

New Orleans Preliminary Resilience Assessment

June 2015

RESILIENT NOLA



CITY OF NEW ORLEANS

PIONEERED BY THE
ROCKEFELLER FOUNDATION

100

RESILIENT CITIES



About 100 Resilient Cities in New Orleans

100 Resilient Cities - Pioneered by The Rockefeller Foundation (100RC) is dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century. 100RC supports the adoption and incorporation of a view of resilience that includes not just the shocks - earthquakes, fires, floods, etc. - but also the stresses that weaken the fabric of a city on a day to day or cyclical basis. By addressing both the shocks and the stresses, a city becomes more able to respond to adverse events, and is overall better able to deliver basic functions in both good times and bad, to all populations.

The City of New Orleans was selected as one of the first cohort of 32 cities by 100RC to embark on an exciting effort to examine city resilience and develop a strategy that is customized according to individualized needs and capacity.

As a partner to 100RC, New Orleans receives four types of support:

1. **Leadership:** Funding to hire a Chief Resilience Officer, an innovative new position in city government, and support staff to lead New Orleans' resilience-building efforts
2. **Guidance:** Assistance with the development of a comprehensive resilience strategy
3. **Global Access:** Access to the 100RC network of cities also engaged in resilience-building efforts to share knowledge and best practices
4. **Technical Assistance:** Access to a global platform of resilience tools and services to design and implement the strategy

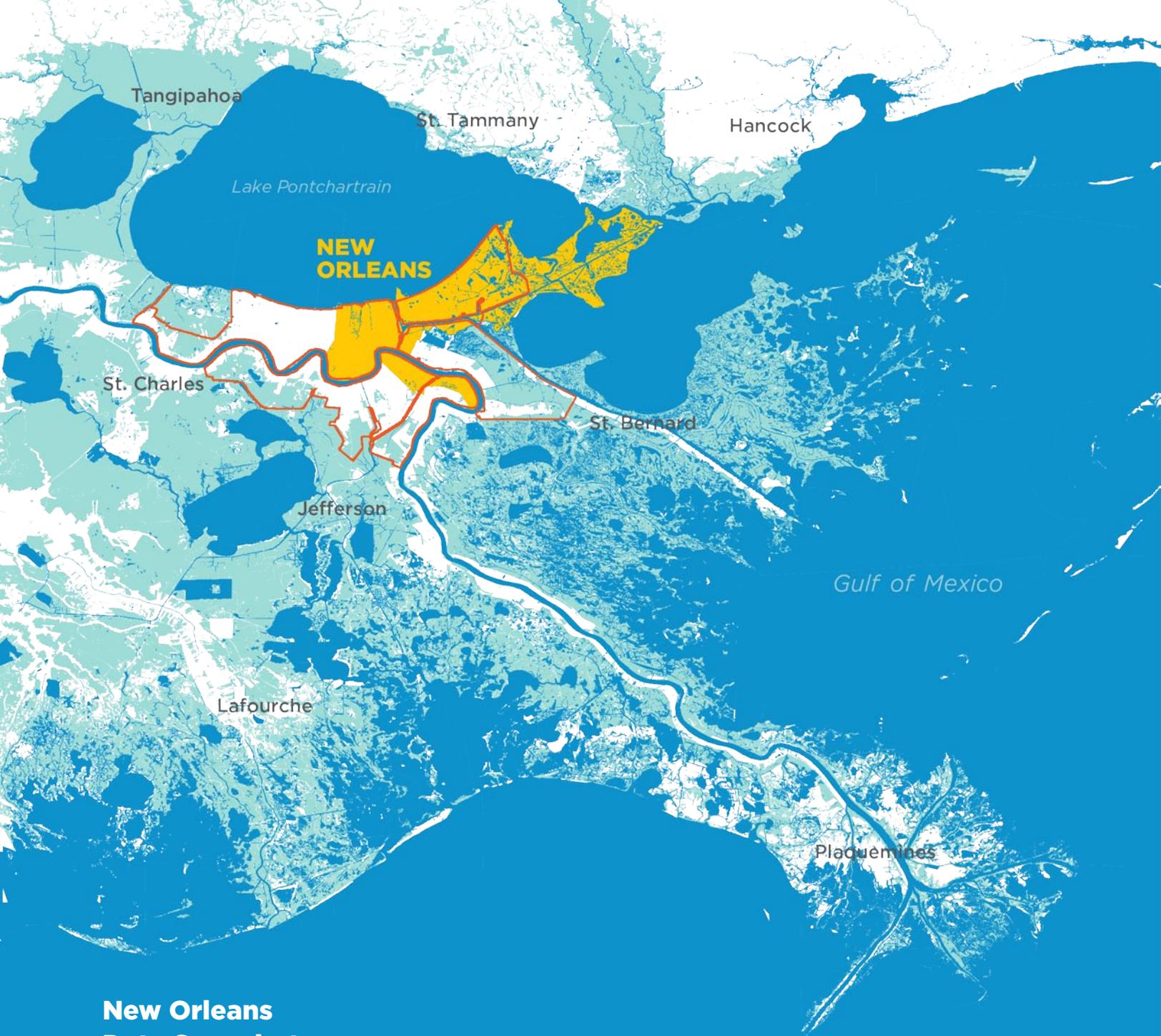
New Orleans' engagement with 100RC began at the global launch of the program in 2013, with Mayor Mitchell J. Landrieu helping to announce The Rockefeller Foundation's \$100 million initial investment in the future of cities for its 100th anniversary. Since being selected as one of the first cities to join the global 100RC network, New Orleans has begun work on its comprehensive resilience strategy and the task of assessing what resilience means for the city today.

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Purpose of this Report

1. Provide a summary of the state of resilience in New Orleans today
2. Describe the work that has been done to date to understand New Orleans' key threats and opportunities to build resilience
3. Identify emerging resilience themes and translate those into cross-cutting Focus Areas to guide the development of a Resilience Strategy for New Orleans



New Orleans Data Snapshot

- The 2014 population was 384,320 - 83% of pre-Katrina population of 461,915
...but there are **101,160 fewer African Americans**.
- Since 2010, New Orleans has netted on average **27.8 new residents per day**
and **13.9 new private sector jobs per day**.
- Median Household Income in 2013 for white households was \$60,178,
compared to only **\$25,102 for African American households**.
- 52% of working-aged African American males are not working.
- Relative **sea level rise** in Southern Louisiana is projected to be **4.3 feet by 2100**
- higher than anywhere else in the world.
- Water management is one of the largest and fastest-growing industry clusters
in Southeast Louisiana, growing by **7,832 jobs** from 2010 to 2013.



The New Orleans Resilience Challenge

For the past three centuries, New Orleans has faced fires, floods, epidemics, and storms that have required innovations in the areas of public health and safety, water management, and designing with the environment. As a result, New Orleans could be considered one of the most resilient cities in the country, continually rebounding from these events.

Today, a new set of challenges faces the city. Climate change and rising seas, land subsidence, poor air quality, coastal land loss, and aging water and energy infrastructure are some of the mounting physical stresses that make the city and its people only more vulnerable to extreme events like hurricanes and floods.

However, city resilience is about more than just innovations in infrastructure to address these threats to our physical environment. A resilient New Orleans is predicated first and foremost on the ability of its residents – particularly those most vulnerable – to thrive, no matter what kinds of chronic stresses and acute shocks they experience. Equity is a critical ingredient of resilience. Far too many New Orleanians suffer the chronic social stresses of poverty, unemployment and violence. Wide disparities exist in employment and wages, educational attainment, and health outcomes for residents of color compared to white residents. And these social stresses are correlated with a greater vulnerability to physical shocks: lower income communities of color are more likely to live in low-elevation areas at greater risk of flooding and subsidence.

While the challenges are many, the opportunity has never been greater. New Orleans is now stronger and more innovative than before. This is a city with a deep sense of pride in its unique history and culture, determined to protect and preserve this place for the generations to come. New Orleanians are dedicated to improving their communities and the city as whole, while honoring the traditions that make it great.

The opportunity of resilience lies in finding a comprehensive approach to addressing New Orleans' physical and social challenges so that we achieve multiple benefits. As an example, the many efforts to address environmental challenges have made water management one of the largest and fastest-growing industry clusters in Southeast Louisiana – creating 7,832 new jobs at all skill levels from 2010 to 2013. The region's myriad physical challenges provide an opportunity to develop a new generation of quality green collar jobs in the design, engineering, construction and long-term maintenance of new water management infrastructure. This is an example of the Resilience Dividend.

New Orleans' resilience has been tested before and will be tested again. We must develop innovative solutions that protect the city's infrastructure, culture and people, and create opportunities for all New Orleanians to grow and thrive. New Orleans is committed to becoming a global model for resilience by its 300th anniversary in 2018. ✨

CITY RESILIENCE

is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience.

By developing a **Resilience Strategy**, New Orleans becomes more able to respond to adverse events and better able to deliver basic functions, especially to the poor and vulnerable.

Developing A Resilience Strategy for New Orleans

A resilience strategy helps cities prepare for, adapt to, and quickly rebound from shocks and stresses. The process to develop the **New Orleans Resilience Strategy** is guided by **100 Resilient Cities** and builds from the **City Resilience Framework**, which identifies key drivers of a city’s resilience (see graphic on page 7). This comprehensive strategy seeks to build not only physical resilience of infrastructure and environment, but also social resilience that creates opportunities for all New Orleanians to thrive. A successful resilience strategy has three outcomes:

1. Catalyzes resilience in the city

- Coordination across private, public and civic stakeholders at the local, municipal, state, national, international levels
- Integration of existing actions in the city
- Application of a resilience lens to ongoing efforts
- Identification of new actions to fill gaps in resilience understanding and practice
- Prioritization and implementation

2. Informs the market and activates distribution

- Identification of city needs
- Creation of a market signal on a city’s resilience priorities

- Building on existing partnerships
- Establishment of new partnerships

3. Establishes a resilience practice

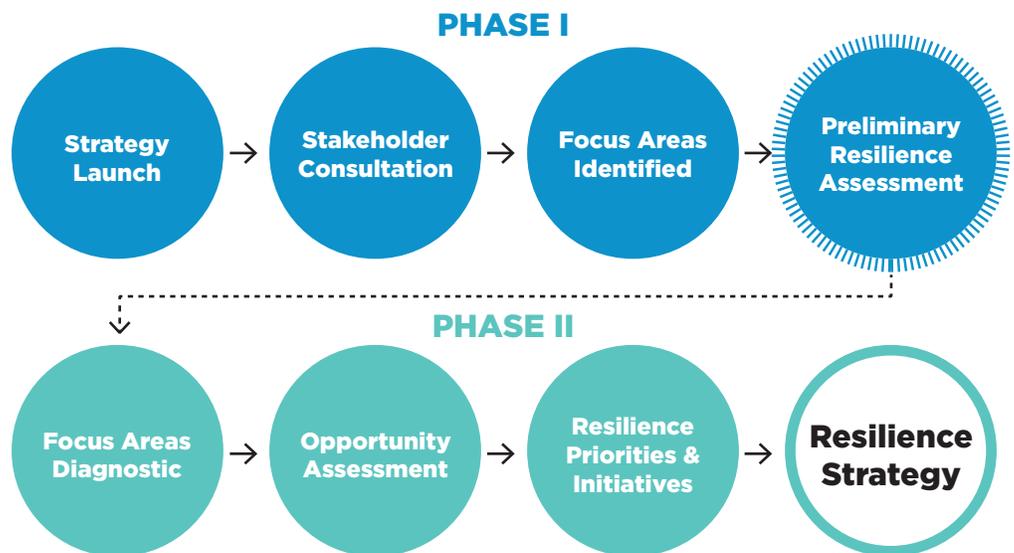
- Incorporation of resilience lens into new municipal decision-making
- Knowledge and best practice sharing between cities

The New Orleans Resilience Strategy development follows a two-phased process (see graphic below) which begins with a data gathering and research period surveying the many challenges facing the city and pivots in Phase II to more targeted questions to move toward implementation.

As part of the **100 Resilient Cities Network**, New Orleans also has the opportunity to share lessons and best practices with other cities around the globe that are developing a Resilience Strategy of their own. The Resilient New Orleans team has already built relationships with many of these network cities, including San Francisco, Medellin, Melbourne, Rotterdam, Rome, and Norfolk, where many threats and opportunities are shared by New Orleans.

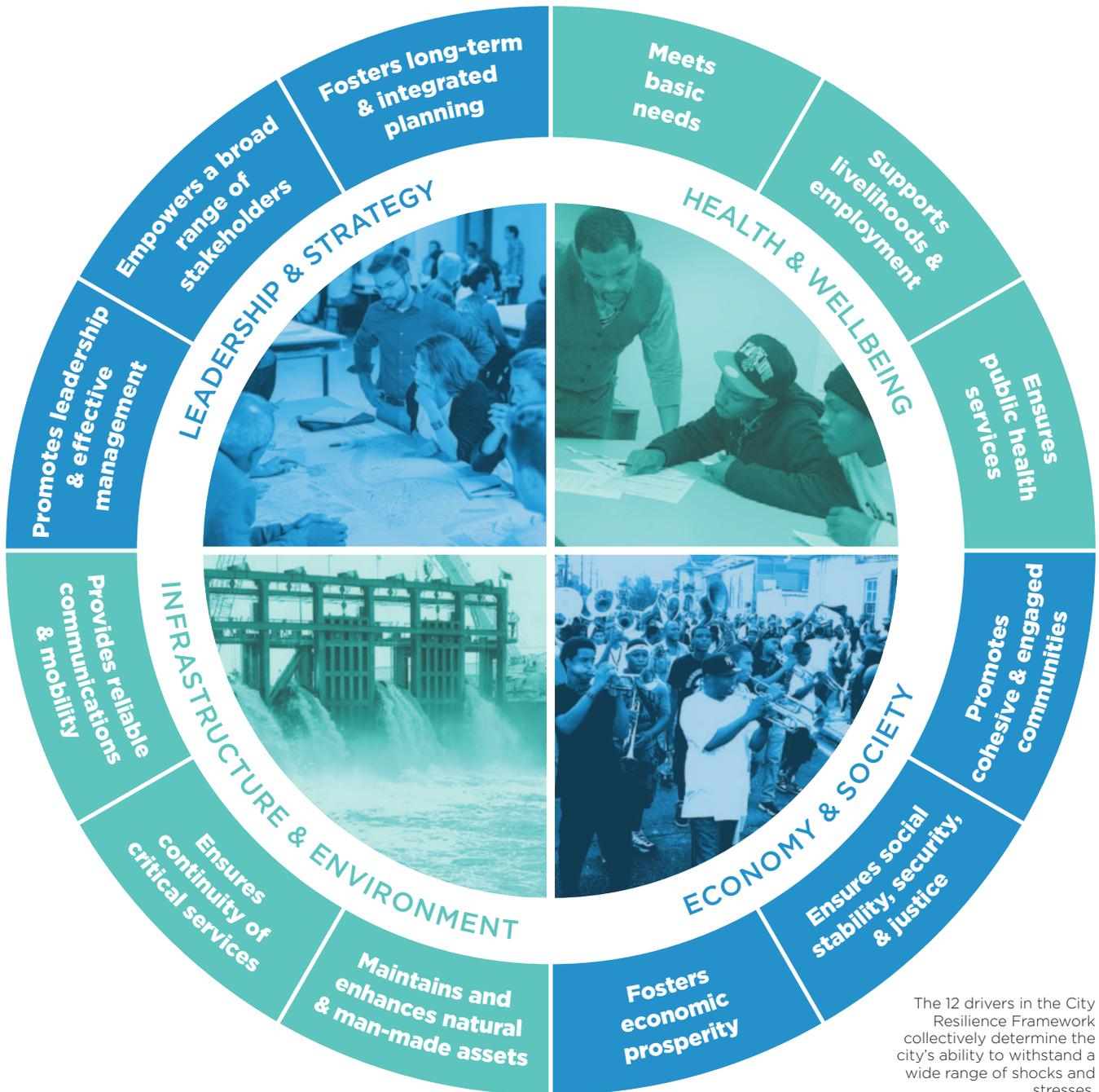
This **Preliminary Resilience Assessment** marks the conclusion of Phase I of the New Orleans Resilience Strategy development. This report represents the compilation and baseline evaluation of assets, shocks and stresses, stakeholder perceptions, current approaches, and emerging opportunities that inform the creation of **Focus Areas**, which will guide the more targeted discussion of approaches and implementation in Phase II of the strategy development process. This report concludes with a discussion of Phase II and how the Focus Areas will form the basis of the upcoming Resilience Strategy.

The Resilience Strategy Development follows a two-phase process. This Preliminary Resilience Assessment marks the conclusion of Phase I, identifying the Focus Areas that will guide a more targeted discussion of goals and approaches in Phase II. The final strategy will identify implementation programs and projects that build physical and social resilience in New Orleans.



Building Resilience Value: **THE RESILIENCE DIVIDEND**

Investing in actions for better outcomes that will reduce future impacts to individuals, the physical environment, and the economy also improves cities today with multiple co-benefits.



The 12 drivers in the City Resilience Framework collectively determine the city's ability to withstand a wide range of shocks and stresses.

Towards Focus Areas to Guide the Resilience Strategy

Focus Areas will help provide structure to the Resilience Strategy, offering guidance for how to measure the Resilience Dividend in New Orleans and help in understanding the interrelated nature of the complex systems that make up our city.

Focus Areas are not projects or programs. They serve as paths of inquiry for further research and as a framework for the development of resilience-building actions. The Phase II research that is guided by the Focus Area questions will allow for the exploration of approaches that tackle multiple shocks and stresses and create cross-cutting benefits.

The analysis and mapping of assets, shocks, stresses, risks, and stakeholder perceptions during Phase I of the Resilience Strategy Development process resulted in the collection of

themes that represent resilience challenges and opportunities for New Orleans. These 21 themes, listed below, were most often cited meaningfully as challenges to the long-term resilience of the city and provide a basis for Phase II paths of inquiry.

Based on the interrelated nature of the 21 emerging resilience challenges and opportunities, the Resilient New Orleans team translated the themes into four Focus Areas and three Cross-Cutting Questions (*see page 9*) that will be crucial to a context-sensitive implementation process. During Phase II, Working Groups will research the related themes within the Focus Areas and also ask the Cross-Cutting Questions of those research results in pursuit of a comprehensive strategy for implementation.

Emerging Resilience Challenges and Opportunities

- **Climate Change**
- **Air Quality**
- **Coastal Protection**
- **Environmental Risk Awareness**
- **Water Infrastructure**
- **Energy Infrastructure**
- **Economic Opportunity**
- **Social Mobility**
- **Violence**
- **Health**
- **Criminal Justice**
- **Housing Affordability**
- **City Systems Management**
- **Resilience Lens for Decision-Making**
- **Education System**
- **Community Education**
- **Trust in Government**
- **Transportation Network**
- **Creative Financing**
- **Regional Coordination**
- **Culture**

Focus Areas



1. Adapt to Thrive

How can our communities and systems adapt to thrive within our changing natural environment?

CHALLENGES + OPPORTUNITIES

- Climate Change
- Air Quality
- Coastal Protection
- Environmental Risk Awareness
- Water Infrastructure
- Energy Infrastructure



2. Connect to Opportunity

How can New Orleanians be best prepared for and connect to opportunity?

CHALLENGES + OPPORTUNITIES

- Economic Opportunity
- Social Mobility
- Violence
- Health
- Criminal Justice
- Housing Affordability
- Transportation Network



3. Transform City Systems

How can we transform the management of city systems to build a 21st Century New Orleans?

CHALLENGES + OPPORTUNITIES

- City Systems Management
- Resilience Lens for Decision Making
- Education System
- Trust in Government
- Transportation Network



4. Inform and Engage

How can New Orleanians be best informed about the risks and opportunities of the future?

CHALLENGES + OPPORTUNITIES

- Education System
- Community Education/Capacity Building
- Environmental Risk Awareness

Cross-Cutting Themes

- **Financing Adaptation** | *How do we use existing and new finance tools and approaches to address the challenges and opportunities of the 21st Century?*
- **Coordinating Regionally** | *How do we coordinate regionally to address shared risks and opportunities?*
- **Harnessing Culture** | *How do we use our culture to address the challenges and opportunities of the 21st Century?*



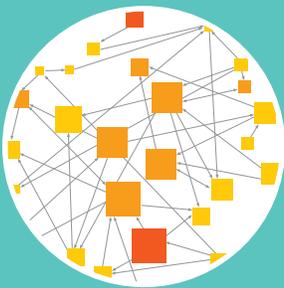
Phase I Strategy Development Process

The Resilient New Orleans team undertook a rigorous data gathering and research process in Phase I to assess the city's current state of resilience and identify emerging resilience challenges and opportunities.



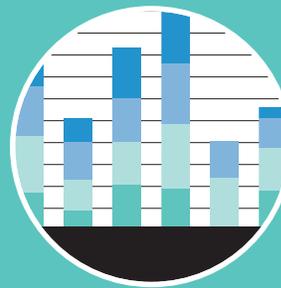
1. Planning Research

Since 2005, there have been countless efforts to create plans and engage the community around the future of New Orleans. The Resilience Strategy is intended to serve as an implementation road map for the visions that have been developed over the last ten years. Therefore, it is important to honor those plans and processes and ensure that the resilience strategy builds upon them.



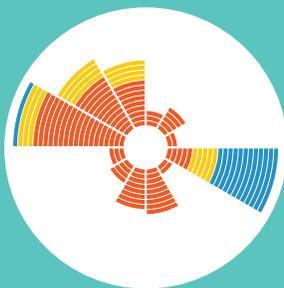
2. Shocks and Stresses Analysis

Building upon research and analyses by leading global experts, including ARUP's Perspectives on City Resilience that identified a comprehensive lists of shocks and stresses in New Orleans and other case study cities, the Resilient New Orleans team consulted local leaders from across the city and met with experts and local stakeholders to map the connections and interrelationships among the many shocks and stresses facing New Orleans.



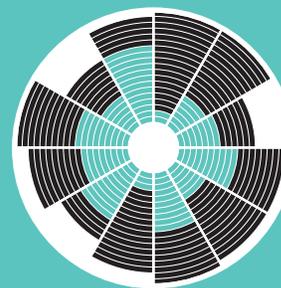
3. Asset Scan & Risk Analysis

To understand key risks to critical city assets, the Resilient New Orleans team reviewed both qualitative and quantitative data. Many of the official risk assessments for New Orleans are in the process of being updated, so much of the data comes from interviews with experts and the review of draft documents. Additionally, the team used an Asset Scan and Risk Assessment tool provided by 100RC to compile much of the data and understand complex relationships among critical assets and their exposure to shocks and stresses.



4. Perceptions Assessments

The Resilient New Orleans team consulted with key stakeholders in the public, private, and NGO sectors to gather opinions and observations about resilience in New Orleans, based on the following key questions: 1) What is New Orleans doing well? 2) What does New Orleans need to improve? 3) What helps New Orleans bounce back from shocks and stresses?



5. Actions inventory

The Resilient New Orleans team, using a combination of desktop research and surveys of key government and external stakeholders, compiled a working list of resilience-building activities across government, private, and nonprofit sectors in New Orleans. The list is ever-evolving, and the team will continue to update it as new actions are identified and evaluated.

A DECADE OF PLANNING

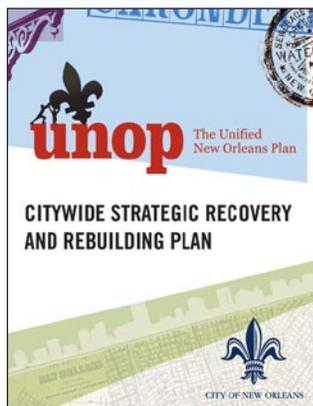
The Resilience Strategy builds on past visions



Plan for the 21st Century (Master Plan)

The Master Plan for the city of New Orleans 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 that emerged through an extensive community participation process.

Defining resilience: The Master Plan dedicates a chapter to resilience which it defines as "living with water and natural hazards."



Unified New Orleans Plan (UNOP)

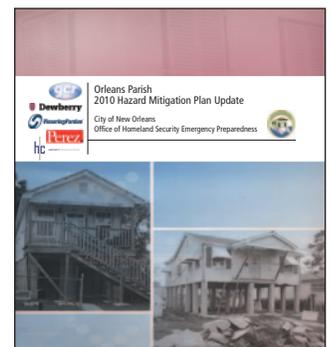
A comprehensive recovery plan funded by the Rockefeller Foundation and HUD, UNOP included broad resident engagement across the city and across the country to reach those families still displaced. UNOP was the framework used to develop the City's Strategic Recovery and Redevelopment Plan that guides the deployment of \$411 million in HUD funding for Long Term Community Recovery projects.

Unprecedented resident engagement:

UNOP hosted three Community Congresses, the largest of which took place simultaneously in 21 cities, convening 2,500 displaced New Orleanians.

Efforts to engage residents also included:

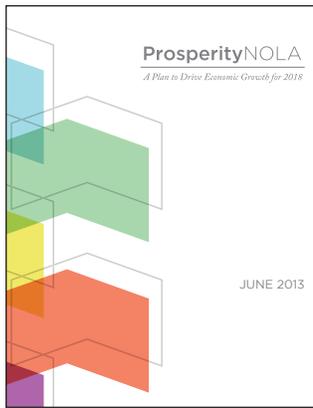
- hundreds of neighborhood and focus-group meetings
- grass-roots outreach in New Orleans as well as many key cities where displaced residents were living
- newsletters, call-centers, surveys, and an extensive website



Hazard Mitigation Plan

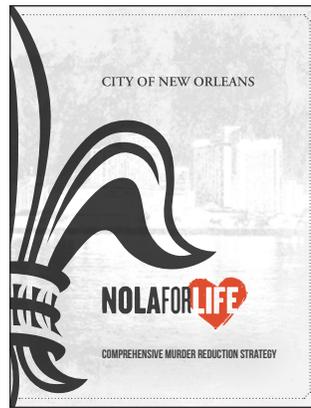
This plan is developed every five years by the City's Hazard Mitigation Office, a branch of the city's Office of Homeland Security and Emergency Preparedness, and adopted by the City Council. The Hazard Mitigation Plan provides a detailed evaluation of city risks and outlines a strategy to reduce hazard impacts on people and property.

Defining hazards: The plan's primary focus is on acute shocks (e.g., hurricanes and lightning). However it also addresses some long-term stresses such as coastal erosion, subsidence, and drought.



ProsperityNOLA

A citywide economic development strategy to increase wealth and quality job opportunities for New Orleans, ProsperityNOLA was developed by the New Orleans Business Alliance after consulting over 200 stakeholders in business, government, education, philanthropy, and economic development.



NOLA For Life

New Orleans' Comprehensive Murder Reduction Strategy, NOLA For Life outlines 35 initiatives to reduce the murder rate in New Orleans. Taking a holistic, cross-cutting approach to this imperative challenge, these initiatives fall under five pillars: 1) Stop the Shooting, 2) Invest in Prevention, 3) Promote Job Opportunity, 4) Get Involved and Rebuild Neighborhoods, 5) Strengthen the New Orleans Police Department.



2012

2013

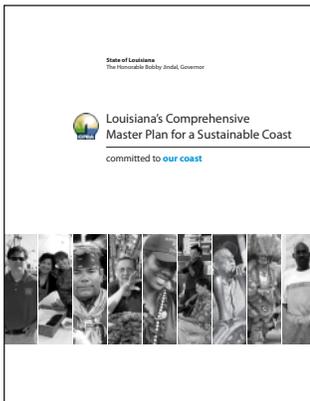
2014

New Comprehensive Zoning Ordinance adopted

2015

New Capital Improvements Plan adopted

RESILIENT NOLA



Louisiana Coastal Master Plan

Based on scientific and engineering analysis, the plan proposes a series of projects that will sustain ecosystems, safeguard coastal populations, and protect vital economic and cultural resources by reducing flood risks and rebuilding wetlands.

50-year planning: The plan accounts for acute shocks and long-term risks associated with coastal erosion as well as the inherent uncertainty in the coast's future.



Greater New Orleans Urban Water Plan

Promoting a vision for "living with water," the Urban Water Plan provides a road map for innovative regional water management for New Orleans and neighboring parishes. The plan was crafted through the input of stakeholders and a local, national, and international team of experts. A goal of the plan is to position the region as a global leader in water management, exporting expertise and technologies to other cities.

Over the past decade, New Orleans has undertaken extensive planning efforts to guide the recovery and rebuilding of the city post-Katrina, reduce impacts from future hazards, re-vision the city's Master Plan and Comprehensive Zoning Ordinance, propose strategies to halt coastal erosion and provide for a more sustainable coast, outline a new regional vision for "living with water" in an urban context, develop an economic development strategy for increasing wealth and quality job opportunities for New Orleanians, and reduce violent crimes. These robust planning processes included extensive outreach and engagement of residents across the city as well as civic leaders and experts. The Resilience Strategy does not intend to be simply another planning process. Rather than replicate the vast work that has already been done, the Resilience Strategy builds on these existing visions to provide a road map for implementation. In order to achieve this, we have reviewed the planning processes of the past decade to understand the evolution of resilience planning that led us to this holistic strategy today. For more detail, please see *Appendix: A review of key resilience-related planning efforts in New Orleans.* *



Shocks

- Hurricanes
- Flooding
- Infrastructure failures
- Economic shocks
- Terrorism
- Extreme temperatures
- Infectious disease epidemics
- Drought
- Civil unrest

Stresses

- Climate change and sea level rise
- Coastal erosion and wetland loss
- Land subsidence
- Aging infrastructure
- Poor air quality
- Lack of risk awareness
- Poverty and inequality
- Unemployment
- Educational attainment disparities
- Lack of social mobility
- Lack of affordable housing
- Crime
- Violence
- Poor public health access
- Lack of reliable and efficient public transit
- Demographic-led social change
- Disproportionate risk to vulnerable communities

SHOCKS & STRESSES

What are our threats?

Many of the threats to New Orleans are not surprises to residents or visitors. The most prominent environmental shocks come in the form of severe storms or hurricanes and flooding events. The impacts from these events are only exacerbated by the presence of cumulative physical stresses, like land subsidence and coastal wetland loss; and social stresses, like poor economic, educational, and health outcomes among vulnerable populations. To gain an understanding of the interconnectedness of these shocks and stresses, the Rockefeller Foundation commissioned ARUP International Development to research and report on the state of threats to the resilience of New Orleans and predict their effects on the city of the future. Much of the following shocks and stresses information was adapted from that report and further appended based on research into the risk profile of the city and concerns of many of the key experts and stakeholders consulted during Phase I of the strategy development process.

Shocks

The city of New Orleans is both sustained and threatened by its natural environment. Storm events have compounding impacts on the city's flood protection system and internal water systems, power grids, and other utilities and infrastructure, which persist after a storm has passed. Flooding due to intense rainfall and the limited capacity of pipes and pumps causes direct damage to roadways, homes, businesses, and infrastructure, and can hamper both emergency response and recovery efforts. As the city's soft soils become saturated and the drainage network reaches capacity during severe storms, the interdependencies of the city's utilities means that the effects of the storm spread across multiple systems. Waterlogged soils in conjunction with high winds, for example, often result in downed trees and power lines – leading to outages that compromise the city's energy-dependent stormwater and wastewater pumping facilities and significantly increase the period of power interruption.

In addition to flooding and storm events, New Orleans has experienced past shocks from infrastructure failure and economic downturn. The 2010 Deepwater Horizon oil spill off the Louisiana coast caused significant environmental and economic damage to coastal communities near New Orleans. While New Orleans weathered the Great Recession better than most of the country, the Oil Glut of the 1980s resulted in a severe loss of revenue to the city and serves as a reminder of the region's vulnerability to future economic shocks.

Beyond those shocks that New Orleans has historically experienced, the city's Threat and Hazard Identification and Risk Assessment (THIRA) explores further shocks that could be possible in the future, including explosive attacks, extreme temperatures, cyber threats, and radiological attacks.

Physical Stresses

Shocks like hurricanes and storms are compounded by daily stresses on the city's natural and built environment. The rapid loss of coastal wetlands puts the city's flood protection system at risk. According to the U.S. Geological Survey, Louisiana has lost nearly 1,900 square miles of land since 1932 – an area as large as the state of Delaware. An additional 1,806 square miles could disappear by 2060 if the Louisiana Coastal Master Plan is not implemented. Based on the forecasts of rising seas and subsiding land in this region, the National Oceanic and Atmospheric Administration projects a 4.3-foot net rise in sea level in Southeast Louisiana by 2100 – higher than anywhere else in the world. The loss of the coast means not only less protection from storm surges, but also a severe impact on the regional and national economy, losses to ecosystems and habitats, and a potential population retreat from areas outside of the levee protection system.

Inside of the flood protection system, the day-to-day functioning of New Orleans' urban water management system renders man-made infrastructure and the natural environment increasingly vulnerable. Land subsidence – a result of low groundwater levels maintained during dry times – places a significant stress on aging urban infrastructure systems. As the ground sinks – over 8 feet in some neighborhoods over the past 50 years – pipes break, utility poles become less stable, streets and sidewalks buckle, and the foundations of homes and businesses are structurally compromised.

Poor air quality has negative health impacts for many New Orleanians. High concentrations of ground level ozone – the main ingredient of smog – typically occur on hot, sunny

days. When inhaled, ozone can cause respiratory problems like shortness of breath, coughing, and asthma, particularly among children and the elderly. Climate change is likely to increase the number of very hot days when ozone levels are at their highest. While lower emissions have decreased ozone levels since the 1980s, New Orleans may soon find itself in violation of new lower standards recently proposed by the EPA should they be approved this year.

Social Stresses

In addition to vulnerabilities related to physical shocks and stresses, New Orleans faces social stresses from high levels of poverty, unemployment, and violence. According to the 2013 American Community Survey, 27% of New Orleans residents are living in poverty – a figure that exceeds 40% for children and 53% for single mothers. More than a third of working age New Orleanians are jobless, and more than half of working age African-American men are jobless.

New Orleans has experienced a post-Katrina economic boom; however, it has not benefited all residents. According to recent research by The Data Center, there is no evidence that the economic gains enjoyed in New Orleans since 2005 have improved poverty and jobless rates of African-American men. The median income of \$25,102 for African American households is less than half of that for white households in New Orleans. Bloomberg News ranked New Orleans the second worst in the United States for income inequality with the poorest 40% of New Orleans residents earning only 7.5% of the income generated in New Orleans.

High inequality is compounded by extremely low opportunity for social mobility. A recent study from Harvard economists on the importance of place for income mobility found that Orleans Parish ranks as the 5th worst out of 2,478 U.S. counties in helping children in poor families move towards higher incomes in adulthood. The same study highlighted the critical relationship between transportation and social mobility, finding commuting time to be the single strongest factor in predicting income mobility. Many New Orleanians lack reliable and efficient public transportation options to get them to their jobs and schools. The local transit advocacy organization Ride New Orleans found that by the end of 2012, just 36% of pre-Katrina transit service offered by the New Orleans Regional Transit Authority in 2005 had been restored and these service reductions have been worse in areas where transit service is most critical: low-income neighborhoods, communities of color, and areas where people have less

access to personal vehicles.

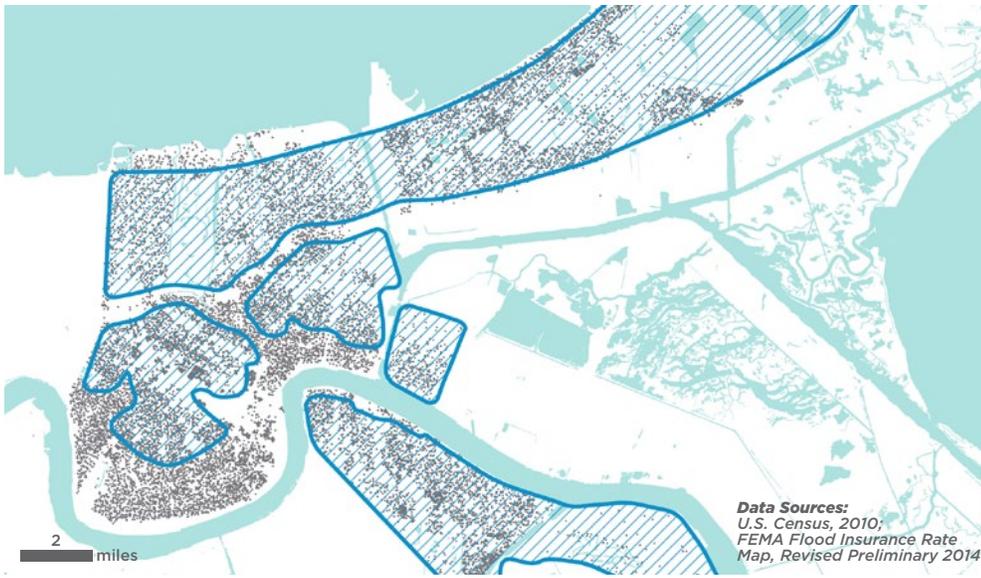
Disparate educational outcomes and high incarceration rates in New Orleans also stifle social mobility. While only 3% of white adults 25 years and older in New Orleans have less than a high school diploma, 21% of African American adults over 25 have not graduated high school. The incarceration rate in New Orleans is nearly four times the national rate, with 912 per 100,000 persons held in jail in 2011, according to findings from the Data Center. Incarcerations have broader economic impacts, limiting future job opportunities for those who have served time. Many employers will not hire job candidates who have an arrest record – regardless of whether they were ultimately convicted of a crime. In 2014 the City conducted a survey of unemployed African American males of working age in New Orleans and found that 60% of respondents had been arrested at some point and 43% had been convicted of a crime. Many of those surveyed highlighted a criminal record as a main obstacle to finding a job.

Housing affordability has also been an increasing economic stress for many New Orleanians. Renters in the city now pay on average 35% of their income on rent, up significantly from historical averages of 15% and above what is considered “affordable” by national measures, according to Zillow data.

In addition to economic disparities, there are wide disparities in public health outcomes, including higher rates of heart disease, diabetes, cancer, and homicide for African-American residents compared to white residents, according to a June 2013 report by the City’s Health Department. A 2012 report from the Joint Center for Political and Economic Studies found that life expectancy in certain zip codes of New Orleans is as low as 54 years – a similar average as people of sub-Saharan African nations like Uganda and Botswana – compared to a life expectancy as high as 80 years in other parts of the city and a national average of 78 years. The study also found a strong correlation between low life expectancy and other physical and social stresses like poor housing, polluted air, low quality schools, crime, neighborhood blight, and a lack of access to healthcare.

Additionally, social stresses in New Orleans, like in many other threatened cities, are correlated with vulnerability to physical shocks. Due to real estate policies that reinforced racial segregation and historic settlement patterns tied to topography, people of color and lower-income residents are today more likely to live in low-elevation areas at greater risk of flooding and subsidence (*see maps on page 17*).

Disproportionate risk of flooding to vulnerable communities

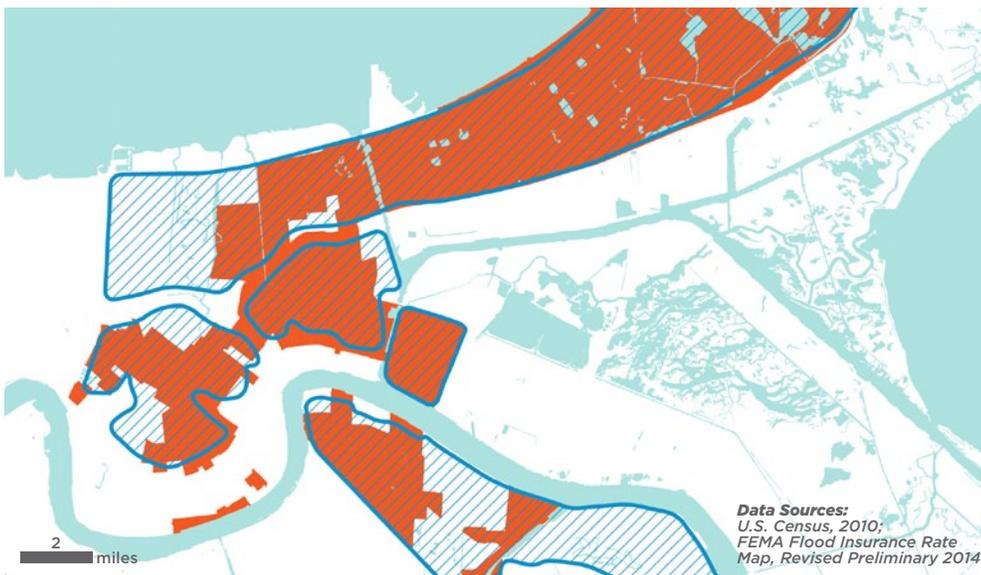


TOTAL POPULATION + Flood Risk

● **1 dot = 20 people**
by Census Block

▨ **Areas of higher
flood risk**

(based on FEMA 100-year and
500-year storm flood zones)



POPULATIONS OF COLOR + Flood Risk

■ **>75%
Persons of Color**
(non-"White Alone", including
Hispanic or Latino, by Census
Block Group)

▨ **Areas of higher
flood risk**

(based on FEMA 100-year and
500-year storm flood zones)



LOW INCOME + Flood Risk

■ **< \$30,000
Median Household
Income**
by Census Block Group

▨ **Areas of higher
flood risk**

(based on FEMA 100-year and
500-year storm flood zones)

While the social stresses facing New Orleans are great, the city has made progress on many of these issues in recent years. While the murder rate remains one of the highest in the country, 2014 marked a 43-year low for homicides in New Orleans. Ten years ago, the graduation rate was just over 50 percent, compared to 73% today. The homeless population has dropped from nearly 10,000 in 2010 to just over 1,700 today. Over the past five years, New Orleans has reduced neighborhood blight by 13,000 units. Since 2010, New Orleans has netted on average 27.8 new residents per day and 13.9 new private sector jobs per day.

Planning for unknown threats

As we seek to make resilience a part of our daily practice, New Orleans will need to plan and prepare for uncertainty. While the shocks and stresses discussed above present the most urgent risks and vulnerabilities as we understand them today, it is possible and even likely that other unforeseen or lesser known perils will confront New Orleans in the future.

Even in New Orleans' recent history, new challenges have emerged. For example, just 10 years ago housing affordability was not the pressing issue it is today. Our capacity to react quickly and adapt effectively to new conditions will be a measure of our resilience as a city. Our ability to build systems that are themselves flexible enough to address new challenges will influence our resilience as a city. For example, developing a robust and free broadband telecommunications system may help New Orleans be more resilient whether the challenge is to be economically competitive, provide opportunities for low-income families, or be efficient and coordinated in times of emergency response.

Some of the risks that were not highlighted by the data collected in the making of this document include terrorist attacks, infectious disease epidemics, drought, extreme heat, and civil unrest. While they were not listed among the top shocks and stresses, there is some data that suggests that New Orleans is vulnerable to each of these. While the resilience strategy cannot contain a solution to every problem, it can take into account these threats even as it focuses on challenges that have been deemed to be more imminent risks.

Opportunities

Despite being faced with a variety of shocks and stresses, New Orleans can transform these challenges into opportunities. For example, water management is one of the largest and fastest-growing industry clusters in Southeast Louisiana, growing by 7,832 jobs from 2010 to 2013 and outperforming national trends for the sector, according to *The Water Workers*, a 2014 study by The Data Center. Nearly 40% of the Sewerage and Water Board of New Orleans' (SWBNO) workforce is nearing retirement eligibility, creating a significant new opportunity to train the next generation of water infrastructure stewards and ensure that the people of New Orleans benefit from the city's growth. Beyond the jobs in the design, engineering, and construction of these projects, the long-term maintenance of landscape-integrated water management features will require a new generation of green collar jobs.

From coast to curbs, New Orleans can use its location as a delta city to implement projects that establish the City of New Orleans as a national and global leader in resilience best practices. *

Challenges and Opportunities

- Climate Change
- Air Quality
- Coastal Protection
- Environmental Risk Awareness
- Water Infrastructure
- Energy Infrastructure
- Economic Opportunity
- Social Mobility
- Violence
- Health
- Criminal Justice
- Housing Affordability
- City Systems Management
- Education System
- Transportation Network

CRITICAL ASSETS

What do we need to protect?

A System of Systems

The resilience of New Orleans and other cities is rooted in the many interdependent natural, infrastructural, and human systems that support and form the city. The city of New Orleans is more than simply a collection of streets and buildings. The urban area is a complex network of critical assets, from levees and highways to businesses and neighborhood associations to schools and families. The most critical assets in New Orleans are those which offer the greatest opportunity to build resilience through the strengthening and improvement of these interconnected systems.

Natural Assets

Every city exists and thrives based on the health of its critical systems, but New Orleans depends particularly on its specific geography. The city was founded in the 18th Century due to its strategic location for commerce near the mouth of the Mississippi River and on the shores of Lake Pontchartrain, which offered the most direct connections to the Gulf of Mexico and the world. Today, the natural systems upon which the city was built continue to sustain the city, but also threaten it. The deltaic, semi-aquatic soils underfoot and the wetlands that largely surround the city are part of a shifting coastal landscape that offers unique challenges for the built environment. The health of the natural and coastal systems in South Louisiana has direct effects on the urbanized area of New Orleans, regulating natural protections from storms and storm surge, providing landscapes for economic development, and underlying the stability of the soils upon which the city has been built.

The landscape and natural environment of Southeast Louisiana are arguably some of the most anthropogenically altered and managed systems in the world. Oil and gas exploration and extraction; levees and canals for shipping,

logging, and flood protection; drainage projects for urban development; and commercial fishing and farming are only some of the activities that have shaped the natural systems of greater New Orleans and Southeast Louisiana into a “working coast”. Because of this radical alteration, the future health of the coast and the natural systems that support the urbanized area of New Orleans depends largely on their sustainable management. The complexity of the intersection between natural and built systems on the coast and in New Orleans is only increased when considering the many political and organizational jurisdictions involved with the management of them. Federal, state, local, and regional public agencies and organizations must interface with private companies and individual interests for the monitoring, planning, and development of each system.

Built Assets

Each one of the interventions to develop cities and towns or economic activity in the Delta region is a part of a larger system of built assets. Perhaps the most notable built assets in the New Orleans area are the structures of the flood protection system of levees, canals, pumping stations, and flood gates that reign in the Mississippi River, surrounding lakes and marshes, and man-made canals and shipping lanes. This system of barriers to keep the New Orleans urbanized area dry is linked to the systems of drainage and stormwater management inside the levee protection system.

The urbanized area of New Orleans is served by one of the world’s most complex urban drainage systems, consisting of some of the oldest and largest pumping stations in the world, a series of canals and catchment basins, and hundreds of miles of underground pipes. The system is massive and drains more than 25% of neighboring Jefferson Parish in addition to the more than 160 square miles of land within New Orleans’ corporate limits. The system does not act independently, however. Because the system requires the pumping of water up and out of the leveed city and into large basins like Lake Pontchartrain, the system is energy-intensive, requiring stable power to function properly.

The water and energy infrastructure systems of New Orleans are indelibly linked. The energy grid, largely owned and maintained by power utility Entergy and regulated by the New Orleans City Council, is a regional system that powers many water management facilities. If the pumping stations have no power, for example, water will collect in the city and could destabilize the soil, further compromising the above-

New Orleans Critical Asset Snapshot



Natural

- River
- Delta
- Lake
- Gulf
- Wetlands/Marshes
- Wildlife



Built

- Transportation Infrastructure
 - Roads
 - Rails
 - Transit
- Water Infrastructure
 - Drainage
 - Potable Water
 - Sewer
- Energy Infrastructure
- Communications Infrastructure
- Levees
- Canals



Economic

- Port
- Shipping Access
- Hospitality Infrastructure
- Oil + Gas
- Transportation
- Seafood and Fisheries
- Entrepreneurship



Social

- Neighborhoods
- Families
- Clubs
- Social Networks
- Traditions
- Festivals
- Sense of Place
- Social Services

ground energy distribution system and creating cascading effects. While the pumping systems often have backup power sources, the reliability of the grid is still vital to water treatment and management.

New Orleans has been a hub for the transportation of goods throughout the region and the continent for almost 300 years, largely due to its location on the Mississippi River, which drains more than 48% of the continental United States. Today, the Port of New Orleans and the Port of South Louisiana make up one of the world's largest container port complexes and their continued success has necessitated extensive links to other land-based transportation systems, including road and rail infrastructure. Today, more than 1/3 of all East-West rail traffic in the United States passes through the Public Belt Railroad system, the City of New Orleans' publicly owned network of freight rail tracks. The region's development has been made possible by many of the largest transportation infrastructure projects in the nation, including some of the world's longest road bridges and busiest train yards. Much of this critical transportation infrastructure physically runs directly through the economic and residential heart of the city, creating opportunities for connectivity, but also threatening some of the city's most valuable structures and population centers in the event of accidents.

Economic Assets

Many of the structures and areas where critical transportation infrastructure runs near or through are dominated by tourist traffic. The hospitality industry by some measures accounts for more than a quarter of the New Orleans economy. Physical structures like the many large hotels in the CBD and French Quarter, the Superdome, the Convention Center, Louis Armstrong International Airport and downtown shopping areas are tourist magnets, and the hospitality industry is a major employer for the region. The hospitality and service industry intersects all other types of assets – from natural to social – by depending on the natural environment and the built infrastructure to support travel and providing the livelihood for so many New Orleanians. Additionally, major annual festivals such as Mardi Gras and the New Orleans Jazz and Heritage Festival are significant tourism events and economic multipliers for the city and region.

While the economy has diversified significantly in recent decades, the oil and gas exploration and extraction industry still play a very important role in the regional economy. Since exploration began in the Delta region and offshore,

the oil and gas industry has arguably reshaped the physical and economic landscape of South Louisiana more than any other. Today, while no major energy companies are still headquartered in New Orleans, many support functions and secondary industries are based in the greater New Orleans region and necessitate the management and development of many other built and economic systems.

As previously mentioned, New Orleans was founded on a shipping economy and the Ports of New Orleans and South Louisiana continue to drive a great deal of the region's economic development. The port's physical assets are some of the largest industrial facilities in the region and connect directly to other built and natural assets. The port is a good example of the interconnectedness of systems – depending on the presence of the river and access to the Gulf of Mexico, creating the need for robust transportation networks, and driving a large portion of economic development for companies and community members.

Social Assets

The culture of New Orleans is often cited as a strength and a contributing factor to the overall resilience of the city in the face of many threats. While difficult to measure empirically, the value of tight and rooted social networks and familial ties has been proven to aid communities around the world during difficult times. High rates of nativity (living in the state or city where born) and the strength of groups like neighborhood associations and social clubs indicate the presence of important social networks in New Orleans. Perhaps most important as an asset and opportunity for the future resilience of New Orleans is the sense of place that is imbued in the built environment and in the many public social events that occur throughout the year. Pride in local geography and community is a great opportunity for growth and could be a vehicle for future resilience and adaptation. *

Challenges and Opportunities

- **Coastal Protection**
- **Water Infrastructure**
- **Energy Infrastructure**
- **Economic Opportunity**
- **Social Mobility**
- **Transportation Network**
- **Regional Coordination**
- **Culture**



The Resilient New Orleans team consulted with key stakeholders in order to understand how they perceive the state of resilience in New Orleans today.

PERCEPTIONS

What do stakeholders think about the city's resilience?

The New Orleans Resilience Strategy development builds off of the extensive community engagement efforts of the past ten years of planning processes. In addition to researching and cataloguing shocks, stresses, and city assets, the Resilient New Orleans team partnered with local on-the-ground organizations for a series of moderated workshops with stakeholders to better understand perceptions of the city's resilience today. These workshops convened more than 110 people representing four key groups:

- 1. Community leaders and advocates serving historically vulnerable populations**
- 2. Professionals working in the built environment space**
- 3. Young professional leaders in various sectors**
- 4. City officials**

During the workshops stakeholders discussed their perspectives on resilience in New Orleans and issues they—as well as their constituencies—commonly face. The Resilient New Orleans team recorded qualitative data based on workshop participants' perceptions of New Orleans' strengths and weaknesses as they related to the City Resilience Framework's key dimensions, drivers, and sub-drivers (*see page 25*). Specifically, workshop participants were asked to respond to three questions:

- 1. What helps New Orleans bounce back from shocks and stresses?**
- 2. What keeps New Orleans going every day?**
- 3. What could New Orleans be doing better?**

From these workshops, the Resilient New Orleans team collected valuable insight into what experts and residents perceive to be the city's resilience strengths and weaknesses, what local expertise and knowledge exists about the health of the city, what specific needs are not being met, and if there is consensus around issues that are likely to influence the

direction of New Orleans' Resilience Strategy. In addition, the Office of Neighborhood Engagement convened a summit of neighborhood leaders to solicit perspectives on city resilience.

Strengths to build on:

The following common themes were derived from the extensive discussions during the city resilience perceptions workshops, which point to key strengths in New Orleans that can be leveraged to cultivate resilience.

New Orleanians deeply value the city's unique history and culture. Stakeholders noted that New Orleans' deep-rooted traditions and sense of pride amongst its residents has significantly contributed to the city's overall ability to respond to stresses and shocks. These attributes have also contributed to New Orleans' growing economy and recent attraction of young professionals and entrepreneurs. Workshop participants also remarked that New Orleans' local identity and culture facilitates social cohesion across the city, bringing residents together for festivals, second lines, Mardi Gras, and other "celebrations in the street."

Residents of New Orleans are dedicated to improving their communities. Stakeholders expressed that New Orleans' greatest asset is its residents and their will to fight for the city and make it a better place. There is a strong network of grassroots community organizations and nonprofit organizations that work across the city implementing programs and initiatives to address some of New Orleans' most pressing challenges. Workshop participants remarked that it is because of New Orleans' residents, who embody a unique and strong sense of spirit and pride for their city, that positive change is occurring.

Tightly-knit social networks in New Orleans bolster responses to shocks and stresses. Stakeholders noted that community ties within and across neighborhoods facilitate information exchange and provide community support systems. Stakeholders suggested the content and application of the Resilience Strategy should more purposefully utilize and build upon these strong social networks.

New Orleans' experience and history has tested resilience. Stakeholders shared examples of the ways in which New Orleans has learned from post-Katrina recovery and improved its response to acute shocks as well as chronic stresses. However, multiple stakeholders referenced a "disaster amnesia" that impedes action on lessons learned.

Remaining challenges:

Although there were numerous strengths that support New Orleans' resilience, an array of areas that could be improved or further developed were also identified throughout the city resilience perceptions workshops. A sample of the key themes are highlighted here:

Inequity persists. Across every Perceptions Workshop, issues of equity and social cohesion resonated with stakeholders. Participants cited long-standing impacts of poverty and inequitable distribution of, and access to, resources as being central to a discussion of New Orleans' resilience challenges. Specifically, stakeholders noted that low-income and minority communities often face limited access to health care services, minimal opportunities for high-quality education and job training, and high incarceration rates. Stakeholders also remarked that although the city has greatly improved post-Katrina, it is too often the case that low-income and minority community members do not reap any benefits and in some instances face subsequent injustices. Stakeholders expressed a need for city leadership to help level access to resources for all community members and ensure that New Orleans is addressing core vulnerabilities for a range of populations.

Despite promising initiatives and action plans, implementation often falls short. Workshop participants remarked that there are numerous initiatives and action plans throughout New Orleans that are promising; however, the city does not always have the political will or effective stakeholder alignment for implementation or bringing successful programs to scale. Relatedly, participants cited the relationships between public and private sectors as needing work, especially in the areas of economic growth and environmental sustainability.

City infrastructure lacks maintenance and innovation. Stakeholders raised concerns about long-term land use and urban development decisions related to zoning and code enforcement, historic preservation, and availability of affordable housing. There was concern both in terms of what data were driving which policy and whether policies were being implemented as intended. Stakeholders also raised several issues raised regarding the overall maintenance of city infrastructure, in particular streets, roads, and water management infrastructure. Workshop participants noted that laws and codes dealing with these types of issues are frequently not enforced. In addition, stakeholders highlighted a lack of innovation associated with city infrastructure;

deficiencies in New Orleans' outdated public transportation network being an oft-cited example of this.

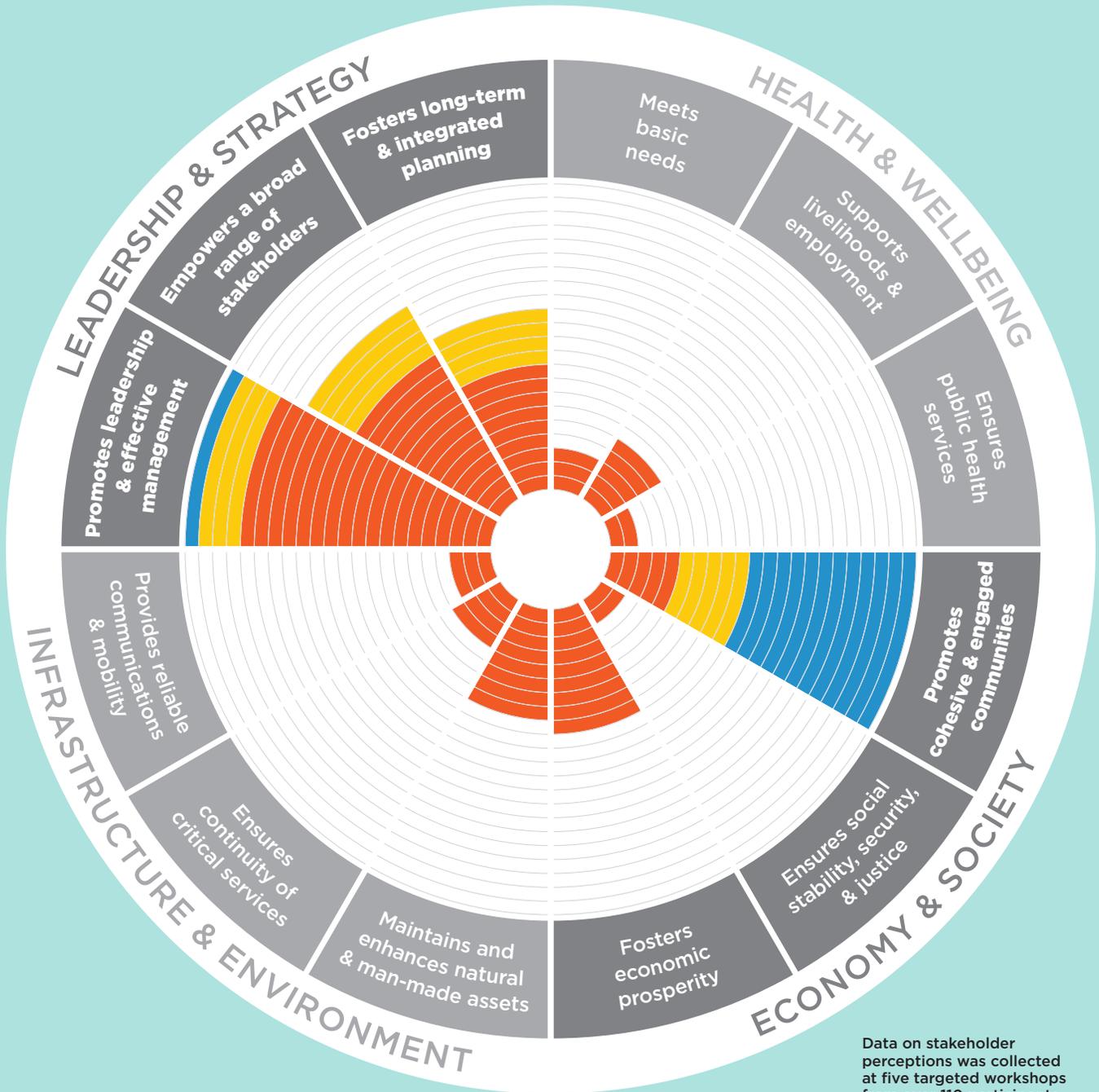
A healthy coast and a healthy urban environment are critical. The importance of the coast and preparing for climate change impacts, such as sea level rise and increases in hurricane activity, were cited across all five of the workshops. Stakeholders noted issues of sustainability, stormwater management, innovations in the levee system, as well as public education of potential risks and the approach of "living with water" as critical to the future of the city and its overall ability to bounce back from shocks and stresses. Workshop participants also remarked that all levels of government are aware of these pressing issues but there has yet to be any true leadership or coordination put in place to tackle the problems.

Workforce development and availability of quality jobs are problem areas. Although there are numerous workforce development programs in the city, workshop participants noted these are often underfunded and not of scale. It was also remarked that there is a lack of accessible and effective training and job placement programs for low-income and minority community members in particular. In addition, many development projects in the city have contracted an out-of-town workforce, while stakeholders suggested local residents should have priority in procurement. ✨

Challenges and Opportunities

- Climate Change
- Environmental Risk Awareness
- Water Infrastructure
- Economic Opportunity
- Social Mobility
- Health
- Criminal Justice
- Housing Affordability
- City Systems Management
- Community Education
- Trust in Government
- Transportation Network
- Culture

- Area of strength
- Doing well, but can improve
- Need to do better



Data on stakeholder perceptions was collected at five targeted workshops from over 110 participants. Topics and issues identified by stakeholders were mapped to the City Resilience Framework's 12 drivers of resilience. This graph shows both the frequency of responses related to each driver and whether stakeholders perceived it as an area of strength or something to improve.



Ripple Effect

is a SWBNO-funded program run by local designers, teachers, and water experts that promotes “water literacy” through design-based, in-school instruction.

This topographic model, constructed by the Gutter to Gulf studios at Washington University in St. Louis, helps teach students at KIPP Central City Primary about the relationships among water, land, and people in New Orleans. Credit: Ripple Effect

ACTIONS

What is New Orleans already doing?

The Resilient New Orleans team compiled existing actions that build resilience in New Orleans into an Actions Inventory. This activity was undertaken to identify gaps in capacity as well as opportunities for the city to build on existing programs, projects, and initiatives to enhance its resilience in key areas. The actions recorded consist of both existing and historical efforts, including plans, practices, programs, projects, initiatives, assessments, or studies undertaken by public, private, and civic groups to improve resilience in New Orleans.

The team has thus far identified over 200 actions across the city and has mapped those actions to each of the City Resilience Framework's twelve drivers of resilience. The preliminary findings show that the city is taking the highest number of actions focused around the CRF drivers "Ensures Continuity of Critical Services" and "Meets Basic Needs." The fewest number of existing actions relate to the drivers "Ensures Social Stability, Security, and Justice" and "Provides Reliable Communication and Mobility." Stakeholders perceived issues associated with these drivers as relatively important, and the potential gaps here will be further considered in Phase II of the Resilience Strategy development process.

It is important to note that the mere frequency of activities does not indicate their effectiveness. Phase II will work to evaluate these actions based on their "resilience dividend" and their potential to be included in a comprehensive portfolio of deliberate resilience-building actions.

Recent City Investments in Resilience

When reviewing the city's recent investments, there are many examples of existing investments in resilience-enhancing activities that respond to the shocks and stresses outlined earlier and align with the four Focus Areas that will guide the next phase of the New Orleans Resilience Strategy development (*see page 31 for more detail*). The actions

included here are not meant to be exhaustive, but rather a representation of existing resilience-building projects and programs, particularly those led by the City of New Orleans.

Adapt to Thrive. The City and its partners have made significant recent investments in both coastal restoration projects and innovative urban infrastructure projects to improve the ability of local communities and systems to adapt to a changing natural environment while creating co-benefits such as recreation, economic development, and neighborhood stabilization.

The City is investing \$1.63 billion in new parks, playgrounds, libraries, streets, and community centers around the city, many of which include design features that conserve energy and capture stormwater, such as Rosa Keller Library in Broadmoor and the Lafitte Greenway, a new 2.6-mile bicycle and pedestrian path connecting the French Quarter to Bayou St. John and Mid-City. The City has invested another \$1.8 billion in new school facilities that provide modern, safe, healthy environments for students to learn and grow. This includes 55 new or redeveloped LEED Silver public schools.

The Sewerage and Water Board of New Orleans (SWBNO), a public agency that owns and operates New Orleans' potable water supply, drainage system and sewerage system, has recently undertaken a massive \$2 billion capital improvement program to repair and upgrade this extensive, aging system. This includes a \$2.5 million investment in green infrastructure to build demonstration projects, raise public awareness, and create programs that educate professionals and K-12 students on water and the environment.

The New Orleans Redevelopment Authority (NORA) completed a series of demonstration rain gardens across the city, which can detain up to 88,000 gallons of water during rain events. NORA and the City are in the design phase of a \$15 million FEMA-funded project to transform 55 vacant lots across the Pontchartrain Park and Gentilly Woods neighborhoods into a network of rain gardens that will reduce flood risk and FEMA claims on properties acquired through the State's Road Home voluntary buyout program.

New streetscape projects and programs, particularly in under-invested commercial corridors across the city, create great public spaces for culture and commerce to thrive. NORA's Façade Renew program provides façade improvement and placemaking grants in select historic commercial corridors. Through its Resilient Main Streets program, the City Planning

Commission has begun an initiative to increase the ability of businesses in six under-invested commercial corridors to rebound after disasters.

The City coordinates its coastal restoration efforts with the Coastal Protection and Restoration Authority (CPRA), the single state entity with authority to implement comprehensive coastal protection for Louisiana. In 2012, CPRA developed a \$50 billion Coastal Master Plan to coordinate and fund restoration projects across Louisiana's coast. Since 2007, CPRA has secured \$18 billion for restoration projects including the improvement of 256 miles of levees, construction of 45 miles of barrier islands, and strengthening of 26,241 acres of coastal wetlands.

Connect to Opportunity. The City of New Orleans is committed to programs and initiatives that address social stresses and enhance the quality of life for all residents.

The City's NOLA for Life initiative makes positive, lasting impact in the lives of at-risk young men and women living in New Orleans' most violent neighborhoods through community policing, skills and job training, mental health services, restorative justice, and re-entry programs.

Developed to implement the vision created through the Sustainable Communities Planning grant, the Network for Economic Opportunity connects job seekers to work opportunities in anchor institutions such as new federally funded hospitals and the construction of the future Louis Armstrong Airport terminal. The Network also coordinated a \$11.8 million program at Delgado Community College to prepare students for green collar jobs.

The New Orleans Health Department supports a number of innovative and data-driven initiatives that protect, promote and improve the health of all residents where they live, work, and play. This includes programs that provide nutrition education for women and infants, primary care services to the homeless, domestic violence prevention, and public health emergency preparedness and response training for volunteers.

In response to a national challenge from First Lady Michelle Obama to mayors across the country, New Orleans became the first major U.S. city to house every single homeless veteran – one year ahead of schedule. Today there are just over 1,700 total homeless individuals in the city, compared to nearly 10,000 five years ago.

The City is committed to ramping up the production of affordable housing. More than \$1 billion in new affordable public housing is available or coming online. There is currently a stock of approximately 15,000 affordable rental units for low income families, including in the new and growing 'big four' housing developments – Faubourg Lafitte, Marrero Commons, Columbia Parc and the Harmony Oaks. The recently passed Comprehensive Zoning Ordinance both encourages and requires affordable housing development in 'hot' market neighborhoods. Earlier this year, the city awarded \$5 million in federal funds to leverage another \$124 million for 500 units of mixed income housing. Nearly 900 first-time homebuyers received assistance through the City's \$52 million Soft Seconds program, helping many low-income households build assets.

The City of New Orleans worked with local universities, national planning firms, key employers, anchor institutions, national and local philanthropies, and community members to develop the Livable Claiborne Communities Plan, a community-based strategy to guide holistic, inclusive development in the city's historic neighborhoods and to connect disadvantaged job seekers with businesses.

Transform City Systems. Recent efforts exist to improve the management of city systems and build resilience into decision-making.

Under Mayor Landrieu, City departments were reorganized in order to coordinate and fund projects and initiatives across traditional government silos. This framework allows for swift and decisive response to address needs within the community, respond after disasters, and to take advantage of opportunities to address both shocks and stresses. To coordinate the management and repair of streets and underground infrastructure, SWBNO and DPW have co-located key engineering staff and entered into a cooperative endeavor agreement. This restructuring expedites the planned upgrades to the city's municipal water systems – the largest in the United States – and allows each entity to perform emergency repairs and upgrades on each other's assets, significantly reducing project times and costs. Additionally, in January 2015, the City hired its first inter-agency Stormwater Manager to coordinate SWBNO's and the City's green infrastructure projects and programs, and continues to add technical staff to City departments to facilitate permitting and implementation of stormwater management projects.

The City is committed to institutionalizing best practices

in sustainable design, showcased by the recent adoptions of a Complete Street standard for road projects and a Comprehensive Zoning Ordinance that includes guidelines that promote innovative design and on-site stormwater management while respecting historic neighborhoods.

Inform and Engage. While often small in scale, several programs exist to educate residents about the environment and inform them about potential risks and opportunities.

The City-Assisted Evacuation program helps anyone in New Orleans leave town and return safely in the case of the Mayor calling for a mandatory evacuation. The nonprofit organization Evacuteer recruits, trains, and manages evacuation volunteers who assist this public evacuation. In partnership with the City, Evacuteer placed 17 large metal sculptures that look like a person waving or hailing a cab at strategic points throughout the city, indicating where residents can catch a shuttle in the case of an evacuation.

The City's NOLA Ready campaign aims to build 24/7 awareness and preparedness among citizens and businesses. Through an official Twitter account, the City can circulate information on facility closures and service provisions

evacuation procedures, and respond to citizens' questions.

NOLA Wise is a partnership between the City of New Orleans, the Southeast Energy Efficiency Alliance, the U.S. Department of Energy, and Global Green New Orleans that provides outreach, education, and advocacy for energy efficiency and green building. The program helps homeowners improve the energy efficiency, health, and comfort of their homes by taking them from an energy assessment through upgrade completion. NOLA Wise also promotes energy efficiency improvements in multifamily buildings, small businesses, and institutions.

In partnership with the National Wildlife Federation, the City hosts public forums on coastal restoration. The forums explore a number of topics including the critical role New Orleanians can play in advancing crucial coastal restoration projects that can strengthen the economy and protect the city from future storms.

The Sewerage and Water Board provided funding in 2014 for several projects and programs that seek to educate and inform students, homeowners, and professionals about living with water and the value of green infrastructure. *

Examples of Existing Actions

Adapt to Thrive

- CPRA Coastal Restoration Projects
- SWBNO + NORA Green Infrastructure Projects
- LEED Silver Public School Facilities
- Resilient Main Streets
- Entergy's Energy Smart Program
- Greater New Orleans Urban Water Plan

Transform City Systems

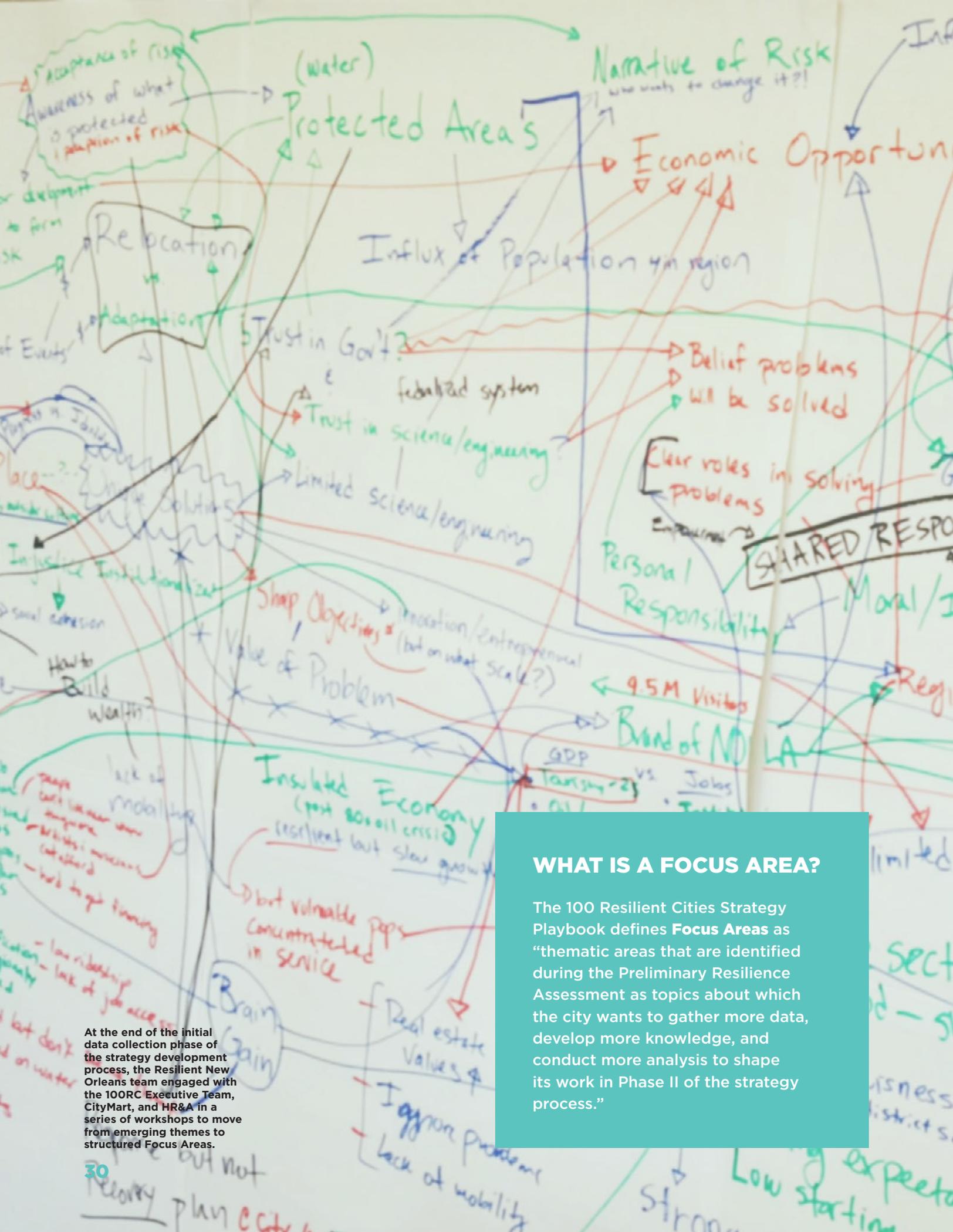
- One Stop Shop
- CZO Stormwater Requirements
- Office of Performance and Accountability
- Innovation Delivery Team
- Complete Streets Guidelines
- BlightSTAT

Connect to Opportunity

- NOLA for Life
- Fresh Food Retailer Initiative
- Network for Economic Opportunity
- Mayors Challenge to End Veterans Homelessness
- Livable Claiborne Communities Plan
- Best Babies Zone

Inform and Engage

- NOLA Ready
- NOLA Wise
- Evacuteer Evacuspots
- Ripple Effect "Water Literacy" Curriculum
- Cultural Economy Planning Map
- Louisiana Urban Stormwater Coalition



WHAT IS A FOCUS AREA?

The 100 Resilient Cities Strategy Playbook defines **Focus Areas** as “thematic areas that are identified during the Preliminary Resilience Assessment as topics about which the city wants to gather more data, develop more knowledge, and conduct more analysis to shape its work in Phase II of the strategy process.”

At the end of the initial data collection phase of the strategy development process, the Resilient New Orleans team engaged with the 100RC Executive Team, CityMart, and HR&A in a series of workshops to move from emerging themes to structured Focus Areas.

From Phase I analysis to Focus Areas for further exploration

After months of research, 21 major themes defined the scope of the data collected about New Orleans' resilience challenges and opportunities. Many of these were not surprises for New Orleans, particularly after a decade of research and planning processes in the wake of the 2005 disasters. The purpose of a Resilience Strategy is not simply to identify the range of problems, but to strategically address multiple challenges in pursuit of the Resilience Dividend. In order to do that, the connections between challenges and opportunities must be explored in further detail, so that future interventions will have critical and meaningful benefits across sectors, ultimately building the resilience of the city. Focus Areas represent the consideration of connections between perhaps seemingly disparate challenges and opportunities that New Orleans faces. Via strategic research and work products framed in the Focus Areas, the Resilience Strategy will play a coordinating role for projects, programs, and initiatives developed with a cross-cutting and resilience-building vision.

How did we get to our Focus Areas?

Developing Focus Areas as strategic paths of inquiry was part of a deliberate and designed process to ensure maximum potential to capture the Resilience Dividend. After identifying the 21 major resilience challenges and opportunities in New Orleans, the Resilient New Orleans team engaged in workshops with expert facilitators to begin to explore relationships between themes and strategically group them for further research in Phase II. Through this process, the 21 themes generated seven major questions, three of which cut across all sectors. These Focus Areas and Cross-Cutting Questions will form the structure of the Resilience Strategy.

1. Honing of Vision

Many of the most crucial aspects of city resilience cannot be built immediately like a piece of infrastructure. Much of the change that must occur can only happen slowly and deliberately. The team was challenged to understand what generational change could look like for a child born in the year 2020. With the year 2050 as a target, the facilitators

conducted visioning exercises that took into account the future scenarios developed in past planning processes and added a resilience-building lens. As a result, a specific, aspirational vision was crafted for each of the 21 emerging themes. The team then used these to “work backwards” to begin to understand what a path to that vision could look like.

2. Identification of Unknowns

With the aspirational vision of each theme in mind, the next step was to identify key gaps in knowledge that could act as barriers to action. By comparing the state of each theme today versus what was envisioned for 2050, some clear gaps emerged. Identifying a lack of clear data, knowledge of political will, meaningful ways to measure effectiveness, and other gaps helped the team formulate some basic questions for further research based in each different sector.

3. Mapping of Relationships

Resilience is holistic in nature. Therefore, understanding each sector or system separately is not enough to understand their resilience or their impact on city resilience overall. In order to start the process, the team mapped the challenges and opportunities against each other based on intersections in approach, actions, or physical interconnectedness. This task produced far more connections than separations, helping to prove the importance of a complex systems approach to resilience and encourage the pursuit of research that could address many challenges at once.

4. Grouping of Challenges

In order to have the potential to address 21 seemingly disparate themes, the Resilience Strategy has to explore the principle of the Resilience Dividend. This means that each path of inquiry, each opportunity, each intervention must work to accomplish multiple goals and serve to achieve complementary benefits. The resilience challenges were grouped according to theme, common vision, and potential overlap of research questions.

5. Development of overarching questions for research

With each of the themes grouped thematically and by potential to address multiple resilience issues, the team systematically developed overarching questions that would guide the Focus Area paths of inquiry. Each question was designed to incorporate major aspirations for generational change as well as serve as a structure for specific and directed research questions. The seven overarching questions that emerged became the basis of the four Focus Areas and three Cross-Cutting Themes for Phase II.

1. ADAPT TO THRIVE

How can our communities and systems adapt to thrive within our changing natural environment?

CHALLENGES + OPPORTUNITIES

- **Climate Change**
- **Air Quality**
- **Coastal Protection**
- **Environmental Risk Awareness**
- **Water Infrastructure**
- **Energy Infrastructure**



New Orleans' urban environment is built upon some of the newest land in the world – part of the shifting, semi-aquatic Mississippi River Delta complex. The only constant in the natural environment of Greater New Orleans since its founding in 1718 has been change. With the existential threats of climate change, sea level rise, coastal land loss, and urban land subsidence, the city will face only increasing complexity in the natural challenges it faces.

Adapt to Thrive is dedicated to understanding the man-made systems and human communities that make up what some authors have dubbed the “concrete lily pad” and how they can continue to mitigate threats and adapt to Southeast Louisiana’s increasingly dynamic natural processes.

Aspirations for the year 2050

- **New Orleanians have an accurate understanding of risks and have developed the capacity to adapt to those risks.**
- **The coast is healthy, functioning and sustains communities and ecosystems.**
- **The urban environment has adapted to its natural semi-aquatic, deltaic foundation.**
- **Greater New Orleans has a reliable and redundant energy production and distribution network that is able to meet and adapt to the increased demand and risks of the 21st Century.**

2. CONNECT TO OPPORTUNITY

How can New Orleanians be best prepared for and connect to opportunity?



CHALLENGES + OPPORTUNITIES

- Economic Opportunity
- Social Mobility
- Violence
- Health
- Criminal Justice
- Housing Affordability
- Transportation Network

Aspirations for the year 2050

- Our most disadvantaged citizens and small businesses have the opportunity to gain the skills, training, education, and support needed to fully participate in our economy, prosper, and reach their full potential.
- Every New Orleanian has access to a quality education, social services, and transportation that allow them to achieve individual economic growth
- We are stemming the epidemic of violence in New Orleans, particularly among vulnerable young black males, through high quality educational, economic, and cultural opportunities that enable each person to be healthy, self-reliant and able to realize their dreams and aspirations.
- The gap in disparate health outcomes for our most vulnerable populations is closed.
- Justice is equally and fairly served with a focus on diversion, rehabilitation, and re-entry.
- Every New Orleanian has access to high-quality, healthy, and resource-efficient housing in vibrant neighborhoods at a cost they can afford.

Stark inequality has defined the social experience of New Orleans for far too long. **Connect to Opportunity** is founded on the need for equity in opportunity for New Orleanians. Opportunity is not a simple concept, however. This Focus Area will take into account the complex economic, behavioral, and infrastructural factors that contribute to access, health, and prosperity for a new generation of New Orleanians.

3. TRANSFORM CITY SYSTEMS

How can we transform the management of city systems to build a 21st Century New Orleans?

CHALLENGES + OPPORTUNITIES

- **City Systems Management**
- **Resilience Lens for Decision Making**
- **Education System**
- **Trust in Government**
- **Transportation Network**



New Orleanians rely on the municipal government for countless services and systems management. As needs and desires change along with the environment, the City of New Orleans should be able to respond in the most efficient and effective ways possible. ***Transform City Systems*** focuses on the evaluation and restructuring of internal municipal systems and external services to support equity and opportunity for New Orleanians. This Focus Area also looks to incorporating “resilience thinking” into government decision-making processes to ensure that investments are strategic, creating multiple benefits, and have a view to the future.

Aspirations for the year 2050

- **City services are efficiently and effectively managed to meet and adapt to the emerging demands of the 21st century.**
- **City government evaluates decisions based on the principle of contributing to the ability of the city to mitigate and adapt to future threats and to take advantage of emerging opportunities.**
- **Government is founded on transparency, accountability, efficient use of public funds, meeting basic needs, high-level of service delivery, stability, reliability, and a use of resources to connect the vulnerable to opportunities.**
- **A modern, efficient, and predictable regional transit system connects people to opportunities and fulfilling, prosperous, and healthy lives.**

4. INFORM AND ENGAGE

How can New Orleanians be best informed about the risks and opportunities of the future?



CHALLENGES + OPPORTUNITIES

- **Education System**
- **Community Education/
Capacity Building**
- **Environmental Risk Awareness**

Aspirations for the year 2050

- **Individuals and families have access to the capacity, resources, and expertise to live and adapt to our environment.**
- **New Orleanians have an accurate understanding of risks and have developed the capacity to prepare for and adapt to those risks.**
- **The city's most vulnerable populations have access to and confidence in high quality education that prepares them for a variety of viable pathways to college, career, civic engagement, and participation in the local economy.**

In a complex and deeply divided New Orleans, a lack of accurate knowledge and understanding of the city's risks and opportunities is a serious threat to future resilience. **Inform and Engage** targets creative and effective strategies for building awareness and capacity for groups and individuals both in and out of formal education settings. High-quality educational and capacity-building opportunities are crucial to supporting the charges of all the other Focus Areas; the future economic and social success of New Orleanians in complex and changing urban and natural environments depends upon meaningful preparation.

CROSS-CUTTING THEMES



Financing Adaptation:

How do we use existing and new finance tools and approaches to address the challenges and opportunities of the 21st Century?

Any innovative project or initiative will require new thinking around how to leverage assets and financial tools to make it sustainable. The resilience of New Orleans depends on the ability to reliably finance adaptation to an unknown and complex future. This group explores new ways to monetize risk reduction and best achieve the Resilience Dividend.

2050 Aspiration: *New Orleans has the capacity, resources, and expertise to realize the design and development of the infrastructure that allows us to adapt to shifting risks and challenges while harnessing opportunities of the future.*



Coordinating Regionally

How do we coordinate regionally to address shared risks and opportunities?

The many shocks and stresses that threaten Greater New Orleans will not correspond to political and jurisdictional boundaries. Regional coordination and planning is crucial for the implementation of resilience-building measures to ensure the mutual survival and prosperity of each.

2050 Aspiration: *Greater New Orleans operates as a region to comprehensively address shared risks and vulnerabilities and to catalyze shared opportunities.*



Harness Culture

How do we use our culture to address the challenges and opportunities of the 21st Century?

New Orleans is an international cultural capital. Its residents often cite the city's strong social networks as a key element of its long history of resilience. Any comprehensive future resilience-building efforts must take the city's local culture into account to harness its creative and economic momentum to help address risk and generate opportunities.

2050 Aspiration: *New Orleans' culture serves to enhance opportunities and reduce the city's risk and vulnerabilities.*

NEXT STEPS

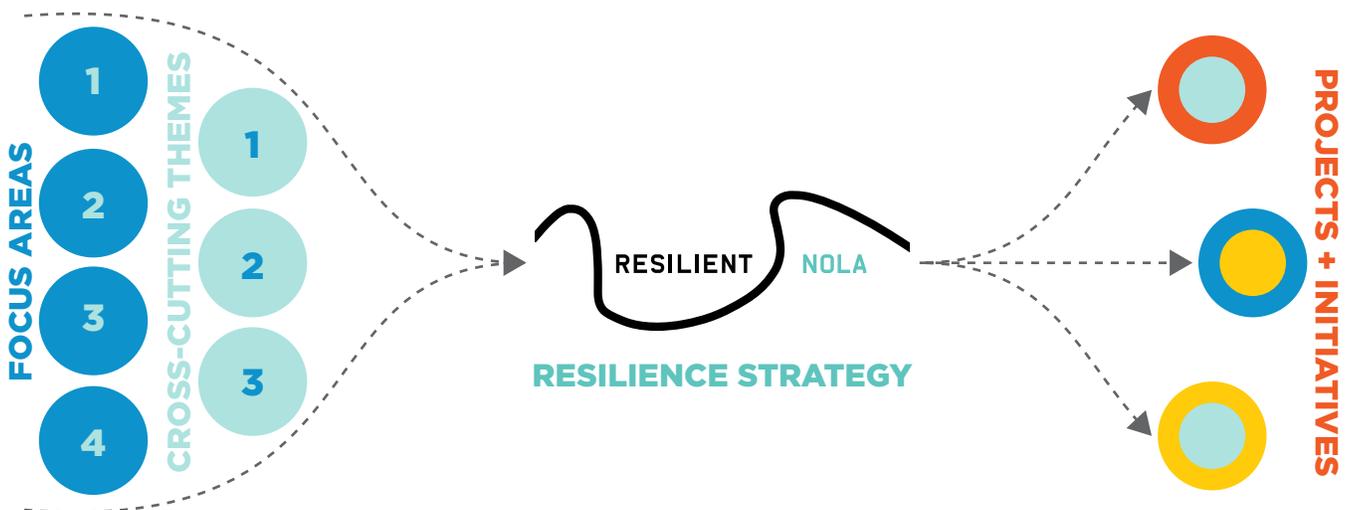
Towards a Resilience Strategy

The goal of Phase I of the Resilience Strategy development process was to research and define a baseline for the exploration of new approaches to resilience in New Orleans. The emergence of resilience challenges and opportunities allowed the team to develop Focus Areas that will shape the Resilience Strategy.

In order to turn those Focus Area questions into implementable projects, programs, and initiatives, Phase II of the strategy development process will consist of targeted research and idea generation by local, national, and international experts and the assembly of ideas into a coherent and practical strategy. Working Groups will be

formed around each of the four main Focus Areas to analyze specific gaps of service and opportunities for leverage to make projects a reality. This work will then be checked against the three cross-cutting themes: Finance, Regionalism, and Culture, to explore how the proposed strategies address these challenges.

The resilience challenges of New Orleans are complex and might seem beguiling, but by considering our shocks, stresses, assets, and opportunities together, the Resilience Strategy and its implementation have the potential to benefit New Orleanians today and those of the next generation.



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New Orleans City Council

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CeaseFire

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Kingsley House

Louisiana Bucket Brigade

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National Alliance for Mental Illness

New Orleans Workers' Center for Racial Justice

NO/AIDS Task Force

Orleans Public Education Network

Providence Community Housing

Restaurant Opportunities Center

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Mitchell J. Landrieu | Mayor

Jeff Hebert | **Chief Resilience Officer**

Jared Genova | **100 Resilient Cities Fellow**

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