to long-term stresses.

Yet, there are key opportunities or gaps, which a citywide resilience strategy can address. First, there is fairly minimal description of how each plan will contribute to a core set of resilience capacities and capabilities. A shared framework ensures that sector specific planning is efficiently leveraging the knowledge and resources from other sectors and plans. Further, a shared framework facilitates ongoing quality improvement, a hallmark of resilient communities, because those metrics can feed into a common resilience dashboard or performance monitoring systems that is cross-sectoral. In review of existing city data sets that could inform resilience, most data relate to vulnerable populations, hazard analysis, building permits, flood insurance, and general property information. There is comparatively

little comprehensive data that have been extracted on other community assets, such as the quality and nature of social institutions or economic development programs (reach, impact, effectiveness). Those types of data could be outlined in a resilience strategy.

Another area of opportunity is in the blend of cultural heritage and tradition maintenance with the interest in augmenting and diversifying economic development. While most plans that have been developed to date recognize this tension, no plan yet appears to have a way forward to balance tradeoffs effectively. A resilience strategy could address this issue. None of the plans appear to have a set of criteria that are common for evaluating investment opportunities and strategies against their long-term resilience benefit.

Finally, some of the plans are more complete in terms of which funding sources each are leveraging. But, the linkage across funding programs and partnerships is less clear. A resilience strategy could provide that networked map, but more importantly outline a common governance structure and more detailed relationships locally and regionally that could ensure resilience investment is efficient.

4. Key initiatives and milestones

The major plans for New Orleans have resulted in key outcomes that should be considered as initial benchmarks from where citywide resilience strategy could be developed. In the following table, we outline some key milestones surfaced from analysis of where each plan currently stands. We do not include the Louisiana Coastal Master Plan here in order to focus only on New Orleans specific changes, and do not summarize UNOP progress given that this was based in immediate recovery planning post-Katrina. As such, key outcomes of UNOP then informed subsequent plans. Please note that most of these data are gleaned from document review, and not from stakeholder discussion. As such, there may be progress achieved and not noted, because those outcomes have not been formally documented in public materials. Future work to build out a citywide resilience strategy should include additional stakeholder input to add or amend this table.

Plan	Select Outcomes Achieved to Date
Plan for 21st Century	<ul style="list-style-type: none"> • For resilience chapter specifically, progress on updated Hazard Mitigation Plan as well as increased structural flood protection in the form of flood gates and levees; increased development in low-lying, vulnerable areas; soil subsidence; and coastal erosion. • Requirement for public meetings in reviewing land use proposals, transportation plans, etc.
Hazard Mitigation Plan	<ul style="list-style-type: none"> • Integration of acute shocks and long-term stresses in hazard analysis, THIRA assessments
The Urban Water Plan	<ul style="list-style-type: none"> • Some progress in storm water retrofits, smart retrofits • Renewed and shared vision of how to live with water, with attention to improved safety, economic opportunity, and quality of life-all viewed together
ProsperityNOLA	<ul style="list-style-type: none"> • Streamlined business services into the One-Stop Shop where businesses can access the government services they require • Use of technical assistance providers to help businesses navigate government processes, as well as provide access to capital, business training and other services to strengthen businesses • Increased use of incubator models to spur business innovation • Increase in minority loans

5. Other initiatives

Currently, there are other initiatives that build on these core plans in a few key areas: living with water and flood management, general emergency preparedness and response, general infrastructure, land use planning, public safety, and some initiatives in broad social vulnerability and health.

In the area of water resource management, key efforts include the development of small-scale water

retention projects and the Lafitte Greenway Project. At the state level, there have been complementary structural and non-structural mitigation strategies employed as part of the work of the Coastal Planning Restoration Authority.

There are various activities broadly in disaster planning such as home elevation, NOLAReady, and several efforts to create multiple lines of defense for hurricane preparedness. New Orleans has been included in some disaster resilience efforts for the Gulf South, including the Coastal Community Resilience Index, but it is not obvious whether the city is fully employing resilience measurement tools like this as part of ongoing planning and implementation.

For general infrastructure, the Capital Improvement Plan (CIP)—a five-year program for expenditures by the City of New Orleans for permanent physical improvements—addresses key initiatives and future investments associated with upgrades to street quality, renovation and retrofitting of critical public facilities, and some investment in technology upgrades including municipal broadband. But, it is still murky whether and how there are detailed processes for evaluating the benefits of these upgrades and how these advancements contribute to wider city resilience.

For land use planning, key efforts have been underway including new zoning ordinances that must deal with the aforementioned issues of the increasing numbers of development projects and the balance with historical neighborhood integrity. But, the issue of land use planning and association with climate response consideration is less notable in planning documents. This may be an area for future city resilience strategy.

For public safety (also a priority area identified in the City's Master Plan), NOLA for Life has been the key, integrative initiative with a focus on violence reduction. While homicide and violent crime reduction are key outcomes for NOLA for Life, there are also elements to the initiative that could build resilience capacity in the city, particularly features related to youth development and criminal justice reform.

Finally, there are several efforts to address general social vulnerability, but these are not fully integrated. For example, BlightStat is a part of the City's efforts for transparency and accountability as noted in the Master Plan and is intended to highlight areas of New Orleans requiring concerted efforts

for blight reduction. But, how that Blight Reduction maps to Prosperity NOLA is not specified. The special needs registry, typically developed for emergency preparedness and response, could be leveraged for more comprehensive vulnerability planning and to create strategy for community wellbeing. Further, there are some concerted efforts on behalf of the New Orleans Health Department to identify areas of health assets in order to reduce disparities and improve access to preventive health services. However, reviews of the registry processes and this health mapping do not indicate that the cross-benefit or application has been fully realized.

6. Conclusion

This review and analysis of the plans and activities, which took shape after Hurricane Katrina, offers some insights into where New Orleans has made considerable progress in addressing structural and nonstructural vulnerabilities and developed plans for ongoing resilience as well as economic and environmental sustainability. However, the review also suggests critical gaps that could be served by an overarching, New Orleans resilience strategy that effectively integrates progress; aligns plans and assets; and institutes a resilience orientation across city efforts. Based on this brief analysis, we offer some perspectives for consideration. We return to the core components of resilience described earlier to organize these recommendations.

6.1 Acknowledgement of the risk continuum from acute shocks to long-term stresses

While the combined understanding of shocks and stresses is core to resilience planning and implementation, a framework for how to consider these two categories together is not particularly evident. Each plan has some recognition of a range of hazards, threats, and risks that could be defined as episodic versus entrenched. However, there is limited or no investment or measurement framework for how to consider shocks and stresses together. To what extent should there be decision analysis guiding how stresses are characterized and managed, relative to the time and effort devoted to address more acute scenarios? While the Coastal Master Plan and Urban Water Plan discuss the full range of issues from surge to coastal erosion, there is a relatively little direct consideration of climate effects exacerbating these conditions; yet that could be the link between shocks and stresses. Further, while New Orleans is C40 member, it is difficult to discern how climate planning relates to principles of living with water and water literacy noted in the Urban Water Plan.

In other areas of resilience consideration, such as social or health needs, most of these descriptions focus on areas of long-term disparity in access to and use of preventive services. But, there is relatively little examination of how to reconsider safety net services in light of the risk continuum upon which traditionally marginalized or underserved individuals or households sit. To what extent should safety net program and policy analysis or reform be part of long-term resilience strategy? One could argue that while the preponderance of stress in the social, health, or even economic domains are chronic, the programs and policies may be better suited for acute shocks (e.g., loan assistance).

6.2 Capacity and capability to leverage assets against vulnerabilities

One hallmark of a resilient community is one that understands how to cultivate assets and how to deploy assets when needed. The plans reviewed in this brief analysis offer some description of assets but relatively little detail on how those assets would be used, when, and how. Assets include a range of resources, not limited to facilities and other physical infrastructure, but also historical knowledge, training, and social understanding. The issue of asset leveraging is particularly acute in New Orleans, which is struggling to maintain its cultural tradition but still excite internal and external business investment. As noted earlier, this tension has been argued, but no plan to date has addressed the conflict squarely with discrete action steps and metrics.

Further, it is unclear whether there is centralization of information on assets that can be used cross-sectorally. Most information on assets is nested within specific plans or agencies. As such, it is difficult to obtain a full picture of assets in New Orleans. This profile would not simply be a location or enumeration profile, but one that accounts for asset quality or response reliability.

6.3 Dual-benefits in resilience development

Another component of resilience and resilience strategy is exact linkages among particular investments for cross-sectoral benefit. Resilience is based in the integration of resilience orientation in routine practice, or the creative consideration of the risk continuum in how decisions about assets, strategies, policies and programs are made by established organizations (governmental and non). If a city has a comprehensive resilience strategy, it can be more clearly document the multiple advantages of specific tactics or interventions across sectors. Some of those dual benefits are implicit within and across plans and other current initiatives reviewed in this report. For example, decisions around blight reduction may feed future workforce planning and economic investment via industry clusters. But, none of this

dual benefit consideration is explicitly noted in the separate plans. A citywide resilience strategy could more clearly articulate that value. This is critical not only for efficient use of resources, another component of resilience science, but also can help ensure that resilience orientation is integrated into the fabric of future policy (i.e., without dual benefit, the sell is less).

6.4 Quality improvement and ongoing use of data for resilience capacity and capability development

A community's ability to collect, analyze, and utilize data is a critical lever needed to monitor and evaluate progress on building resilience. If a community cannot adequately monitor during a range of shocks and stresses, its ability to strengthen resilience capacity and capability is compromised. In review of the current slate of New Orleans plans, there are varying levels of evaluation principles in plan development and implementation. Some plans have loose metrics, while others include short and long-term outcomes. But, there is no full framework that defines or guides resilience monitoring and evaluation. In order to develop such a framework, it requires three elements. First, there are actionable and specific measures relating resilience capacity and capability, which can be shared across sectors and plans. Second, to operationalize and implement resilience measurement necessitates common platforms and analytics, not simply to create a visual dashboard but to include embedded processes that link data with immediate and long-term decision analysis. Finally, quality improvement in the context of resilience needs governance structure, whereby the impact of findings or decisions about data are fed into a concrete system of accountability and communication that then specifies roles actions for each city agency. All of these elements are not well specified in the current set of plans, but this gap leaves opportunity for the citywide resilience strategy.

The review of plans represents only a first phase of analysis to inform where a city resilience strategy could contribute. But, using these core components of resilience provides a lens by which the construction of a citywide resilience strategy can be crafted and reviewed. For example, resilience strategy for the city can spend more time on how chronic stresses are addressed (e.g., safety net reform) or how the community is educated about the risk continuum (e.g., water literacy noted in the Urban Water Plan). This analysis also helps to shape a distinct space in which a resilience strategy can sit. The strategy would not replace these other important New Orleans plans, but rather would serve as a dynamic and synergistic framework.

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