RESILIENT JACKSONVILLE

CITY OF JACKSONVILLE

October 2023

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October 2023

Letter from the Mayor

October 13, 2023

Dear Residents,

It is my pleasure as Mayor of Jacksonville to welcome you all to the launch of Jacksonville's 50-year Resilience Strategy.

The effects of climate change—rising sea levels, more frequent and intense storms, and rising temperatures—are unfortunately here to stay. As a coastal town connected by over 1,500 miles of shoreline, it is imperative that we prepare now and ensure our city's growth occurs safely and sustainably.

Beginning in 2021, the City of Jacksonville's Chief Resilience Officer got to work developing a long-term strategy for our city's development. In it, we look at historic vulnerabilities, the estimated impacts from storms and sea level rise, as well as the opportunities for action. With this plan, we will ensure our city grows in ways that protect residents and businesses from the effects of climate change and preserve our remaining natural resources.

Preparing for climate change is something that each of us must play a part in. Together, we can promote sustainable options, protect our existing resources from future damage, and ensure the City of Jacksonville is adapting to our new reality. We are in this together, and together we will push towards a brighter, more resilient future.

I encourage you to review this vision for a resilient Jacksonville and help us safeguard the future of our city.

Sincerely,

Donna Deegan

Donna Deegan
Mayor

Letter from the Chief Resilience Officer

October 13, 2023

Dear Friends,

Resilient Jacksonville is an ambitious, visionary strategy built on science and data that puts Jacksonville in the best possible position to thrive in the face of a changing future.

This strategy closely examines the risks facing Jacksonville today, and in the future, to ensure that our city systems are strong and adaptable enough to confront whatever challenges come our way. By allowing data and science to guide this planning process, we have been able to develop actions that meaningfully address our risks in objective, equitable, and efficient ways. A great deal of care was taken to ensure every corner of Jacksonville was studied, and that the resilience actions proposed in this document are tailored to the many geographies, communities, and ecosystems that make up Jacksonville.

I want to thank the hundreds of residents, students, advocates, and experts who participated in this planning process. This strategy was developed through an incredibly collaborative effort that involved every City department, expert working groups, public meetings and surveys, and other forms of stakeholder outreach. As we move forward, the great task of implementing this strategy will require a continued commitment to dynamic and long-lasting collaboration.

Resilience is a generational issue. The future resilience of Jacksonville and the wellbeing of Jacksonville's next generation will be determined by our willingness to make consistent and deliberate decisions about risk and growth over the coming years and decades. This Strategy offers a roadmap for how, together, we can shape our collective future.

Sincerely,

Anne Coglianese
Chief Resilience Officer

EXECUTIVE SUMMARY

As Jacksonville, which celebrated its bicentennial in 2022, enters its third century, this Resilience Strategy looks to the future of our city for the next 50 years. Jacksonville is a city that is constantly evolving and is poised to adapt again to meet future challenges. The city's population has grown to over ten times what it was a century ago to nearly one million people today. If trends continue, Jacksonville will grow to 1.6 million residents by 2070. What will define Jacksonville in this new century that will not only bring a changing climate, but also changing technologies and social and economic conditions?

The actions Jacksonville takes today will shape the future of our city as it grows and addresses the challenges of a new century. How should we proactively adapt now to make the next generation of Jacksonville's residents less vulnerable to climate risks? What changes must be made to foster healthier communities and environments? How do we expand opportunities for Jacksonville's businesses and residents? How do we tailor these actions within Jacksonville's unique landscape of neighborhoods and build for the future while preserving its open space and natural environment?

Resilient Jacksonville addresses these questions and identifies specific and implementable actions that will strengthen the city's resilience. This Strategy builds on many recent efforts in the wake of Hurricanes Matthew and Irma and leverages local expertise with science-based assessments of current and future conditions to prioritize investments based on sound science and our city's vision for the future.

Recommendations in this Strategy are organized into two chapters. The first includes resilience actions—implementable policies, projects, and programs. The second chapter builds on these actions by tailoring and prioritizing them for different conditions on the ground in Jacksonville neighborhoods.

Adaptation Actions

Resilient Jacksonville includes **45 Actions and 90 Sub-Actions** organized by the scales at which the actions are intended to be implemented—Systems, Sites, and People. Under each of these scales, Actions are further organized across 11 Adaptation Approaches.

Systems: *Actions that work across multiple sites at neighborhood, corridor, landscape, or regional scales*

Jacksonville is the largest city by land area in the continental United States. To achieve comprehensive resilience in this expansive city, there are actions that need to be undertaken at scales that work across its 500+ neighborhoods, diverse landscapes, and the entire region.

We will ***grow resiliently*** by guiding safe and connected new development to areas of low risk to flooding and other hazards, but also well-connected to infrastructure and services. We will ***transform*** Jacksonville by redesigning how infrastructure such as roads, trails, utilities, waterways, open spaces, and tree canopies are designed, constructed, and maintained. We will ***preserve*** Jacksonville's character as a water city by conserving and enhancing the use of valuable open space and discouraging development in areas of high flood risk. We will ***protect*** the city and its residents by fortifying critical city systems against future climate threats, and we will ***prepare*** Jacksonville in advance of these threats by improving the response of city systems during emergencies.

Sites: *Actions that can be implemented at the scale of a single asset or site*

In addition to actions that span across Jacksonville's neighborhoods, there are some that can be

implemented at a smaller scale, such as updates to existing buildings and parks, that will result in enhanced resilience for Jacksonville's residents.

We will ***accommodate*** the threats of a changing climate by altering or retrofitting vulnerable buildings and Jacksonville's built environment (e.g., infrastructure and parks) to adapt to extreme heat and manage water. In areas of repetitive and destructive flooding, where accommodation is not efficient or effective, we will ***relocate*** assets and streamline voluntary, incentive-based residential buyout programs.

People: *Actions that focus on residents, communities, businesses, organizations, and partnerships*

A resilient Jacksonville requires holistic planning for a safe and prosperous future for all. This means preparing communities for future climate threats, as well as addressing some of the existing social and economic challenges facing our communities today. We will ***support*** the well-being of Jacksonville residents through actions that strengthen citywide response to extreme heat, increase mental and physical health, improve housing quality, and strengthen community cohesion. We will ensure Jacksonville's people and businesses ***thrive*** for the long-term through investments in Jacksonville's youth, job creation, and business development.

Achieving resilience in Jacksonville cannot occur without strong partnerships, interagency coordination, and funding. Through the establishment of an Office of Resilience, we will ***collaborate*** among City departments, between government agencies, with civic organizations, and in support of regional coalitions to implement the actions detailed in this Strategy and work together toward our *Resilient Jacksonville* vision.

Place-Based Strategies

The vast scale of Jacksonville is part of what makes our city unique, but it also presents a challenge in planning for citywide resilience. Actions that may work to make Downtown more resilient may be very different from the actions that would work best for our more rural communities. To identify where in Jacksonville different adaptation approaches and actions might be most effective, this Strategy establishes eight types of development conditions and provides a framework for targeted and scalable resilience actions that are tailored to the different characteristics and vulnerabilities of Jacksonville's communities. These Development Types include: Downtown, Historic Walkable Neighborhoods, Post-War Suburbs, Contemporary Suburbs, Rural Mosaic, Coastal Communities, Protected Lands, and Industrial Riverfront.

The Place-Based Strategies chapter presents each Development Type through maps and diagrams that illustrate the approximate extent of each type, its defining characteristics, its unique risk profile (e.g., flood and extreme heat vulnerability), and opportunities to enhance resilience through shared adaptation approaches and actions. Collectively, these recommendations provide a framework for scaling the implementation of resilience actions citywide.

Scenarios for Citywide Adaptation

As Jacksonville's population and economy have grown over the past century, new development has continuously expanded outward. This trend has accelerated in recent years, with more than 85% of Jacksonville's population growth since 2000 happening in Contemporary Suburbs that were previously rural. *Resilient Jacksonville* concludes by exploring a set of "what if?" future scenarios for where new development could occur to accommodate 685,000 new residents over the next 50 years, and how those decisions could impact risks to people, property, and ecosystems.

Fortunately, as this Strategy outlines, Jacksonville has a pivotal opportunity as it enters its third century to encourage a resilient model of growth that accommodates a growing population while adapting to the challenges of a changing climate. Implementing the actions in this Strategy, and tailoring those actions to the characteristics and needs of Jacksonville's neighborhoods, will position Jacksonville to support safe and thriving communities, ecosystems, and economies for today's residents and future generations.


RESILIENT JACKSONVILLE

TABLE OF CONTENTS

JACKSONVILLE TODAY

A CITY SHAPED BY WATER

Jacksonville's relationship with water is central to its past, present, and future. The city's geography is defined by water in many ways: by its close proximity to the Atlantic Coast and the Intracoastal Waterway, by the St. Johns River in the heart of the city, and by the more than 59 tributaries—the streams, creeks, and smaller rivers connected to and flowing into the St. Johns River—located within city limits. In total, Jacksonville has over 1,500 miles of shoreline.[1] Jacksonville's abundant water contributes to its unique ecosystems, its economy, the character of its communities, and its sense of place.

The area that is now Jacksonville was formed over thousands of years by waves, winds, and through sediment deposits to form the St. Johns River, the coastal plains, barrier islands, and dunes we see today. The Timucua who inhabited this region prior to European settlement lived along the shores of the river and tributaries and relied on these waters for fishing and agriculture. The river remained essential for transportation and trade throughout the periods of rule by the French, Spanish, British, back to the Spanish, and finally the United States. Starting in the 1890s, dredging of the St. Johns River to allow for deeper draft ships enabled Jacksonville to become a major East Coast port city.[2] The establishment of naval bases in Jacksonville during World War II significantly contributed to the city's growth and continue to play an important role in Jacksonville's economy and culture today.

While the water that surrounds Jacksonville has shaped it into the city it is today, this water also makes Jacksonville vulnerable to flooding—from the ocean, from the St. Johns and its tributaries, from rain, and often from multiple sources at the same time. Jacksonville experienced this vulnerability during Hurricane Irma in 2017 when coastal flooding was exacerbated by high river flows. Climate change—through its impact on sea level rise and other consequences—is rapidly increasing these threats.

JACKSONVILLE INTERNATIONAL AIRPORT

ATLANTIC OCEAN

US-23 / New Kings Rd

I-95

US-17 / N. Main St

I-295

BROWARD RIVER

TROUT RIVER

I-295

MILL COVE

INTRACOASTAL WATERWAY

ATLANTIC BEACH

NEPTUNE BEACH

US-90 / W Beaver St.

MCCOYS CREEK

I-10

POTTSBURG CREEK

Normandy Blvd

CEDAR RIVER

ST. JOHNS RIVER

DUVAL COUNTY

ST. JOHNS COUNTY

J. Turner Butler Blvd

PABLO CREEK

ORTEGA RIVER

I-95

US-1 / Philips Highway

I-295

JULINGTON CREEK

US-1 / Philips Highway

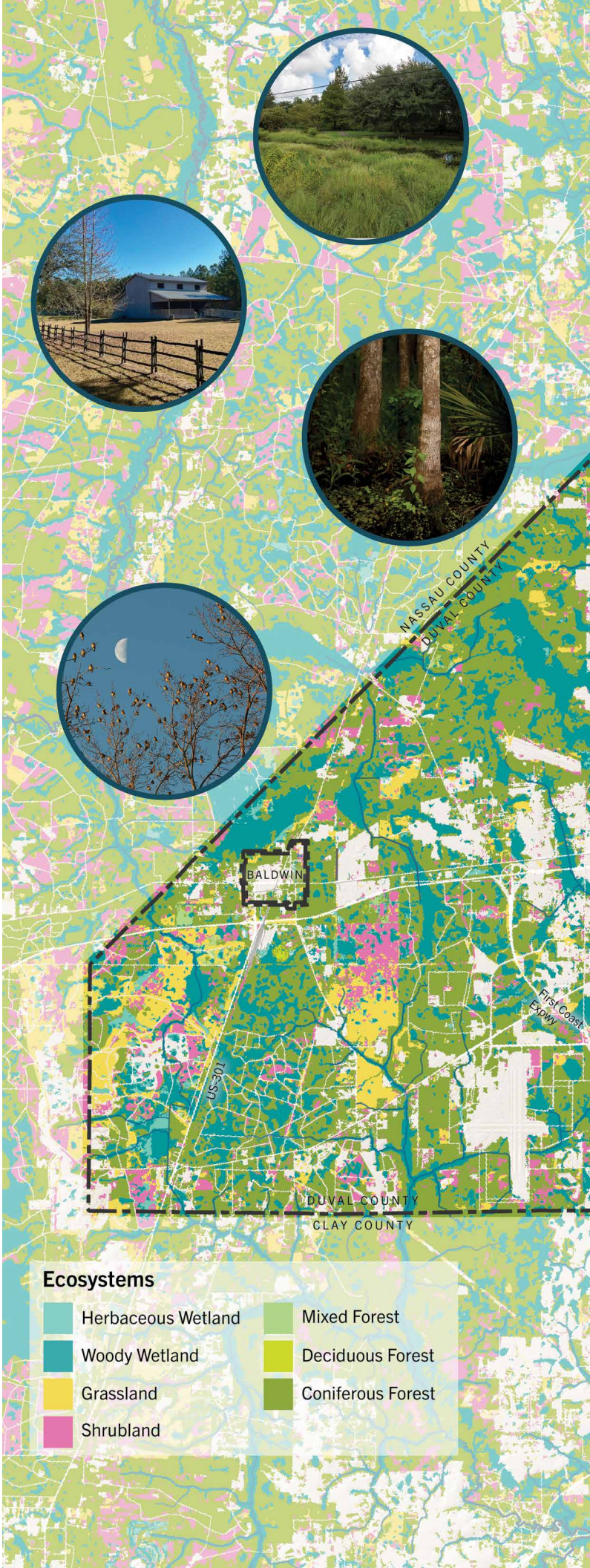
I-95

0 2 4 8 mi

A SPACIOUS CITY

At 747 square miles of land, Jacksonville is the largest city by land area in the continental United States. This is approximately the size of New York City and Los Angeles combined. You can fit nearly 16 San Franciscos within the city limits of Jacksonville. Over half of Jacksonville is undeveloped forests, wetlands, grasslands, agricultural lands, and other open space. Jacksonville also has the largest urban park system in the country. These diverse and valuable ecosystems provide many benefits to Jacksonville residents: supporting clean air and water, erosion and flood control, reducing urban heat, recreation, food and timber production, and biodiversity.

The vast scale of Jacksonville stems from the decision by voters in the 1960s to consolidate the City of Jacksonville and Duval County governments. Overnight, the Jacksonville city boundary expanded to 20 times its former size to include suburban and rural areas of Duval County. Jacksonville today includes a wide diversity of neighborhoods, and city services have an extensive reach. For example, if you laid all of the City-managed roads in a straight line, you could get to Los Angeles and halfway back. The city boundaries of Jacksonville exist at a regional scale, requiring—and enabling—regional solutions to challenges the city faces.



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US-1 / Philips Highway

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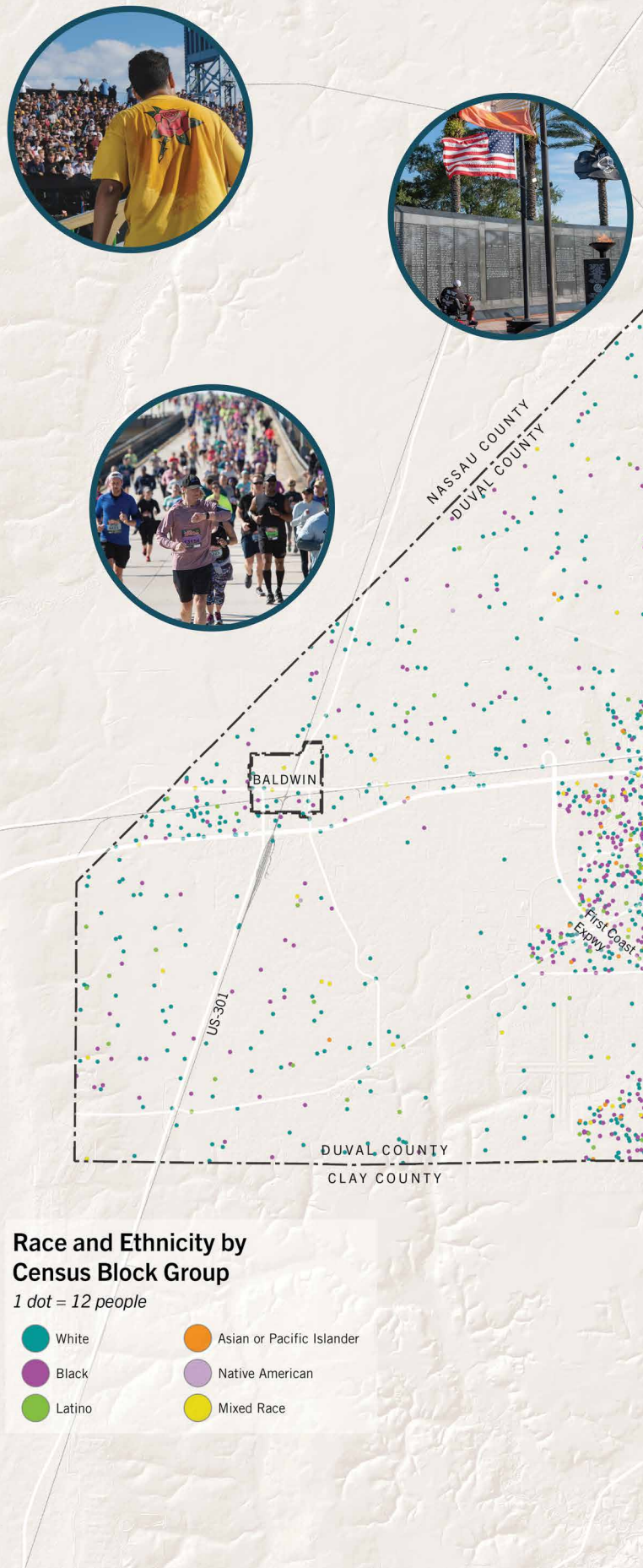
A WELCOMING CITY

Jacksonville is a place where everyone is embraced for who they are and invited to make a home, build opportunity, and participate in charting the city's future. Diverse new industries, along with mainstays like the city's military bases and port, have made Jacksonville a dynamic place for businesses and residents to prosper. Jacksonville's festivals and sporting events regularly draw residents and visitors together to celebrate the city.

Jacksonville continues to welcome new residents to the city every day—gaining a net increase of over 35 new residents per day.[3] As Jacksonville's population has increased, it has become a more racially diverse city. People of color accounted for 98% of net population growth—307,000 people—in Jacksonville between 1990 and 2020.[4] In 2022, Jacksonville's population was estimated to be 49% White (non-Hispanic), 31% Black, 11% Latino, 5% Asian or Pacific Islander, 0.2% Native American, and 4% Mixed-Race.[5]

Jacksonville has been recognized as having one of the best job markets in the country in recent years and continues to see significant employment growth.[6] The Jacksonville area's labor force increased by 5.4% from June 2022 to June 2023, adding nearly 45,000 new jobs.[7] However, the prosperity that may come with this growth is not shared by everyone. 15% of Jacksonville residents are experiencing poverty—with residents of color twice as likely as White residents to be below the poverty line. Where you live in Jacksonville determines a lot about your life outcomes—with residents in the predominantly White neighborhoods in south and east Jacksonville living on average over ten years longer than residents in north and west Jacksonville, which are predominantly communities of color.[8] Addressing these disparities will also make Jacksonville a more resilient city, as without a concerted focus on equity, climate change will continue to exploit existing gaps, and will limit the city's recovery and opportunities.



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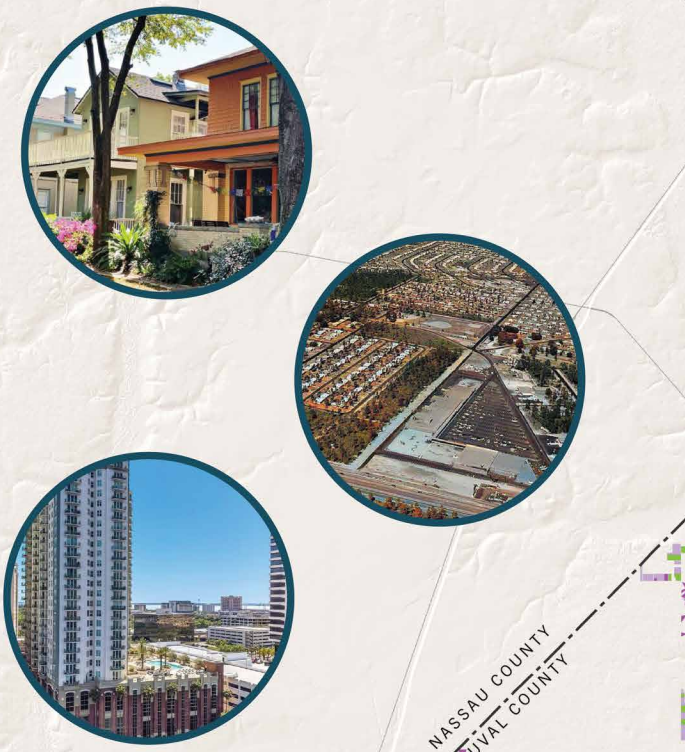
A GROWING CITY

As Jacksonville's population and economy have grown over the past century, development has expanded outward from the historic urban core of the city into previously undeveloped areas on the periphery. Post-World War II saw a wave of growth expand into areas like Arlington, Cedar Hills, and Northwest Jacksonville, following a suburban style of low-density development. This outward growth was in part catalyzed by infrastructural investments like the construction of the Mathews Bridge, which spurred significant development in the Arlington area. With the construction of I-295 from the 1970s–2000s, development has further expanded into more contemporary suburban areas like Baymeadows, Beach Haven, Deer Creek, East Arlington, Sandalwood, and Town Center. Between 2000 and 2020, approximately 45 square miles of land was newly developed in Jacksonville, and over 90% of that development occurred in areas that were once open space and farmland. Today, the vast majority of Jacksonville residents live in single-family homes in suburban neighborhoods.

While Jacksonville's population has been on a steady climb, urban development has followed boom-and-bust cycles that mirror the national economic trends of the last century. Downtown and nearby neighborhoods were rapidly rebuilt after the Great Fire of 1901. New construction in Jacksonville slowed during the Great Depression, boomed in the post-World War II period, slowed again during the 1970s recession, and went through another boom-and-bust cycle during a period of national volatility in the commercial real estate market in the 1980s and early 1990s. In 2006 and 2007, over 10,000 properties per year were built in Jacksonville before the subprime mortgage crisis burst the housing bubble and slowed new development to less than 2,000 properties per year in 2011–2013. New development has steadily climbed again since then.[9] Investing in resilience can help Jacksonville's real estate market withstand economic downturns the city may face in the future.



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JACKSONVILLE TOMORROW

WHAT IS CITY RESILIENCE?

City resilience is the ability of city systems to adapt and thrive in the face of *acute shocks* (sudden, extreme events that threaten a community) and *chronic stressors* (long-term pressures that weaken the fabric of a community over time).[1]

VISION & OBJECTIVES FOR A RESILIENT JACKSONVILLE

Jacksonville's vision for resilience looks toward the future and embraces change. Even as the city faces new, increasing, and uncertain risks, we believe Jacksonville's best days are ahead. The challenges Jacksonville faces from climate change will grow over time, but Jacksonville is constantly evolving and poised to adapt to meet these and other future challenges.

Jacksonville will draw from its essential characteristics as a city shaped by water, a spacious city, a welcoming city, and a growing city to build a resilient future for generations to come. The following four themes are central to Jacksonville's vision for resilience and set the direction for the development of this strategy. These themes and the objectives associated with them emerged out of discussions with stakeholders and City staff, and a review of existing local plans and efforts that served as the launching point for this strategy.

Jacksonville's vision for resilience will not be achieved overnight; it will be an evolution of the city that will happen over time and with the support and active participation of government agencies, civic organizations, private sector industries, and all Jacksonville residents.

A RESILIENT JACKSONVILLE WILL BE A CITY THAT:

Proactively adapts.

Fosters healthy communities and environments.

Expands opportunities.

Builds for the future.

A CITY THAT PROACTIVELY ADAPTS

Jacksonville will prepare not only for today's risks, but also proactively adapt to the future in the face of climate change and evolving social and economic conditions.

To continue to thrive in the face of increasing climate threats, Jacksonville must confront head on the risks the city faces, understand the measures needed to address them, and adapt the city's infrastructure as well as prepare residents to withstand and recover from increasing climate impacts. Threats from more extreme heat, heavier rainfall, and more intense storms are already being felt today and are impacting quality of life for Jacksonville residents. Preparing for and adapting to climate threats is not only a long-term goal; it is an urgent need. Experiences like the extended temperatures over 95°F experienced in summer 2023 or the chronic nuisance flooding experienced across the city will become more frequent occurrences in the future due to climate change.

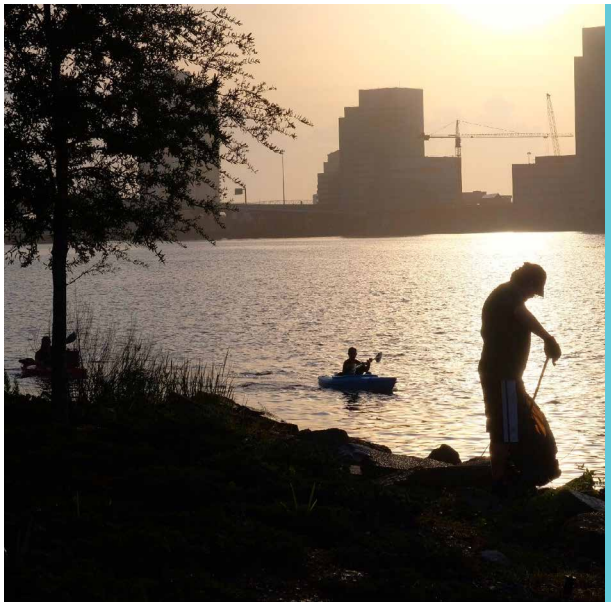
OBJECTIVES

- Reduce damage to property, infrastructure, and the environment from shocks and stressors.
- Reduce negative effects of shocks and stressors on human health and well-being.
- Avoid disruptions to the local economy.
- Avoid disruptions to essential services.

A CITY THAT FOSTERS HEALTHY COMMUNITIES & ENVIRONMENTS

Jacksonville will improve the health and well-being of all of its people, communities, and ecosystems, even as the city experiences increasing impacts from extreme heat, flooding, and other environmental and social stressors.

Climate change doesn't just impact property and infrastructure—some of the biggest impacts are to human health. For example, extreme heat can take a physical toll on the body, air pollution can increase asthma risk, and repeated experiences of flooding can create mental stress and trauma. Mitigating these impacts will be imperative to ensuring Jacksonville residents maintain a healthy quality of life as our climate changes. Efforts to improve overall community health can also support social resilience—making communities better able to cope with shocks and stressors. Advancing equitable health outcomes and narrowing the gaps in health and well-being between residents of different races or who live in different neighborhoods will strengthen Jacksonville's resilience as an entire city. Healthy ecosystems also support human health and assist in managing hazards like flooding and heat. A resilient Jacksonville values and stewards the vast open space and rich ecologies that exist within the city limits.



OBJECTIVES

- **Improve residents' physical and mental health.**
- **Reduce disparities in health and well-being.**
- **Preserve ecosystem health and ecosystem services.**

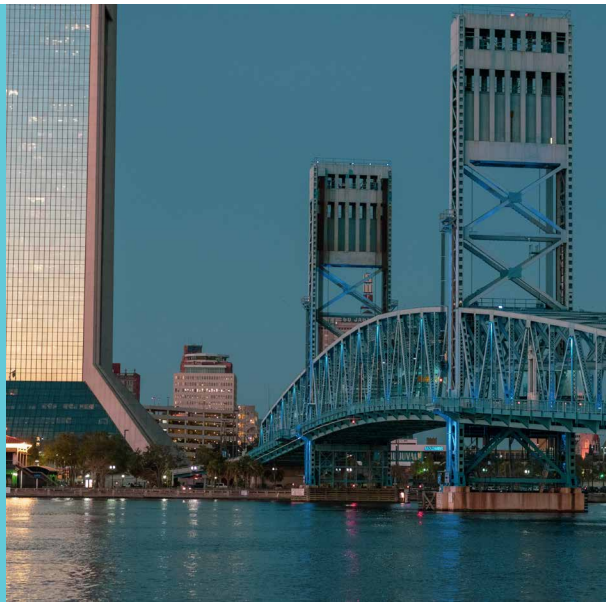
A CITY THAT EXPANDS OPPORTUNITIES

Jacksonville will support innovative businesses, a diverse economy, and quality jobs to ensure widespread, shared prosperity during periods of economic growth and to provide a strong buffer against any potential future downturns.

To continue to welcome new businesses and residents, a resilient Jacksonville will continue to diversify the industries that support the local economy and encourage economic mobility. Jacksonville will continue to be a place for entrepreneurial opportunity, quality jobs, strong wages and salaries, and business innovation and growth. Expanding opportunity also means ensuring all residents have reliable access to basic needs—safe housing and high-quality essential services like energy, drinking water, broadband, and recreational resources. While Florida has a long history of boom-and-bust economies, making smart long-term investments will strengthen Jacksonville's economic resilience to future potential downturns.

OBJECTIVES

- **Expand economic growth and prosperity.**
- **Eliminate barriers to economic mobility.**
- **Ensure access to safe housing and essential services.**



A CITY THAT BUILDS FOR THE FUTURE

Jacksonville will grow in a way that anticipates the needs and risks of future decades and ensures the city remains a world-class place to live for generations to come.

Resilience is not just about adapting our existing infrastructure and built environment; it's also about building smarter for the future so that we are not further putting people at risk as Jacksonville continues to grow. A resilient Jacksonville will promote a new model of growth and development that considers the long-term implications of decisions made today. Building for the future means guiding development to areas connected to high-quality transportation options and designed to protect Jacksonville's valuable open spaces. A resilient Jacksonville will also transform how we plan and build infrastructure so that it is long lasting and serves multiple purposes.

OBJECTIVES

- Guide smart and equitable development to areas that are safest from future hazards.
- Promote safe, active, and connected transportation options.
- Increase the sustainability and adaptiveness of infrastructure.
- Maximize the benefits from public investments in the short- and long-term.

EVOLVING CHALLENGES REQUIRE NEW APPROACHES

ACUTE SHOCKS

Sudden, extreme events that threaten a community

- Hurricane
- Flooding
- Extreme Heat
- High Winds
- Wildfire
- Tornado
- Extreme Cold
- Pandemic
- Infrastructure Failure
- Power Outage
- Supply Chain Disruption
- Cyber Threat
- Hazardous Materials Incident

CHRONIC STRESSORS

Long-term pressures that weaken the fabric of a community over time

- Sea Level Rise
- Chronic Flooding
- Coastal Erosion
- Saltwater Intrusion
- Groundwater Threats
- Urban Heat Island Effect
- Drought
- Aging Infrastructure
- Economic Downturn
- Poverty
- Social Inequality
- Lack of Reliable Transportation
- Housing Instability
- Food Insecurity
- Lack of Healthcare
- Chronic and Infectious Disease
- Social Isolation

A COMPREHENSIVE APPROACH

This Strategy takes a comprehensive approach to preparing for and adapting to the shocks and stressors Jacksonville may face today and in the future. Often, the impact of an acute shock, like a hurricane, is made worse by chronic stressors, like aging infrastructure or poverty. A resilience approach plans holistically for a safe and thriving future for the city's people, economy, and physical environment. By considering the risks facing Jacksonville and the potential opportunities to address them in an integrated way, we can develop approaches and solutions that achieve multiple benefits at once. This is often referred to as the "resilience dividend"[1]—the additional benefits that accrue by investing in actions that strengthen the city's resilience. Investing in resilience can save lives, save money, boost the economy, and improve community health and well-being.

Developing a comprehensive approach for resilience requires an understanding of how the risk of shocks and stressors will change in the future. The Earth's climate is now changing faster than at any point in the history of modern civilization, resulting in widespread and growing impacts. Climate models that represent our understanding of historical and current climate projections are often used to predict how the climate will continue to change under future conditions. Today, the largest uncertainty in projecting future climate conditions is the level of greenhouse gas emissions going forward. With substantial and sustained reductions in greenhouse gas emissions, the global annual average temperature increase could be limited to less than 4°F (2.2°C). However, without significant greenhouse gas mitigation, this increase could be as high as 9°F (5°C) by the end of this century. This increase in temperature will result in rising sea levels and increased extreme weather events.[2] These predicted changes in climate will result in existing shocks and stressors becoming more severe and/or frequent.[3]

The list of acute shocks and chronic stressors to the left were identified as potential threats to Jacksonville. Most of the acute shocks and many of the chronic stressors are explored further in the 2020 *Duval County Local Mitigation Strategy*[4] and the 2023 *Jacksonville Regional Threat and Hazard Identification and Risk Assessment* (THIRA).[5] In addition to incorporating the analysis from these two reports, the process to develop this Resilience Strategy included a geographic assessment of the risks and vulnerabilities associated with four climate threats—flooding, heat, high winds, and wildfires—across different types of community assets. These community assets consisted of homes, infrastructure and services, commercial and industrial properties, and open space and vacant land. This assessment also evaluated how climate threats overlap with social stressors like poverty and food insecurity to increase vulnerability. An overview of flooding and extreme heat exposure, vulnerability, and risk is included in this chapter. Additional discussion of Jacksonville's vulnerability to climate hazards, such as high winds and wildfire, are included throughout this Resilience Strategy as a part of the discussion of resilience actions proposed to address them. For a detailed summary of vulnerability assessment findings, please reference the *Resilient Jacksonville Vulnerability Assessment.*

UNDERSTANDING EXPOSURE, VULNERABILITY, AND RISK

Beyond assessing what shocks and stressors may threaten Jacksonville, understanding key concepts of exposure, vulnerability, and risk—and analyzing data associated with them—can help us pinpoint actions that best put Jacksonville on a path toward achieving our vision for resilience in the face of these evolving challenges.

Exposure

Exposure is the presence of people, assets, and ecosystems in places where they can be adversely affected by hazards. We adopt a broad definition of community assets that includes "the tangible and intangible things people or communities value," consisting of both physical infrastructure (e.g., a specific property, section of roadway, or critical facility) and the services it provides.[6] To analyze exposure, we identify community assets or populations that are present where a hazard, such as coastal flooding, is likely to occur.

Vulnerability

Vulnerability is the tendency of an asset to be adversely affected if one or more hazards were to occur. Vulnerability tells us which community assets are most and least likely to be harmed by a particular hazard. Vulnerability consists of two components: (1) **sensitivity**, or the degree to which an asset, system, or population might be affected by a hazard; and (2) **adaptive capacity**, or the ability of an asset, system, or person to adjust to a hazard and cope with change.[7]

Social vulnerability is the susceptibility of certain social groups or communities to potential harm and losses from shocks and stressors. For example, older adults, young children, people with disabilities and chronic illnesses, low-income communities, renters, people of color, and households with limited access to transportation may face more difficulty preparing for or recovering from certain shocks and stressors.

Risk

Risk is the potential for negative consequences from a shock or a stressor. It brings together the likelihood of a hazard; the exposure and vulnerability of people, assets, or ecosystems to that hazard; and the negative impacts from the hazard into a single measure. For example, an asset on low-lying land near a river generally has a higher likelihood of flooding (greater exposure) than one uphill and farther from the river (lower exposure). If that asset is a critical facility like a senior center, hospital, or wastewater treatment plant that lacks flood defenses (higher vulnerability), the negative consequences from a flooding event are likely greater than if that asset is an empty warehouse or a facility with flood defense measures in place (lower vulnerability).

Understanding risk in this way allows decision makers to identify the populations, assets, or ecosystems of greatest concern and consider options designed to reduce exposure, vulnerability, or both.

Credit: Jeff Hicks

Same Exposure, *Different Risk*

While these two homes may share similar exposure to flood risk, the one on the right is more vulnerable, or likely to experience damage if flooded, than the elevated home on the left.

FLOODING

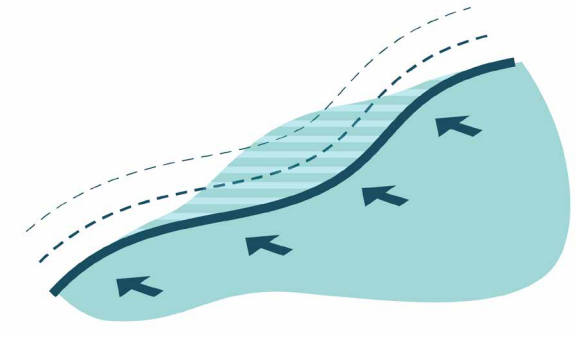
Given the city's proximity to the Atlantic Ocean, the St. Johns River, and its tributaries, Jacksonville is exposed to many types of flooding. Jacksonville can be flooded by high tides, coastal storms, rainfall, and/or high river flows. Sometimes coastal flooding and heavy rains happen at the same time. This is called compound flooding, and it can lead to extreme impacts. Sea level rise and other effects of climate change are increasing this risk.

Coastal Flooding

Coastal flooding refers to flooding that occurs due to coastal inundation. Because the Lower St. Johns River is a broad and shallow tidal estuary, salt water and tides reach as far as 100 miles upriver. Thus, the threat of coastal flooding extends far inland from the Atlantic coastline.[8]

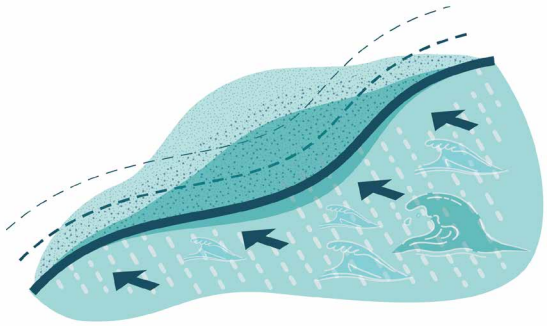
High Tide Flooding

High tide flooding involves flooding of low-lying coastal areas by high tides. This can occur during normal high tides or extreme high tide events (e.g., "king" tides or spring high tides). As sea levels rise, the time periods when tidal flooding occurs will increase in frequency and duration.[9]



Coastal Storm Flooding

Coastal storm flooding is flooding driven by coastal storms like hurricanes. It includes the effects of both storm surge and high waves. Higher sea levels due to climate change will raise the elevation of storm surge and waves and cause them to travel further inland than in the past, impacting more coastal assets.[10]

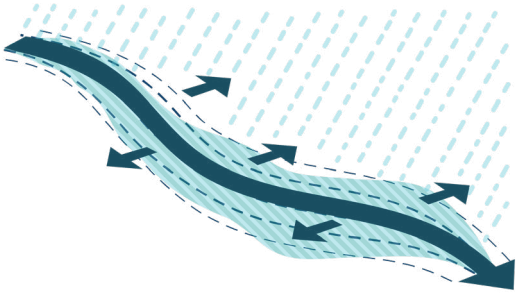


Rain-Induced (Inland) Flooding

Rain-induced flooding is freshwater flooding that occurs as a result of heavy precipitation events. The types of rain-induced flooding that can occur in Jacksonville are riverine flooding and stormwater flooding. As warmer air can result in an increase in atmospheric water vapor, extreme precipitation events are expected to increase. In the southeast and across the United States, an increasing trend in the frequency and intensity of heavy rain events has already been observed.[11]

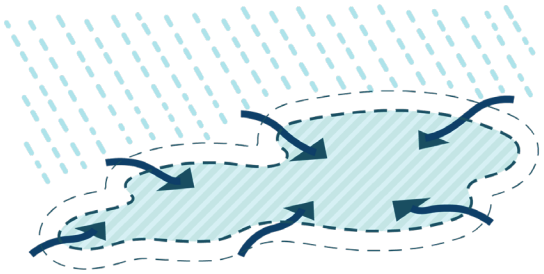
Riverine (Fluvial) Flooding

Riverine flooding, also known as fluvial flooding, is when water in rivers, creeks, or canals overtop their banks. This can happen due to locally heavy rainfall. It can also result from rainfall upstream, even when it has not rained where the flooding occurs.



Stormwater (Pluvial) Flooding

Stormwater flooding, also known as pluvial flooding, is flooding due to rainwater piling up in areas with poor or undersized drainage. This often happens during heavy rainfall events when drains and pipes cannot keep up with the amount of falling rain.[12]



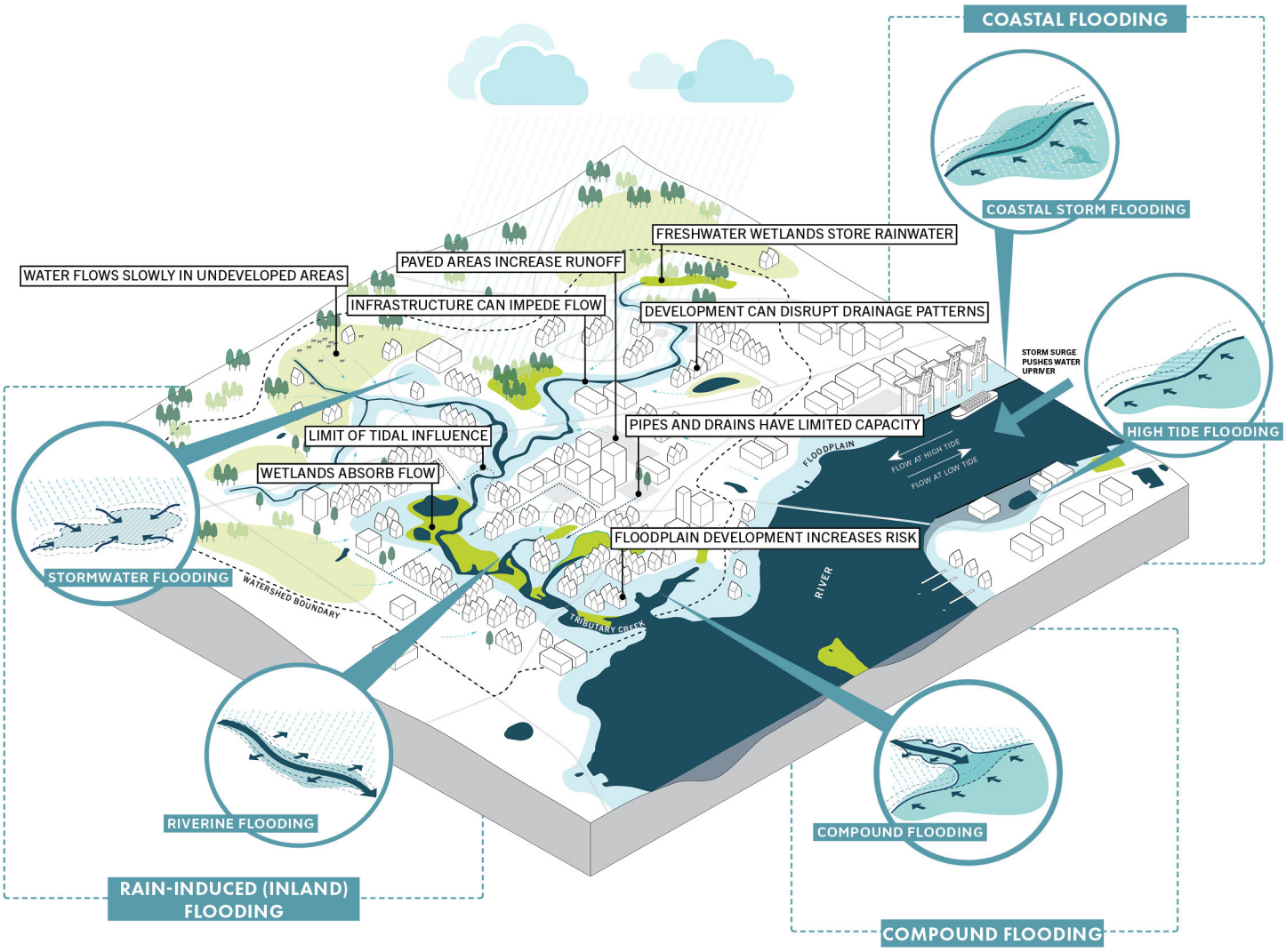
Compound Flooding

Compound flooding is when different types of flooding occur at the same time—for example, when heavy rain falls during a coastal storm, resulting in flooding from both coastal storm surge and waves as well as from riverine or stormwater flooding. Many places along the St. Johns River and its tributaries are vulnerable to compound flooding. However, the likelihood of this type of flooding is the most difficult to estimate for Jacksonville due to the complexity of predicting flooding from multiple sources of water occurring at the same time. Recognizing this challenge, the City is beginning efforts to develop predictive models of compound flooding in Jacksonville that incorporate groundbreaking scientific methods. These new estimates will further support implementation of actions in this Strategy.

HOW DOES WATER MOVE THROUGH JACKSONVILLE?

A **watershed** is an area of land that drains to a common waterbody, such as a creek or a stream. Watershed boundaries are usually ridges or high areas. The bottom of a watershed is usually low-lying and is often a wetland or river mouth. Watersheds do not follow political boundaries. Instead, they follow where water flows. Healthy watersheds are important for water quality, biodiversity, and human well-being.

The built environment affects how water moves through a watershed. In areas with fewer paved or hard surfaces, plants and soils slow down rainwater and can soak it up like a sponge. In areas with more paved or hard surfaces, water flows to the bottom of the watershed faster. Water also stays on the land's surface longer because most building and road materials do not absorb water. This can lead to flash flooding, property damage, and loss of life. Jacksonville can reduce this risk by making room for natural or greened areas that can temporarily hold rainwater during storms, support rainwater infiltration and uptake by plants, and improve the health of the entire watershed.



HOW WILL CLIMATE CHANGE IMPACT FLOODING IN JACKSONVILLE?

Sea-Level Rise

Warming temperatures worldwide are causing land and glacial ice to melt and ocean water to expand as it warms. Globally, the average sea level has risen about 8–9 inches since 1880, with 3 inches of that rise occurring since 1990.[13] Based on historical data, Mayport has observed a relative sea level rise[14] increase of about 0.11 inches per year from 1928 to 2022, which is equivalent to a change of 0.93 feet over the last century.[15]

Over the next century, Jacksonville will experience more coastal flooding due to sea level rise. The short-term impacts of sea level rise include increased risk of high tide flooding and storm surge. In 2021, Mayport experienced four high tide flood days. **By 2050, this number is anticipated to increase to 40–60 high tide flood days**.[16]

40–60 Anticipated High Tide Flood Days in 2050

Precipitation

Findings from the *Fourth National Climate Assessment* suggest that compared to the historic average for the southeast United States, there is an expected **1.5-2x increase in extreme precipitation events by 2070**.[17] Because of this, Jacksonville will experience more inland flooding due to more intense rainfall events and the associated stormwater runoff.

1.5–2X Increase in Extreme Precipitation Events by 2070

HURRICANE IRMA

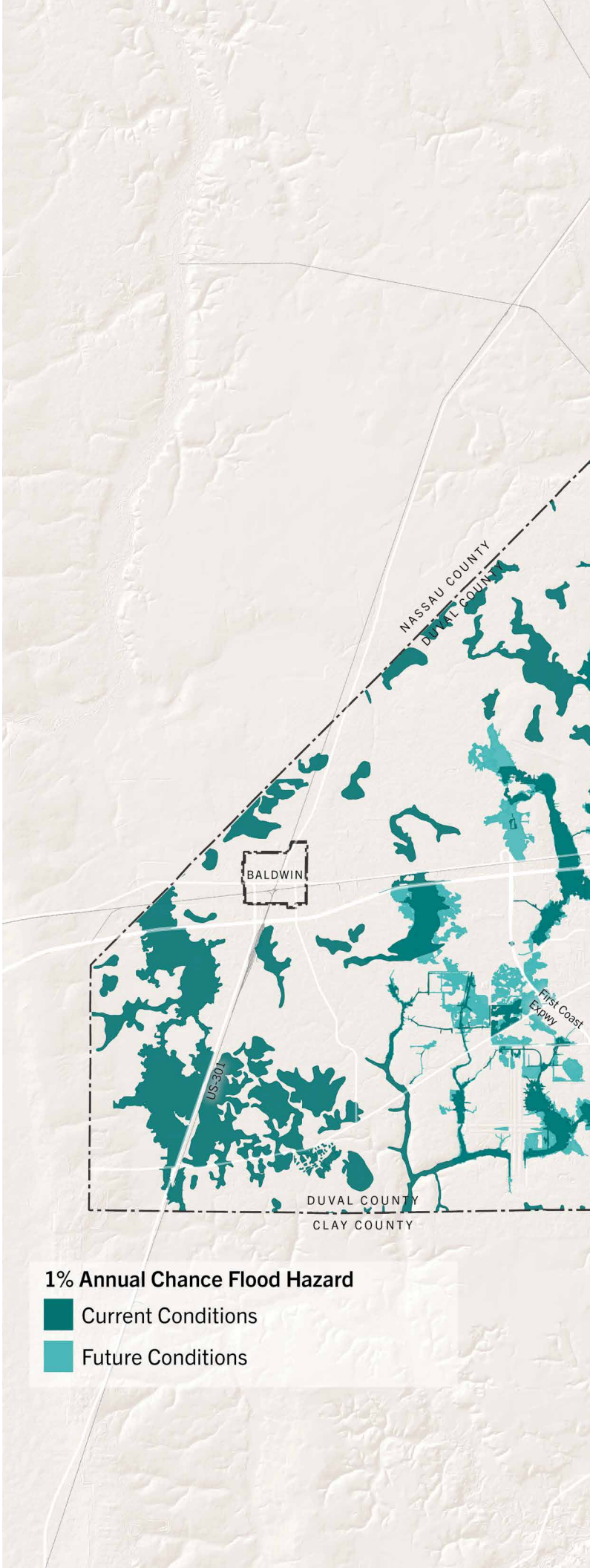
When Hurricane Irma hit Jacksonville as a tropical storm on September 11, 2017, coastal storm surge coincided with runoff from torrential rainfall, pushing the St. Johns River to record-breaking heights.[18] This resulted in the worst flooding observed in Jacksonville's 250-year history, with an estimated $85 million in flood damage across the city. Irma demonstrated Jacksonville's vulnerability to compound flooding—a phenomenon where coastal, river, and/or rainfall flooding occur simultaneously and amplify flood impacts and damage.

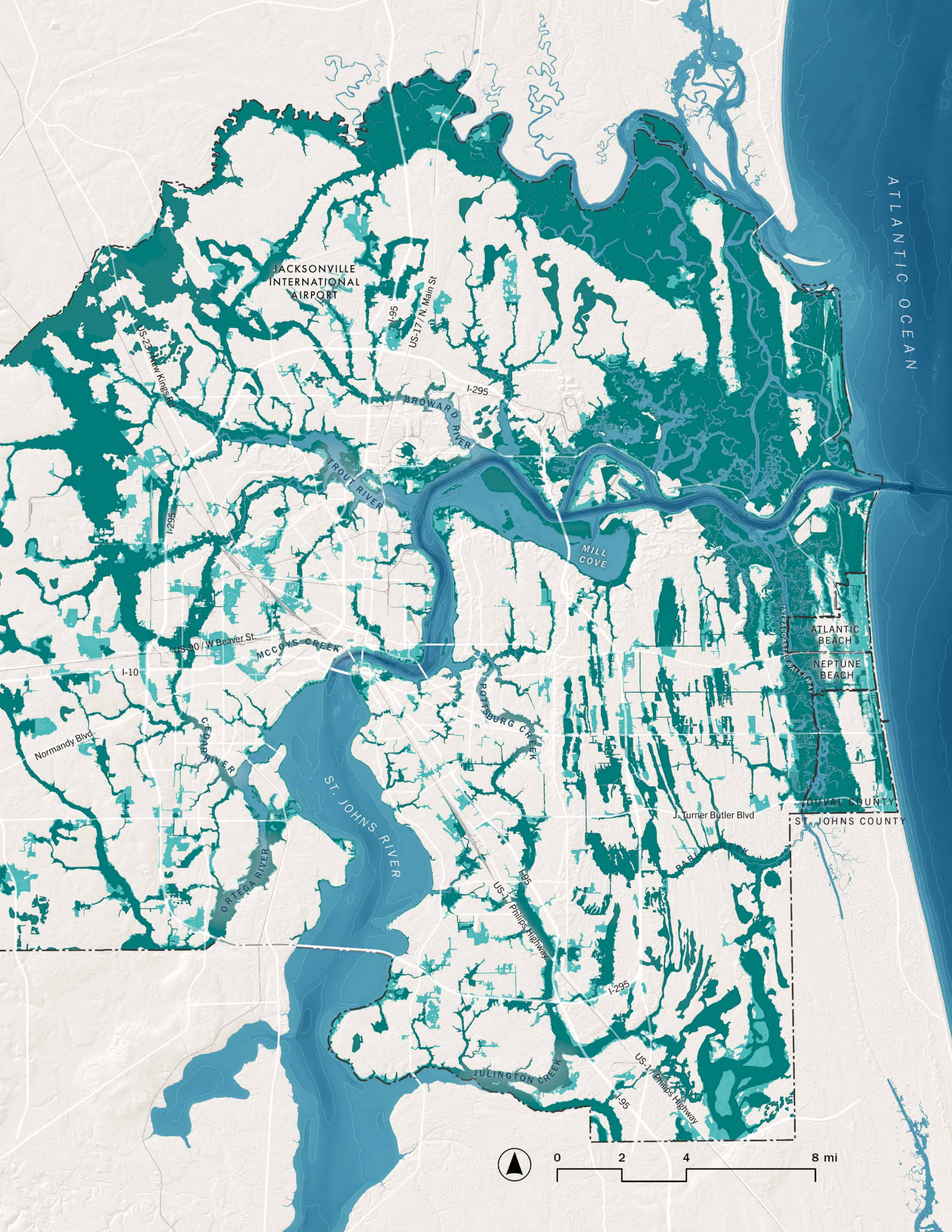
FLOOD EXPOSURE

Different areas of Jacksonville are exposed to different types of flooding, and some areas are more likely to be flooded than others. The planning process to develop this Strategy considered the risk from multiple types of flooding and identified where there are gaps in our understanding of flood risk in Jacksonville.

The map to the right combines data from different assessments of flood exposure to estimate locations in Jacksonville with a 1% or greater chance of flooding each year—today and in the year 2070.[19] This is defined as a 1% Annual Exceedance Probability (1% AEP). Put differently, these areas have a 26% chance of flooding over the course of 30 years or a nearly 40% chance of flooding over 50 years.

This map is a useful tool for planning purposes, but it does not tell the whole story of flood risk in Jacksonville. For instance, it shows only the extent of flooding and not the depths of flood waters estimated with a 1% AEP. The flood modeling underlying these maps also does not fully account for stormwater (pluvial) flooding from localized rainfall, nor does it comprehensively estimate flood risk resulting from compound flood events. These are two gaps in knowledge that the City is working to fill with new scientific methods. What this map does help us understand are areas of Jacksonville that have at least a 1% chance of flooding in a given year. It also helps us understand locations where the 1% AEP floodplain may extend into in the future—and where properties that are not currently required to build to higher standards may be at increased risk in coming years.

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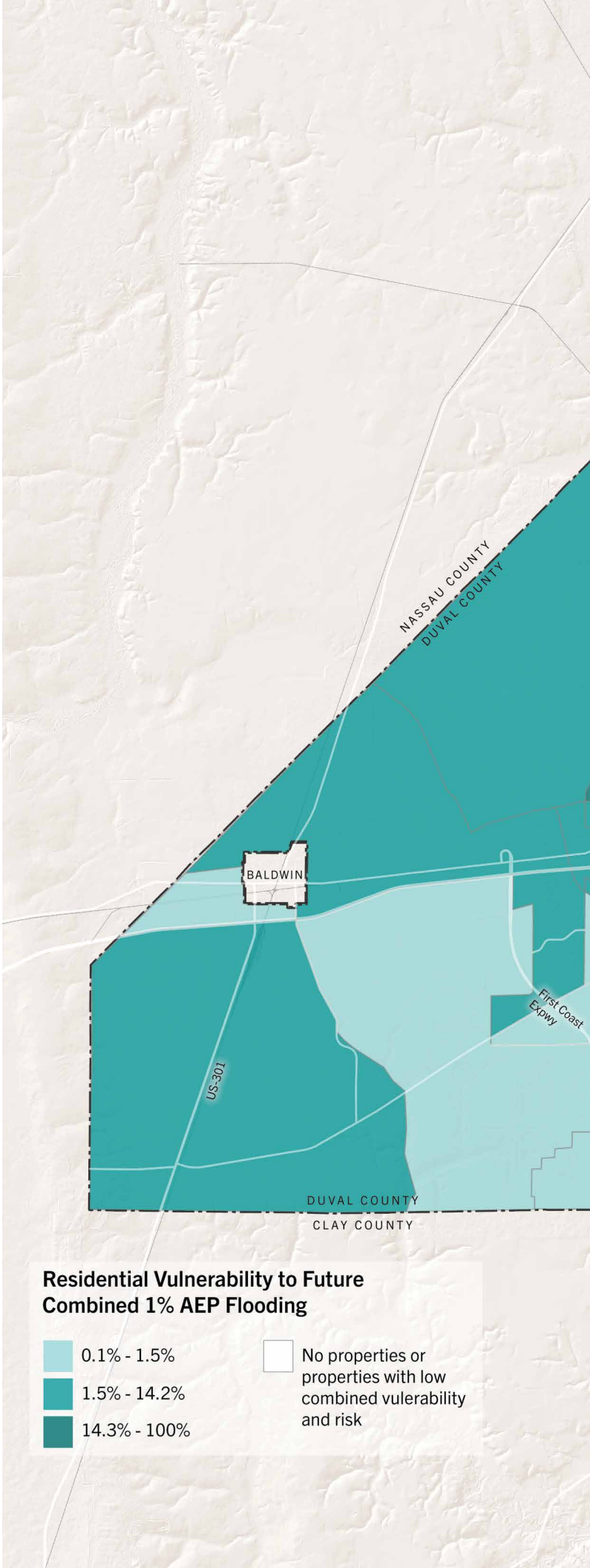
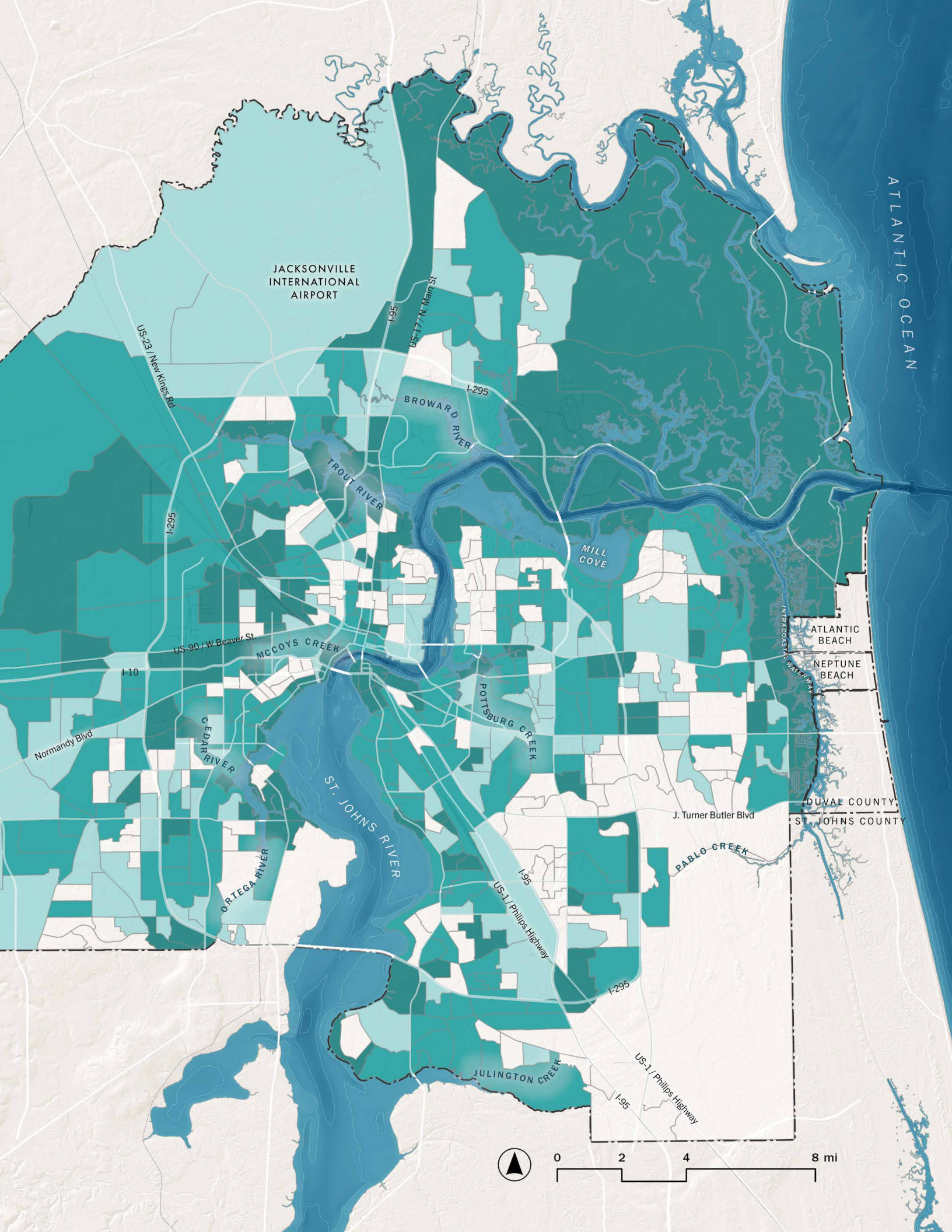
FLOOD RISK & VULNERABILITY

As explained earlier in this section, exposure alone does not determine what areas or assets are **most vulnerable** or at the **greatest risk** of flooding. The *Resilient Jacksonville Vulnerability Assessment* identified the relative level of vulnerability and risk of Jacksonville properties to flooding based on multiple criteria: location of a parcel and a building structure, floodplain regulations and building elevation requirements at the time of construction, property use or criticality, and flood likelihood and depth. This assessment was completed for multiple categories of community assets (homes, infrastructure and services, economic activity, roads and connectivity, and open space and vacant land) and multiple flooding scenarios. For an in-depth summary of findings from this assessment, see the full *Resilient Jacksonville Vulnerability Assessment* report.

The map to the right summarizes one of the assessments. It shows the percentage of residential properties with medium or high combined vulnerability and risk under the future 2070 1% AEP combined inland and coastal flooding scenario (as represented by the map on the previous page). Over 22,000 residential properties (7% of citywide homes) in Jacksonville have a medium or high combined vulnerability and risk to flooding under this scenario. What this map shows is that residential vulnerability and risk to flooding is spread across Jacksonville neighborhoods and not just concentrated in areas nearest to the coast or the St. Johns River. This suggests that Jacksonville needs citywide approaches to adapting to flood risk that can be implemented in a tailored way, considering the unique conditions on the ground in Jacksonville's many neighborhoods.

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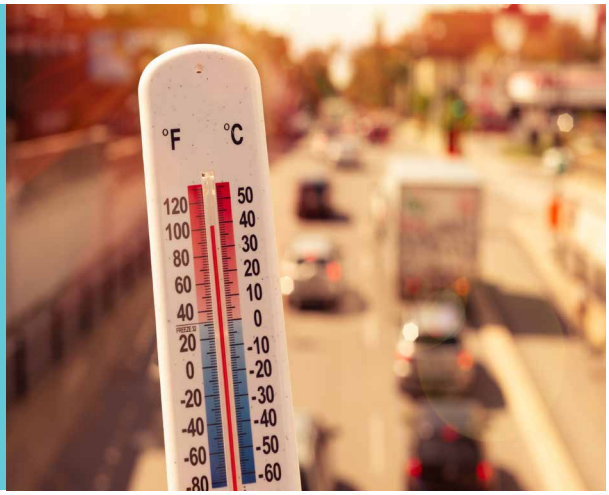
EXTREME HEAT

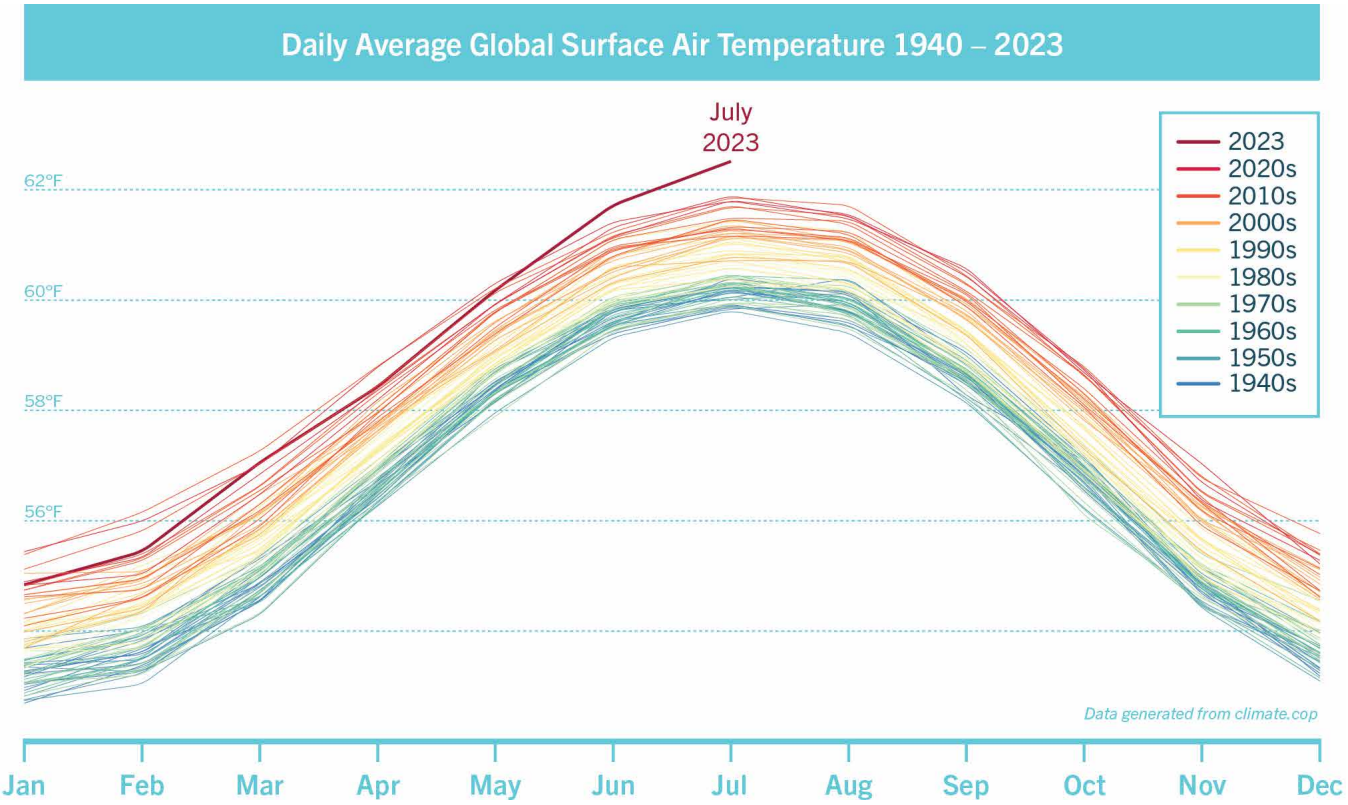
While Jacksonville is no stranger to hot weather, extreme heat is a growing threat. Extreme heat events have always occurred, but a warming climate has made extreme heat events more common, more severe, and longer lasting.[20]

The combination of high heat and humidity is particularly concerning for human health. Higher humidity levels make it harder for the sweat we produce to evaporate, our body's natural cooling mechanism. The heat index, or apparent temperature, is a measure of how hot a human body feels when relative humidity is factored in along with air temperature and is a helpful tool for understanding extreme heat in humid climates like Jacksonville. In the next 30 years, the number of days per year in Jacksonville with heat index above 100°F could more than triple, from just under 20 to more than 60 days.[21]

Extreme heat events are quickly becoming one of the deadliest weather-related events in the country, with more than 600 people killed in the United States by extreme heat every year.[22] However, not everyone is affected by heat equally. Research shows that children under 5 and adults over 65 years of age, people who are pregnant, and those who have chronic lung, heart, and kidney conditions have higher sensitivity to extreme heat. Often, extreme heat events involve nighttime temperatures that stay too warm and do not allow human bodies to cool down.[23] This prevents recovery from daytime heat and can lead to increased health risks. In addition, outdoor workers or indoor workers in certain settings, those living in mobile homes or individuals who are unhoused, renters in substandard housing with limited access to air conditioning, and student athletes are also likely to have increased exposure or decreased adaptive capacity to extreme heat. Together these are also often referred to as "high-risk" groups in the context of public health impacts of extreme heat.

In the next 30 years, the number of days per year in Jacksonville with Heat Index above 100°F could more than triple, from just under 20 to more than 60 days.





Average global temperatures have increased between the 1940s (shown in blue lines) and the 2020s (shown in red lines). July 2023 was the hottest month on Earth on record to date, follwing June 2023 which was the hottest June on record.

Urban Heat Islands & Equity

Urban areas with high concentrations of heat-absorbing buildings, roads, and other hard infrastructure and with limited trees and other greenery experience higher temperatures than areas with more natural landscapes. These areas are referred to as urban heat islands, and they amplify effects of rising temperatures due to climate change.

Even within cities, some neighborhoods have more trees and greenery than other neighborhoods. Research across hundreds of U.S. cities shows that lower-income communities and communities of color are disproportionately exposed to urban heat islands—meaning they are more likely to live in areas with fewer trees and more pavement than Whiter and wealthier communities. This inequitable distribution of land cover that we still see in urban areas is due in part to historic discriminatory housing and land use practices, such as redlining—the now-illegal practice from the 1930s that facilitated racially segregated housing through federal policies such as refusing to lend mortgages or insure homes in predominantly Black neighborhoods. Past redlining correlates with present urban heat islands.[24] A 2020 study found that in Jacksonville, historically redlined communities were on average nearly 10°F hotter than areas that were deemed the most desirable "Class A" neighborhoods on the same 1930s maps.[25] As Jacksonville works to advance cooling strategies like planting more trees, an equitable approach that prioritizes investments in historically marginalized communities can begin to reduce these disparities in urban heat islands.

2023 SUMMER HEATWAVES

July 2023 marked the hottest month on record to date across the globe, following the hottest June ever on record and far surpassed global average temperatures.[26] It was also Jacksonville's hottest month on record to date. Daily maximum temperatures (not accounting for the increased apparent temperature from humidity) were over 90°F on all but two days in July and peaked at 95°F or above on 16 days in July.[27]

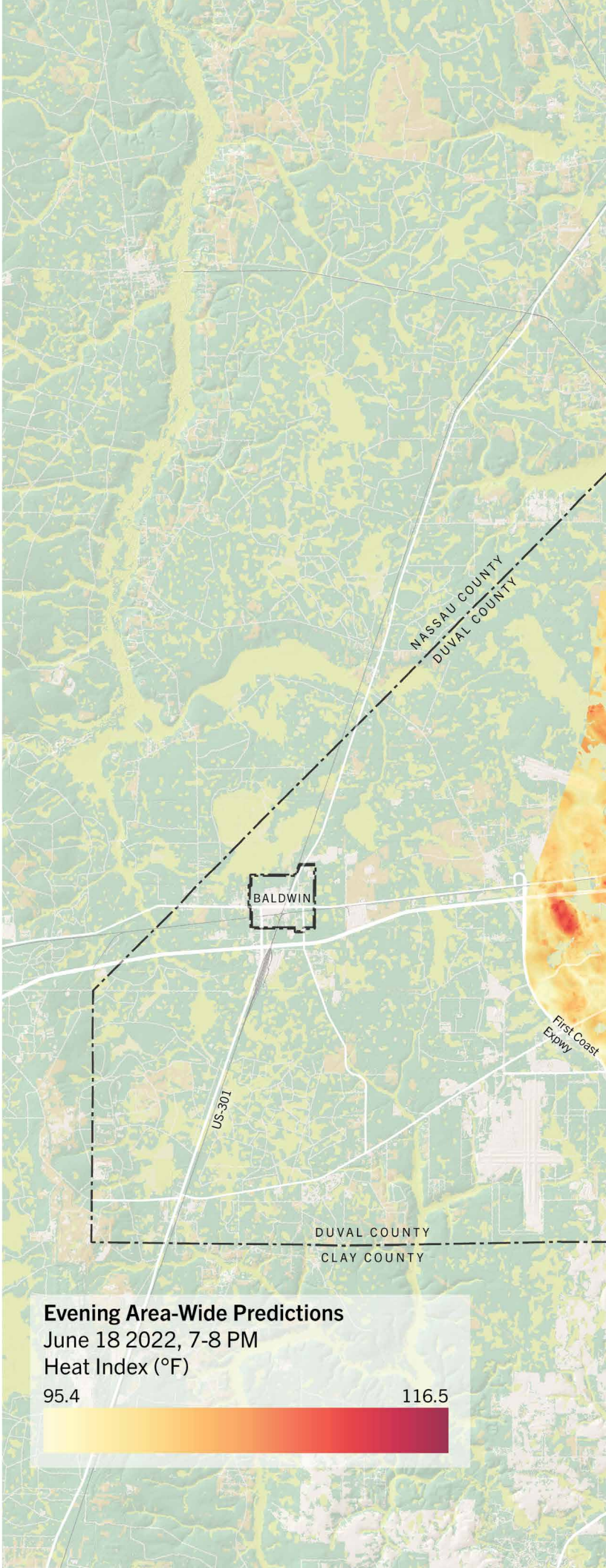
The summer of 2023 has been exceptionally hot across the southern U.S. and internationally. Heat domes, which occur when the atmosphere traps hot ocean air over vast areas creating sweltering conditions, have created heatwaves that have been extremely long-lasting and wide in their geographic extent.[28]

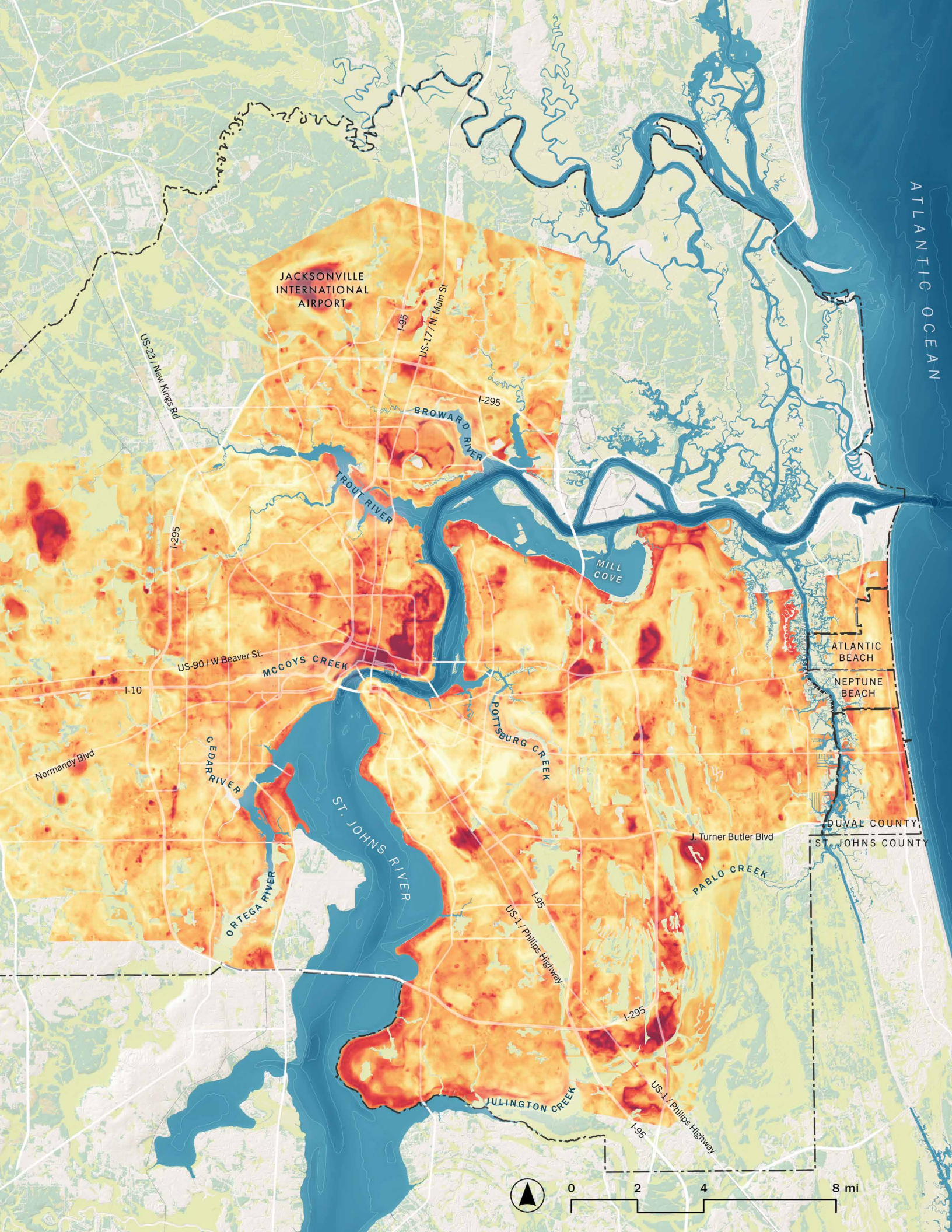
Analysis from Climate Central's Climate Shift Index estimates that climate change made the July 2023 temperatures experienced in Jacksonville nearly three times more likely. Climate change will continue to make heatwaves more common, more extreme, and longer lasting in the future.[29]

HEAT EXPOSURE

On June 18, 2022, the CAPA Heat Watch Program, in collaboration with the University of North Florida and the City of Jacksonville, conducted a field campaign to collect local heat data and capture the ways in which urban heat varies across Jacksonville. The findings from this assessment, mapped on the right, show that heat can vary significantly across Jacksonville based on land use and land cover. A difference of 11.8°F was observed[30] during the study across the warmest and coolest parts of the city.[31] In addition to Downtown, where the highest temperatures were recorded, many of the warmest areas of the city were observed in some of the more socially vulnerable communities, including Eastside and New Town. In addition, there were several other commercially developed areas, such as Regency and Southpoint, that recorded much warmer temperatures than the surrounding areas. These results highlight the elevated risk that increasing temperatures may pose to certain communities within Jacksonville.

Evening temperatures are shown to highlight areas that remain especially hot overnight. Inability to cool down at night can cause human health hazards, especially when experienced consistently over time.

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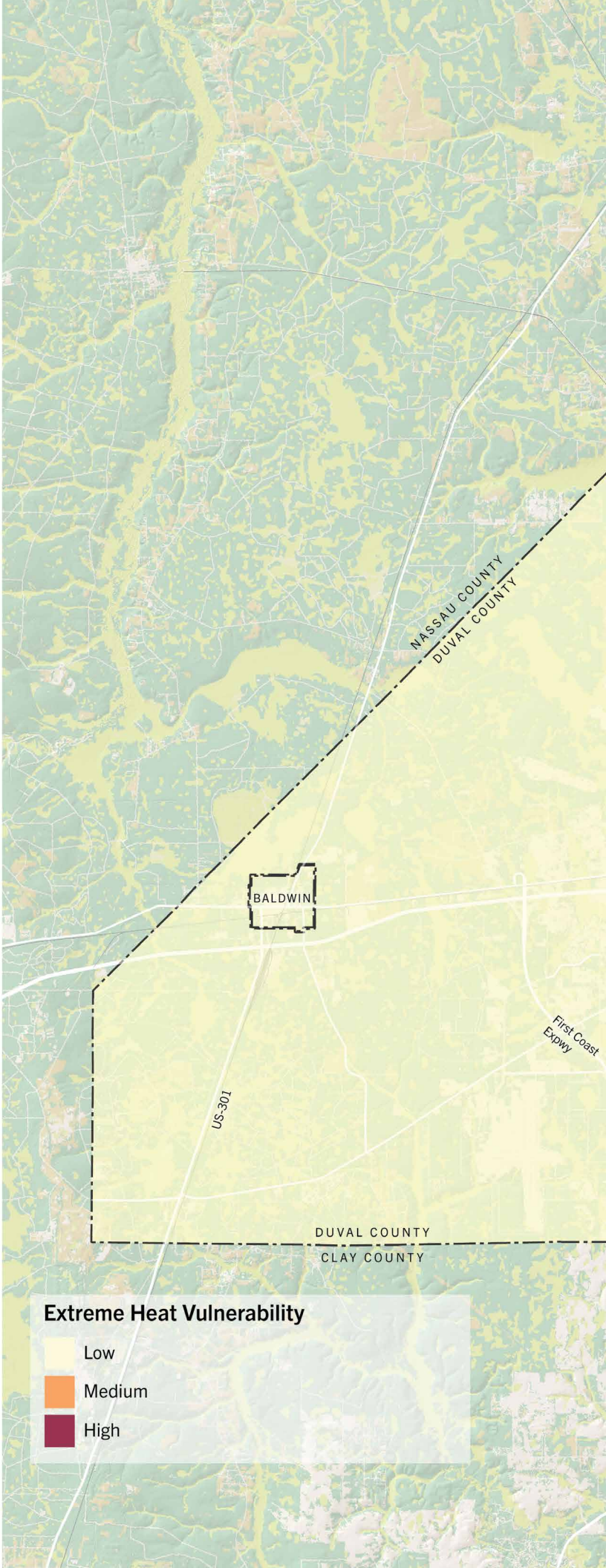
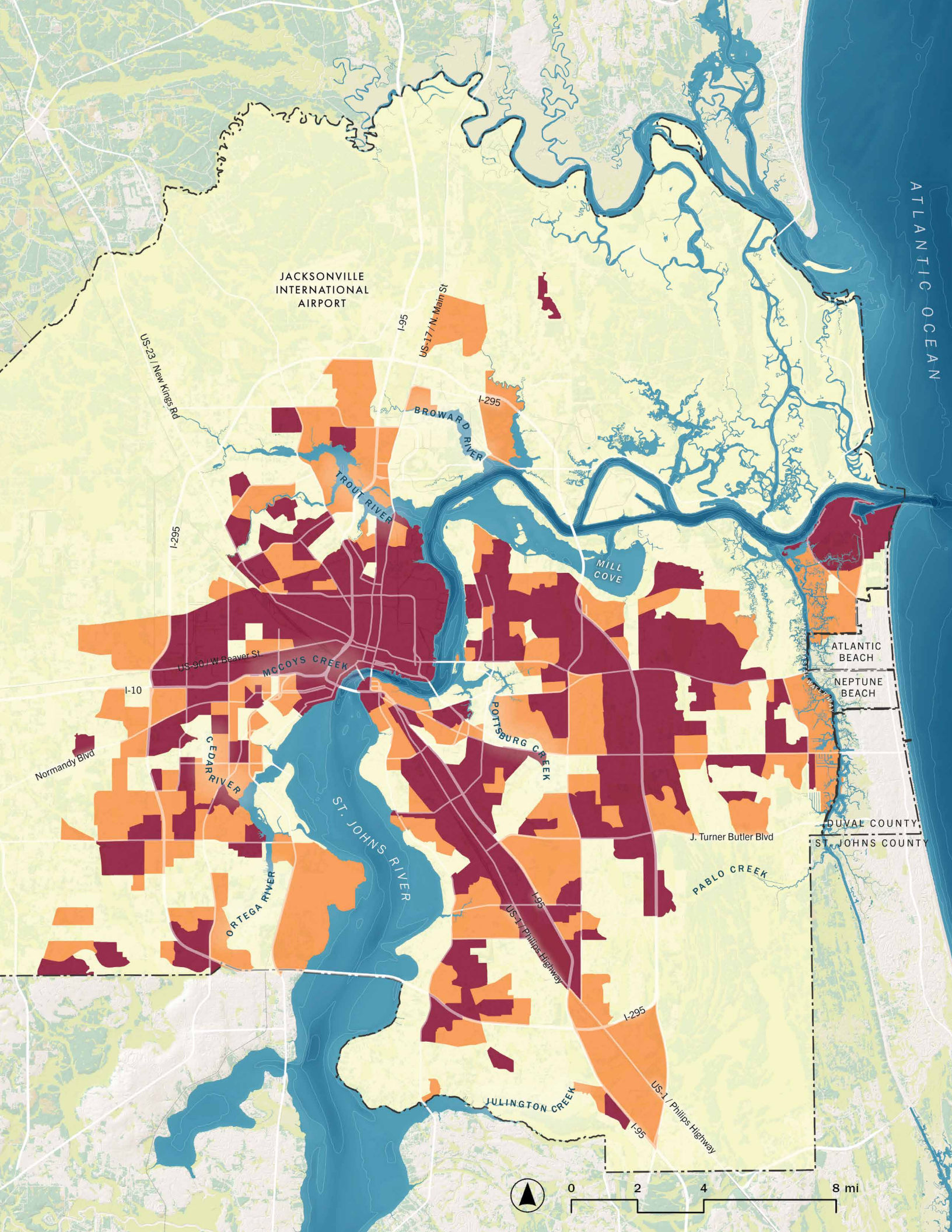
HEAT VULNERABILITY

As with flooding, exposure alone does not indicate which communities may be **most vulnerable** to extreme heat. The *Resilient Jacksonville Vulnerability Assessment* evaluates the relative vulnerability of Jacksonville communities to extreme heat based on the following criteria: the proportion of developed land cover, the proportion of tree canopy coverage, and median household income.

The map to the right summarizes the results from this assessment. The Census block groups in the darkest shade indicate areas with relatively high heat vulnerability, meaning they have a higher percentage of developed land cover, lower tree canopy, and higher percentage of households with lower incomes.

Another important component of heat vulnerability is that certain population groups may experience increased health impacts from extreme heat. The Resilient Jacksonville Vulnerability Assessment found that approximately one-third of Jacksonville households with individual(s) over 65 years of age and approximately one-third of households with individuals under 18 years of age live in areas that are highly vulnerable to extreme heat. This is proportional to citywide percentages; however, approximately half of school properties and 60% of afterschool care facilities are in highly heat-vulnerable areas. Renters, who are likely to have limited control to improve or make modifications to insulation or cooling in their homes, also disproportionately live in areas vulnerable to heat. Renters occupy 58% of housing units in neighborhoods with high heat vulnerability compared to 44% citywide.

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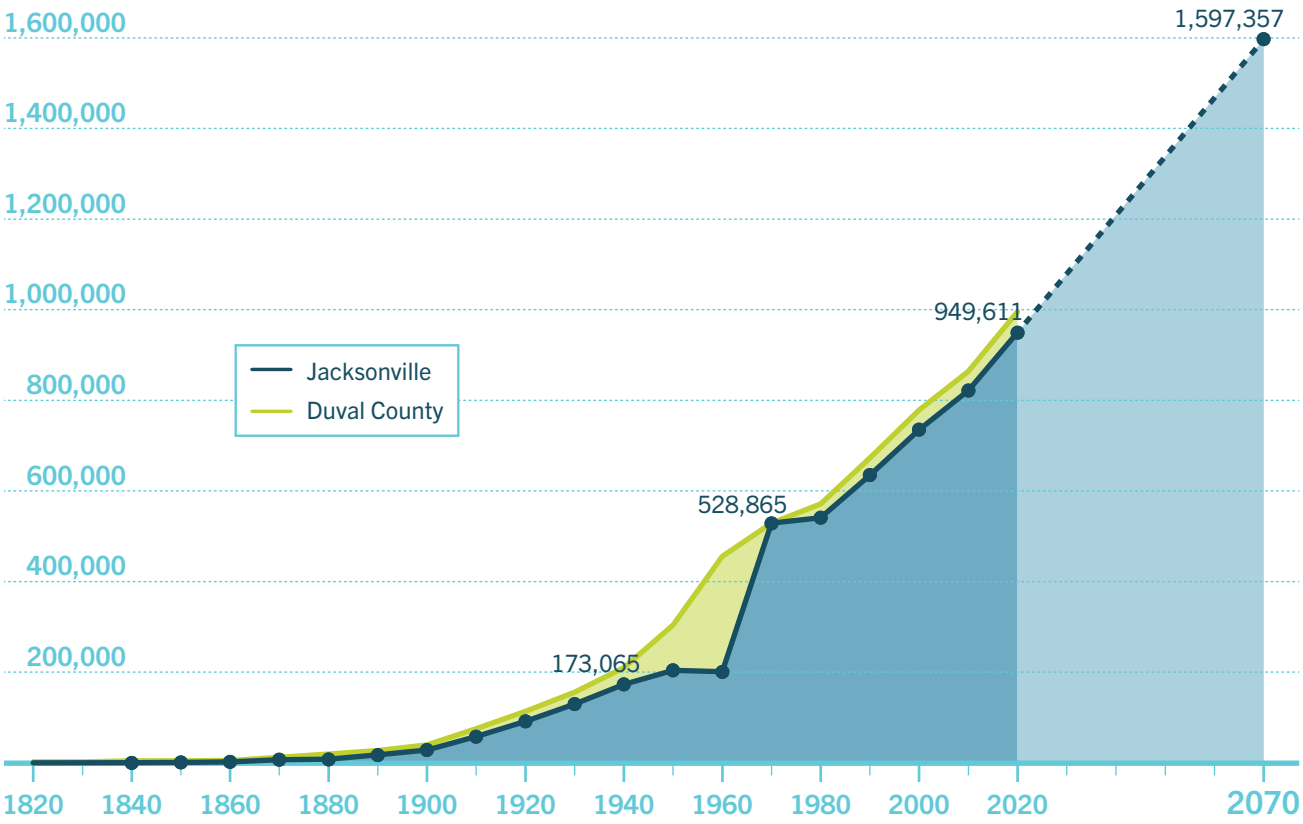
A FUTURE WITHOUT ACTION

The Jacksonville of the future will not look the same as the city today. In addition to climate impacts, Jacksonville continues to undergo rapid growth and expansion that is reshaping the city's population and landscape. While the future is uncertain, projections of future climate, population, urban development, and other trends can help us understand the importance of developing actions to increase the city's resilience, as well as paint a picture of the risks of inaction.

Based on recent population trends, the number of Jacksonville residents could increase by more than 685,000 people in the next 50 years, growing to 1.6 million people by the year 2070.[32] The number of homes, buildings, and other structures would also need to increase dramatically to accommodate this population growth, with an estimated increase from around 385,000 structures to more than 670,000 structures assuming most new residents continue to move to lower-density suburban neighborhoods. If this growth continues to be focused on outward expansion, virtually all of what is now rural farmland and unprotected natural areas could be developed into suburban neighborhoods. This conversion would amount to a loss of over 150 square miles of open space that today contributes to the unique character of Jacksonville, provides drainage areas for flood waters, mitigates urban heat, and provides other benefits.

Jacksonville Population by Year: Historical & Projected

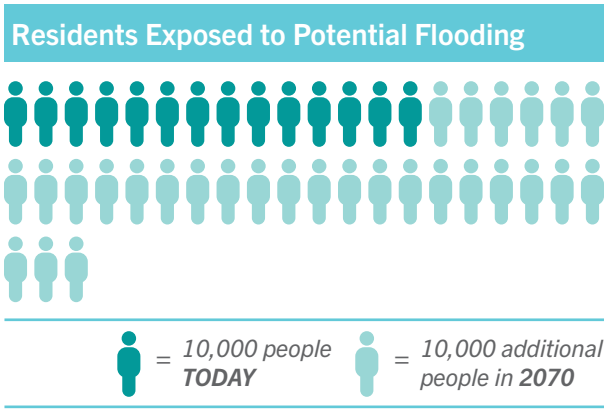


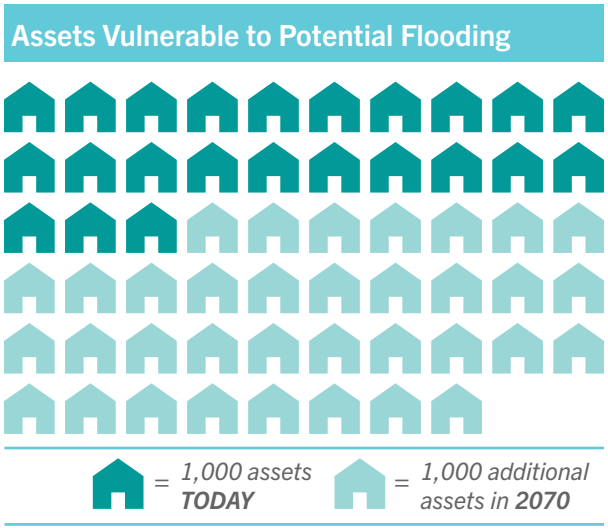
A future without action is also a future with more people, homes, and businesses at risk. For example, if deliberate actions are not taken to focus development in areas of low risk and otherwise mitigate risks from flooding, the number of people exposed to potential flooding events could increase by three times from just under 140,000 individuals to more than 430,000 people. Without efforts to limit development in current and future flood-prone areas, many of the homes and businesses built to accommodate this population growth would be at risk.

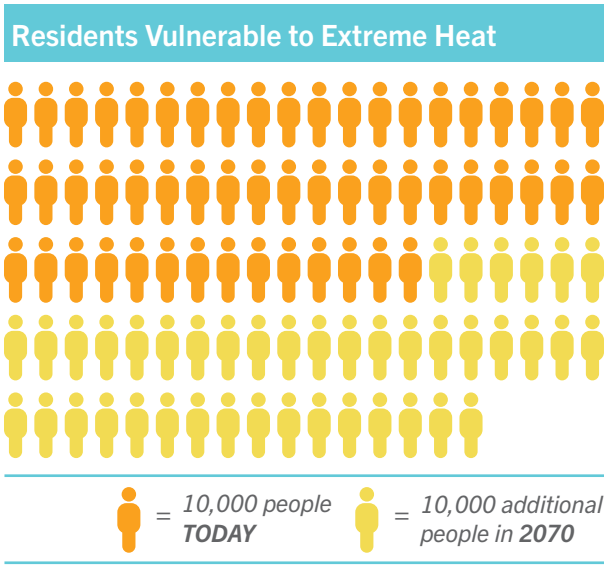
Additionally, sea level rise and increases in extreme precipitation due to climate change will extend and intensify the risks of flooding to existing structures. Structures that may be outside of the current 1% AEP flood zone and that were not required to build to higher floodplain standards may be at greater risk in the future as exposure to flooding increases. Across both factors, the number of vulnerable homes, businesses, and other structures could balloon from approximately 23,000 to more than 58,000 in the next 50 years.

Jacksonville's vulnerability to extreme heat will also increase without deliberate action: the number of residents living in areas assessed as having high or moderate vulnerability to heat could increase from approximately 536,000 to over 959,000 people.[33]

Jacksonville will change over the next 50 years: sea levels will rise, hurricanes and other storms will cause flooding, heat waves will become an increasing threat, and population growth will likely bring more residents to the area. By developing a robust strategy for resilience, however, the city can move forward into that future prepared to adapt to the threats that flooding, heat, and other shocks and stressors pose to existing and new residents while preserving and strengthening the city's unique character for generations to come.







DEVELOPING A RESILIENCE STRATEGY


VISION FOR A RESILIENT JACKSONVILLE
A RESILIENT JACKSONVILLE WILL BE A CITY THAT...
PROACTIVELY ADAPTS
WHAT IS CITY RESILIENCE?
WATER AND FLOOD RISK

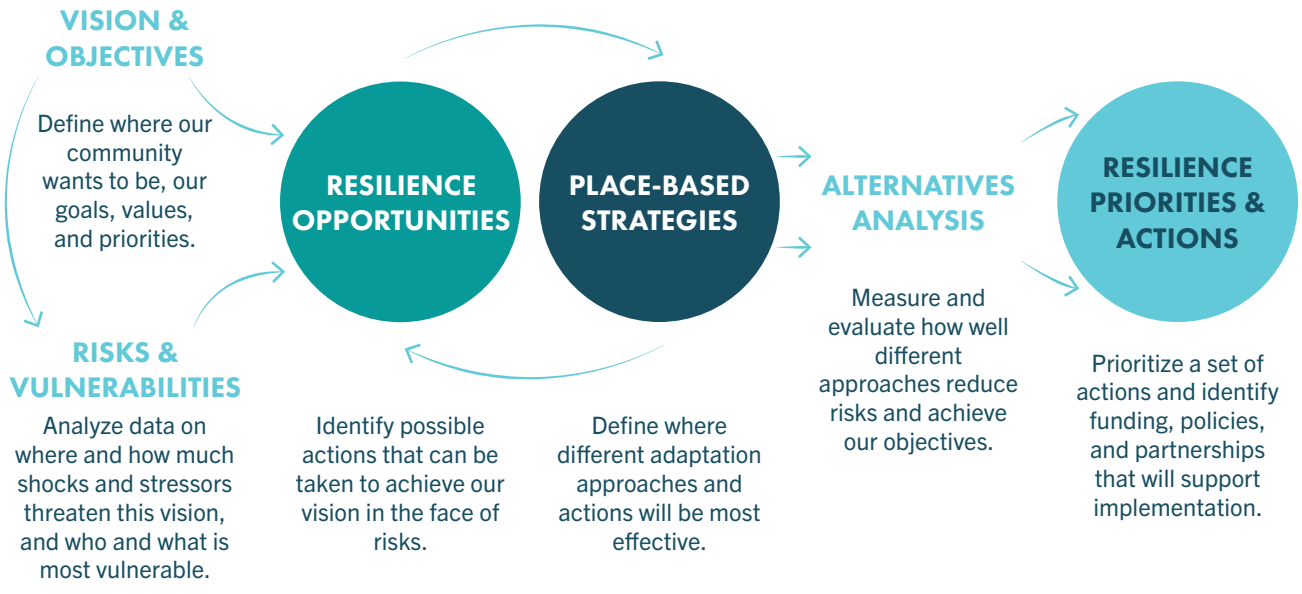
A COLLABORATIVE PROCESS GROUNDED IN SOUND SCIENCE

Resilience is a process and a practice, not a destination. Improving Jacksonville's resilience will require decision-making processes that incorporate the best available science and data on changing risks and consider long-term costs and benefits. In addition, these approaches need to build connections across issues and sectors, include all community perspectives, tailor approaches to the unique conditions across the city's neighborhoods, and prioritize equitable outcomes.

The goal of this comprehensive Resilience Strategy is to guide policies, projects, and programs that will help Jacksonville prepare for, adapt to, and quickly rebound from acute shocks and chronic stressors that the city may face. This work builds on numerous related planning and data collection efforts in Jacksonville that preceded it and will help to shape city investments and day-to-day practices for years to come.

The City of Jacksonville's Chief Resilience Officer, supported by a team of local and national experts in resilience planning, policy, design, science, and engineering, led an 18-month planning process to develop this Strategy. We aimed for this process to be ***rigorous*** in applying the best-available scientific data and methods to guide decision making; ***inclusive and collaborative*** in consulting the knowledge and perspectives of a wide range of local experts, organizations, and residents; and ***equitable*** in addressing the disproportionate risks and vulnerabilities faced by marginalized and frontline communities.

The following six phases defined the Resilient Jacksonville strategy development process.



Vision & Objectives

Summer 2022

We began the process to develop this Strategy by looking to the future—defining the city Jacksonville wants to be for the next 30–50 years and identifying measurable objectives towards achieving that vision. The four vision themes described earlier in this document guided decisionmaking throughout the strategy development process in a clear and transparent manner. To develop these themes and objectives, we started by doing our homework. This Strategy builds on years of previous efforts, each of which involved significant stakeholder and community engagement. We reviewed relevant existing local plans and projects and synthesized the priorities they established. Jacksonville's vision for resilience further emerged from early discussions with stakeholders and City staff.

Risks & Vulnerabilities

Fall 2022

We identified potential shocks and stressors facing Jacksonville by reviewing existing analysis from the *Duval Local Hazard Mitigation Plan* and other local assessments. We gathered the best available data on Jacksonville's exposure to flooding and heat, along with projections of how climate change will impact these threats. We met with stakeholders and the public to break down our current understanding of these threats and discuss their priority concerns. We identified and mapped the community assets that are important to Jacksonville, including homes, businesses, infrastructure, critical facilities, and people. We developed and analyzed spatial data on the risks and vulnerabilities of assets to threats from flooding, heat, wind, and wildfire. And we summarized findings for working group members, City staff, and the public to guide the strategic development of actions to address these risks. A companion *Resilient Jacksonville Vulnerability Assessment* details the findings from this analysis.

Resilience Opportunities

Fall 2022–Winter 2023

This phase focused on identifying opportunities for action—potential policies, projects, and programs that will increase Jacksonville's resilience. This was a collaborative effort that engaged City departments, relevant independent authorities, the business community, local organizations, academia, technical experts, and the public in generating and refining resilience opportunities. We established five working groups of local subject matter experts across sectors under the themes of: Land Use and Development; Critical Infrastructure and Emergency Services; Parks, Open Space, and Ecology; Health and Quality of Life; and Hydrology and Flood Risk Management. We convened each working group for a half-day workshop in December to generate potential actions for consideration in the Strategy, discuss local context that may shape opportunities for action, and identify mechanisms to support implementation. Additionally, we held several public meetings across Jacksonville in early 2023 and distributed public surveys for adults and students to share their ideas for adaptation actions that could improve Jacksonville's resilience. For a more detailed timeline of stakeholder engagement to develop the actions in this plan, see pages 64–65.

Place-Based Strategies

Winter–Spring 2023

Jacksonville is a big city with many diverse neighborhood conditions. An intervention that improves resilience in one part of the city may not be applicable in another. Adaptation approaches and actions need to be tailored to different conditions on the ground in Jacksonville. We worked to make sense of this citywide so that Jacksonville can prioritize what types of adaptation actions will be most effective in what types of places. We identified common patterns of development that define an area's sensitivity to flooding and other

climate threats and their options for managing risk. Out of this analysis, we defined eight types of development conditions in Jacksonville and explored appropriate actions for adapting to climate threats for each of these areas of the city. This typological approach provides Jacksonville with a framework for standardizing and scaling the deployment of resilience interventions citywide.

Alternatives Analysis

Spring 2023

To inform the refinement of actions and place-based strategies, we developed quantitative methods for analyzing the consequences of different approaches to where and how Jacksonville invests in its future. We sought to provide data-informed insights to complex questions around where Jacksonville should target future growth, where shoreline protection should be prioritized, and where City-owned assets should be fortified. Findings from these analyses are incorporated throughout this Strategy.

Resilience Priorities & Actions:

Spring–Summer 2023

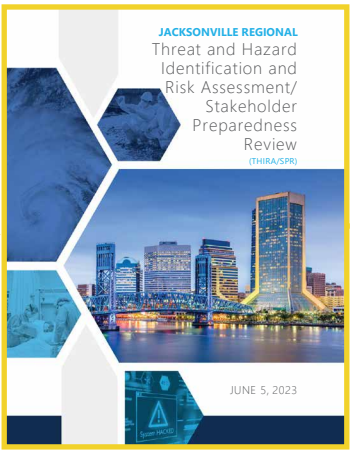
We reconvened the five working groups in a cross-sector, day-long workshop in April to review progress, discuss feedback on draft Actions, and identify key partnerships. Working group members discussed elements of what will make this strategy successful and implementable—identifying priority actions, opportunities to align this strategy with ongoing projects and plans, and operational changes to facilitate a culture of resilience. Following this meeting, we refined the Actions and Sub-Actions in this strategy with additional input from implementation partners and subject-matter experts. Each Action identifies implementation details, including lead and partners, potential funding mechanisms, timeline, and relative costs. Implementation of this Strategy is an ongoing process that will require a coordinated effort across government, private sector, non-profit, and academic partners, along with continued engagement of Jacksonville residents.

BUILDING ON EXISTING EFFORTS

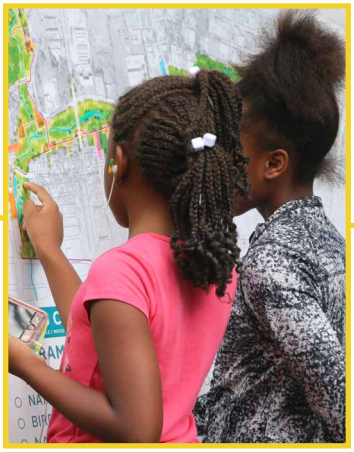
The work to develop a comprehensive resilience strategy for Jacksonville builds on many recent efforts in the wake of hurricanes Matthew and Irma to strengthen Jacksonville's resilience. These efforts have improved our data and understanding of the current and future risks Jacksonville may face and supported the initial development of policies, plans, and projects across City departments that help us prepare for and adapt to these risks.

Resilient Jacksonville brings these and other existing and ongoing efforts under a comprehensive program so that we can prioritize investments based on sound science and our community's goals for the future.

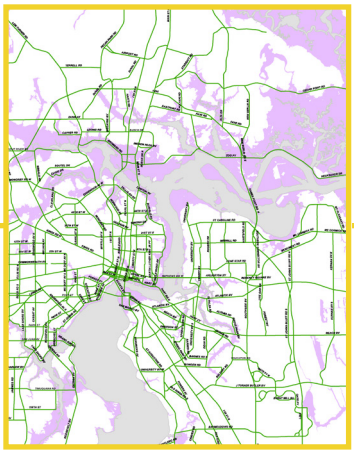
Storm Resiliency & Infrastructure Development Review Committee



Regional Threat and Hazard Identification & Risk Assessment

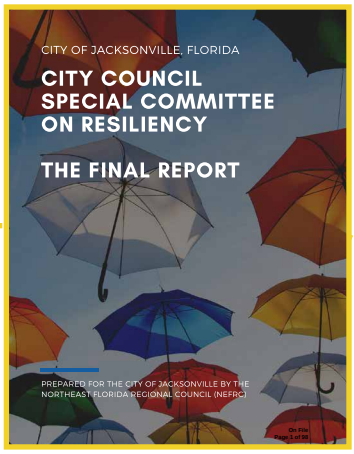


McCoys Creek Restoration Project

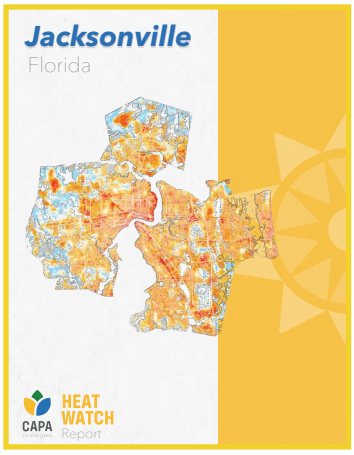


Adaptation Action Area Workgroup

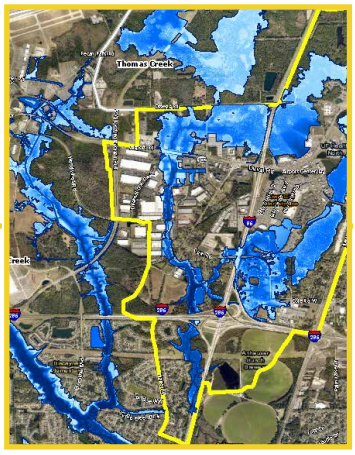
Duval County Local Mitigation Strategy



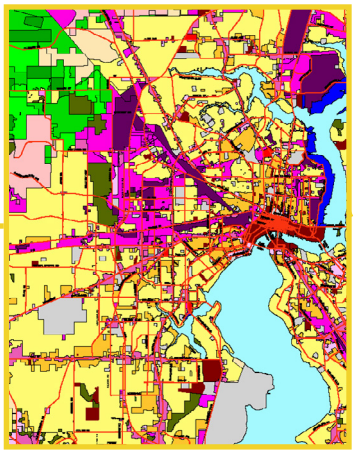
City Council Special Committee on Resiliency



CAPA Strategies & UNF Citywide Heat Map Study



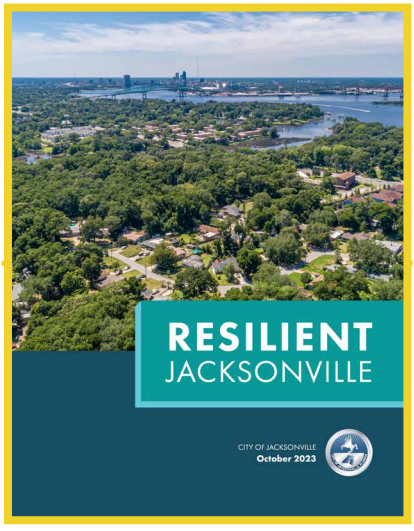
Tributary Flood Risk Modeling



2030 Comprehensive Plan Update

Emerald Trail Master Plan

Hogans Creek Restoration Project



ADAPTATION ACTIONS

SYSTEMS

Adaptation Approaches and Actions that work across multiple sites at a neighborhood, corridor, landscape, or regional scale.

GROW RESILIENTLY	Guide safe and connected development to areas of low flood risk and high resilience potential.
TRANSFORM	Redesign infrastructure and the built environment to make space for water, reduce urban heat, and improve connections between places.
PRESERVE	Conserve and enhance valuable open space and ecosystems and limit development in areas of high flood risk.
PROTECT	Fortify critical city systems against future threats.
PREPARE	Plan in advance of a threat to improve the response of city systems during an emergency.

SITES

Adaptation Approaches and Actions that can be implemented at the scale of a single asset or site.

ACCOMMODATE	Alter or retrofit vulnerable buildings and the built environment at the parcel level to adapt to heat and manage water.
RELOCATE	Offer voluntary, incentivized, or gradual retreat where fortification and accommodation are not efficient or effective.

PEOPLE

Resilience Approaches and Actions that focus on residents, communities, businesses, organizations, and partnerships.

SUPPORT	Invest in the health and quality of life of Jacksonville residents.
THRIVE	Ensure shared prosperity for Jacksonville's people and businesses for the long-term.
COLLABORATE	Strengthen partnerships and coordination among city departments, between government agencies, with civic organizations, and in support of regional coalitions.

ORGANIZATION OF APPROACHES AND ACTIONS

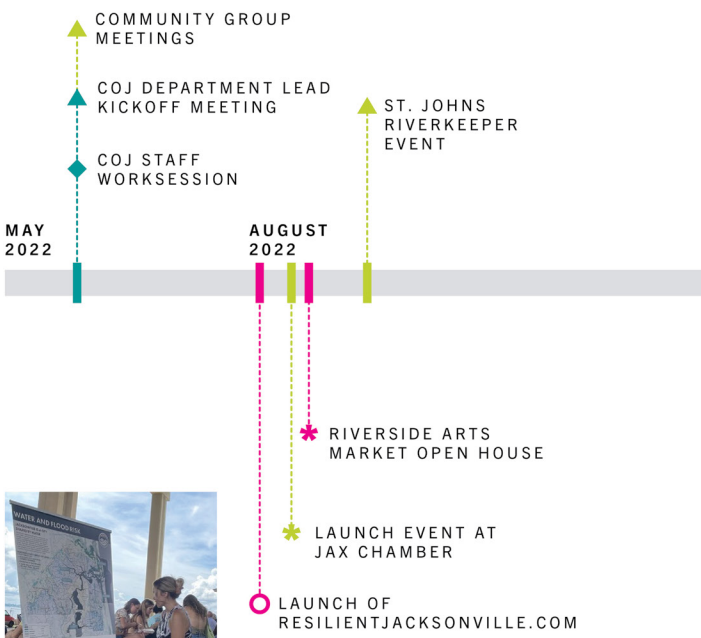
Resilient Jacksonville **includes 45 Actions and 90 Sub-Actions organized by the scales at which the actions are intended to be implemented—Systems, Sites, and People. Under each of these scales, Actions are further organized across 11 Adaptation Approaches. These approaches represent complementary tools in the city's toolbox to adapt to climate impacts and increase Jacksonville's resilience. A singular approach to adaptation—for example, focusing wholly on structural protection of assets—is not sufficient or effective for the unique conditions, vulnerabilities, and risks experienced across different assets and communities in Jacksonville. The city's vision for resilience will be achieved through thoughtful coordination of many, layered, approaches to adaptation and resilience.**

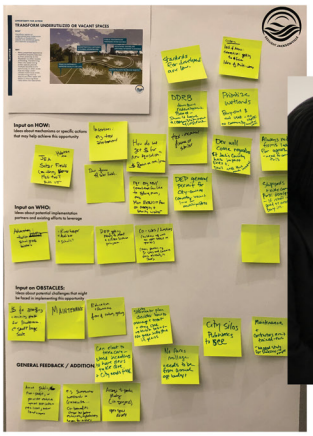
The Adaptation Approaches in this Strategy build upon the City of Jacksonville Adaptation Action Area Working Group recommendations and the State of Florida's guidance on sea level rise adaptation strategies, which are organized under the categories of protection, accommodation, retreat, and avoidance. This framework is focused on options for adapting to sea level rise, primarily at the site or structure scale. *Resilient Jacksonville* expands this focus to include Adaptation Approaches that address multiple shocks and stressors, account for people and systems as well as sites, and are geared toward shaping a resilient future for the city.

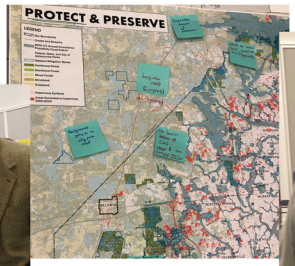
STAKEHOLDER ENGAGEMENT

Strengthening Jacksonville's resilience is an inclusive effort that requires many perspectives at the table to guide planning and decisionmaking. *Resilient Jacksonville* was developed collaboratively in consultation with hundreds of stakeholders, residents, and subject matter experts throughout the 18-month planning process. The Actions included in this chapter emerged out of a series of workshops, public meetings and events, surveys, and discussions. This input helped us highlight and align with existing successful efforts in Jacksonville, develop and prioritize the types of Actions that will best serve our city, understand potential obstacles and how to overcome them, determine the appropriate mechanisms to advance implementation, and identify the partners and funding sources to ensure success.

The primary stakeholder engagement activities that guided this process are included in the timeline to the right. This timeline is not exhaustive and does not include, for example, many small group or one-on-one conversations and the direct input, revisions, and feedback that advanced the Actions in this Strategy. Getting to this point was a group effort, and making these Actions a reality will require continued collaboration through implementation.







PARKS, OPEN SPACE, & ECOLOGY WORKING GROUP

HEALTH & QUALITY OF LIFE WORKING GROUP

CRITICAL INFRASTRUCTURE & EMERGENCY SERVICES WORKING GROUP

CLIMATE JAX MEETING

DCPSD STUDENT SURVEY

IMPLEMENTATION WORKSHOP

ENVIRONMENTAL SYMPOSIUM

LAUNCH OF RESILIENT JACKSONVILLE

DECEMBER 2022

FEBRUARY 2023

OCTOBER 2023

ONLINE SURVEY #1

ONLINE SURVEY #2

WORKING GROUP REVIEW OF DRAFT ACTIONS

PUBLIC MEETING AT SOUTHEAST REGIONAL LIBRARY

PUBLIC MEETING AT ED BALL BUILDING

PUBLIC MEETING AT LEGENDS COMMUNITY CENTER

HYDROLOGY WORKING GROUP

LAND-USE AND DEVELOPMENT WORKING GROUP

TYPE OF ENGAGEMENT

- WORKSESSION
- DIGITAL OUTREACH
- STAKEHOLDER MEETING
- PUBLIC MEETING / OPEN HOUSE
- SURVEY

STAKEHOLDER GROUPS

- CITY STAFF
- SUBJECT MATTER WORKING GROUPS
- COMMUNITY, NGO, & BUSINESS LEADERS
- BROADER PUBLIC

HOW TO READ AN ACTION

Collectively, the set of Adaptation Approaches and Actions included in this chapter aim to help Jacksonville achieve its resilience vision of being a city that: proactively adapts, fosters healthy communities and environments, expands opportunity, and builds for the future. The 45 Actions within *Resilient Jacksonville* follow a consistent format, including the following:

Resilience Value and Action Description

The introductory paragraph to each Action explains the Action in more detail as well as how it will help Jacksonville withstand shocks and stressors, provide multiple benefits to the community, and achieve the city's vision for resilience.

Shocks and Stressors Addressed

Each Action includes the primary acute shocks and/or chronic stressors that the Action aims to address.

Implementation Partners

Each Action identifies the key public, private, nonprofit, and academic collaborators that will advance the Action. The specific partners listed are intended as a starting point for implementation; engaging a broad range of stakeholders and residents will be critical to success.

Potential Funding Mechanisms

While in many cases, specific funding to support Action implementation has not yet been secured, funding mechanisms that could be pursued are listed here. This includes potential grants, existing government budgets, philanthropic funds, and private partnerships.

Timeframe

Each Action includes an implementation timeframe of immediate (2025), short-term (2030), medium-term (2035), or long-term (2070) for when the Action is expected to be significantly advanced or completed.

Costs

Anticipated relative implementation costs are included on a scale of $–$$$$, where "$" represents tens of thousands and "$$$$" represents tens of millions of U.S. dollars.

Sub-Actions

Many Actions also include discrete Sub-Actions that represent different steps or mechanisms for implementing the main Action. The Sub-Actions describe the specific policies, programs, projects, and initiatives that will be advanced. For Actions without any Sub-Actions, information on the mechanisms to advance implementation are included in the Action description.

APPROACH

No. | **Action title**

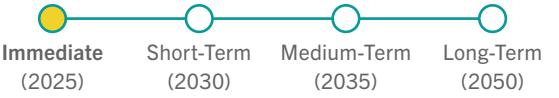
Resilience Value and Action Description

Shocks and Stressors Addressed

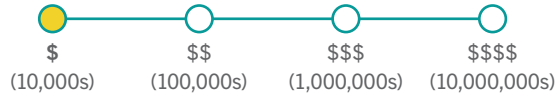
Implementation Partners

Potential Funding Mechanisms

Implementation Timeframe



Relative Cost



SYSTEMS

Adaptation Approaches and Actions that work across multiple sites at a neighborhood, corridor, landscape, or regional scale.

GROW RESILIENTLY

Guide safe and connected development to areas of low flood risk and high resilience potential.

Jacksonville is a growing city, but for that growth to enable Jacksonville to thrive, it must be informed by the risks and hazards facing the city today and in the future. The business-as-usual patterns of development in Jacksonville are not sufficient for coping with the stressors that exist today and the increasing risks of the future. A Grow Resiliently approach focuses on actions Jacksonville can take to guide future development that is not only safer from flooding and other hazards, but also well-connected to infrastructure and services—facilitating a more resilient growth model for Jacksonville's future.

TRANSFORM

Redesign infrastructure and the built environment to make space for water, reduce urban heat, and improve connections between places.

Laying the groundwork for the next generation of resilient development in Jacksonville will require rethinking how we plan and build infrastructure to support a high quality of life for all residents. A Transform approach focuses on actions that fundamentally alter where and how infrastructure such as roads, trails, utilities, waterways, open spaces, and tree canopies are designed, constructed, and maintained to meet the challenges and demands of the future.

PRESERVE

Conserve and enhance valuable open space and ecosystems and limit development in areas of high flood risk.

Jacksonville is a water city. The critical functions of the river, tributaries, coast, ecosystems, and open spaces can be maximized to manage water, mitigate heat, and maintain natural lands for the benefit of all residents. Actions under a Preserve approach are focused around living safely with water, managing land, and discouraging development where the risk of flooding is high right now and in the future.

PROTECT

Fortify critical city systems against future threats.

Planning resilience for Jacksonville's future includes investing in critical assets and city systems. A protect approach includes strategic actions to safeguard vulnerable critical systems in built, natural, and cyber environments and prioritize investments using data and science to remove and avoid single points of failure. Most protect actions are costly and not suitable everywhere. This approach is therefore about deciding what actions will be effective and practical and how and where specific protect actions can be used to best serve Jacksonville's residents.

PREPARE

Plan in advance of a threat to improve the response of city systems during an emergency.

Preparedness is a core adaptation approach, as not all threats can be avoided or mitigated. In an uncertain future, preparing for severe events, outages, and disruptions is a sound practice to ensure that daily life in Jacksonville can resume as soon as possible and that residents' needs can be met under difficult circumstances that are often compounded by financial pressures and emotional hardship.

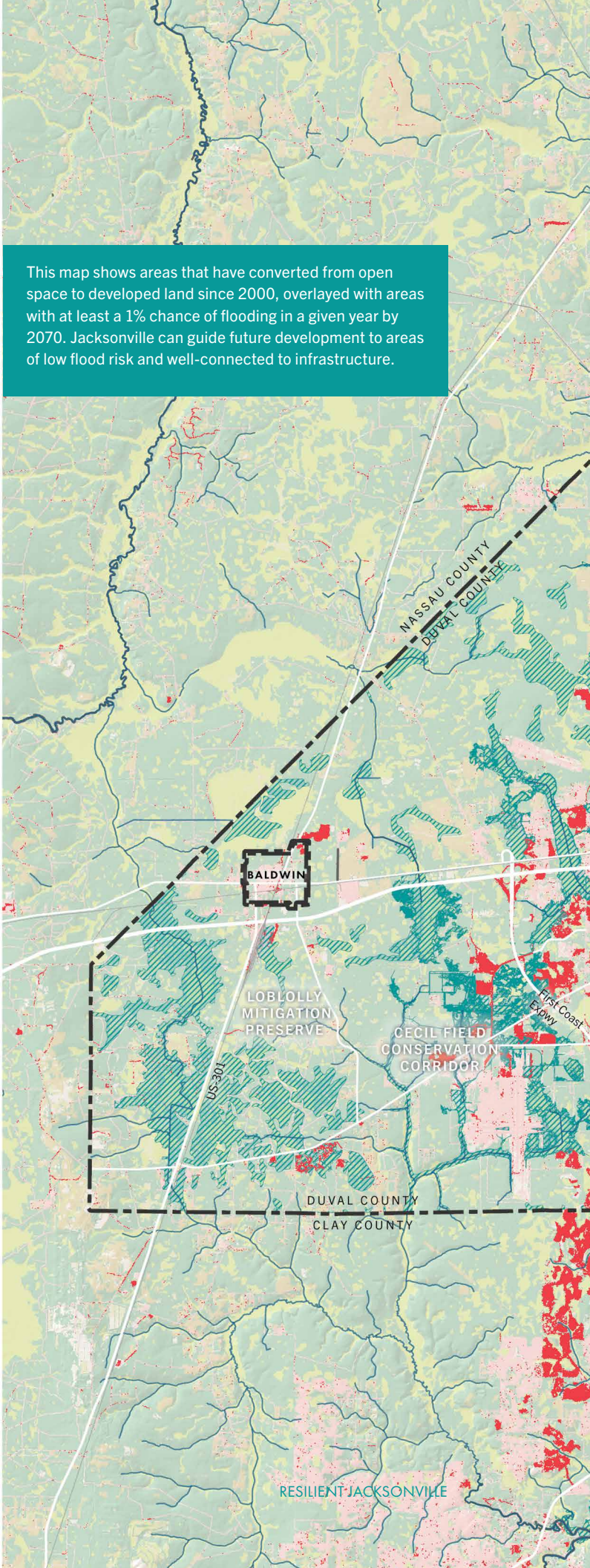
GROW RESILIENTLY

Guide safe and connected development to areas of low flood risk and high resilience potential.

This map shows areas that have converted from open space to developed land since 2000, overlayed with areas with at least a 1% chance of flooding in a given year by 2070. Jacksonville can guide future development to areas of low flood risk and well-connected to infrastructure.

Actions Include:

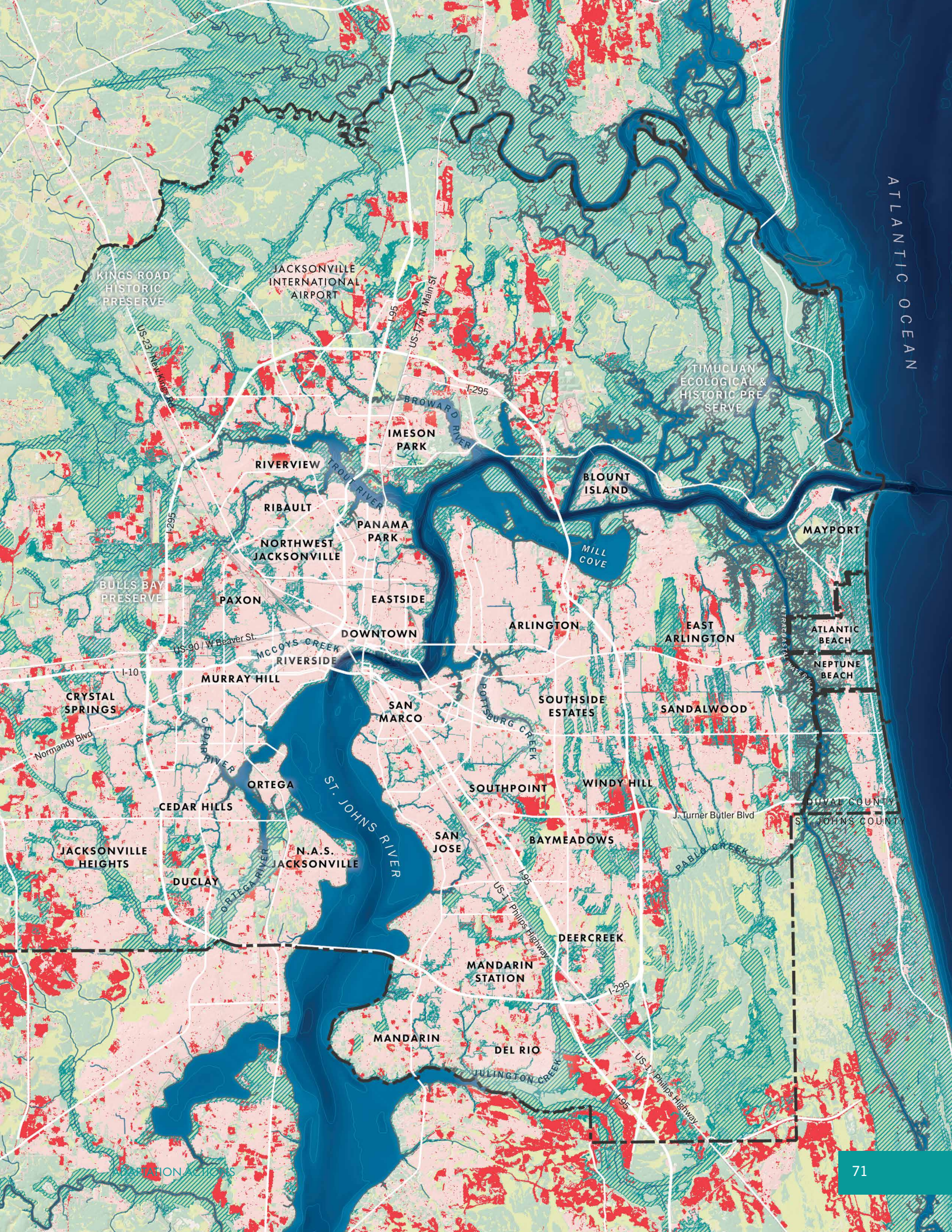
1. Guide **future growth** in areas that are at low risk and well-connected to infrastructure.
2. Ensure **infrastructure investments** are aligned with land use priorities for growth and conservation.
3. Develop **design guidelines** for climate adaptive and low-impact new subdivisions, neighborhoods, and planned developments.
4. Increase and safeguard the supply of **affordable housing** in low-risk and well-connected neighborhoods.



LEGEND

- City Boundaries
- Creeks and Streams
- 2070 1% Annual Exceedance Probability Flood Extent*
- Impervious Surfaces
- Areas Converted to Impervious, 2000-2019
- Forests
- Wetlands

0 2 4 8 mi


ATLANTIC OCEAN
KINGS ROAD HISTORIC PRESERVE
JACKSONVILLE INTERNATIONAL AIRPORT
US-23 / New Kings Rd
I-95
US-17 / N. Main St
I-295
BROWARD RIVER
TIMUCUAN ECOLOGICAL & HISTORIC PRESERVE
IMESON PARK
RIVERVIEW
TROUT RIVER
BLOUNT ISLAND
RIBAULT
PANAMA PARK
MAYPORT
NORTHWEST JACKSONVILLE
MILL COVE
BULLS BAY PRESERVE
PAXON
EASTSIDE
ARLINGTON
EAST ARLINGTON
ATLANTIC BEACH
DOWNTOWN
US-90 / W Beaver St.
MCCOYS CREEK
RIVERSIDE
NEPTUNE BEACH
I-10
MURRAY HILL
CRYSTAL SPRINGS
SAN MARCO
SOUTHSIDE ESTATES
SANDALWOOD
BOTTSBURG CREEK
Normandy Blvd
CEDAR RIVER
ORTEGA
ST. JOHNS RIVER
SOUTHPOINT
WINDY HILL
CEDAR HILLS
J. Turner Butler Blvd
DUVAL COUNTY
ST. JOHNS COUNTY
SAN JOSE
BAYMEADOWS
JACKSONVILLE HEIGHTS
N.A.S. JACKSONVILLE
PABLO CREEK
DUCLAY
ORTEGA RIVER
US-1 / Philips Highway
DEERCREEK
MANDARIN STATION
MANDARIN
DEL RIO
JULINGTON CREEK

1 | Guide future growth in areas that are at low risk and well-connected to infrastructure.

Resilience and growth can be complementary goals if new development is guided to areas that are at lower risk of flooding and other climate threats and well-connected to the existing infrastructure necessary to support thriving communities, such as various modes of transportation and energy and water utilities. Multiple interrelated dynamics shape decisions around where growth and development happen, making it challenging to advance resilience objectives alongside other economic and social considerations. Jacksonville can guide growth in a resilient way by using a suite of planning, regulatory, and incentive-based tools in concert toward a common vision for the city's future. By guiding growth in locations well-suited for low-risk development, the City can avoid increasing the number of homes, critical facilities, and people located in flood-prone areas and thus avoid further increasing potential damages from flood events.

Resilient strategies for growth, like infill development, can also provide additional benefits. Infill development focuses growth on underutilized sites, such as parking lots or vacant properties, within an already developed area. It is a model of growth that "fills in," rather than expands from the existing urban fabric and supports increased density in areas where infrastructure and resources already exist. Infill development can reduce the distance that people need to travel to jobs and services; enable diverse modes of transportation, like public transit and bicycles; reduce urban sprawl and protect ecologically and recreationally valuable open spaces from development; make multi-unit housing options accessible for more residents; increase the return on investment in existing infrastructure; and reduce the extent and cost of infrastructure and services the City needs to provide and maintain.[1]

Credit: Halff

Shocks and Stressors Addressed

Flooding / Sea Level Rise / Chronic Flooding / Housing Instability

Implementation Partners

Planning & Development / JEA / JTA / North Florida TPO / Development Community

Potential Funding Mechanisms

CIP / Modified Fee Structure

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$** (100,000s)	$$$ (1,000,000s)	$$$$ (10,000,000s)

1.1 Update the City's land development regulations.

The City's land development regulations govern multiple aspects of where and how land is developed, including allowable uses, site requirements, and building and construction standards. Jacksonville's land development regulations include the Zoning Code, the Code of Subdivision Regulations, and the Floodplain Management Ordinance. Jacksonville's current land development regulations were written when climate threats were not a major consideration and do not account for the full range of current and future conditions that climate change brings. New homes, businesses, services, and subdivisions are permitted in a manner that may be inconsistent with the goals of *Resilient Jacksonville*, placing residents at greater risk from climate hazards. Projections for how climate change will increase flood risks to certain areas of the city are now available and can be used to regularly update regulatory tools to reflect the best available data and science in a way that serves Jacksonville residents for generations to come. The City is working on updating its land development regulations over the coming year to account for future flood risk projections in where and how land and buildings are developed. Land development regulations will also be regularly updated to account for changes in the environment and exposure to risk over time.

1.2 Facilitate strategic infill development in areas of low flood risk.

The City of Jacksonville, in partnership with Jacksonville Transportation Authority (JTA), JEA, the development community, and other partners, will explore and implement a range of tools to encourage infill development that is resilient to increasing climate impacts and located in high, dry, and connected areas. These tools may include incentivizing redevelopment of vacant properties in high, dry, and connected areas; thoughtfully and strategically increasing allowable densities or providing density bonuses in those areas; partnering with developers to transfer development rights from one property to another; reducing utility connection fees in target areas; and reducing parking minimum requirements for new developments. City Council passed legislation in 2022 that expands where accessory dwelling units (ADUs), small housing units built on the same lot as a single-family home, are allowed in Jacksonville. This is another important tool that will support affordable infill development in Jacksonville. The City will combine tools for infill development with approaches for maintaining and expanding affordable housing (see Action 4) to ensure that making room for new neighbors improves conditions for existing residents and minimizes displacement.

1.3 Incorporate resilience considerations into future land use planning.

Jacksonville's 2030 Comprehensive Plan is a policy document required by Florida Statutes and the City's Code of Ordinances. This plan guides future growth and development with the goal of promoting public health, safety, and welfare. The plan also guides updates to the City's land development regulations. Jacksonville will incorporate resilience goals, climate threats, and risk considerations into updates of the Comprehensive Plan, including the Future Land Use Element and Future Land Use Map that describe the land uses and physical characteristics intended for all areas of the city.

2 | Ensure infrastructure investments are aligned with land use priorities for growth and conservation.

One of the ways that the public sector continuously shapes where growth happens is through infrastructure investments, such as where and how roads are built and the provision of utilities. For example, the construction of I-295 catalyzed growth and development in adjacent neighborhoods. Roadbuilding, expansion of sewer service, and other strategic infrastructure investments are additional tools that Jacksonville will use to guide development in areas that are lower-risk and well-connected to existing infrastructural systems. Jacksonville will consult the best available data on risk and align infrastructure decisions, priorities, and investments with the City's Comprehensive Plan and land development regulations. Coordinating infrastructure investments with land use priorities for where to target growth versus where to prioritize land conservation will ensure that Jacksonville is encouraging growth in areas that are high, dry, and connected.

Credit: JEA

Shocks and Stressors Addressed

Flooding / Sea Level Rise / Chronic Flooding / Urban Heat Island Effect

Implementation Partners

Public Works / Planning & Development / JEA

Potential Funding Mechanisms

CIP / Independent Authorities Capital Planning

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$ (100,000s)**	$$$ (1,000,000s)	$$$$ (10,000,000s)

2.1 **Embed resilience in the prioritization process for Capital Improvement Plan investments.**

Funding resilience begins with leveraging and maximizing our existing budgets and being strategic with the dollars we spend every year. The Capital Improvement Plan is a comprehensive, 5-year outline of proposed City investment in the construction and repair of City facilities and infrastructure that identifies and balances the improvement needs of the Jacksonville community with the fiscal capabilities and limitations of the City budget. The 2023–2024 fiscal year budget alone included $399 million in capital investments. This significant investment in capital expenditures can tip the scales toward or away from resilient outcomes for the city depending on which projects are identified and prioritized. In 2022 and 2023, the City of Jacksonville committed a total of $10 million in dedicated funds for resilient infrastructure projects. The City will commit resources to implementing *Resilient Jacksonville* through dedicated line-item funding and incorporating resilience into the criteria by which capital investments are prioritized and made. Jacksonville will look to best practices from other cities and incorporate resilience objectives, frameworks, and evaluation criteria into the capital improvement planning process, which is grounded in data on risks and vulnerabilities.

2.2 **Prioritize utility expansion in high, dry, and connected areas.**

The City will closely coordinate with JEA to align plans for expanding the provision of water, sewer, and energy services to new areas with the goals of this Resilience Strategy. Expanding utilities to areas at greater exposure to future flooding can have the unintended consequence of encouraging and incentivizing new development in areas that will put more residents at risk. Reducing flood risk will be considered alongside other resilience goals related to public health, quality of life, and environmental quality when making decisions about where to expand utility services. This will require a strong working relationship and data sharing between the City and JEA.

3 | Develop design guidelines for climate-adaptive and low-impact new subdivisions, neighborhoods, and planned developments.

Developing resilient design guidelines is a crucial step toward reducing the vulnerability of buildings, structures, and residents to flooding and other hazards. To this end, the City will develop new guidelines that can adapt to changing environmental conditions, secure the longevity of private investment, and minimize consequences from future storms. In addition to flooding, design guidelines can help reduce residents' vulnerability to extreme heat. Development and implementation of robust guidelines will therefore decrease the amount of public and private money spent on recovery from storms and other hazards. Additionally, these standards and guidelines can be an effective way to structure future incentive programs to encourage resilient development throughout Jacksonville.

Action Description

The City of Jacksonville will develop design guidelines for use in new subdivisions, neighborhoods, and planned developments to ensure that new development is climate-adaptive. Examples of guidelines that can reduce vulnerability to flooding and/or heat hazards include elements such as minimum amounts of tree cover or other forms of shade, limits on impervious surface coverage, use of resilient materials, and maximum floor area ratios. These guidelines will be developed based on best practices, lessons learned in other cities and communities, and available data.

Shocks and Stressors Addressed

Flooding / Sea Level Rise / Chronic Flooding / Urban Heat Island Effect

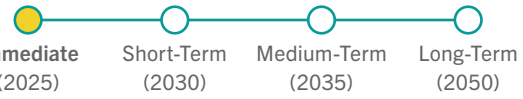
Implementation Partners

Resilience / Planning & Development / Development Community

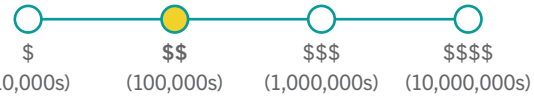
Potential Funding Mechanisms

Resilience Office Budget

Implementation Timeframe



Relative Cost



Credit: Babcock Ranch

CASE STUDY

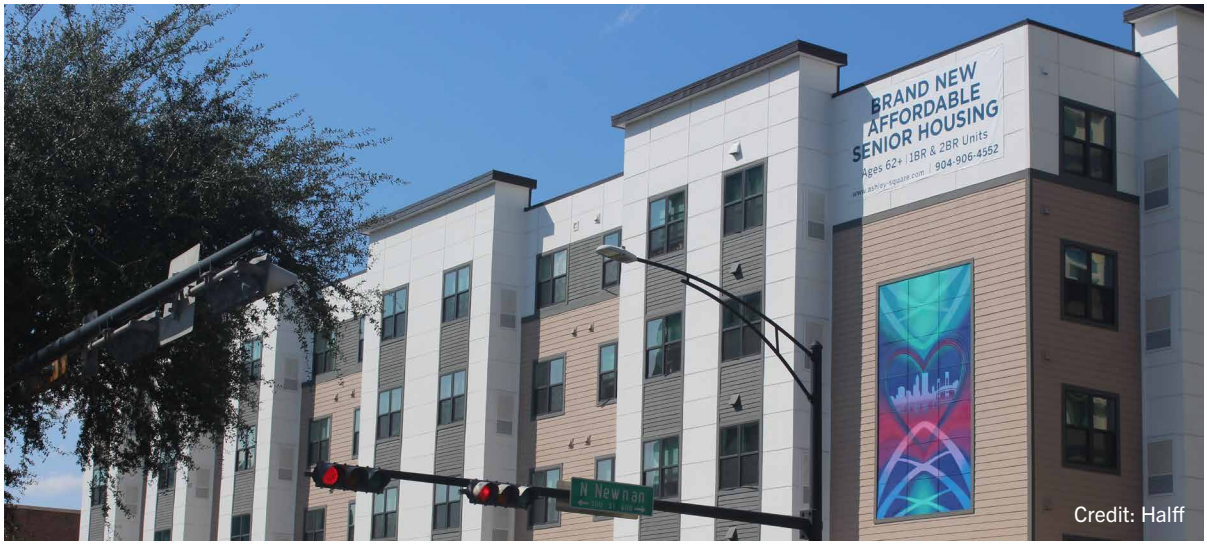
BABCOCK RANCH

Fort Myers, FL | 2015

Babcock Ranch is a planned unit development outside of Fort Myers, Florida, that has prioritized low-impact development and climate-adaptive standards to strengthen the community's resilience and improve its ability to withstand flooding and other climate stressors. The development is powered by 100% renewable energy and manages stormwater through wetlands and low-impact development, including conservation land—developers set aside 80% of the community's land area for conservation (73,000 of 91,000 acres). This preserved land provides 50 miles of public trails and habitat for endangered species in addition to its stormwater management function. Homes within the Babcock Ranch development were built to exceed code minimums, and withstood Hurricane Ian (a Category 4 hurricane) with minimum damage and no power outages. Additionally, Babcock Ranch has integrated some commercial development, which reduces resident vehicle miles traveled (VMTs).

4 | Increase and safeguard the supply of affordable housing in low-risk and well-connected neighborhoods.

A robust supply of affordable housing is critical to economic growth and to Jacksonville continuing to be a city that supports a wide variety of jobs and industries. Jacksonville is not alone in facing a lack of affordable housing—it is a challenge growing cities across the country face. To address this challenge, Jacksonville will need to preserve existing and develop new affordable housing in low-risk and well-connected neighborhoods to ensure that low-income residents are not stranded in high-risk or outlying areas. Many of Jacksonville's more affordable neighborhoods are currently facing gentrification pressures as a result of relocation patterns: people retreating from high-risk coastal areas are buying more affordable property in less flood-prone areas, which are, in some cases, located in lower-income communities of color. This trend, sometimes called "climate gentrification," will continue to put pressure on the amount of affordable housing in low-income communities of color throughout the city.[2] Additionally, many Black families in Jacksonville face the barrier of heirs' property (passing property from one family member to another without a will), where without a clear title, they can face the loss of their earned wealth or equity as well as their home. The City and its partners will invest in preventing displacement and supporting Jacksonville families with the goal of keeping people housed and building wealth in historically disinvested and segregated neighborhoods.



Credit: Halff

Shocks and Stressors Addressed

Housing Instability / Social Inequality

Implementation Partners

JCLT / LISC / CDCs

Potential Funding Mechanisms

HUD Grants / Florida State Housing Initiatives Partnership

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	**$$$ (1,000,000s)**	$$$$ (10,000,000s)

4.1 Expand property acquisitions and affordable housing development in low-risk areas.

There are several tools that Jacksonville can use to support the increase of affordable housing throughout the city. Supporting nonprofit developers or community development corporations (CDCs) in acquiring and building on low-risk, vacant properties is one strategy that can help cities increase their stock of affordable housing. Community land trusts are another strategy to increase affordable housing. The Jacksonville Community Land Trust (JCLT)—launched in 2021 with a mission to create home ownership options for low- and moderate-income families—is positioned and staffed to be the vehicle for preserving and expanding affordable housing in the city's neighborhoods that are at low risk for environmental hazards but highly vulnerable to gentrification. The JCLT, like other land trusts, maintains ownership of the land in perpetuity while using shared-equity ownership to support family wealth-building in their house. By supporting JCLT acquisitions in these areas and deploying other affordable housing strategies where the greatest needs exist, the City can expand the availability of affordable housing and contribute to renewed investments and wealth-building for families at multiple income levels.

4.2 Safeguard affordable housing by securing heirs' property rights.

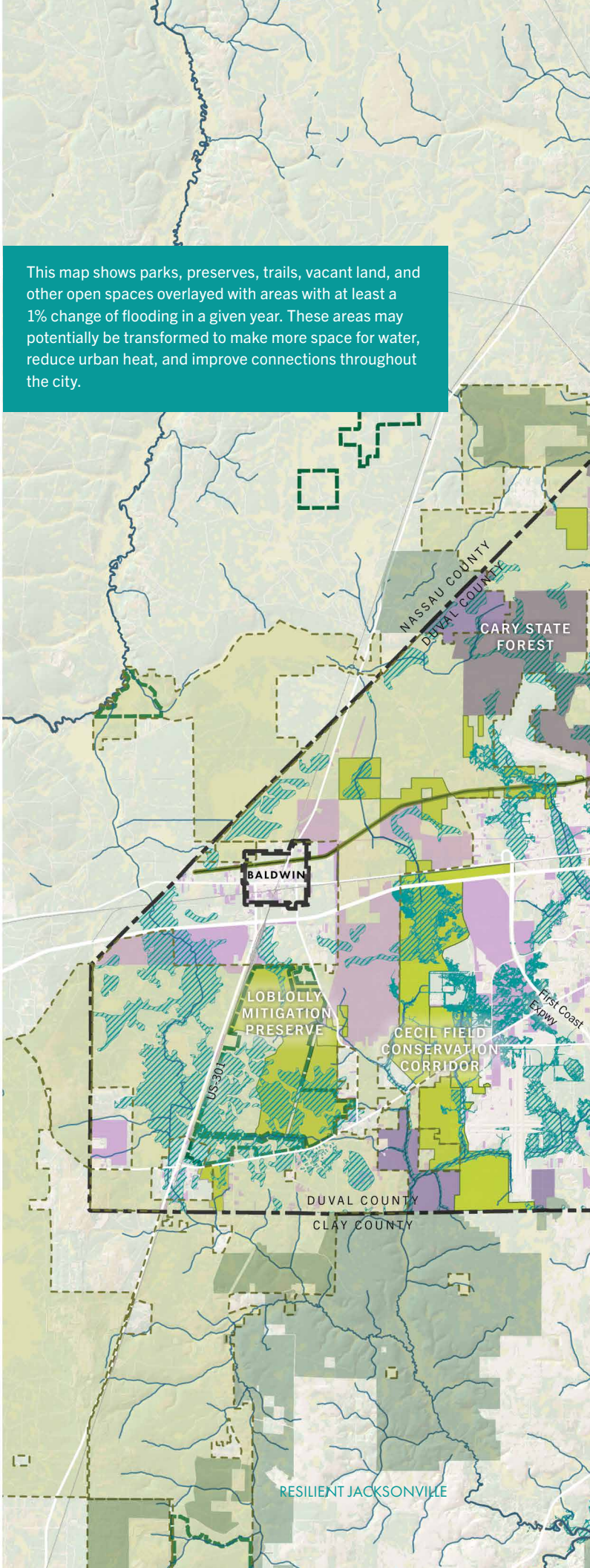
Heirs' property—when properties are passed down to family members without wills or probate, lacking the correct chain of title—leaves generational family homes at risk of being sold at auction. This issue is of enormous importance in Jacksonville, where there is approximately $2.5 billion in housing market value that cannot be realized because of unclear titles. The Local Initiatives Support Corporation (LISC) Jacksonville and other partners are working to identify and preserve heirs' property, keeping families housed and enabling them to build generational wealth. LISC's initiative has closed 487 legal assistance cases so far and is working to identify additional resources to expand this work. The City will continue to support this movement to clear title to heirs' property and offer estate planning to secure Jacksonville family histories and futures.[3]

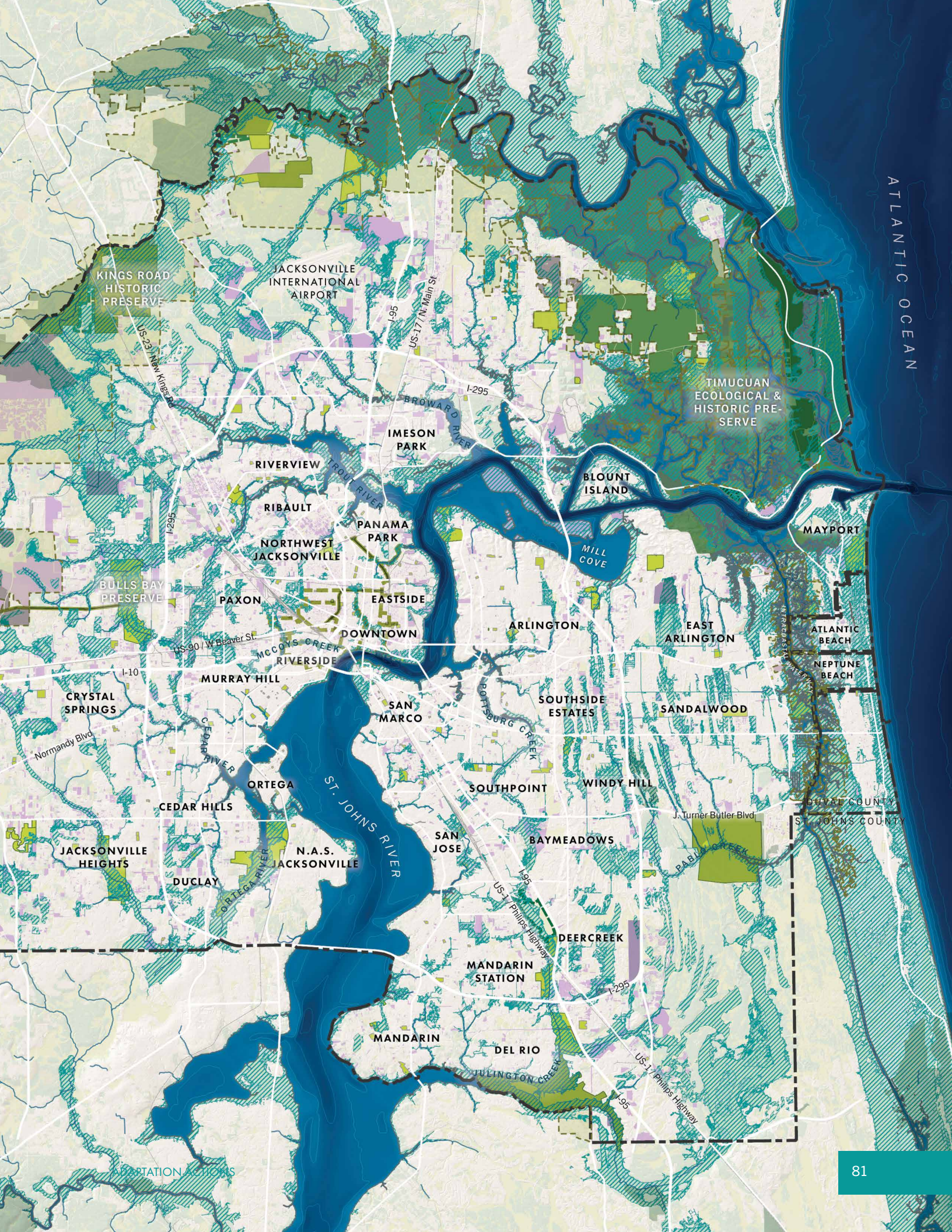
TRANSFORM

Redesign infrastructure and the built environment to make space for water, reduce urban heat, and improve connections between places.

Actions Include:

5. Update **public works design standards** to account for climate change impacts and support resilient infrastructure development.
6. Create connected and **multimodal transportation** options.
7. Build **ecological and recreational connections** across Jacksonville's parks and open spaces.
8. Make **room for the river and tributaries**.
9. Develop a **green stormwater infrastructure** program across Jacksonville based on the best available science and data.
10. Expand Jacksonville's **tree canopy**.
11. Ensure **water and energy utilities** can meet the growing demands of the future.




ATLANTIC OCEAN
KINGS ROAD HISTORIC PRESERVE
JACKSONVILLE INTERNATIONAL AIRPORT
US-23 / New Kings Rd
I-95
US-17 / N. Main St
I-295
BROWARD RIVER
TIMUCUAN ECOLOGICAL & HISTORIC PRESERVE
IMESON PARK
RIVERVIEW
TROUT RIVER
BLOUNT ISLAND
RIBAULT
PANAMA PARK
NORTHWEST JACKSONVILLE
MILL COVE
MAYPORT
BULLS BAY PRESERVE
PAXON
EASTSIDE
ARLINGTON
EAST ARLINGTON
ATLANTIC BEACH
DOWNTOWN
US-90 / W Beaver St.
McCOYS CREEK
RIVERSIDE
NEPTUNE BEACH
I-10
MURRAY HILL
CRYSTAL SPRINGS
SAN MARCO
SOUTHSIDE ESTATES
SANDALWOOD
BOTTSBURG CREEK
Normandy Blvd
CEDAR RIVER
ORTEGA
ST. JOHNS RIVER
SOUTHPOINT
WINDY HILL
CEDAR HILLS
DUVAL COUNTY
ST. JOHNS COUNTY
J. Turner Butler Blvd
SAN JOSE
BAYMEADOWS
JACKSONVILLE HEIGHTS
N.A.S. JACKSONVILLE
PABLO CREEK
DUCLAY
ORTEGA RIVER
US-1 / Philips Highway
DEERCREEK
MANDARIN STATION
MANDARIN
DEL RIO
JULINGTON CREEK

5 | Update public works design standards to account for climate change impacts and support resilient infrastructure development.

Public works design standards set a precedent for the safety and resilience of public infrastructure and establish a baseline of resilience for any city investment. Prioritizing the resilience of infrastructure is critical, not only to avoid costly repairs but also to minimize the wide-ranging consequences of natural disasters for the livelihoods and well-being of residents.[4] Integrating climate change data into public works design standards and the Capital Improvement Plan prioritization process will ensure that retrofits and new construction performed by the Department of Public Works are resiliently designed and built to withstand flooding, high winds, heat, and other extreme weather.

Resilient design standards will also guide the development of community services, jobs, retail, and affordable housing in low-risk areas with existing infrastructure, transit networks, and underutilized sites, and reduce the amount of capital spent on repairing infrastructure. In addition, actions intended to improve infrastructure resilience—for example, a park that is "designed to flood" and provide additional water storage capacity during heavy rainfall events—can often yield additional benefits during non-emergency conditions.[5] The multiple benefits derived from interventions like this are often referred to as the "resilience dividend," which represents the many benefits that accrue by investing in actions that strengthen the city's resilience. Extensive research from the National Institute of Building Sciences has repeatedly shown that investments in mitigation provide substantial benefits over cost. Their study of federal mitigation grant programs found a $6 benefit for every dollar invested.[6]

Credit: Montgomery County DEP

Shocks and Stressors Addressed

Flooding / Sea Level Rise / Chronic Flooding / Urban Heat Island Effect

Implementation Partners

Public Works / JEA / Subdivision Standards and Policy Advisory Committee / Context Sensitive Streets Committee

Potential Funding Mechanisms

Resilience Office / Fuse Fellows

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$** (100,000s)	$$$ (1,000,000s)	$$$$ (10,000,000s)

5.1 Align above-ground and below-ground infrastructure specifications and review processes.

To ensure consistency in design for above- and below-ground infrastructure, it's important that the committees setting these standards are in close coordination. The City will facilitate the merging of the Subdivision Standards and Policy Advisory Committee (SSPAC) and the Context Sensitive Streets Committee to allow for holistic planning and streamlined decisionmaking. Additionally, to save on costs and materials and improve sustainability citywide, the City and JEA will closely coordinate projects and maintenance, collaborate to improve standards and specifications, and implement resilient standards where applicable.

5.2 Update the standard details and specifications for City of Jacksonville street designs.

If you laid all of Jacksonville's City-managed roads in a straight line, you could get from Downtown to Los Angeles and halfway back—a total of over 3,400 miles. Each road has the potential to provide significant resilience benefits beyond transportation. The City will undergo a streetscape design update that will comprehensively look at the various types of roadways in Jacksonville and provide standards for roadway design and upgrades that provide additional quality of life, stormwater management, and urban heat reduction benefits. These redesigns could include multiple components, such as multimodal active transportation with lanes and pavement markings for buses and bicyclists. They could also include light-colored roadways to reduce urban heat absorption and additional street trees to provide shade, absorb stormwater, and lower air temperatures. Redesigns could both benefit pedestrians through the installation of safe and accessible sidewalks and include permeable paving to reduce runoff and promote infiltration. Updating the City's streetscape design standards is an opportunity to make significant improvements to meet resilience goals.

5.3 Incorporate green infrastructure features into drainage specifications.

Though not a catch-all solution for drainage, green infrastructure features can take pressure off the city's drainage system while simultaneously providing multiple benefits by filtering, storing, and even infiltrating stormwater (the process by which water flows into and through the soil). Development of design guidelines for green infrastructure features as part of a drainage guidebook is one mechanism that can be used to implement citywide standards around green infrastructure installation (e.g., determining what an urban bioswale should look like in specific parts of the city). In addition to establishing design guidelines and standard details—and separate from the regular flow capacity the city relies on from the traditional drainage system—the City can set targets for how much water different parts of Jacksonville should be able to temporarily retain during and after one or more major rainfall events.

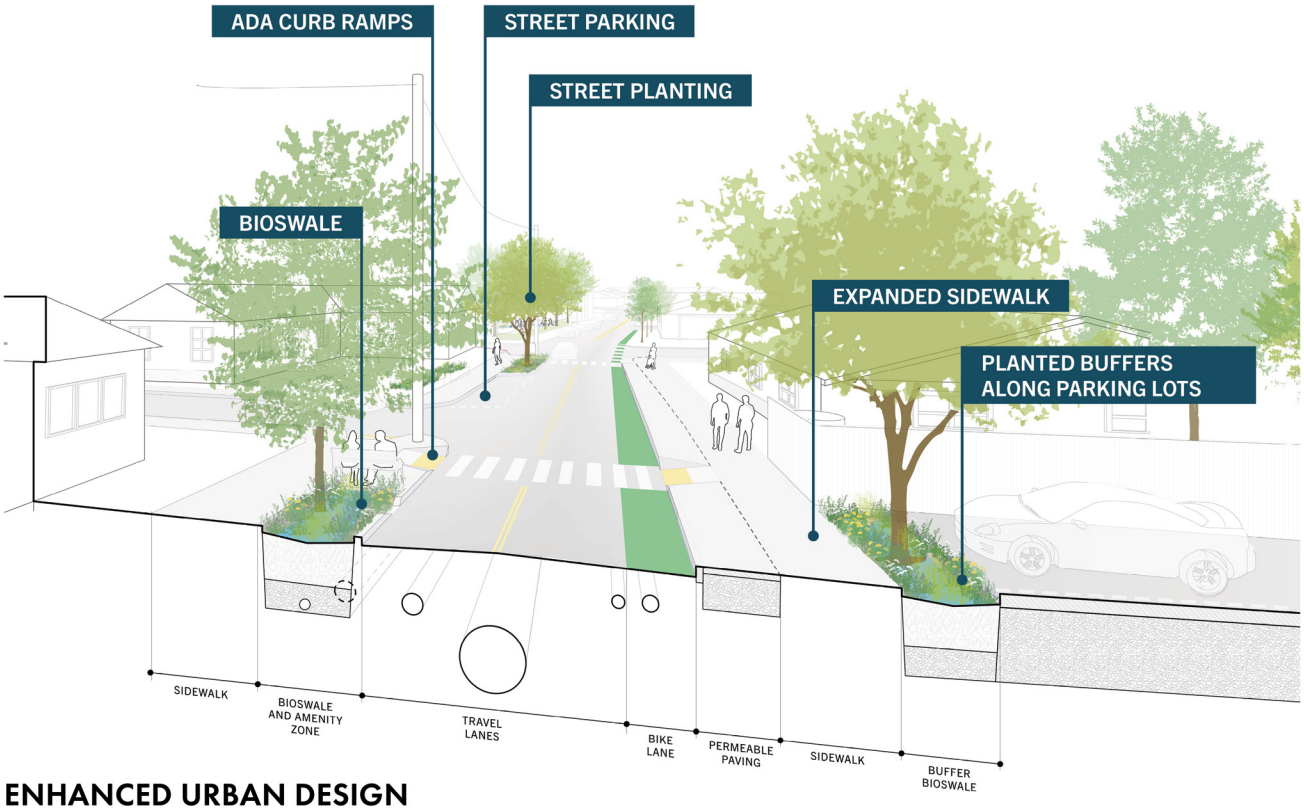
EXAMPLE

REDESIGNING STREET STANDARDS

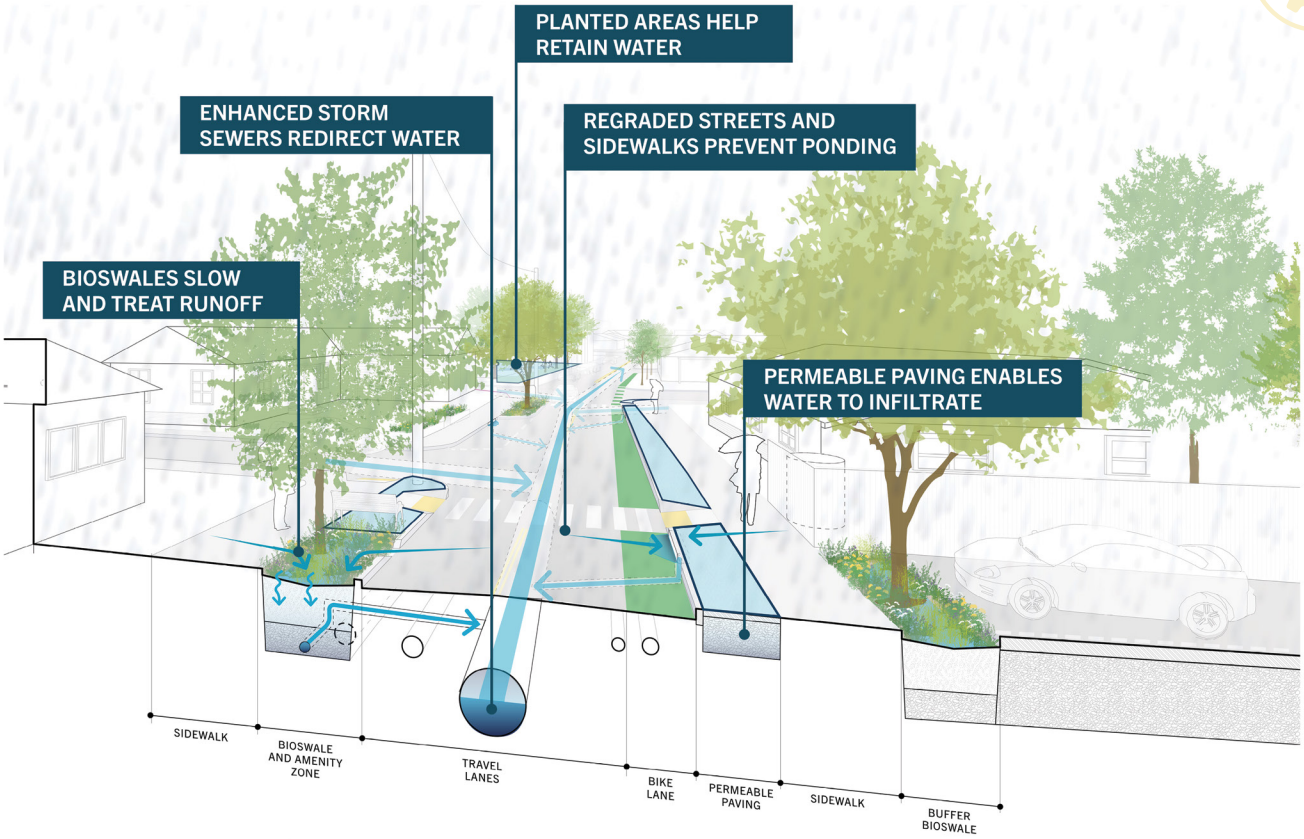
Streets and roadways comprise a significant portion of Jacksonville's land area, and the city's residents interact with them every day. While roadways are typically designed and constructed by engineers using state and national standards for vehicular travel, many cities have adjusted and augmented these standards with design guidance to encourage multi-modal users, promote safety, and increase sustainability. Many features of such "complete streets" can also benefit urban resilience such as the inclusion of improved stormwater management, green infrastructure, and cool pavements, among other features.

Broadly, updated street design details and specifications can enhance safety and accessibility, improve stormwater management, and reduce urban heat. Features like larger or raised crosswalks, curb extensions, accessible curb ramps, and designated space for bicycles and transit can enhance safety and accessibility. Green infrastructure like bioretention planters and raingardens combined with improved drainage infrastructure and features like permeable paving can improve stormwater management. Vegetation, particularly shade trees as well as light-colored pavement can dramatically reduce surface temperatures and mitigate the urban heat island effect. Many features—such as street trees and other planting—can address all three factors, improving overall experience of the streetscape.

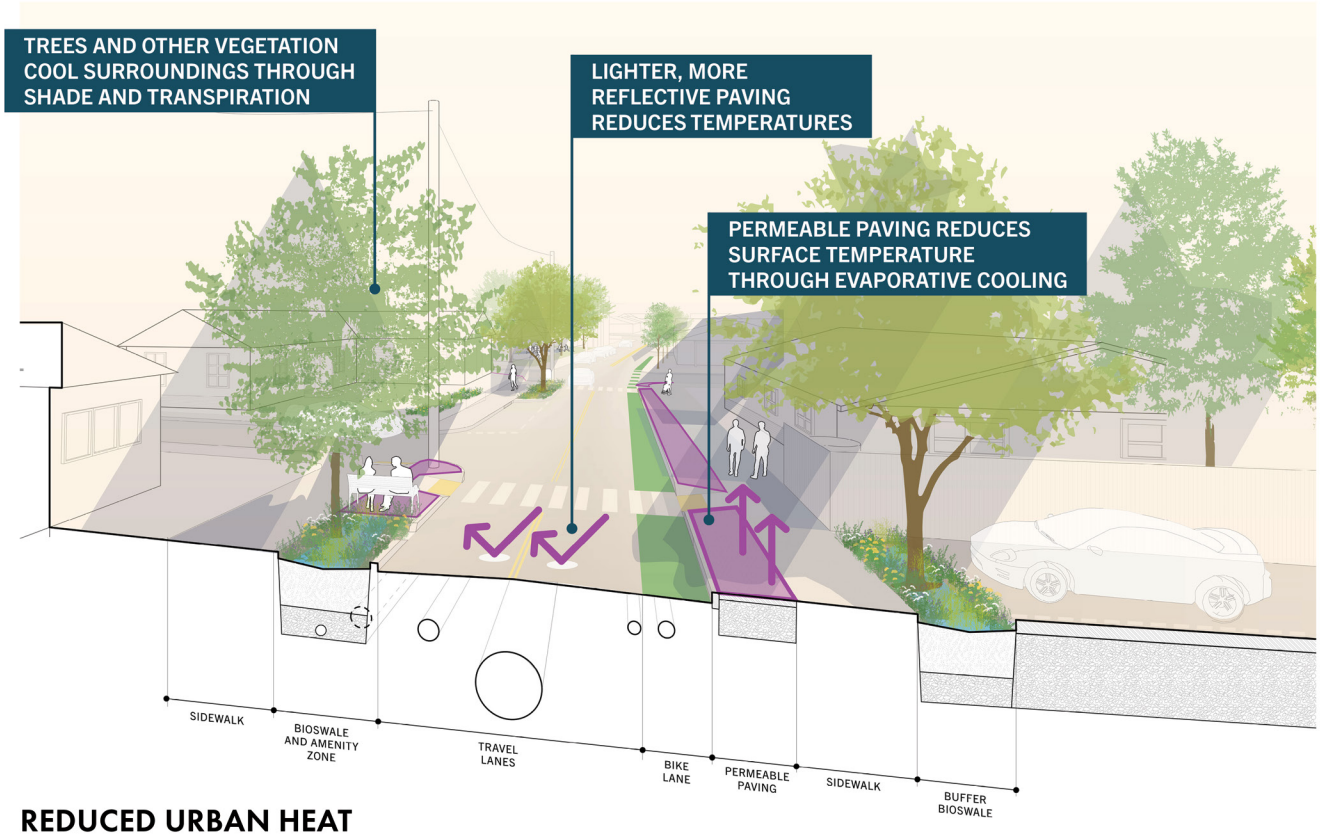
New design standards can apply to street renovation or reconstruction project as well as to new roads. Redesigning and augmenting Jacksonville's street design standards will provide new options for both the Department of Public Works and private developers.



ENHANCED URBAN DESIGN



IMPROVED STORMWATER MANAGEMENT



REDUCED URBAN HEAT

6 | Create connected and multimodal transportation options.

In a city as large as Jacksonville, transportation and connectivity are critical. Multimodal transportation options—where driving, walking, biking, taking the bus, and even boating and kayaking are all welcomed and accommodated—can ensure that everyone in Jacksonville can meet their day-to-day mobility needs, no matter the weather. While most of Jacksonville's transportation infrastructure is currently car-centric, improving access for other transportation modes can also provide economic resilience, for example, when gas prices rise and people seek alternative ways to get around. The City will lead and support improvements to transportation options that connect neighborhoods and better accommodate people on foot, bikes, and buses.

Credit: Halff

Shocks and Stressors Addressed

Flooding / Sea Level Rise / Chronic Flooding / Urban Heat Island Effect

Implementation Partners

Planning & Development / Public Works / JTA / FDOT

Potential Funding Mechanisms

TPO / FDOT / Public-Private Partnerships / RAISE Grants

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	**Medium-Term (2035)**	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	**$$$ (1,000,000s)**	$$$$ (10,000,000s)

6.1 Increase public transit service and ridership.

The city's transit provider, Jacksonville Transportation Authority (JTA), completed its MOVE2027 strategic plan in 2022, with a vision of seamless mobility for all. The plan covers current core transit services as well as new multimodal infrastructure, upgrades to customer experience, regional connectivity, new innovations like integration with autonomous vehicles, and economic development to support continuous improvement. Many components of JTA's plan are mirrored in this Resilience Strategy, such as Sub-Action 6.2 below and Sub-Action 7.1 to support the continued buildout of the Emerald Trail. The City will support implementation of the MOVE2027 plan[7] and encourage other key partners to plan for multimodal mobility in Northeast Florida with the goal of increasing public transit ridership across JTA's diverse service lines.

6.2 Strengthen first and last mile connections to transit.

The first and last miles of a multimodal trip that includes transit refers to the pedestrian and bicycle infrastructure necessary to get residents safely and comfortably from their homes to transit stops, from transit stops to end destinations, and vice versa. These first and last mile connections are important for making transit more accessible for users of all ages and abilities. The City will work with JTA to identify sidewalk, crossing, lighting, beautification, and bicycle infrastructure improvements within a half-mile walk of each of the transit stops along the Green, Orange, Blue, and Red First Coast Flyer Lines. The City will offer guidance and technical assistance to JTA to develop a list of recommended first/last mile improvements, including opinions of probable construction costs.

6.3 Increase bicycle ridership through bike share and e-bike incentives.

Bike share programs, pioneered by Paris's "Velib" program in 2007, have been implemented in at least 58 major metropolitan areas in the U.S. to date, with the number of programs increasing each year. Bike share programs provide residents an alternative point-to-point mobility option by borrowing and returning shared bicycles at docking stations or within dockless geofencing boundaries for a nominal, typically cost-structured fee. Successful bike share programs, such as Divvy (Chicago), Citibike (New York), and Capital Bikeshare (DC) have hundreds of stations and provide trips all year round. Bike share programs are instrumental in supporting multimodal travel, closing first and last mile connections gaps for those in zero-car households or residents that prefer a shift to reduced vehicle usage (see Sub-Action 6.2).

Electronic-assisted bicycles, or "E-Bikes," are an increasingly common and cost-effective way for urban residents to get to jobs, health facilities, retail, and other essential destinations. E-Bikes are faster, although typically limited to 20 mph, less physically demanding, and can make short trips more comfortable in inclement weather. With nearly 60% of all vehicle trips being less than six miles in distance, E-Bike usage supports equity in transportation by offering residents without cars a modal alternative. Statewide, cities like Tampa have developed subsidy programs to increase the use of E-Bikes within underserved communities. A similar incentive or subsidy program in Jacksonville would improve transportation equity in a climate-adaptive, resilient way. The City will explore how bike share and E-Bike incentives can be applied to increase alternative commuting modes and encourage transportation equity.

7 | Build ecological and recreational connections across Jacksonville's parks and open spaces.

Building new parkland that connects existing parks and trails creates a larger resilience impact. Connected greenways link people and places and enhance the ecological value that parks provide for local wildlife. Connected trails and greenways provide recreation, transportation, and public health and economic benefits. Parks and trails offer additional benefits such as stormwater management, reduced urban heat, and improved habitat connectivity. Multi-use trails, such as the Emerald Trail System and others, are a major asset to Jacksonville, and continued expansion of the City's trail system will better serve Jacksonville's residents and encourage ecotourism. In partnership with the Department of Parks, Recreation and Community Services (Parks Department) and the Department of Public Works, the Office of Resilience will support the continued buildout of the City's multi-use trail system, such as the Emerald Trail, and will support the North Florida Transportation Planning Organization's (TPO's) efforts to develop additional trails to improve regional connectivity. These departments will also coordinate with JEA to plan for the buildout of utility corridors (land set aside that can be used for both utility infrastructure and trails) throughout Jacksonville to expand the City's multi-use trail system.

Credit: City of Jacksonville, WSP, SCAPE

Shocks and Stressors Addressed

Lack of Reliable Transportation / Urban Heat Island Effect

Implementation Partners

Parks / Planning & Development / Public Works / North Florida TPO / JEA

Potential Funding Mechanisms

CIP / SJRWMD Critical Wetlands Aquisition Program

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	**Medium-Term (2035)**	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	**$$$ (1,000,000s)**	$$$$ (10,000,000s)

7.1 Support the continued buildout of and safe connections to the Emerald Trail System.

The Emerald Trail System Master Plan identifies an approach to constructing 30 miles of trails, greenways, and parks adjacent to the urban core, which will connect 14 historic neighborhoods to Downtown and nearby waterways such as Hogans Creek, McCoys Creek, and the St. Johns River. As part of the Master Plan, the development of the metropolitan trails network includes a transformation and restoration of the urban waterways, underutilized areas, and roadways to support recreational and ecological goals. As of 2023, 7.2 miles of trail are under construction; there are 4.97 miles of trail in design; and 1.1 miles of trail have been completed (not including the s-line segment). The City will continue to support the buildout and construction of the Emerald Trail System to serve more Jacksonville residents.

7.2 Support the expansion of Jacksonville's regional trail system.

Shared-use paths, also referred to as "trails," provide the safest and most comfortable travel for nonmotorized users. Using a baseline of trail projects identified in the North Florida TPO's Regional Multi-Use Trail Master Plan, and the City's Capital Improvement Plan, the City's Parks Department and Planning and Development Department will prioritize projects that increase connectivity and expand the overall trail network while concurrently planning for new trail projects that may close existing system gaps. Landscaping and other elements that provide coverage for trails and protection from the elements will be considered in determining preferred trail alignments and project selection. The city's existing trails and trails in the planning or funding phase will be analyzed for expansion or connectivity to other trails. The City will work to identify additional trails to be designed, planned, funded, and constructed to expand Jacksonville's overall nonmotorized trail network, maximizing access to job centers, parks, retail centers, and other essential services. These efforts will further consider long-term maintenance and likelihood of flooding when designing shared-use trails.

7.3 Connect open spaces and ecosystems to establish habitat corridors and improve water management.

Through targeted land acquisition and execution of easements, the City will create corridors between ecologically significant areas for wildlife and public access. This will increase the size of preserved natural areas and reduce habitat fragmentation while expanding the services of existing parks. The City can work with and leverage Florida Forever for funding projects in Duval County. In identifying areas most suitable for habitat corridors, the Parks Department will prioritize wetland and flood-prone areas and work in coordination with the recommendations of the Florida Ecological Greenways Network (FEGN). Connected and expanded open spaces can be designed to support water management within the city. This could include swales with native vegetation or larger stormwater bioretention ponds that capture and filter stormwater while providing aquatic and wetland habitats.

8 | Make room for the river and tributaries.

Rivers and tributaries naturally carry and hold rainfall runoff from their watershed. Providing more room along riverbanks for floodable open spaces can reduce flood risk by systematically holding more water in the riparian corridor, limiting assets at risk in the floodplain, and improving health and quality of life by providing connective recreational and ecological corridors. In planning for new structures along the St. Johns River and tributaries, the City will support the restoration of natural, historic floodplains by making investment decisions and prioritizing projects that make room for flood water, avoiding placing structures in the floodplain, and actively returning areas of the floodplain to natural space that can provide Jacksonville residents benefits such as flood risk reduction, improved water quality, urban heat reduction, and recreation areas.

Action Description

The Office of Resilience will collaborate with the Parks Department and the Department of Public Works to limit the use of City funds along tributaries to water-dependent structures, like docks, piers, boat ramps, or elevated walkways. The City agencies will further encourage the addition of vegetated buffers along rivers, wetlands, and stormwater ponds; replace hardened shorelines with green or hybrid infrastructure where feasible; and limit new bulkhead permits on private property.

Shocks and Stressors Addressed

Flooding / Chronic Flooding / Groundwater Threats

Implementation Partners

Parks / Public Works / Groundwork Jacksonville / St. Johns Riverkeeper

Potential Funding Mechanisms

Resilient Florida / National Fish and Wildlife Foundation

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	**Medium-Term (2035)**	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	**$$$ (1,000,000s)**	$$$$ (10,000,000s)

EXAMPLE

MCCOYS CREEK RESTORATION

The McCoys Creek Recreation and Restoration Project, currently underway, exemplifies the efforts of Action 8: Make Room for the River. Like many creeks in Jacksonville, much of the historic McCoys Creek was channelized underneath highways or hidden behind dense overgrowth. The creek suffered from water quality and acute flooding issues. Through City, nonprofit, community, and stakeholder collaboration, the project is making a significant impact in improving resilience, ecology, and quality of life in Jacksonville.

The City of Jacksonville has committed $105.4 million to restore McCoys Creek through natural channel design and mitigate the ongoing and frequent flooding in nearby neighborhoods.[8] Groundwork Jacksonville, a local nonprofit, has partnered with the City to engage residents and community stakeholders to craft a vision plan and design for McCoys Creek that reduces flooding, improves water quality, restores fish and wildlife habitats, expands recreational opportunities and access through a multimodal greenway, and establishes wayfinding that honors McCoys Creek's rich social and cultural history.

The McCoys Creek project is a great example of the resilience dividend: by building a larger project with multiple benefits, many funding sources can be combined and leveraged, rather than used piecemeal. Combining the expertise of multi-disciplinary teams with community engagement, feedback, and values has led to a project with broad support and extensive benefits. While still under construction, this project is already demonstrating flood risk reduction benefits, evidenced by its ability to mitigate against the impacts of Hurricane Ian in fall 2022.

EXAMPLE

RIBAULT RIVER CORRIDOR PROJECT

The Ribault River Corridor Project demonstrates ways in which Jacksonville can maintain environmental health at the neighborhood scale and prioritize investments that expand access to waterways and seek to address the needs of individual communities. For this project—located on the banks of the historic Ribault River—LISC (Local Initiative Support Corporation) Jacksonville and the St. Johns Riverkeeper partnered with community and academic leaders to identify community assets, social and environmental vulnerabilities, and community-defined investments for parks and waterway access, housing, infrastructure, and environmental quality. Different from McCoys Creek which is highly urbanized, the Ribault River Corridor Project will help determine how creek restoration can work on a larger scale and identify elements that are transferrable to many other tributaries throughout Jacksonville.

9 | Develop a green stormwater infrastructure program across Jacksonville based on the best available science and data.

The growing trend of "cloudburst" rain events that drop many inches of rainfall in a short period of time is a phenomenon impacting every part of Jacksonville. These increasingly regular events can overwhelm the city's drainage systems and worsen flooding. Oftentimes, cloudbursts are not named storms, not always easy to predict, and may arrive as one single heavy rain event or many sustained days of rain when the ground is saturated and storage systems are full. Like many other cities experiencing these types of events, Jacksonville's drainage systems, including underground pipes, stormwater ponds, and open-air drainage ditches on the side of the road, can be overwhelmed by the frequency and severity of such rainfall events. Simply put, there is often too much water and not enough places for it to go. Green stormwater infrastructure can help relieve the pressure that heavy rainfall puts on Jacksonville's drainage system by capturing and holding water before it reaches the storm drain system and absorbing overflow during rain events. Green infrastructure also improves water quality, mitigates extreme heat, expands natural space, and creates a healthier environment for residents.

Action Description

Up until now, Jacksonville and other cities across the U.S. have sought to address stormwater flooding by looking at historical data to identify where it has already been happening. Analyzing reported flood data from 630-CITY, for example, is a useful first step to identify key areas that experience repeat stormwater flooding, but the City recognizes the need for more sophisticated estimates that can more accurately project future flood risk from both heavy rainfall events and compound flood events (events when different types of flooding, such as storm surge and heavy rain, occur at the same time). Using new estimates of flood risk and mapped outputs from Jacksonville's upcoming compound flood analyses, the City will establish a new program focused on green stormwater infrastructure, identify locations with the greatest need for these types of interventions, and invest resources accordingly.

Shocks and Stressors Addressed

Stormwater Flooding / Urban Heat Island Effect

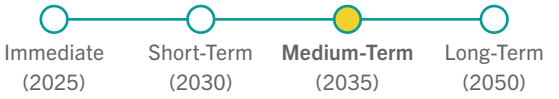
Implementation Partners

Resilience / Public Works / Parks

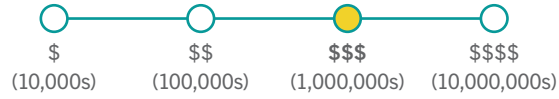
Potential Funding Mechanisms

Resilient Florida / USACE Silver Jackets

Implementation Timeframe



Relative Cost



Credit: Philadelphia Water Department

CASE STUDY

GREEN CITY, CLEAN WATERS

Philadelphia, PA | 2011

Green City, Clean Waters is a comprehensive 25-year plan developed by the Philadelphia Water Department (PWD) to implement green stormwater infrastructure (GSI) citywide. The primary goal of this program is to reduce water pollution by utilizing GSI such as rain gardens, swales, and stormwater tree trenches to store stormwater runoff before it reaches the sewers and causes an overflow of polluted waters into the city's rivers. PWD has partnered with other city departments, agencies, private developers, and organizations to install GSI at recreation centers and schools, as well as in parking lots. Green City, Clean Waters is also looking into opportunities for GSI to be coupled with future renovations, such as upgrades to athletic fields.

In the program's first decade of implementation, nearly 800 sites across the city have incorporated GSI, resulting in more than 2.7 billion gallons of polluted water kept out of local waterways. These efforts yield additional environmental benefits like reduced stormwater flooding, improved air quality, energy conservation, ecological support, and reduced impacts from extreme heat. They also provide economic and social benefits such as improved opportunities for recreation, increased property values, investment in local businesses, and reductions in crime.

10 | Expand Jacksonville's tree canopy.

Trees improve air quality, reduce the amount of energy needed to cool buildings, provide shade, absorb stormwater, increase property values, and enhance an area's beauty. Trees are also critically important for wildlife. A strategic approach to the management and long-term care of the urban forest can increase the likelihood of achieving benefits from trees. The City will develop, implement, and monitor an Urban Forest Management Plan which will guide proactive and effective management for long-term community benefits. This plan will be developed in coordination with the Jacksonville Tree Commission, city arborists, urban foresters, and natural resource staff, and will inform plans to manage invasive species, set guidelines for planting climate-adaptive species, and provide recommendations for pruning and tree maintenance processes across the city. The Office of Resilience will work with the Tree Commission to lead the development, implementation, and monitoring of the Urban Forest Management Plan. The Department of Public Works and Parks Department will support the development of guidance for planting and maintaining resilient tree species and the revision of codes to improve tree maintenance and account for temperature, salinity, rainfall fluctuations, and invasive species. They will also coordinate with JEA to ensure North American Electric Reliability Corporation (NERC) reliability standards for electric line clearance and JEA's standards for tree trimming are met.

Shocks and Stressors Addressed

Extreme Heat / Urban Heat Island Effect / Stormwater Flooding

Implementation Partners

Parks / Public Works / Tree Commission / Greenscape

Potential Funding Mechanisms

City Tree Mitigation Fund / U.S. Forest Service Urban Community Forestry Program

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	**Medium-Term (2035)**	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$ (100,000s)**	$$$ (1,000,000s)	$$$$ (10,000,000s)

10.1 Plant more climate-adaptive trees to increase shade and ecosystem value.

As Jacksonville's climate changes, temperatures increase, and rainfall and storms become more intense and frequent, selecting tree species able to tolerate these conditions will be critical to long-term survival of a healthy urban forest. Some species are more adapted to these climate changes than others, and being aware of these differences will support more long-term survivability of the urban forest. Regardless of climate change, site-specific conditions need to be understood when planting a tree. Trees near the coast should be tolerant of flooding by saltwater during storms and salt spray. Trees should be able to withstand hurricane force winds and should be relatively drought tolerant to reduce water use. Additionally, planting a wide variety of species will support biodiversity and improve resilience. Investing in the planting and maintenance of native, climate-adaptive trees in parks, on public lands, and on rights of way can increase tree canopy coverage to mitigate the impacts of urban heat and enhance the value of ecosystems throughout the city.

10.2 Develop an Urban Forest Management Plan.

The Office of Resilience will work with the Parks Department, Department of Public Works, JEA, and the Jacksonville Tree Commission to develop and coordinate the implementation of a citywide Urban Forest Management Plan. The coordinated development and implementation of this plan will ensure that Jacksonville's tree canopy is maintained, it continues to expand, and new plantings are in line with resilience goals. This plan will include a citywide tree inventory, detailed procedures for handling invasive species and identifying new planting zones, and a framework for improving pruning and maintenance processes. The Tree Commission can draw on support from several national Urban Forestry resources, such as the Forests in Cities Network, the Urban Forest Management Plan Toolkit provided by the Inland Urban Forest Council, and resources from the Natural Areas Conservancy and the Trust for Public Land.

10.3 Connect open spaces and ecosystems to establish habitat corridors and improve water management.

A healthy and robust tree canopy provides many benefits to Jacksonville communities; however, some residents are skeptical about the value of existing and newly planted trees and the requirements of maintaining them. Common concerns include property damage or power outages from ill-maintained trees and a lack of resources needed for tree maintenance and planting. Engaging and including Jacksonville communities in decisions about the management and expansion of the tree canopy in their neighborhoods can build trust between the City and its residents, increase support for tree plantings, and foster a collective stewardship of a thriving urban forest. The City will partner with local nonprofit organizations, such as Greenscape, to conduct outreach and education efforts across Jacksonville. This could include activities like hosting public meetings, participating in citywide public events to inform residents about the Urban Forest Management Plan and the state of Jacksonville's tree canopy, offering professional arborist training, or organizing leaf collection programs. The City can utilize Jacksonville's TreePlotter website and resources from the University of Florida Institute of Food and Agricultural Sciences to inform residents about tree health, proper maintenance, resources available to assist homeowners, and the multiple benefits of trees.

11 | Ensure water and energy utilities can meet the growing demands of the future.

Reliable electricity and water are essential for Jacksonville's residents and businesses. Risks to the energy system are growing, driven by hurricane winds, heat waves, extreme freeze events, and other climate hazards, as well as other threats such as cyber-attacks. These hazards can also pose challenges to a safe and reliable drinking water supply with the possibility of cascading shocks that affect both the energy and water supply. As Jacksonville grows, the population's demands will increase. JEA remains focused on providing reliable utilities and will continue to seek improvements to its electric and water systems so they can withstand the hazards of today and tomorrow to provide reliable electricity and safe drinking water for the city. JEA's own ongoing resilience program includes industry standard vegetation management, the installation of more advanced technologies to reduce the duration of customer outages, the use of meter data from smart meters and Geographical Information Systems (GIS) to allow for automated troubleshooting, and the investment of $24 million over the past 5 years to target customers and neighborhoods that experience more than five outages of at least one minute over a 12-month period.


Credit: JEA

Shocks and Stressors Addressed

Power Outage / Supply Chain Disruption / Water Quality / Groundwater Threats

Implementation Partners

JEA

Potential Funding Mechanisms

JEA Capital Planning

Implementation Timeframe

Immediate (2025) | Short-Term (2030) | Medium-Term (2035) | Long-Term (2050)

Relative Cost

$ (10,000s) | $$ (100,000s) | $$$ (1,000,000s) | $$$$ (10,000,000s)

11.1 Support the implementation and regular updating of JEA's Integrated Resource Plans.

An Integrated Resource Plan (IRP) is a long-term planning document utility companies develop to ensure they're able to meet supply and demand needs. Considering the input of representative stakeholders and modeling multiple scenarios and sensitivities, JEA will continue to develop recommendations for asset decisions based on integrated operational and financial plans that align with JEA's strategic direction. In its 2023 Electric IRP, JEA set goals including implementing a 35% clean energy portfolio, retiring less efficient generating assets, using 100% clean energy to serve JEA facilities, and increasing and enhancing energy efficiency programs to offset growing demands. JEA's Water Integrated Plan is aimed at diversifying its water supply portfolio and will focus on reducing surface water discharge in the coming years. Because JEA's operations are essential to all city operations and critical for every resident, it is imperative that the City continues to be an active partner in these long-term planning and implementation processes as JEA regularly updates them.

11.2 Improve energy resilience in Jacksonville's neighborhoods to minimize disruptions to service delivery.

With extreme weather often comes power outages, which can be deadly in high heat and humidity. Minimizing disruptions to electricity and energy delivery can take many forms: improving maintenance of power poles; replacing transformers; and adding redundancies in transmission lines. These components also power future growth of the city, increasing reliability as demand also increases. Microgrids can also play a role where specific installations of solar or other renewables are 'islands' in the electricity system, backed up by batteries and other energy storage, and able to provide power even when the grid is struggling. Microgrids can support neighbors with cooling, recharging, food storage, and more after disasters. The City and JEA will continue to plan for hazard events, prioritizing full resumption of the grid while exploring how distributed energy resources like backup generation, combined heat and power, and microgrid solutions throughout Jacksonville can provide extra support for residents.

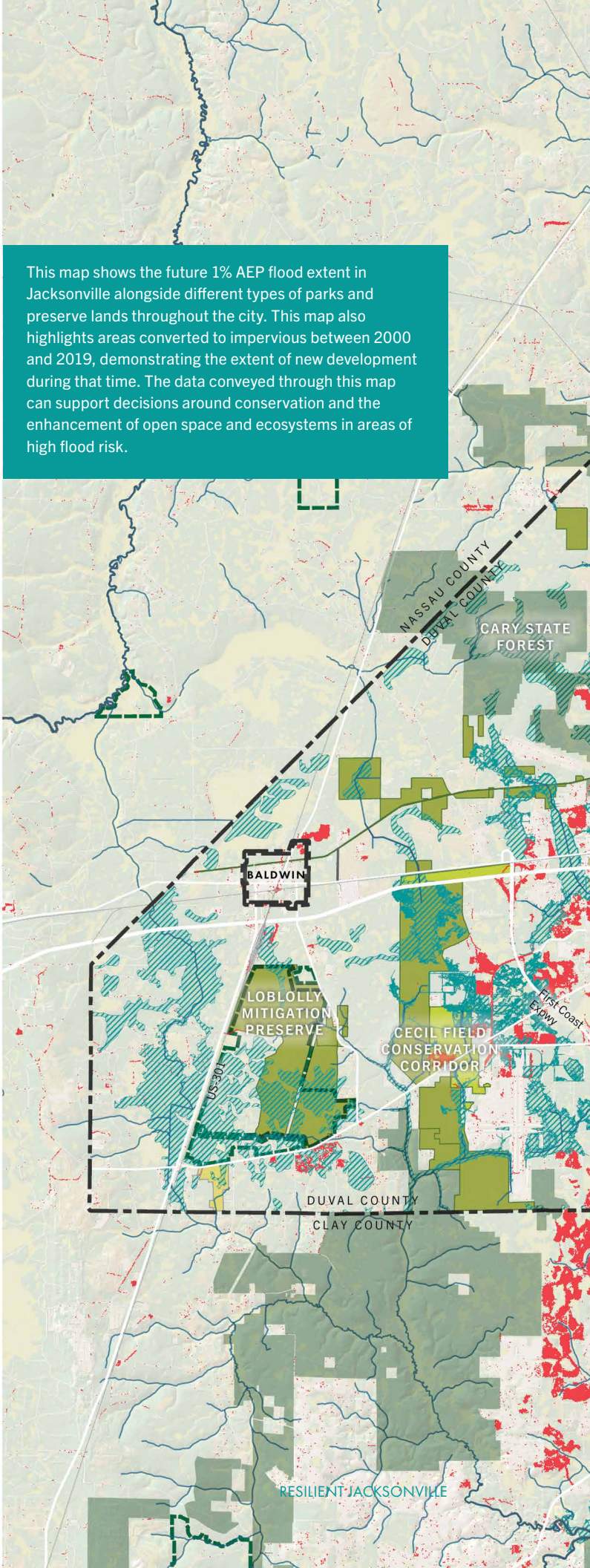
PRESERVE

Conserve and enhance valuable open space and ecosystems and limit development in areas of high flood risk.

This map shows the future 1% AEP flood extent in Jacksonville alongside different types of parks and preserve lands throughout the city. This map also highlights areas converted to impervious between 2000 and 2019, demonstrating the extent of new development during that time. The data conveyed through this map can support decisions around conservation and the enhancement of open space and ecosystems in areas of high flood risk.

Actions Include:

12. Preserve **ecologically important areas** with the capacity to manage water and mitigate extreme heat.
13. Improve **land management and stewardship** to enhance ecosystem value.
14. Discourage development in current and future **undeveloped high-risk areas** and mitigate downstream impacts in the watershed.
15. Enhance ecosystem and community health by improving **water, soil, and air quality**.



LEGEND

- City Boundaries
- Creeks and Streams
- Open Water
- 2070 1% Annual Exceedance Probability Flood Extent
- Timucuan Historical & Ecological Preserve
- Florida State Parks & Conservation Land
- COJ Preservation Parks
- COJ Regional Parks
- COJ Specialty Parks
- COJ Community and Neighborhood Parks
- Mitigation Banks
- Areas Converted to Impervious, 2000-2019

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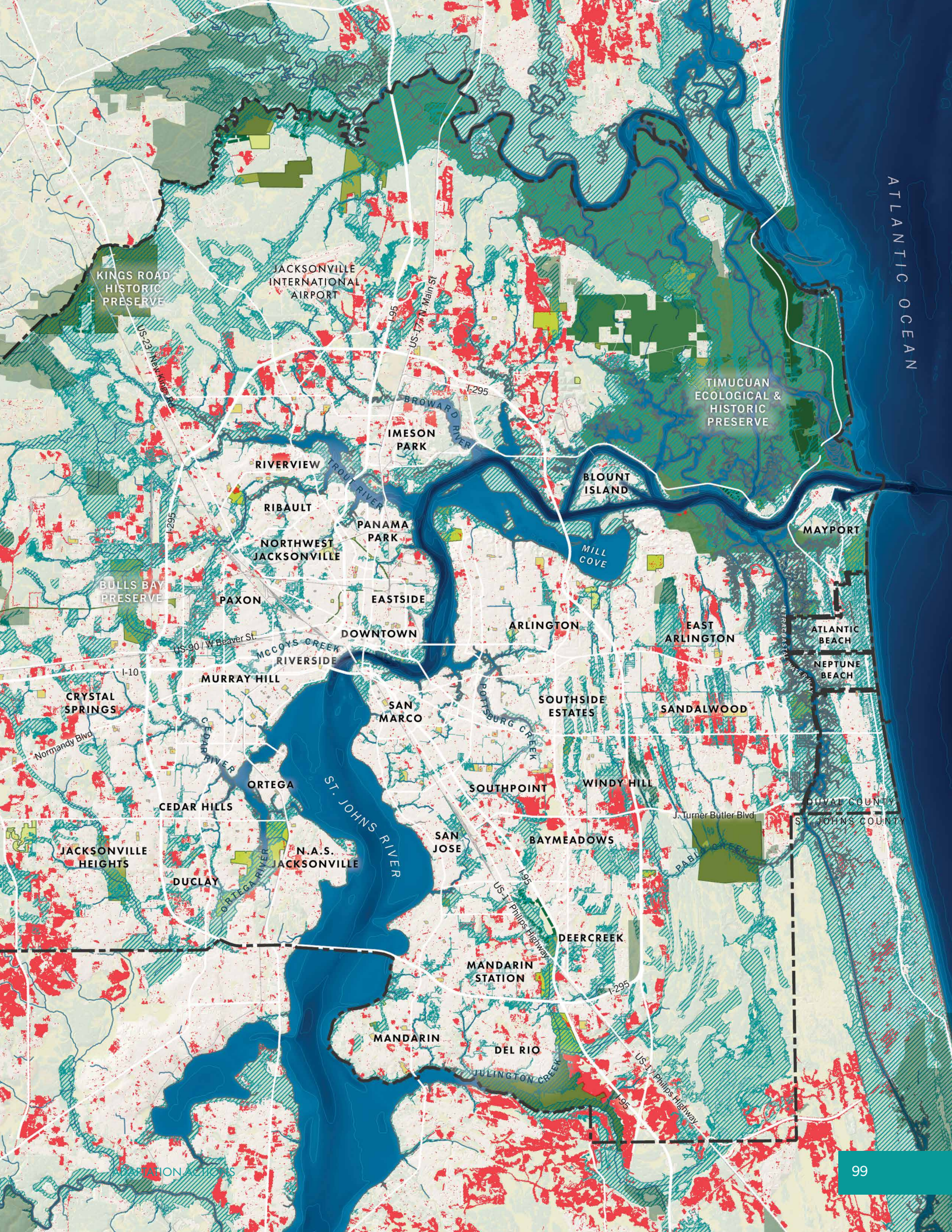
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TIMUCUAN ECOLOGICAL & HISTORIC PRESERVE
IMESON PARK
RIVERVIEW
TROUT RIVER
BLOUNT ISLAND
RIBAULT
PANAMA PARK
MAYPORT
NORTHWEST JACKSONVILLE
MILL COVE
BULLS BAY PRESERVE
PAXON
EASTSIDE
ARLINGTON
EAST ARLINGTON
ATLANTIC BEACH
DOWNTOWN
US-90 / W Beaver St.
MCCOYS CREEK
RIVERSIDE
NEPTUNE BEACH
I-10
MURRAY HILL
CRYSTAL SPRINGS
SAN MARCO
SOUTHSIDE ESTATES
SANDALWOOD
BOTTSBURG CREEK
Normandy Blvd
CEDAR RIVER
ORTEGA
ST. JOHNS RIVER
SOUTHPOINT
WINDY HILL
CEDAR HILLS
DUVAL COUNTY
ST. JOHNS COUNTY
J. Turner Butler Blvd
SAN JOSE
BAYMEADOWS
JACKSONVILLE HEIGHTS
N.A.S. JACKSONVILLE
PABLO CREEK
DUCLAY
ORTEGA RIVER
US-1 / Philips Highway
DEERCREEK
MANDARIN STATION
MANDARIN
DEL RIO
JULINGTON CREEK
ADAPTATION ACTIONS

12 | Preserve ecologically important areas with the capacity to manage water and mitigate extreme heat.

Jacksonville's ecosystem diversity is impressive—its habitats include marine and estuarine, intertidal, subtidal, estuarine wetlands, freshwater wetland, rivers and streams, ponds and lakes, coastal beaches, coastal uplands, scrub and prairie, and upland and pine forests. Each ecosystem plays a role in a resilient Jacksonville. Establishing mechanisms for preserving and protecting existing natural areas, especially wetlands and flood-prone areas, can provide many benefits for the city. Ecologically important areas are defined as supporting native plant communities and wildlife, providing environmental benefits such as improved air and water quality, and reducing risks associated with natural disasters and climate change. Specifically, they help to purify air and water, lower air temperatures, stabilize soil which reduces erosion, reduce flood risks and impacts, recharge the aquifer, and provide important habitat. Strategic land preservation is critical to improving Jacksonville's resilience and maintaining its identity as a spacious city with the largest urban park system in the nation.

Shocks and Stressors Addressed

Flooding / Extreme Heat / Wildfires / Air Quality / Water Quality

Implementation Partners

Parks / SJRWMD / North Florida Land Trust

Potential Funding Mechanisms

SJRWMD

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$ (100,000s)**	$$$ (1,000,000s)	$$$$ (10,000,000s)

12.1 **Protect existing park and preserve lands in perpetuity.**

Protecting lands in perpetuity allows important ecological areas to grow without risk of development. Within the city limits, there are many protected parklands, including state parks, wetland mitigation banks, and the Timucuan Ecological and Historical Preserve National Park. The City of Jacksonville manages more than 400 park and recreational sites providing many services to residents. Some of these are preserve lands, which are larger, natural areas with specific types of recreational use. The services these existing parks and preserve lands provide Jacksonville include benefitting mental and physical health, naturally absorbing and filtering rainwater, recharging the aquifer, providing safe and natural places for riparian flooding, improving air quality, and storing carbon, among others. Furthermore, according to the Natural Areas Conservancy's 2022 Cooling Study, which included 12 U.S. cities (two in Florida), forested natural areas are 3–9°F cooler on average and are the coolest type of greenspace in cities.[9] Some of Jacksonville's parks and preserve lands are threatened by development pressures. Removing existing parkland from the city's green space network is counterproductive to achieving citywide resilience as it results in a loss of the benefits listed above. To prevent the loss of Jacksonville's park and preserve lands for the next century, the Parks Department will develop a program to add important preserve lands and existing parks into long-term conservation easement agreements. Additionally, the Office of Resilience will develop a citywide policy to limit the sale of existing City-owned park and preserve lands and will work with the Planning and Development Department to add restrictions to the land-use code to prevent the conversion of City park land into other types of land uses.

12.2 **Support strategic land acquisition for conservation.**

Acquiring lands that support important ecological functions and provide citywide benefits is an effective strategy for long-term conservation. The Office of Resilience, in partnership with the Parks Department and Real Estate Division, will identify and pursue methods for acquiring strategic areas of land. This may include large natural areas or contiguous parcels of natural areas, areas adjacent to existing park land, properties experiencing repetitive flooding, or areas of land within future floodplains. The City can partner with other organizations such as the North Florida Land Trust, Florida Forever Program, the St. Johns River Water Management District, and the Timucuan Parks Foundation to leverage resources to apply to grants for land acquisition.

13 | Improve land management and stewardship to enhance ecosystem value, improve public safety, and reduce wildfire risk.

Investment in the stewardship of open space is critical for maintaining healthy ecosystems and the services they provide to Jacksonville's residents. Well-maintained open spaces support native biodiversity, which is key to ecosystem resilience. Native ecosystems provide valuable ecological functions, such as water filtration and storage, while also providing resilience benefits such as reduced flood risk and mitigation of extreme heat effects. Proper land management can reduce the risk of wildfire damage and provide improved visibility and public safety in park land. Land management is also needed to prevent land loss or degradation and habitat conversion due to various climate threats, such as sea level rise, increasing salinity of the St. Johns River, flood damage, increased heat and drought, wildfire, extreme storm events, coastal erosion, and invasive species.

Shocks and Stressors Addressed

Wildfire / Air Quality / Water Quality / Sea Level Rise / Saltwater Intrusion / Coastal Erosion / Drought

Implementation Partners

Parks / JFRD

Potential Funding Mechanisms

Increased General Funding for Parks Department

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$ (100,000s)**	$$$ (1,000,000s)	$$$$ (10,000,000s)

13.1 **Establish guidelines, resources, and trainings for resilient land management.**

Knowledge of and adherence to best practices in land management is an effective step toward strengthening Jacksonville's resilience. In addition to the ecosystem types described in Action 12, there are also many types of working lands and open space on private land in Jacksonville. Each of these ecosystems and land uses require a specific suite of land management approaches to support, restore, and enhance ecological functions. The City will provide comprehensive guidance and training for City staff, contractors, and volunteers to improve land management practices across the full range of ecosystem and open space types. These resources can guide management of City-owned lands as well as be shared with other agencies and landowners.

13.2 **Manage invasive species and nuisance animals.**

Invasive species and nuisance animals can severely damage ecosystems and harm native biodiversity, and invasive plants, in particular, are adversely impacting natural areas in Jacksonville. It can be costly and difficult to treat invasive plants once they become established. For context, the City spent approximately $30,000 in 2022 to treat invasive plants, and much more work is needed to address the problem. Though a wide variety of invasive plants have been treated in Jacksonville's preserve parks, the problem is not limited to a few species. The City will explore opportunities such as increasing landscape inspector and contractor trainings, prohibiting invasives from use on City projects, encouraging property owners to remove invasive trees and plants, and strengthening enforcement of existing codes related to invasive species.

13.3. **Manage forests to reduce wildfire risk.**

Unmanaged forests can pose a risk for wildfire damage. Prescribed burning, or a planned fire under controlled conditions, maintains the health of forests and reduces the risk of wildfires. Other vegetation management activities, such as the mechanical treatment of overgrown understory vegetation, can be used where prescribed burns are not appropriate. To protect Jacksonville's ecologically valuable open space and its people, the City will prioritize investments in proactive land management to reduce wildfire risk, including increased monitoring to prevent wildfires from growing out of control.

14 | Discourage new development in current and future high-risk areas and mitigate downstream impacts in the watershed.

Minimizing new development in high-risk, undeveloped areas to limit exposure to flood risk can be an effective strategy to improve the lives of Jacksonville residents and save public dollars. By discouraging development in areas that are known to be flood prone now or in the future, more costly adaptation measures are less likely to be needed. Discouraging development in these areas does not limit overall growth, but instead guides smarter investments for developers and the City. Additionally, a watershed-based approach to land use and development, where decisions upstream take into consideration how they may impact flood risk in communities downstream, can avoid putting more residents at risk.

Action Description

Jacksonville will minimize new development in current and future flood-prone areas and avoid new development that increases flood risks for communities downstream as part of its effort to accommodate anticipated overall growth safely and cost-effectively. Using updated flood risk data (see Sub-Action 40.2), the City will identify specific flood-prone areas where new development should be avoided and begin to integrate mechanisms for discouraging new growth in these areas into both its comprehensive plan and land development regulations, including appropriate enforcement mechanisms. The City will also factor flood risk criteria into prioritizing areas for land acquisition (see Sub-Action 12.2). Another mechanism for preventing new development in flood-prone areas is to increase the minimum distance required as a buffer between developed areas and wetlands, ponds, and other surface waters. The City will further work to increase the development buffer from wetland and surface waters to a minimum of 100 feet. The resulting preserved land from these actions also provides opportunities for water-related recreation, floodable landscapes for stormwater management, wetland enhancement and restoration, and improved water quality.

Shocks and Stressors Addressed

Flooding / Water Quality

Implementation Partners

Planning & Development

Potential Funding Mechanisms

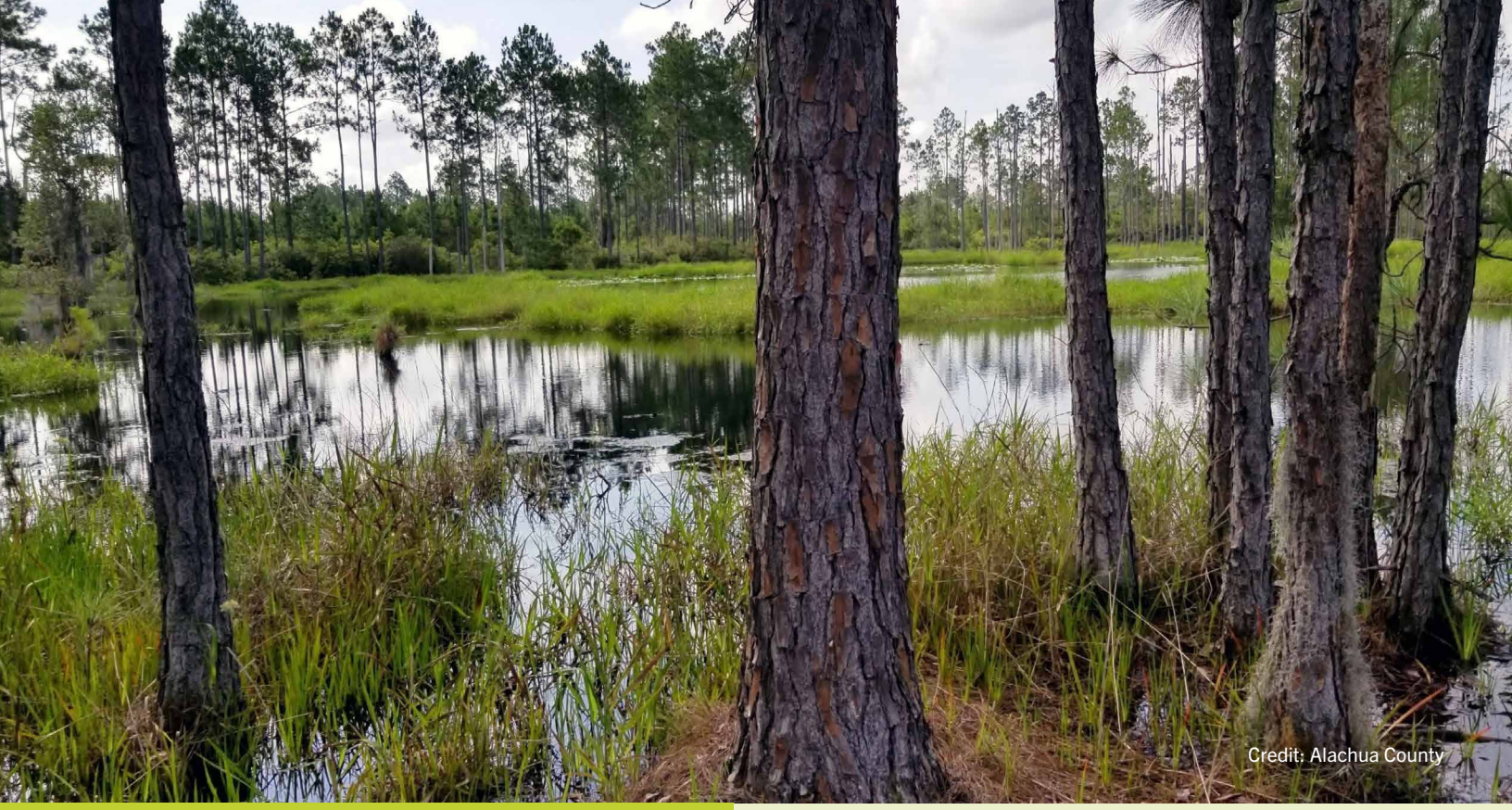
Planning Department / Floodplain Managment Personnel

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	$$$ (1,000,000s)	$$$$ (10,000,000s)



Credit: Alachua County

CASE STUDY

WETLAND BUFFERS

Alachua County, FL | 2018

Many cities, counties, and states regulate the minimum allowable distance between developed land and wetlands because wetlands help with flood control, reduce damage from storm surges, filter sediment and pollutants, recharge groundwater, and provide important habitat for flora and fauna. Wetlands also require healthy upland areas, and buffers that protect land between wetlands and upland areas will become even more important in the future as sea level rise will cause wetlands to "migrate" into upland areas at pace with rising water levels. While local governments have set wetland buffers at varying distances, buffers of 25 feet or fewer have shown no effectiveness in providing protection to wetlands and buffers of greater than 50 feet tend to show fewer signs of human disturbance.[10]

Alachua County, Florida, is a nearby example of a local government protecting its wetlands by increasing the buffer distance to developed areas. Alachua County does not permit development activity to occur within set buffers from existing wetlands, surface waters, habitat for listed significant species, strategic ecosystems, or geologic features. Protection of buffers prohibits clearing, alteration, construction, expansion of utilities and roads, and vegetation removal.[11] Countywide wetland protection standards were adopted in 2018 and additional protections for natural resources passed in 2021 outline specific habitat, listed species habitat, strategic ecosystems, and significant geologic features for protection. Minimum buffer distances vary from 35 to 100 feet depending on the quality and type of wetlands, surface water, and natural resources.

15 | Enhance ecosystem and community health by improving water, soil, and air quality.

Many Jacksonville residents love and appreciate the city's waterways, parks, wetlands, marshes, and other natural areas for their beauty. These areas also play an important role in mitigating heat, storing and cleaning water, and supporting wildlife. Preserving and enhancing these natural areas can help to ensure that Jacksonville's water, air, and soil are clean and support community and human health. The City of Jacksonville and its partners will address issues of air, water, and soil quality by working with communities to map, monitor, and address environmental quality issues; limit new sources of pollution; and increase the number of environmental clean-ups to resolve existing problems.

Shocks and Stressors Addressed

Saltwater Intrusion / Groundwater Threats / Water Quality / Air Quality

Implementation Partners

Neighborhoods Department, Environmental Quality Division / SJRWMD / FDEP / JEA

Potential Funding Mechanisms

EPA Brownfields / Federal Environmental Justice Grants

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	Medium-Term (2035)	**Long-Term (2050)**

Relative Cost

$ (10,000s)	$$ (100,000s)	**$$$ (1,000,000s)**	$$$$ (10,000,000s)

15.1 **Improve watershed health and water quality.**

Jacksonville's high groundwater table and extensive network of rivers and tributaries place both surface water and groundwater close to sources of contaminants, making the city's watersheds particularly vulnerable to pollutant discharge. The City's Environmental Quality Division (EQD) monitors the nutrient levels at 130 tributary sites, with results and trends published annually, while JEA conducts nearly 45,000 water quality tests per year for more than 100 bacteriological and chemical components. St. Johns Riverkeeper monitors the amount of submerged aquatic vegetation, a key indicator of the river's health that has been declining in recent years. The City will work with EQD, JEA, and St. Johns Riverkeeper to monitor and improve water quality, watershed health, and applicable emerging regulations focusing on specific critical indicators that will help determine further action on fertilizer reduction, septic and sewer overflows, saltwater intrusion, and other issues.

15.2 **Address saltwater intrusion and rising groundwater threats.**

Sea level rise can elevate coastal groundwater levels and drive saltwater into the aquifer and upstream into the St. Johns River. Negative effects of this process can include chloride contamination of freshwater wells and harm to sensitive freshwater and brackish ecosystems including submerged vegetation. The effects of saltwater intrusion can be exacerbated by excess pumping of groundwater further inland. Jacksonville will collaborate with the St. Johns River Water Management District to identify the risks and potential solutions to minimize and mitigate saltwater intrusion and groundwater threats.

15.3 **Expand cleanups of toxic soils and brownfield sites.**

In the 1960s, ash from waste burned in incinerators was mixed with sand and used as fill to develop residential areas of Jacksonville. Successful partnerships with the U.S. Environmental Protection Agency and the Florida Department of Environmental Protection to clean up brownfields, like the Brown's Dump site near the former Mary McLeod Bethune Elementary School, resulted in the remediation of more than 200 residences with related pollution issues.[12] Additionally, more than 2,500 above and below ground petroleum storage tanks, which are monitored by the City's Environmental Quality Division, are registered in Duval County. While these tanks are regulated and monitored, they can still result in future contamination. Funding sources for cleanups currently include Department of Environmental Protection funding from gasoline taxes, Voluntary Cleanup Tax Credits, and state tax credits through the Florida Department of Economic Opportunity. The City will continue to prioritize resources for soil and brownfield cleanups to improve community health and reduce contamination in stormwater runoff.

15.4 **Maintain healthy air quality.**

Jacksonville's Environmental Quality Division operates the City's air quality monitoring program, using seven stations around Duval County to monitor and transmit air quality data to the EPA and Florida Department of Environmental Protection. This reporting is part of ensuring compliance with the National Ambient Air Quality Standards (NAAQS) and provides the public with real-time air quality data through the EPA's AirNow.gov website. The City will continue to monitor and provide robust air quality information to the public to address growing concerns, and JaxReady will add air quality alerts based on monitoring data.

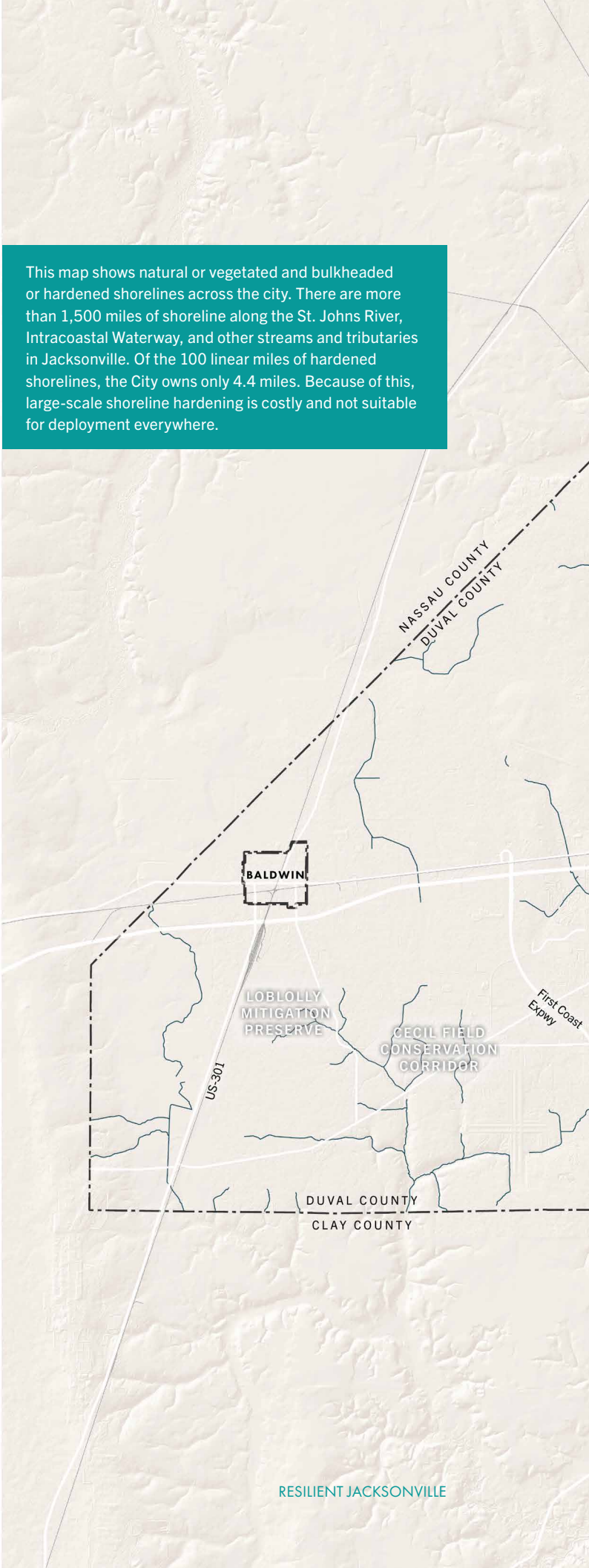
PROTECT

Fortify critical city systems against future threats.

This map shows natural or vegetated and bulkheaded or hardened shorelines across the city. There are more than 1,500 miles of shoreline along the St. Johns River, Intracoastal Waterway, and other streams and tributaries in Jacksonville. Of the 100 linear miles of hardened shorelines, the City owns only 4.4 miles. Because of this, large-scale shoreline hardening is costly and not suitable for deployment everywhere.

Actions Include:

16. Invest strategically in **hardened shorelines**.
17. Identify shorelines where **natural and nature-based solutions** can provide long-lasting ecosystem service benefits.
18. Improve **digital security** of critical assets and infrastructure from cyberattacks.



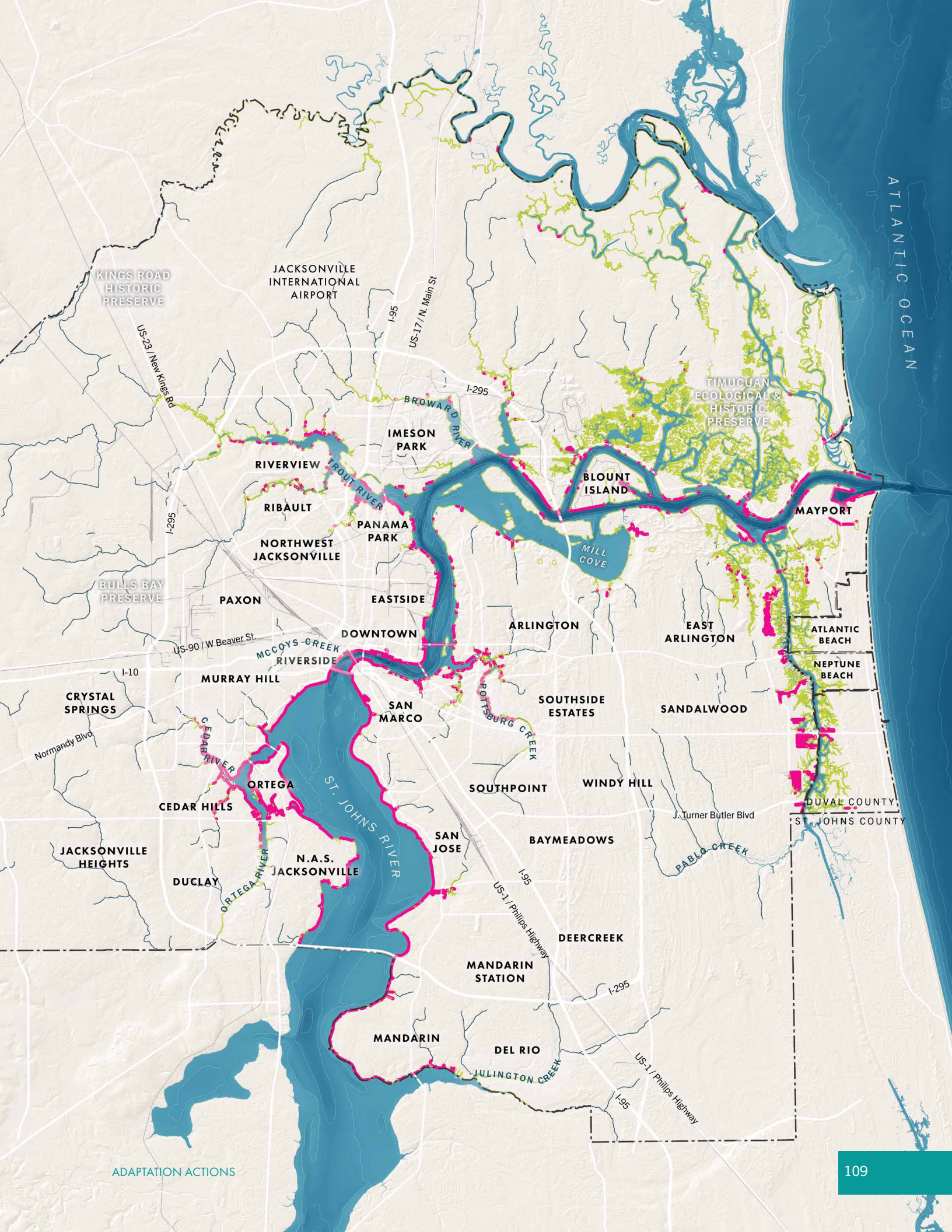
LEGEND

Shoreline Types

Natural or Vegetated

Bulkheaded or Hardened

0 2 4 8 mi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RIVERSIDE
NEPTUNE BEACH
I-10
MURRAY HILL
CRYSTAL SPRINGS
SAN MARCO
POTTSBURG CREEK
SOUTHSIDE ESTATES
SANDALWOOD
Normandy Blvd
CEDAR RIVER
ORTEGA
ST. JOHNS RIVER
SOUTHPOINT
WINDY HILL
DUVAL COUNTY
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J. Turner Butler Blvd
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JACKSONVILLE HEIGHTS
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PABLO CREEK
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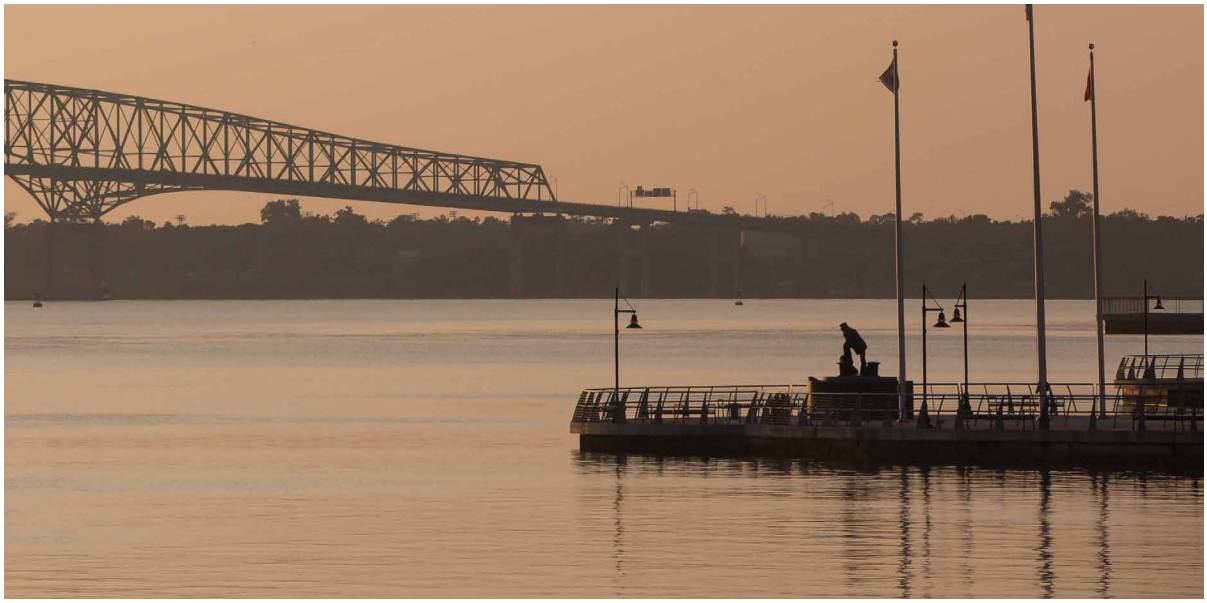
ORTEGA RIVER
I-95
US-1 / Philips Highway
DEERCREEK
MANDARIN STATION
I-295
MANDARIN
DEL RIO
JULINGTON CREEK
US-1 / Philips Highway
I-95

16 | Invest strategically in hardened shorelines.

Shoreline hardening along the river and tributaries is a resilience measure appropriate to use for shoreline stabilization and flood risk reduction in some areas. Costs to harden shorelines are high and some construction options can damage ecosystems or limit recreational options. Site suitability, tradeoffs, and overall benefit must be considered when opting for a hardened shoreline solution. Where appropriate, elevating publicly owned bulkheads and designing bulkheads with adaptive capacity (i.e., which can be raised over time as needed) will reduce the city's level of risk during storm surge events from hurricanes and nor'easters. Notably, bulkheads and seawalls can trap runoff behind them causing residual flooding. To address the risk of residual flooding, a combination of tide valves and pump stations is often necessary to drain runoff during high tide. Pump station design, construction, operation, and maintenance significantly increases the overall cost of the flood protection project. The City will set height standards for public and privately owned bulkheads, provide material resources for privately owned bulkheads in locations necessary for contiguous shoreline protection to benefit the city as a whole, and use the best available data to make informed spatial decisions about hardening along the St. Johns River and its tributaries.



Shocks and Stressors Addressed

Flooding / Sea Level Rise / Chronic Flooding / Infrastructure Failure

Implementation Partners

Resilience / Public Works / USACE

Potential Funding Mechanisms

CIP / Resilient Florida

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	**Medium-Term (2035)**	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	$$$ (1,000,000s)	**$$$$ (10,000,000s)**

16.1 Manage publicly owned bulkhead heights in accordance with best available flood data.

Structural interventions, like bulkheads or seawalls, are some of the costliest resilience interventions that a city can undertake. These structures can also change riverine and stormwater flow patterns, remove shoreline ecosystems, disconnect the river or creek from its floodplain (which worsens water quality), and be ineffective if not built to sufficient height or durability standards. Structural interventions do not remove the need for evacuation during extreme storms because their primary function is to protect property and physical assets. For these reasons, the City will use the best available science and data to select sites and design bulkheads for shoreline stabilization and flood risk reduction where such protection is the most appropriate option. For example, downtown Jacksonville saw extreme flooding and damage during Hurricane Irma in 2017, and the City is now elevating these bulkheads and incorporating adaptive capacity to elevate them to additional heights in the future.

16.2 Set height standards for privately owned bulkheads.

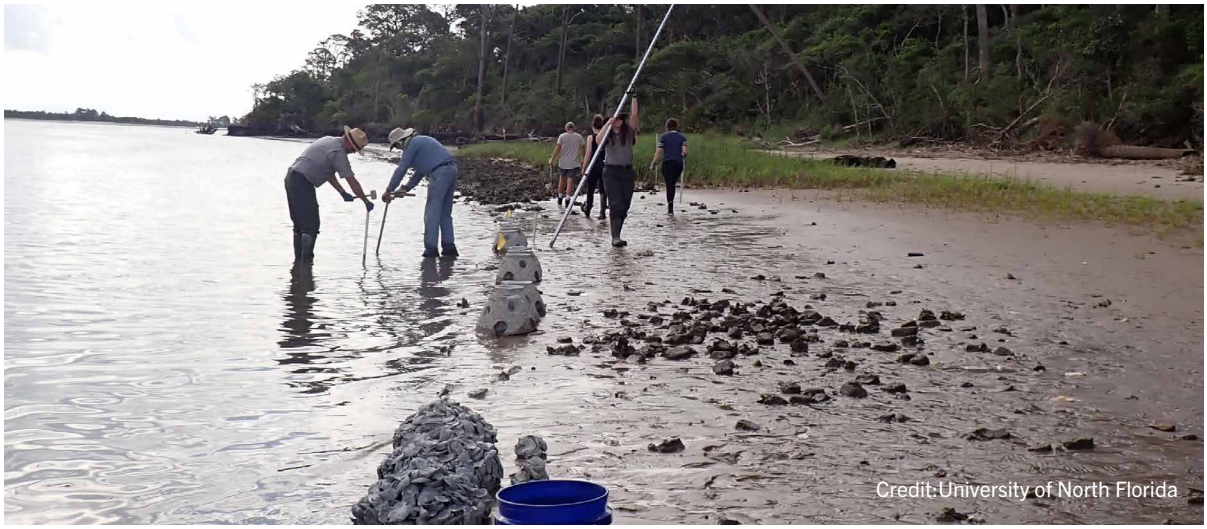
The City owns only 4.4 of the 100 linear miles of hardened shorelines in Jacksonville, limiting the effectiveness of public bulkhead management as a resilience measure. Setting bulkhead height standards for privately constructed and owned sections of bulkhead, therefore, has a more widespread potential impact on increasing the city's resilience. Jacksonville will consider best practice and lessons learned in other areas, such as South Florida, to identify how to set and implement private bulkhead height standards. For example, sea level rise projections can be considered to ensure that any newly constructed or modified bulkhead is designed to mitigate increasing future flood risks. Jacksonville's bulkhead height standards will be set based on the best available science and data, particularly through the upcoming compound flood risk assessment (see Sub-Action 40.2).

16.3 Evaluate where additional publicly funded structural shoreline protection may be technically and financially feasible.

Adding new bulkhead segments into the City's capital inventory should be managed strategically given the high initial investment required for structural interventions and the long-term operation and maintenance costs needed to support assets like bulkheads, flood gates, and pump stations. The City will consider available data on future flood risk, initial and maintenance costs, and site suitability in determining what new locations may be appropriate for shoreline hardening. In addition, Jacksonville will identify opportunities to partner with the U.S. Army Corps of Engineers as a technical and cost-sharing partner to assess the feasibility of sites for structural shoreline protection and to design and construct new infrastructure where appropriate.

17 | Identify shorelines where natural and nature-based solutions can provide long-lasting ecosystem service benefits.

Natural and nature-based solutions, when implemented strategically, have the capacity to provide multiple resilience benefits. As defined by the U.S. Army Corps of Engineers, natural and nature-based features refer to landscape features that produce flood risk management benefits. Projects such as oyster reef installation, salt marsh restoration, dune establishment, and hybrid gray-green infrastructure have the potential to mitigate impacts from coastal hazards, improve ecosystem health, and even lower long-term costs of shoreline maintenance. For example, oyster reefs can serve as breakwaters as they absorb the force of waves, slow coastal erosion, create habitat, and provide water filtration that enhances surrounding ecosystems. Restoration of salt marsh can also contribute to many of these benefits. The Parks Department, in partnership with the Office of Resilience, will prioritize sites for nature-based shoreline stabilization opportunities, develop solutions for coastal erosion within the City's park system, and identify additional opportunities to implement nature-based solutions that yield multiple public benefits. Additional partnerships with the University of Florida and homeowner associations can facilitate the identification of potential private property natural and nature-based opportunities. To facilitate a data-driven process, the Parks Department will combine results from the *Resilient Jacksonville Vulnerability Assessment* with federally funded research and analyses.



Credit: University of North Florida

Shocks and Stressors Addressed

Coastal Erosion / Chronic Flooding / Water Quality

Implementation Partners

Parks / Resilience / USACE

Potential Funding Mechanisms

Resilient Florida / NFWF Coastal Resilience Fund

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	Medium-Term (2035)	**Long-Term (2050)**

Relative Cost

$ (10,000s)	$$ (100,000s)	$$$ (1,000,000s)	**$$$$ (10,000,000s)**

17.1 **Conduct research and analyses to identify waterfront edges most suitable for natural and nature-based solutions.**

With 59 tributaries, the St. Johns River, and the Atlantic Ocean, Jacksonville has hundreds of miles of waterfront edges. Many of these edges may be suitable for natural and nature-based solutions, particularly to address shoreline erosion. The City will pursue a Living Shoreline Suitability Model, as was developed for the Tampa Bay Area by the Florida Fish and Wildlife Research Institute, and will use the results in conjunction with the vulnerability assessment to prioritize sites for stabilization solutions like oyster reefs, living breakwaters and/or salt marsh restoration.[13] Hybrid gray-green approaches may also be suitable where some degree of hardening is needed, but additional habitat area might provide cascading benefits.

17.2 **Address shoreline erosion in coastal parks.**

Hurricanes and tropical events can cause large-scale erosion to Jacksonville's coastal parks and beaches. Past projects, like the Duval County Shore Protection Project implemented by the Jacksonville District of the U.S. Army Corps of Engineers, have successfully renourished hurricane-eroded beaches, adding sand to provide recreation and tourism opportunities as well as shorebird and marine turtle habitat.[14] Renourished beach and dune systems also provide protection to life and property from storm surge and waves during hurricanes and nor'easters. New partnerships, like the University of North Florida's work with the National Park Foundation, Groundwork Jacksonville, and Stericycle, are bringing oyster reefs to protect sensitive areas in the Timucuan Preserve from erosion.[15] The City and its partners will continue to search for new and innovative ways to address shoreline erosion.

17.3 **Identify sand and sediment resources for natural and nature-based solutions.**

Natural and nature-based solutions like beach nourishment and marsh creation can help protect communities and ecosystems while providing recreational benefits to residents, beachgoers, and local businesses. These approaches rely on sand and other sediments which, in the future, may become increasingly expensive as readily available sources of suitable material become depleted. The City of Jacksonville will coordinate with partners such as the U.S. Army Corps of Engineers to identify long-term solutions for supporting beach nourishment, thin layer placement of dredged materials, and other coastal protection measures.

18 | Improve digital security of critical assets and infrastructure from cyberattacks.

Like all cities, Jacksonville contains sensitive data related to the economy, public health and safety, and infrastructure. To ensure that City information and infrastructure is secure, resilient, and prepared for attempted disruptions, continued improvements by the Information Technologies Division in cybersecurity are critical.

Action Description

The City's Information Technologies Division will work with other agencies to migrate to a consolidated, interconnected cybersecurity defense platform. This platform will combine sensors from multiple entry points into the City's infrastructure and will use artificial intelligence and machine learning to detect, prevent, and remediate cyber threats.

Shocks and Stressors Addressed

Cyber Threat / Infrastructure Failure

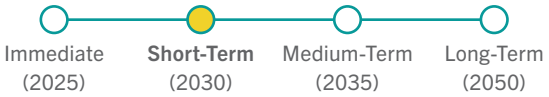
Implementation Partners

Information Technologies

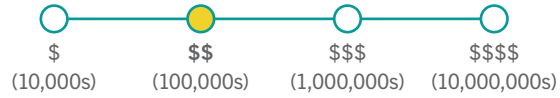
Potential Funding Mechanisms

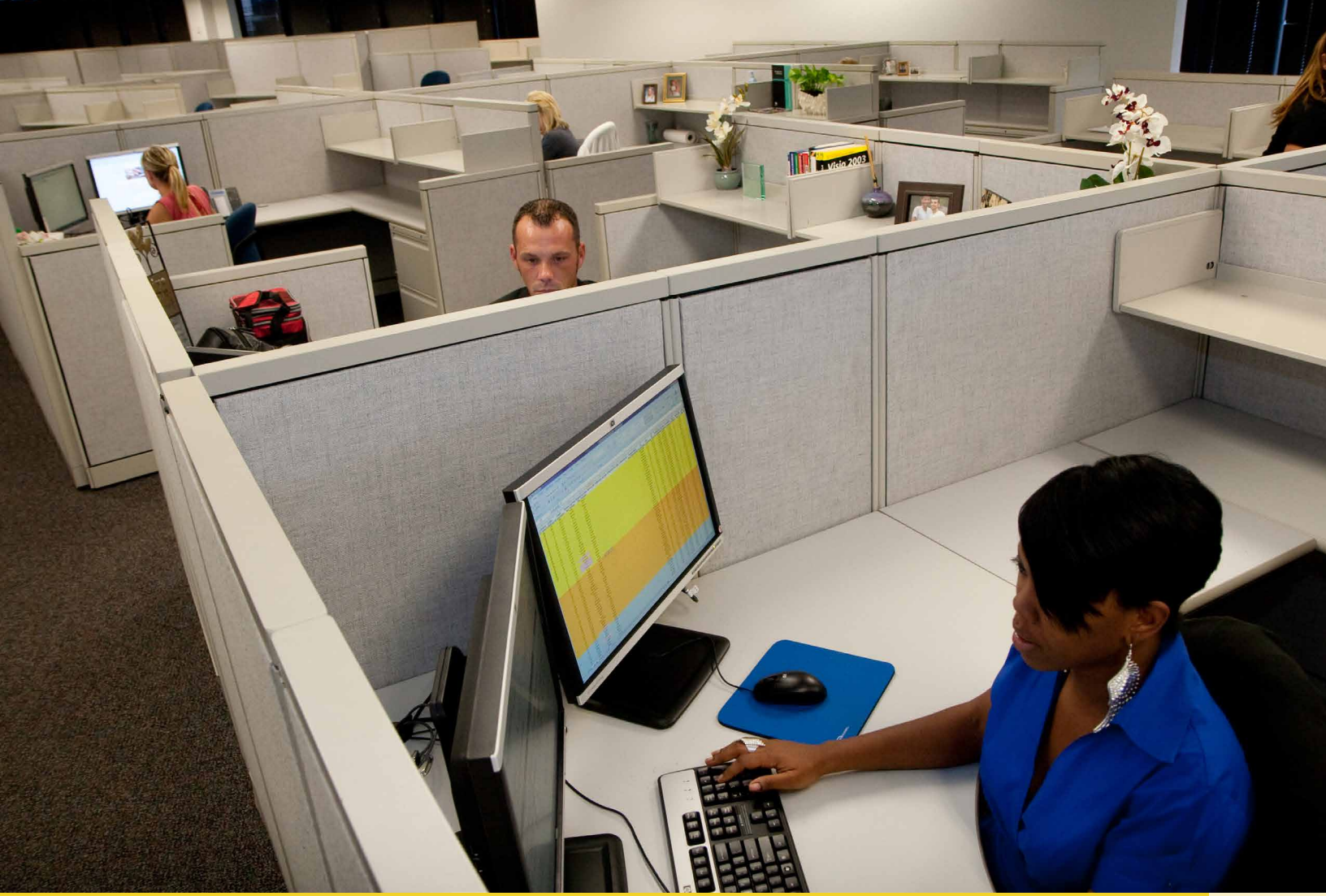
DHS State and Local Cybersecurity Grant Program / IIJA

Implementation Timeframe



Relative Cost





EXAMPLE

THE RELATIONSHIP BETWEEN DIGITAL SECURITY AND CITY RESILIENCE

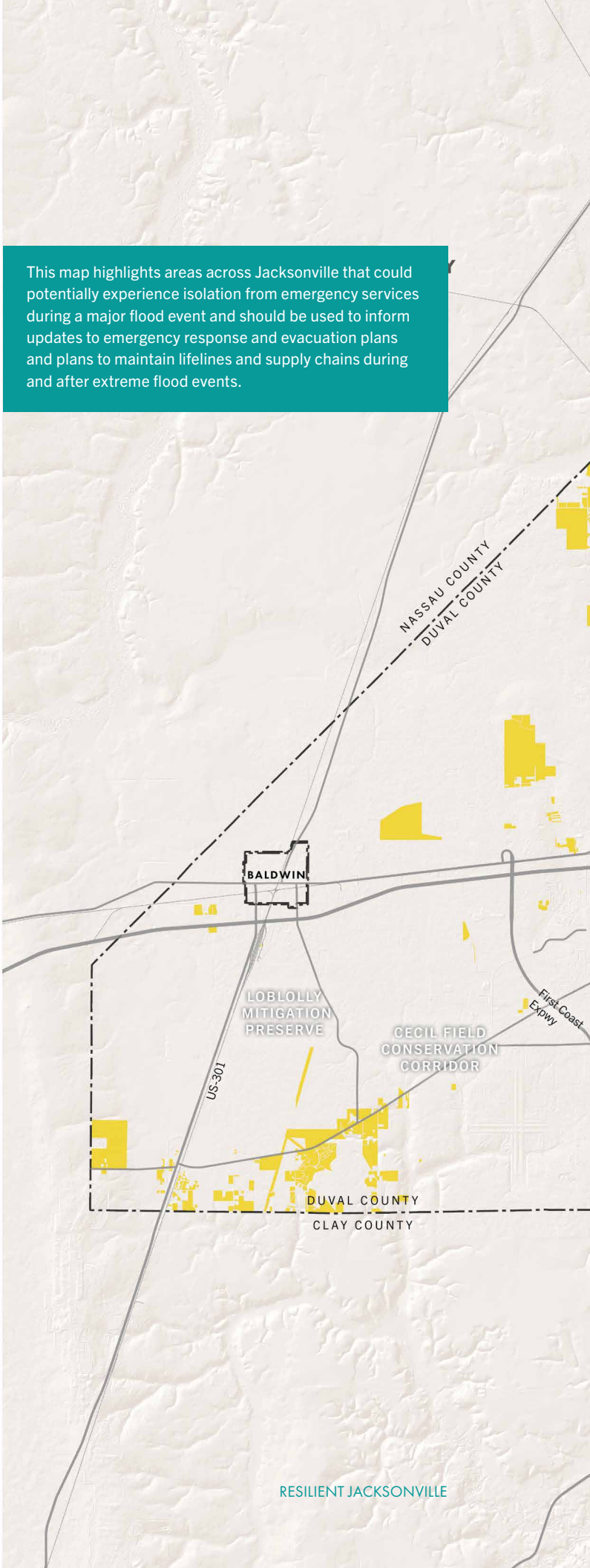
As cities continue to face more frequent and serious cyber threats, it's important to be proactive and plan for the impacts that disruption to digital security could have on Jacksonville and its residents. Cyberattacks that target infrastructure can disrupt traffic management, cause power outages and disruptions to essential services, and impact public safety.[16] Cities that prepare for these threats with robust cyber resilience plans are better equipped to execute swift responses and avoid irreparable damage and expensive ransoms. After the 2018 ransomware attack on Atlanta, Georgia, the city decided to build a foundation for responding to future disruptions instead of solely focusing resources on a single response effort.[17] This approach—recommended by Atlanta's cyber security leaders—is often more costly in the short-term but has longer-term benefits.

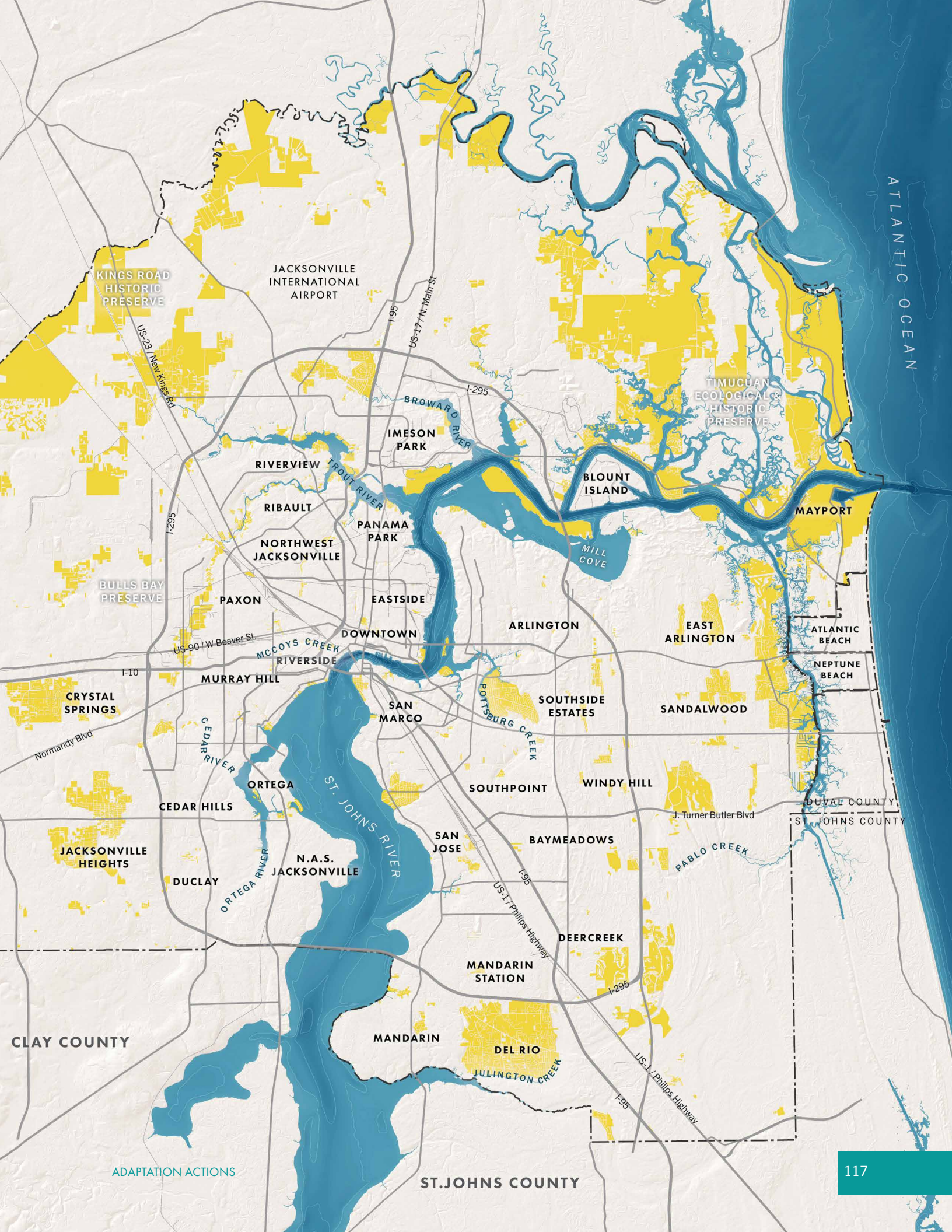
PREPARE

Plan in advance for threats to improve the response of city systems during an emergency.

Actions Include:

19. Strengthen **emergency response and evacuation plans**.
20. Strengthen Jacksonville's **lifelines and supply chains** to withstand extended disruptions to regular operations and commerce.

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EAST ARLINGTON
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I-10
MURRAY HILL
CRYSTAL SPRINGS
SAN MARCO
POTTSBURG CREEK
SOUTHSIDE ESTATES
SANDALWOOD
Normandy Blvd
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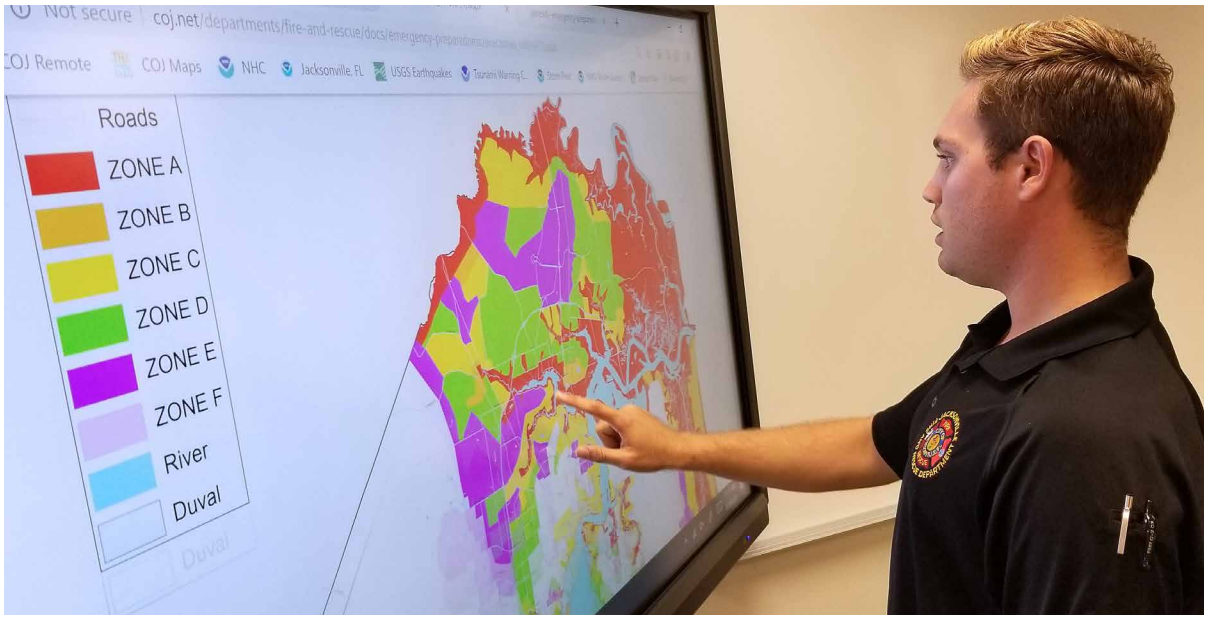
ST. JOHNS COUNTY
SAN JOSE
BAYMEADOWS
JACKSONVILLE HEIGHTS
N.A.S. JACKSONVILLE
PABLO CREEK
ORTEGA RIVER
DUCLAY
US-17 / Philips Highway
DEERCREEK
MANDARIN STATION
CLAY COUNTY
MANDARIN
DEL RIO
JULINGTON CREEK
ST.JOHNS COUNTY

19 | Strengthen emergency response and evacuation plans.

As climate change continues to impact the frequency and severity of extreme weather events, it is important that Jacksonville residents have access to strong evacuation plans informed by the best available data. Using road network analyses conducted in 2023, Jacksonville's Emergency Preparedness Division will be able to anticipate and plan for potential chokepoints and neighborhoods that could be cut off from the rest of the network during an extreme flood event. The City has established criteria for activating the Emergency Operations Center (EOC) for hurricanes, but the City still needs to develop standards for activating the EOC during heat and freeze events. A citywide plan for heat and freeze events will address these gaps and provide guidance for partners such as hospitals and other critical facilities. The Office of Resilience will provide data from Jacksonville's citywide vulnerability assessment to support the Emergency Preparedness Division in the update of evacuation zones for the 2024 hurricane season and the development of a citywide plan for extreme heat and freeze events. The Emergency Preparedness Division will communicate with JEA to ensure that the Emergency Preparedness freeze plan and JEA's freeze plan are coordinated and supportive of each other.



Shocks and Stressors Addressed

Hurricanes / Extreme Heat / Extreme Cold

Implementation Partners

Resilience / JFRD - Emergency Preparedness / JEA / NEFRC

Potential Funding Mechanisms

FEMA HMGP / USDOT / NOAA

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	$$$ (1,000,000s)	$$$$ (10,000,000s)

19.1 **Routinely refine the city's hurricane evacuation zones based on the best available data.**

Revisiting hurricane evacuation zones on a regular basis is a best practice used to ensure that there is a plan in place for any areas that could be potentially inundated during a major flood event. Using road network analyses and additional data from Jacksonville's citywide vulnerability assessment, Jacksonville's Emergency Preparedness Division will routinely update the city's evacuation zones.

19.2 **Identify high frequency flooding intersections for automated flood alert signage.**

Automated flood alert signage can save lives and property in areas that frequently experience high water levels during or after major flood events. Jacksonville's Emergency Preparedness Division will use data from the City's vulnerability assessment to identify intersections that are at high risk for frequent flooding and inform decisions around installation for automated flood alert signage.

19.3 **Create plans for extreme heat and freeze events.**

The Emergency Preparedness Division has established strong criteria for hurricanes and tropical systems that is used to decide when to activate the Emergency Operations Center. To ensure the safety of Jacksonville's residents during extreme heat and freeze events, the Emergency Preparedness Division is working to secure grant funding to develop a citywide plan for these types of events. This plan will establish a set of standards to inform when to activate the Emergency Operations Center during extreme heat or freeze events and will provide more specific guidance for hospitals and other critical facilities.

20 | Strengthen Jacksonville's lifelines and supply chains to withstand extended disruptions to regular operations and commerce.

Community lifelines are fundamental services—food, shelter, medical care, energy, water systems, communications, and transportation—that enable all other aspects of society to function. Lifelines support the continued operation of government and business, human health and safety, and economic security. Jacksonville's supply chains are supported by a major deep-water port, three major interstates, four railroads, and an international airport. Ensuring that lifelines and supply chains are sustained or rapidly stabilized after an acute shock, such as an extreme weather event, is essential to the health and safety not only of Jacksonville residents, but the broader Northeast Florida region and areas beyond that are dependent on goods and services that flow through the city. Jacksonville can strengthen its lifelines and supply chains with robust contingency plans for maintaining operations through multiple emergency scenarios.

Shocks and Stressors Addressed

Supply Chain Disruption

Implementation Partners

JAXPORT / CSX / JFRD - Emergency Preparedness / Hospitals

Potential Funding Mechanisms

FEMA Regional Catastrophic Preparedness Grant Program

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	$$$ (1,000,000s)	$$$$ (10,000,000s)

20.1 **Work with critical service providers, like area hospital systems, to ensure adequate stockpile of resources.**

A resilient city is a prepared city, and Jacksonville's hospital systems must be prepared for supply chain disruptions. The importance of stockpiling was evident during the COVID-19 pandemic, and there are other disruptions that critical service providers must be ready for. To ensure that hospitals and other critical service entities have the resources they need to maintain operations during disruptive events, the City will work with these partners to identify supply chain failure points and develop plans to supply resources and fill potential gaps.

20.2 **Maintain commerce into and out of the city through partnerships with the Port and other agencies.**

JAXPORT is a critical node for both economic development and disaster response in Jacksonville, the state of Florida as a whole, and even Puerto Rico. The Port is relied upon for moving goods and implementing contingency plans, even in the face of extreme weather, pandemics, and other unpredictable crises. To safeguard Port operations and prevent major disruptions to commerce and disaster response, the City will strengthen its partnership with JAXPORT and other key agencies and ensure operational alignment ahead of extreme weather and other emergencies.

Credit: Matt Green

CASE STUDY

HUNTS POINT

Bronx, NY | 2015

After Hurricane Sandy impacted New York's shoreline communities in 2012, Hunts Point, a neighborhood located in the Bronx, was deemed uniquely vulnerable to climate hazards. Hunts Point is a peninsula containing more than 12,000 residents and is also home to one of the largest wholesale food distribution centers in the world. Because the Hunts Point Food Distribution Center accounts for much of New York City's fish and meat and 60% of its produce, the resilience of Hunts Point is not only important for neighborhood residents but is critical for all of New York City. With federal funding resources and comprehensive community engagement that took place over several years, the Hunts Point Advisory Working Group worked to deliver plans to address vulnerabilities of industrial facilities that are critical to maintaining regular operations within the distribution center. The energy generation and storage solutions currently under implementation include a trigeneration microgrid to ensure back-up power at the distribution center, solar and storage installations at two neighborhood schools to provide sustainable energy and back-up power so that these facilities can serve as cooling or evacuation centers, and mobile diesel generators to provide power to other city distributors during emergencies.[18]

SITES

Adaptation Approaches and Actions that can be implemented at the scale of a single asset or site.

ACCOMMODATE

Alter or retrofit vulnerable buildings and the built environment at the parcel level to adapt to heat and manage water.

While setting standards for new development is important, existing vulnerable buildings and structures will also need to be adapted to withstand future risks. An accommodation approach at the site scale includes retrofitting buildings, as well as the land itself. Maximizing the potential of different kinds of parks and open spaces designed to handle flooding can help ensure that stormwater is managed on site. With more accommodations at the site scale, Jacksonville will be more resilient and well-equipped to handle increasing climate risks like heat and flooding.

RELOCATE

Offer voluntary, incentive-based, or gradual retreat where fortification and accommodation are not efficient or effective.

Relocation is often uncomfortable to consider and costly to execute, but planning for targeted relocation before a crisis occurs can help ease this difficult process. Developing plans for assets that can and must be moved is a proactive step that keeps services online, keeps people out of harm's way, and prevents costly damage, injuries, and loss of life. On the residential side, voluntary buyout programs have been piloted in Jacksonville and can be an effective mechanism for moving residents out of areas with repetitive and destructive flooding. However, these programs need streamlining to increase efficiency and to ensure that Jacksonville residents in need of this kind of assistance can move to a safe, welcoming, and affordable neighborhood. These actions may have limited appeal today, but buyouts will likely be a resilience mechanism needed more often in the future.

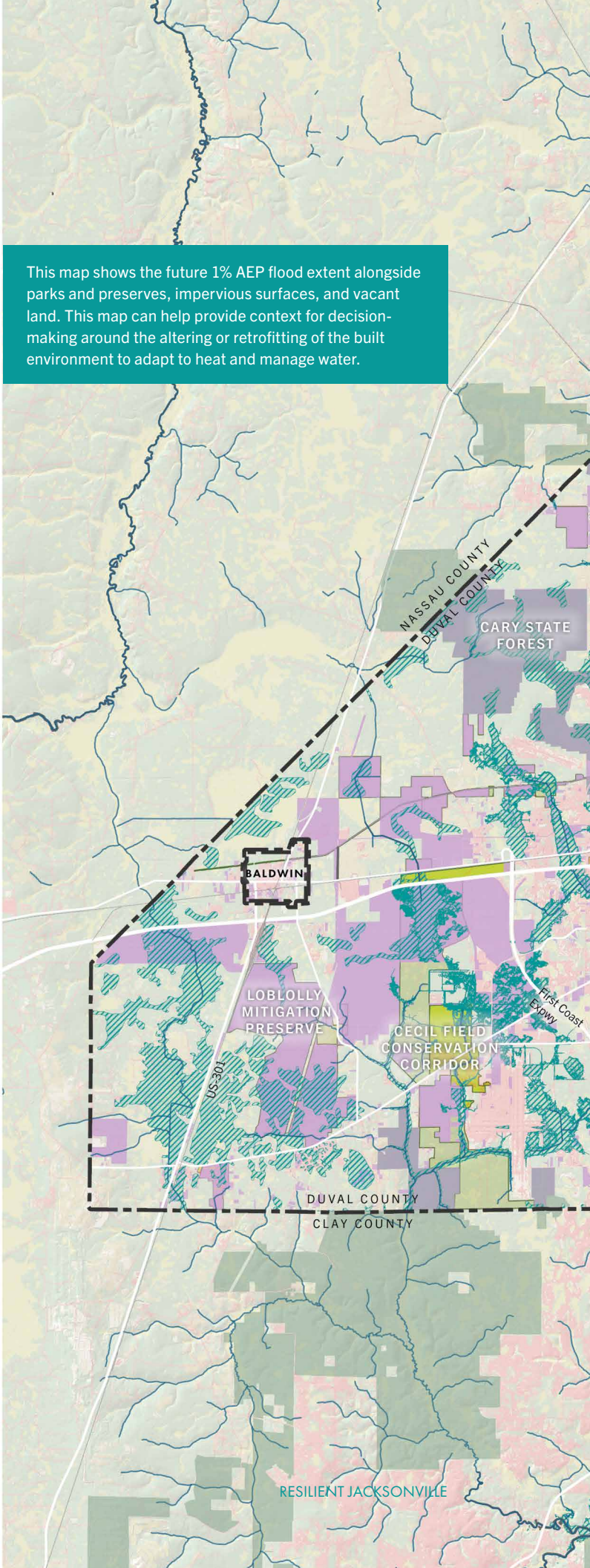
ACCOMMODATE

Alter or retrofit vulnerable buildings and the built environment at the parcel level to adapt to heat and manage water.

Actions Include:

21. Expand **retrofit programs for residential and commercial buildings** to improve building energy performance, storm fortification, cooling, and stormwater detention.
22. Implement resilient **standards and codes** for existing and new construction.
23. Maximize the resilience of **City-owned buildings and assets**.
24. Invest strategically in **existing parks** to increase stormwater management capacity and reduce urban heat.
25. Repurpose **vacant land** for uses that best support resilience goals.
26. Retrofit **parking lots and impervious surfaces** to reduce urban heat and increase stormwater infiltration and storage.
27. **Harden vulnerable critical assets** to mitigate damage from hazards and ensure continuity of operations.

This map shows the future 1% AEP flood extent alongside parks and preserves, impervious surfaces, and vacant land. This map can help provide context for decision-making around the altering or retrofitting of the built environment to adapt to heat and manage water.



LEGEND

- City Boundaries
- Creeks and Streams
- Open Water
- 2070 1% Annual Exceedance Probability Flood Extent
- Timucuan Historical & Ecological Preserve
- Florida State Parks & Conservation Land
- COJ Regional Parks
- COJ Specialty Parks
- COJ Community and Neighborhood Parks
- Impervious Surfaces
- Vacant Land (Public & Private)

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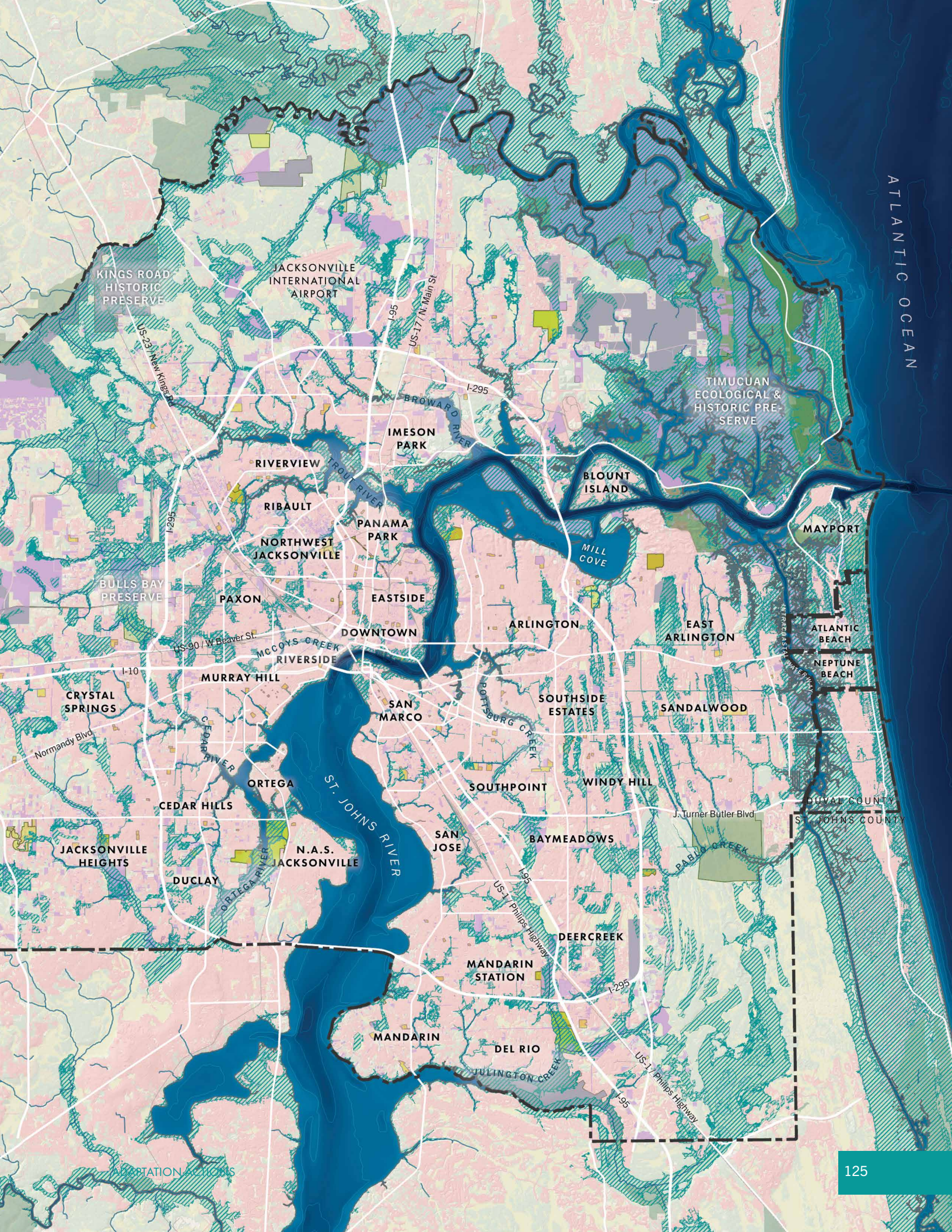
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NEPTUNE BEACH
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MURRAY HILL
INTRACOASTAL WATERWAY
CRYSTAL SPRINGS
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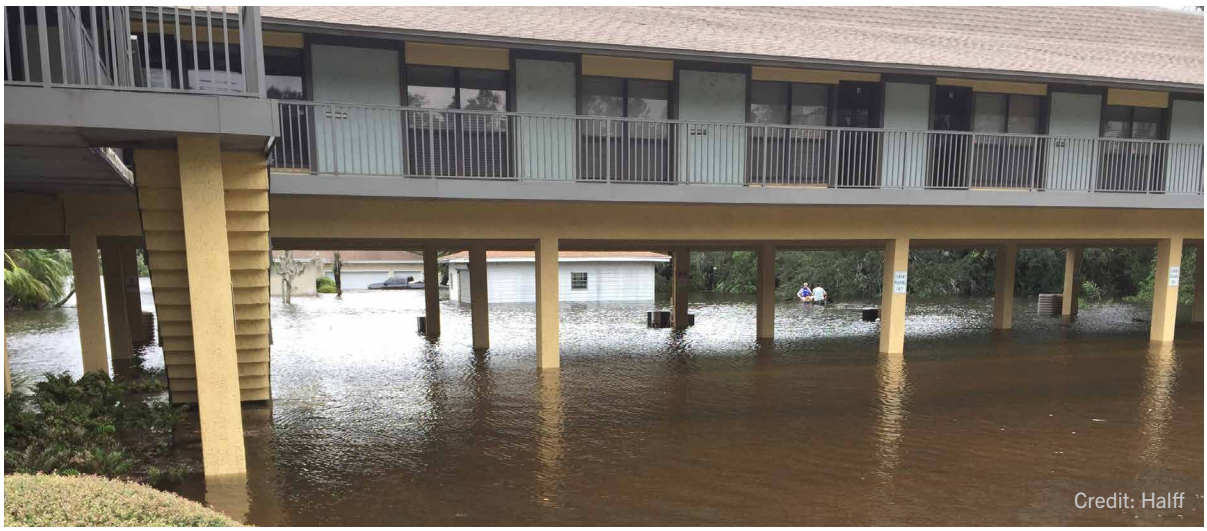
DEERCREEK
MANDARIN STATION
I-295
MANDARIN
DEL RIO
TULINGTON CREEK
US-1 / Philips Highway
I-95

21 Expand retrofit programs for residential and commercial properties to improve building energy performance, storm fortification, cooling, and stormwater detention.

Making resilience improvements to the built environment in Jacksonville will help residents and businesses better cope with more extreme weather conditions, save money on utility bills, and reduce long-term damage. Retrofit programs provide technical and financial assistance for residential and commercial building improvements that increase energy use efficiency and reduce energy demand, improve fortification to prevent flood and wind damage, and increase cooling efficiency. Retrofitted landscape and building features can also effectively reduce on-site stormwater runoff. Energy-related retrofit measures, such as upgraded insulation and on-site solar, improve a building's energy performance, resulting in lower monthly bills. Retrofits for storm fortification can include measures like strengthening roofs to withstand hurricane winds, relocating utilities above floodplain elevations, and modifying the building exterior to reduce the chance of water penetration and increase durability. Retrofits for stormwater management can include rain collection-and-reuse systems and on-site green infrastructure. The citywide benefit of these measures can be significant given that 40% of Jacksonville's residents live in older buildings constructed prior to 1980. Expanding the resources, availability, and implementation of retrofit programs is an effective way to increase building resilience and create jobs for many skill levels.



Credit: Halff

Shocks and Stressors Addressed

Extreme Heat / Extreme Cold / Flooding / Power Outage / Social Inequality / High Winds / Housing Instability / Air Quality

Implementation Partners

JEA / CDCs / LISC / SJRWM / Parks / DIA / HOAs / Academia

Potential Funding Mechanisms

JEA / DOE

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	**Medium-Term (2035)**	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	**$$$ (1,000,000s)**	$$$$ (10,000,000s)

21.1 **Expand existing retrofit programs.**

Jacksonville's existing home retrofit programs, like JEA's Neighborhood Energy Efficiency Program or Historic Eastside's Restore, Repair & Resilience Pilot Collaborative, are limited to specific Census tracts and to residents on low or fixed incomes. Other programs, like North Riverside CDC's partnership with Groundwork Jacksonville and LISC Jacksonville to repair homes in the neighborhoods around McCoys Creek, are geographically focused. Expanding these programs to include more Jacksonville neighborhoods and income levels will be important to address the impacts of deferred maintenance and increasing heat, flooding, and other hazards. This expansion can enable neighborhoods to benefit from lessons learned in program administration, funding, operations, and the specifics of retrofitting Jacksonville's homes from organizations that have coordinated similar programs in other neighborhoods, while also expanding economic opportunities for neighborhood-based contractors and workers.

21.2 **Leverage federal funding to improve community awareness of lower-cost floodproofing, heat, and energy performance upgrades.**

The Inflation Reduction Act included over $8 billion in funding for states to establish rebate programs for energy efficiency upgrades, electrification, and new appliances. Additional funds are available in the form of tax credits for energy efficiency improvements, like new windows or an electric heat pump air conditioner. Some measures to floodproof one's home, such as adding a French drain to a soggy yard, may be feasible for some homeowners to complete without a contractor. The City, local nonprofit organizations, and community development corporations will work to make sure their constituents and clients understand these opportunities and can access funds to improve their homes.

21.3 **Partner with Downtown building owners to adopt larger-scale retrofits like green roofs and shading.**

The larger footprint of buildings in and near Downtown Jacksonville is an opportunity to add improvements that work better at a larger scale, such as green roofs, which are vegetated roofs of buildings. Best management practices for green roofs have been developed over decades, and they are proven solutions for reducing urban heat, filtering stormwater, and often lowering maintenance costs compared to traditional roofs. Even an intervention as simple as painting a roof white, often referred to as a "cool roof," can prevent urban buildings from holding onto heat and in turn make a meaningful impact in reducing localized temperatures. Shade sails can also be added between buildings and over streets or parking lots to further reduce heat. JEA's chilled water service has the potential to reduce energy consumption, reduce greenhouse gas emissions, and reduce the real estate footprint of traditional cooling systems, especially on rooftops. The Downtown Investment Authority (DIA) and other City departments will work with partner organizations and building owners to incorporate these interventions, reducing heat while creating street-level amenities Downtown.

21.4 **Explore retrofits for stormwater ponds.**

The vast majority of stormwater or retention ponds in Jacksonville are privately owned and maintained by homeowners or their associations.[19] These ponds serve multiple functions, including flood management and water quality treatment; however, because they are typically constructed with steep banks and deep water, tragic drowning accidents have been known to occur. Retrofitting stormwater ponds with features like vegetated littoral shelves—which are shoreline plantings on a relatively flat wetland ledge at the bottom of the bank slope, can improve water quality, prevent erosion, increase biodiversity, and improve safety by deterring children and others from entering the deeper pond water. Other potential retrofits include stormwater capacity enhancements, improved water quality treatment, and "smart technology" such as real-time sensors, monitoring, and adaptive controls to operate stormwater outlets. Planting native plants around the upper edge can filter pollutants before they reach the pond and incorporation of paths and seating can enhance the recreational benefit to the community. The Parks Department will identify stormwater ponds within parks that would benefit from littoral shelves and will work with the Public Works Department to identify resources to retrofit City-owned ponds and develop interpretive signage on native plantings. The City will coordinate with Homeowner Associations (HOAs) to educate residents on safety, permitting, and maintenance related to stormwater pond retrofits and will work with the St. Johns River Water Management District to gather best practices and encourage designs that optimize water quality, safety, and recreational values of new and existing stormwater ponds.

Credit: Christopher B. Hoffman Landscape Architect

EXAMPLE

RETROFITS FOR RESIDENTIAL AND COMMERCIAL BUILDINGS

A safe and healthy home can often be out of reach even for people who own their home outright; disrepair, storm damage, and other maintenance issues can compound over time. Retrofit programs to improve resilience can include sealing the building envelope, reducing energy consumption by installing more efficient electric appliances, and adding elements like solar panels with battery backup systems. Unfortunately, many structures cannot support these retrofits without additional structural repairs or basic maintenance, such as a new roof, mold remediation, duct work, electrical work, and more. The cost of these repairs puts them out of reach for many homeowners.

Building retrofit programs such as the Historic Eastside Restore and Repair Program, a collaboration between LIFT JAX, LISC Jacksonville, and the Historic Eastside Community Development Corporation, have worked with longtime residents seeking to stay in their homes while making them safe and stable. The Historic Eastside Restore and Repair Program has attracted an additional $1 million in investment from United Way of Northeast Florida to expand the program to more households. JEA is conducting energy audits and making weatherization improvements to homes as part of this program—showing that programs that target structural issues and maintenance along with weatherization and energy efficiency can succeed. With new federal financial resources from the Inflation Reduction Act, these programs can expand and improve more homes.

22 | Implement resilient standards and codes for existing and new construction.

To make Jacksonville's people safer and more resilient, the buildings they live and work in must also be safer and more resilient to hazards. Strong building standards and codes such as roof tie-downs for wind resistance, thermal breaks for energy efficiency in extreme heat, first-floor elevation requirements, and riparian buffers to prevent flooding and costly damages and save lives. The Florida Building Code, adopted after Hurricane Andrew in 1992, is a national leader in building safety, and it paved the way for states across the country to adopt stronger codes. By determining which additional improvements to design standards and codes can be made to increase the resilience of residential and commercial buildings, Jacksonville can be a leader in strengthening the resilience of the built environment, improving public safety, and saving homeowners from costly rebuilds and repairs.

Shocks and Stressors Addressed

Flooding / High Winds / Tornado

Implementation Partners

Planning & Development / Neighborhoods / DIA

Potential Funding Mechanisms

FEMA Building Resilient Infrastructure and Communities

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$ (100,000s)**	$$$ (1,000,000s)	$$$$ (10,000,000s)

22.1 Identify and promote standards that improve building and roof resilience to high winds.

Extensive cost-benefit research from the National Institute of Building Sciences for the Federal Emergency Management Agency (FEMA) has found that adopting and exceeding the most recent international codes on new construction and retrofits is cost-effective at mitigating loss from natural hazards.[20] Standards such as FORTIFIED roof construction methods from the Institute for Business and Home Safety are becoming more frequently linked with reduced insurance premium costs because of their effectiveness at mitigating damages. For example, the state of Alabama's Strengthen Alabama Homes program provides $10,000 grants to homeowners to upgrade their home's roof to the FORTIFIED standard, and insurance companies then discount the wind portion of their policy.[21] These standards and incentives together increase the number of roofs resilient to winds, increase the number of contractors trained in the higher standards, and reduce damages in future hazard events. The City will work with the State of Florida to identify standards such as FORTIFIED that can be promoted to Jacksonville homeowners.

22.2 Increase compliance with Florida Building Code standards, particularly on retrofits.

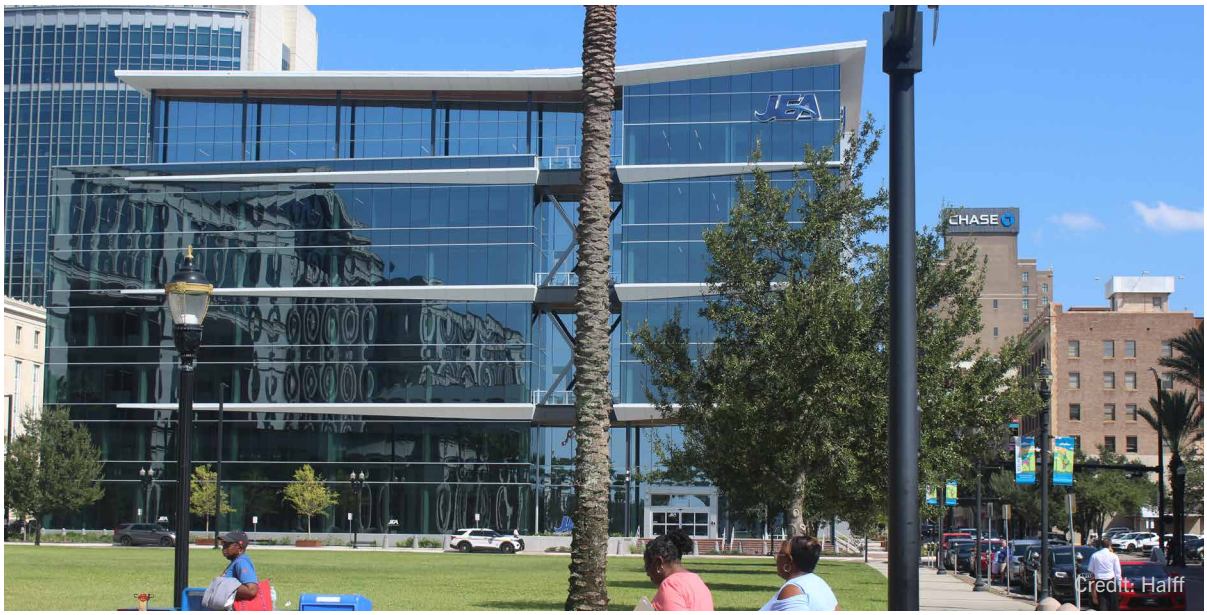
The Florida Building Code was one of the strictest codes in the country when it was first adopted in 2002 and has since been updated and adopted every three years.[22] New federal funding opportunities are available for building code adoption, enforcement, and training. While Florida's standards are already high, increasing compliance and enforcement is a way to bring more of Jacksonville's housing stock in alignment with the Florida Building Code. This is of particular importance for retrofits, especially after disasters, when repairs can place a property above the threshold required for compliance with all current codes. The City will explore how federal funds can increase the number of trained building inspectors working in Jacksonville.

22.3 Develop design standards and guidelines for riverfront properties to accommodate flooding.

Proximity to water is part of Jacksonville's identity, and many residents have a desire to live or recreate near water. Because of this, certain assets may need to be located in areas that could potentially flood during extreme weather events. One way to strengthen the resilience of these areas is to design structures and open spaces in ways that allow for temporary flood inundation without causing catastrophic damage. Design standards for riverfront properties can be established based on the best available science and data on increasing sea levels, mean high water elevations, salt spray, precipitation and fluvial factors, and saltwater inundation. Developing guidelines for new buildings, building retrofits, and park and open spaces that allow floodwaters to rise and recede for easy cleanup and re-opening is one way to encourage floodproofing that can be implemented in many riverfront areas across the city. These efforts are already underway, as the Downtown Investment Authority (DIA) is working with the resilience team to encourage floodproofing measures be implemented for Jacksonville park assets planned along the Downtown riverfront. Initiatives like this are a starting point in setting standards for floodproofing. These collaborative efforts will help minimize potential damages to City-owned assets and can provide an example for privately owned parcels that might benefit from similar floodproofing.

23 | Maximize the resilience of City-owned buildings and assets.

Jacksonville's many public buildings, facilities, and other assets support the services that residents depend on every day and especially during a disaster. During and after storm events, or during extreme heat events, accessible public facilities with working power, cooling, and other resources are important for basic health and safety as well as recovery. Safer, universally accessible facilities can be used by all residents, improving the resilience of Jacksonville's residents that have disabilities and mobility challenges. Public facilities like schools and libraries can benefit greatly from adaptations, such as upgrading energy efficiency, establishing Resilience Hubs, and incorporating green infrastructure. The resilience of these buildings and facilities is key to the City's overall resilience. They are also an opportunity to showcase resilience: from public libraries to parks to schools, everyone in Jacksonville interacts with these facilities, making them a perfect opportunity to demonstrate the impacts of resilience adaptations on health and well-being. Additionally, because libraries and schools are public facilities, these adaptations can also use bulk purchasing power to be cost-effective at scale, which provides further opportunities for small businesses and contractors to build a resilience portfolio.



Credit: Halff

Shocks and Stressors Addressed

Flooding / Extreme Heat / Power Outage / Social Inequality / Air Quality

Implementation Partners

Public Works / Parks / DCPS

Potential Funding Mechanisms

CIP / DOE Funding for Public School Retrofits

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	**$$$ (1,000,000s)**	$$$$ (10,000,000s)

23.1 **Conduct energy benchmarking on City buildings.**

Energy benchmarking is measuring and comparing a building's energy usage to similar buildings, past energy usage, or a reference point. With this knowledge, the City can plan and program facility improvements where needed to decrease energy use and provide exemplar projects for the private sector to implement. Energy benchmarking software is available through the federal government's ENERGY STAR public-private partnership. The City will research this and other benchmarking program options to initiate energy benchmarking on public facilities.

23.2 **Add green space, solar, and energy efficiency upgrades to school facilities and public buildings.**

Public facilities, including school buildings, offer a unique opportunity for large-scale building transformation through coordinated procurement, design, and installation. Upgrades such as rooftop solar generation or efficient HVAC through heat pumps can be done for multiple public buildings, rather than one at a time. Other kinds of projects, such as schoolyard transformations, like those implemented by Ripple Effect[23] in New Orleans or the Trust for Public Land's national Community Schoolyards™ program,[24] can use school community and student input to create green spaces that manage water, like playing fields with subsurface storage. The City of Jacksonville and Duval County Public Schools will explore these options and plan for improvements at public facilities that can reduce energy demand, improve indoor air quality, and expand outdoor recreation opportunities while managing water more effectively.

23.3 **Establish Resilience Hubs in strategically located public facilities.**

A Resilience Hub co-locates key city services in public facilities while also serving a role in disaster response and relief. Public buildings where residents already go for assistance and information, like community centers or libraries, are ideal for further development into a Resilience Hub that can play a larger community-based role in emergency preparedness and response. Previous Hub implementation in cities like Baltimore have resulted in some lessons learned, such as ensuring detailed documentation that minimizes disruptions from government staff transitions and engagement plans that include support services like language translation, food, and childcare. The City will determine strategic locations for developing Resilience Hubs and build on lessons learned to bring public services closer to the community.[25]

23.4 **Update the City's ADA Transition Plan to improve the safety and accessibility of public facilities.**

City staff will update the 2018 Americans with Disabilities Act (ADA) Transition Plan by 2025 to self-assess the accessibility of sidewalks, rest areas, and other facilities owned and maintained by the City for those with mobility limitations. The updated Plan will develop and expand upon ADA guidance, programs, and services administered by the City to increase equity and improve safety, accessibility, and level of comfort for residents with physical exceptionalities and residents that are transportation disadvantaged. The Plan will include a strategy for periodic updates to the policies, actionable items, programs, and performance targets on a recurring basis.

24 | Invest strategically in existing parks to increase stormwater management capacity and reduce urban heat.

Jacksonville has over 400 City parks distributed across the city. These sites provide many services for the community and can be improved to increase their capacity to provide even more stormwater management and urban heat reduction. Several of Jacksonville's parks contain pools and splash pads—facilities that can help prevent heat-related illness during high heat days. Continued investment in and expansion of these resources is important for the well-being of Jacksonville's residents. Green infrastructure such as rain gardens, bioretention ponds, and vegetated swales have the capacity to improve water storage capacity and water quality, provide ecological benefits, and improve public safety. Interventions such as rain cisterns, subsurface storage cells under active recreation, and permeable paving in parking lots can significantly increase the storage capacity of a park while maintaining, and often enhancing, the existing park uses. Interventions like the removal of underutilized impervious surfaces and planting of shade trees can improve areas with a high risk of heat exposure. Tree and other native vegetation planting can help cool and provide shade. Investments in park facilities such as green roofs, white roofs, and lighter, more reflective hardscapes can decrease urban heat. Additional investment in ongoing maintenance of existing features will help maximize the resilience potential as well.

Shocks and Stressors Addressed

Flooding / Extreme Heat / Water Quality

Implementation Partners

Parks / Public Works

Potential Funding Mechanisms

CIP / Resilient Florida

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	**Medium-Term (2035)**	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	**$$$ (1,000,000s)**	$$$$ (10,000,000s)

24.1 **Align resilience actions with the forthcoming Master Recreation Improvement Plan.**

The Parks Department is undergoing a comprehensive Recreation Master Plan effort that includes public outreach as well as cataloging and assessing existing park land and facilities. The Plan will make recommendations for how to improve parks, assess which facilities and parks are used by the community, and take stock of the overall condition and needs for each park site. The Plan will guide short-, medium-, and long-term investments and park modernization efforts. The Parks Department will incorporate resilience objectives, such as reducing urban heat and stormwater flooding and improving community and ecosystem health, into the assessment of existing parks and prioritization of future investments. Relevant resilience actions identified in *Resilient Jacksonville* will be included in the Master Recreation Improvement Plan to coordinate implementation of the two plans.

24.2 **Create multi-beneficial park amenities with intentional stormwater retention.**

The Office of Resilience will work with the Parks Department to prioritize park upgrades that include amenities that provide multiple benefits to the community, rather than serving a single use or function. For example, when a sports field needs to be regraded and renovated, the City will consider incorporating below-grade water storage to provide improved stormwater management, reduce flood risk to neighboring areas, and speed up the time it takes for the field to dry and be playable again after a rain event. Another example is incorporating resilience benefits into parking lot renovations through designs with vegetation and trees to provide shade, biodiversity, and bioretention, as well as use of permeable paving for rainwater management. Upgrading existing parks can improve resilience by reducing flood risks and lowering urban heat effects while providing additional benefits such as improved places to gather, trails for active recreation, and increased adjacent property values. These resilience benefits extend beyond the boundaries of an individual park: parks located on higher ground within a watershed are often key to retaining water during storm events to reduce the amount of water within the storm system, while parks in floodplains or with higher groundwater can be designed to maximize accommodation and retention of stormwater. The City will consult the best available flood and heat data from the vulnerability assessment to identify parks that have the greatest capacity for water storage and can benefit most from improvements that address extreme heat.

25 | Repurpose vacant land for uses that best support resilience goals.

In a city as large as Jacksonville, there are benefits to minimizing further outward expansion and instead utilizing available land within the city's developed area. Doing so reduces construction as well as future maintenance costs for infrastructure while reducing investment needed to provide community amenities that support other actions in this Strategy, such as park space, stormwater management, or affordable housing. Within the otherwise developed areas of Jacksonville, approximately 9% of properties are vacant. Vacant land falls into various land use categories, is owned by multiple public and private entities, and is not evenly distributed throughout the city. Additionally, some vacant land is in areas with higher elevations and therefore lower flood risk, while other vacant land experiences repetitive flooding now or is expected to in the future with a changing climate. Understanding these conditions is essential for determining the best use of each parcel of vacant land to advance resilience goals. Another key consideration in repurposing vacant land is its location within the community and proximity to other amenities and infrastructure. For example, sites that are close to existing greenways, waterways, trails, and residential areas and are well served by roads and sewers may be more appropriate for residential development than sites that are currently surrounded by industrial development or have limited infrastructure connections.

Action Description

The City will work with partners to identify opportunities to best repurpose currently vacant land to increase resilience, considering location, community needs, hazard risks, infrastructure service, and other factors. For example, vacant land exposed to flooding, while unsuitable for new buildings, may be repurposed for habitat restoration, recreational green space, green infrastructure, or solar generation. Other properties in areas of lower risk and well-connected to existing infrastructure and services may be well suited for infill development of housing, community facilities, or mixed-use development (See Actions 1 and 4). The City will develop a planning and decision-making framework to guide the re-use and redevelopment of City-owned vacant land. In addition, the City will work with partners like the Community Land Trust and the Downtown Development Review Board to align redevelopment priorities for private properties with resilience objectives. These measures will be done in close coordination with other actions in the Strategy focused on resilient development and best use of available space, including enhancing ecological and recreational benefit of green space (Action 7); making room for rivers and tributaries (Action 8); and discouraging development in current and future undeveloped high-risk areas (Action 14).

Shocks and Stressors Addressed

Housing Instability / Flooding / Urban Heat Island Effect

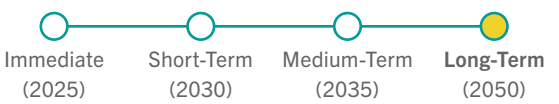
Implementation Partners

Resilience / Public Works / DDRB / JCLT

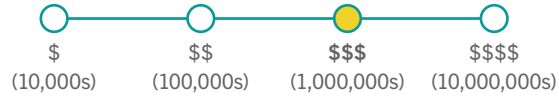
Potential Funding Mechanisms

CIP / JCLT / HUD Grants / Philanthropy

Implementation Timeframe



Relative Cost



CASE STUDY

NEW ORLEANS REDEVELOPMENT AUTHORITY

New Orleans, LA | 2006

The New Orleans Redevelopment Authority (NORA) works to comprehensively revitalize neighborhoods in New Orleans by partnering in affordable and equitable housing and commercial developments and supporting land stewardship and green infrastructure projects. After Hurricane Katrina in 2005, NORA was charged with managing and returning to productive use nearly 5,000 vacant properties acquired by the state through a voluntary buyout program. NORA has taken a data-driven approach to identify the best future pathway for each of these properties, whether that be partnering with an affordable housing developer to expand homeownership opportunities, selling the property to an adjacent homeowner to improve and maintain through their popular Lot Next Door program, leasing the property for community gardens and urban farming, planting tree groves and wildflowers to support ecological corridors, or transforming the property into a green stormwater infrastructure lot to reduce localized flooding. NORA looks at data such as real estate market demand, green infrastructure potential, location related to other community uses, and size/configuration of properties in its portfolio to work with partners to return them to productive uses for the community.

26 | Retrofit parking lots and impervious surfaces to reduce urban heat and increase stormwater infiltration and storage.

Parking lots often include large paved, impervious surfaces that limit rainwater absorption and contribute large amounts of stormwater into the system. In addition, highly paved parking lots absorb heat during the day and release it at night, contributing to the urban heat island effect. Many parking lots in Jacksonville are oversized relative to current demand, particularly at retail outlets, and others are underutilized or even abandoned. Underutilized lots can be retrofitted for the type and intensity of parking currently taking place on the lot, while unused lots can be converted to other uses that provide resilience benefits. For example, a large, abandoned parking lot may be a candidate for de-paving and planting, or for transition to new affordable housing. In contrast, a lot that is heavily used for parking can be renovated with solar carports that provide shade and generate electricity. Other potential retrofits for existing parking areas compatible with retaining some parking include solar-reflective pavement coating, pervious paving systems, tree planting, or bioretention cells to decrease both stormwater runoff and the urban heat island effect. By renovating these large expanses of asphalt and concrete, Jacksonville can address sources of urban heat and manage stormwater while improving the productivity of these lots.

Action Description

Jacksonville will encourage the widespread retrofitting of large parking lots that exacerbate stormwater management issues and are one of the largest contributors to the urban heat island effect. The City will work with partners to implement one or more pilot projects that demonstrate different possibilities for retrofitting. These may include de-paving and planting, green stormwater infrastructure, shade structures, solar production, and flexible community uses such as fairs and tailgates. The City will identify one or multiple pilot sites and partners and establish a demonstration project for the larger community while making the design and construction process transparent and accessible to the public and landowners who could apply similar retrofits on their own lots. The City will also consider establishing a monitoring program for the demonstration project to evaluate and further communicate the benefits and methods for doing this type of retrofit. Lessons learned from pilot projects can be incorporated into public and private design guidelines, such as the ones described in Action 3 and Action 5.

Shocks and Stressors Addressed

Stormwater Flooding / Extreme Heat

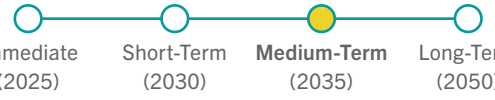
Implementation Partners

Resilience / Public Works / Tree Commission

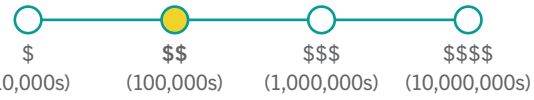
Potential Funding Mechanisms

CIP / Public Private Partnerships

Implementation Timeframe



Relative Cost



EXAMPLE

PARKING LOT RETROFITS

Improved Stormwater Management

Rainwater runoff within parking lots can be managed to help reduce community flood risk and improve water quality. Parking surfaces can be permeable, allowing stormwater to infiltrate into the ground rather than flow across a lot or into the roadway. Subgrade storage systems below parking areas can retain rainwater for later use or delayed release. Bioretention areas capture runoff and filter pollutants and debris through vegetative engineered systems before flowing into the drainage system.

Enhanced Open Space and Biodiversity

Parking lots can increase biodiversity through planting multiple native species suitable for hotter and wetter weather. Incorporating benches and seating creates areas that are more comfortable for people, especially those who cannot walk long distances.

Heat Mitigation

Reducing urban heat can be achieved in a few ways. Shade structures are canopies that overhang parking spaces to provide shade. Planting canopy trees can also provide shade and reduce heat through evapotranspiration. Both strategies limit sunlight from hitting parking lot surfaces and transferring heat. To reduce heat absorption, lightening the parking lot surface color deflects sunrays back to the atmosphere rather than absorbing sunrays and storing heat in the pavement.


Credit: US Naval Academy Chesapeake Bay Program

Emissions Reduction

Parking lots can support emissions reduction by providing access to alternative energy sources. For example, parking lots can have electric vehicle charging stations and parking lot lighting generated from wind or solar panels. Large solar arrays, or groups of solar panels wired together, that are situated over parking lots can also power nearby buildings. These strategies help reduce emissions from gas-powered vehicles and encourage the use of renewable forms of energy.


Credit: Ekistics Design Studio

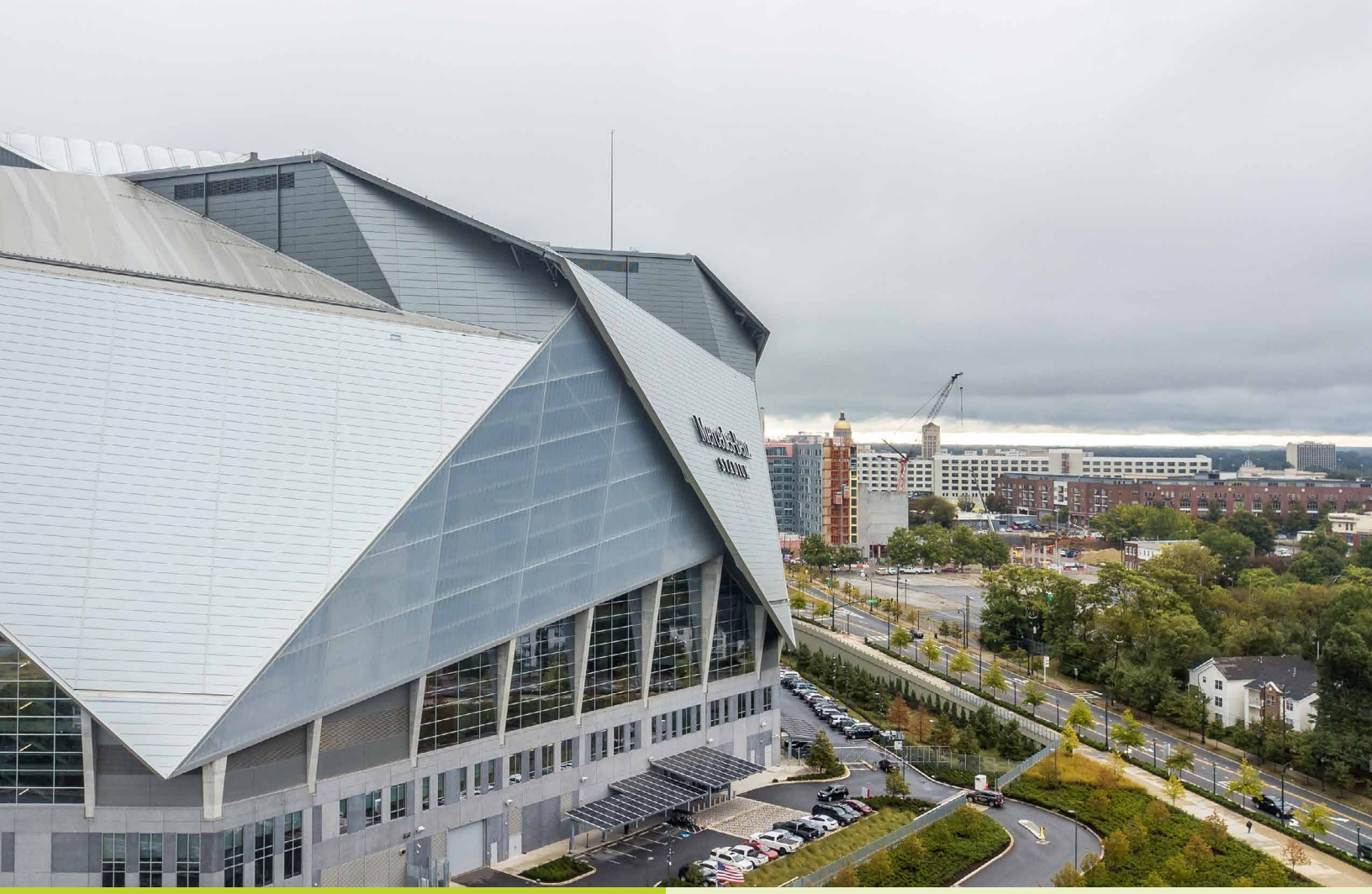
CASE STUDY

WHOLE FOODS PARKING LOT

Brooklyn, NY | 2013

In partnership with a state program, Whole Foods in Brooklyn, NY built a well-recognized project leveraging its parking lot to combine on-site green energy generation, extensive stormwater management and water reuse, as well as energy efficiency measures to their heating and cooling system resulting in a reduction of their energy use by 60% compared to what was required by building code and an estimated $369,300 of annual energy savings.[26]

The project was initially built to practice and advance environmental stewardship and continues to be a demonstration of the effectiveness of incorporating resilience measures into building and site construction. The facility includes solar arrays over parking lot spaces that provide 324 kW of electricity (approximately 29% of the building's energy use)[27] and provide shade that reduces urban heat in the parking lot. LED parking lot lights and electric vehicle charging stations use self-generated power. The site's stormwater management strategies include porous pavers that allow rainwater to infiltrate into the soil, and a water harvesting system[28] that collects runoff from the solar arrays in a 30,000 gallon tank under the parking lot and reuses the water for non-potable uses in the building and for site irrigation. The project also incorporated a public waterfront walkway and landscape providing an additional community amenity on site.



CASE STUDY

MERCEDES-BENZ STADIUM

Atlanta, GA | 2017

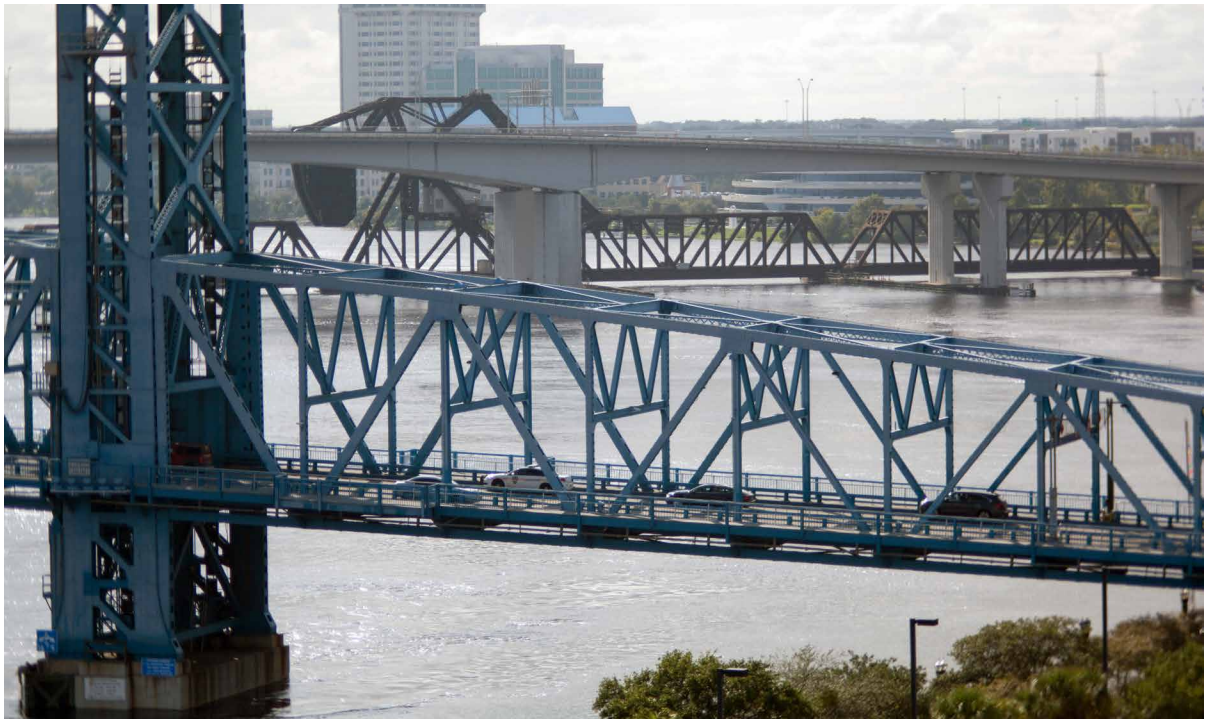
Located in a flood-prone area of Atlanta, Georgia, Mercedes-Benz Stadium has achieved several certifications for its sustainability efforts including the Leadership in Energy and Environmental Design (LEED) Platinum in 2017 and Total Resource Use and Efficiency (TRUE) Platinum for its zero-waste efforts in 2022.[29] The 75,000-seat stadium site includes water retention, energy conservation, alternative transportation, urban gardens and agriculture programs that contribute to its exemplary resilience and sustainability efforts.

Located near Proctor Creek, the stadium sought to reduce its impact on local flooding issues. The project includes a 2-million-gallon stormwater capture and storage system,[30] as well as a 680,000-gallon cistern for rainwater recapture and reuse that is used for landscape irrigation and the site's cooling tower[31] and can hold 80% of the site's rainwater during a 100-year storm.[32] Bioswales on site improve water quality and reduce the burden on storm drainage infrastructure.

To reduce emissions and promote renewable energy, the stadium employed several strategies. By constructing 700kW of solar PV carport arrays, shade is provided for fans and enough renewable energy is produced to power nine Atlanta Falcons games.[33, 34] The Stadium has a bike valet program and 48 EV charging stations and constructed new pedestrian-friendly pathways to encourage foot traffic and connections within the community. The project demonstrates successful implementation of multiple resilience design principles.

27 | Harden vulnerable critical assets to mitigate damage from hazards and ensure continuity of operations.

Recent global heat records and unprecedented flood events have demonstrated the need for cities to reassess the vulnerability of their most critical infrastructure and consider the cascading impacts that might occur if infrastructure were to temporarily or permanently break down. When structures cannot be relocated and preparedness is not sufficient to overcome risks and hazards, critical assets can be hardened to reduce downtime and maintain operations during and after hazard events. Fortification of vulnerable critical assets is expensive and should be prioritized based on criticality, the best available data, and site-specific context. For Jacksonville to achieve long-term resilience, fortification decisions must be well-informed, with consideration for the services they provide and the people and institutions they serve. Fortifying should be deployed after other alternatives are considered and determined to be less effective and should be reserved for infrastructure that is used by the most people.



Shocks and Stressors Addressed

Flooding / Infrastructure Failure / Sea Level Rise

Implementation Partners

Public Works / JEA

Potential Funding Mechanisms

CIP / FEMA / FHWA / HUD CDBG

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	**Medium-Term (2035)**	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	$$$ (1,000,000s)	**$$$$ (10,000,000s)**

27.1 **Fortify City-owned assets, such as evacuation roads and bridges.**

Asset-by-asset fortification is time consuming and expensive, and generally should prioritize infrastructure that impacts the most people. Evacuation roads, bridges, and other critical links in Jacksonville's transportation network are examples of the types of infrastructure that are vital to all residents and might be considered for fortification. For example, as a city with bridges providing the critical and sometimes only route between communities, Jacksonville must be prepared for all acute shocks that could potentially compromise these critical structures (including but not limited to: high wind events, storm surge, and even extreme heat events) and fortify these assets appropriately. The City will use data from the vulnerability assessment to inform the identification and further evaluation of assets that should be considered for fortification measures such as flood-proofing, elevating, or other hardening methods.

27.2 **Work with utilities and independent agencies to identify and fortify their vulnerable critical assets.**

Independent agencies and utilities must also periodically consider fortification for vulnerable critical assets under their ownership. Because the City's vulnerability assessment also includes assets outside of City operations, the Office of Resilience will coordinate with the owners of these assets so that they can make informed decisions about fortification. For example, social vulnerabilities analyzed in the City's vulnerability assessment could help JEA understand where undergrounding power lines could have the greatest impact or highest rate of return within communities with the least resources to recover from acute shocks and significant events.

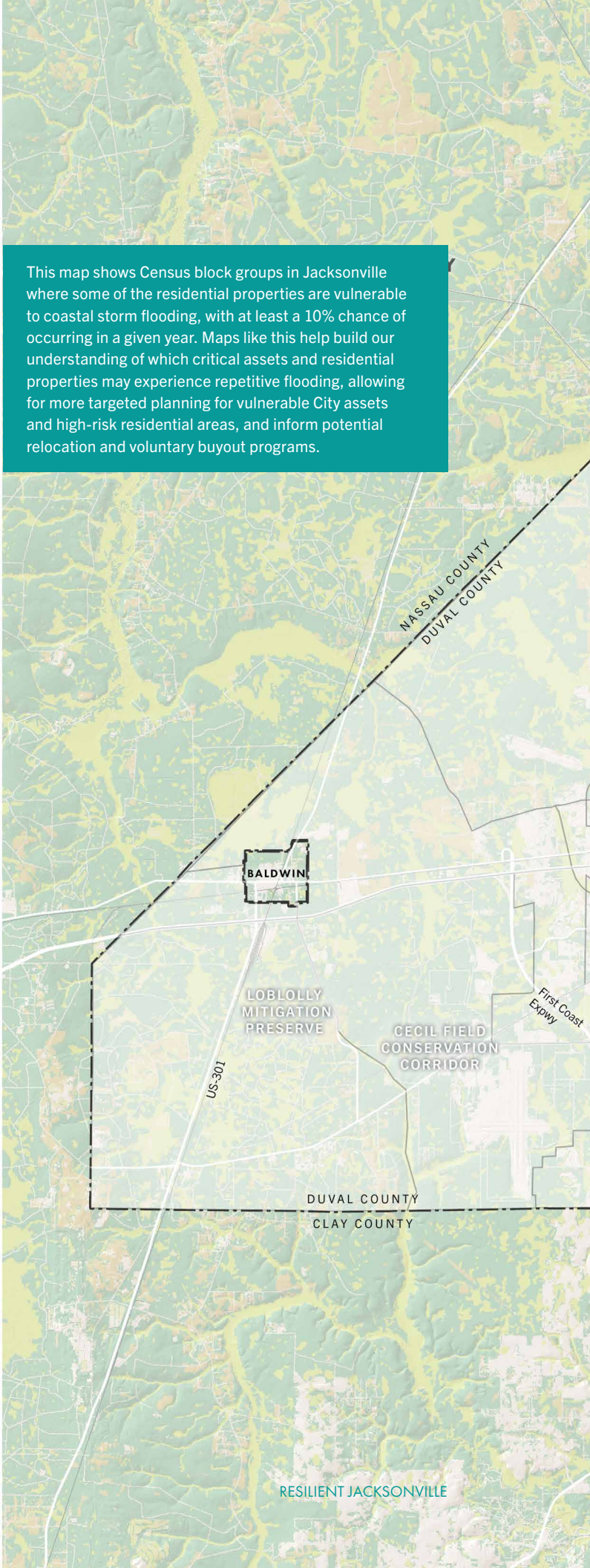
RELOCATE

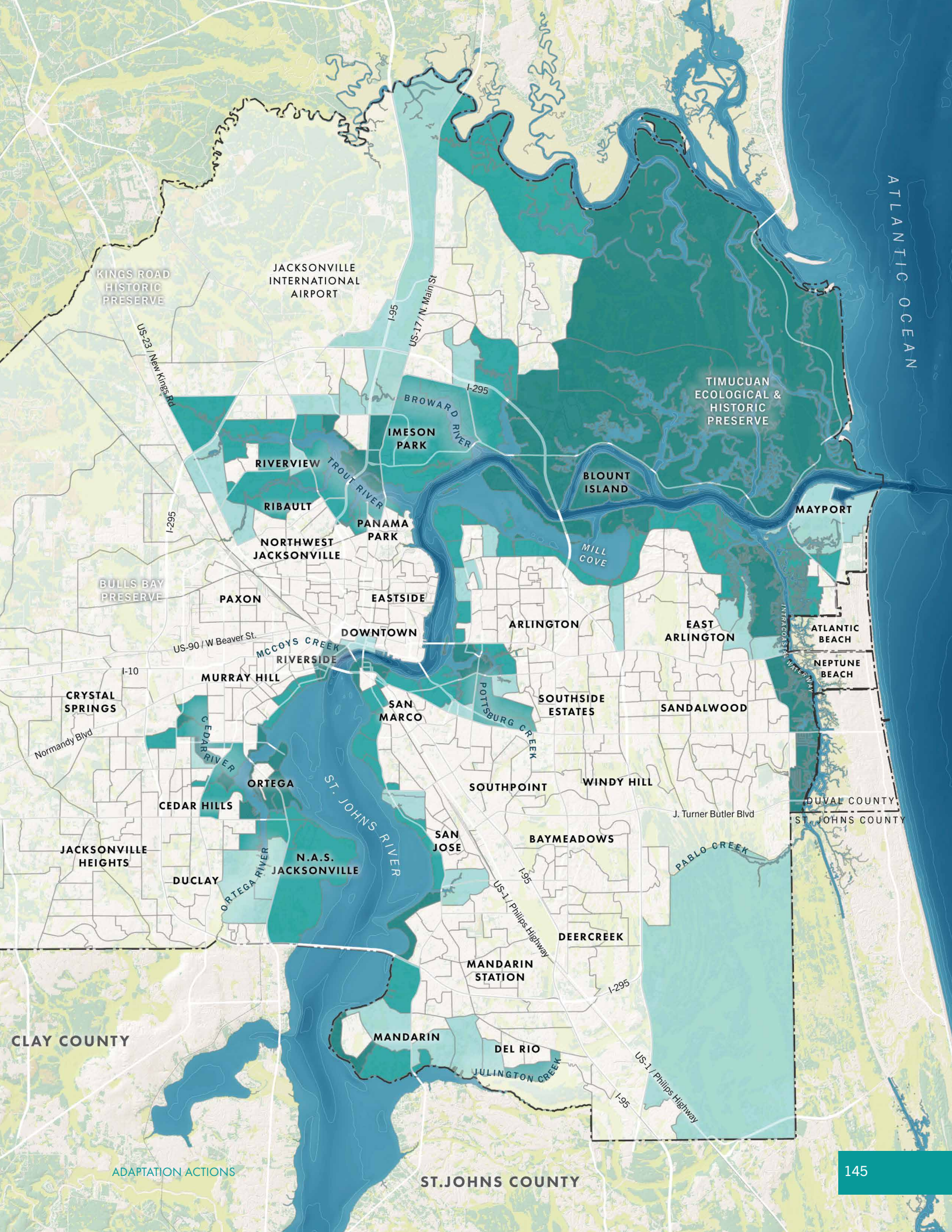
Offer voluntary, incentivized, or gradual retreat where fortification and accommodation are not efficient or effective.

Actions Include:

28. Develop **relocation plans for vulnerable critical assets** that can be moved outside the floodplain.

29. Streamline **voluntary residential buyout and relocation programs** for high-risk areas.




ATLANTIC OCEAN
KINGS ROAD HISTORIC PRESERVE
JACKSONVILLE INTERNATIONAL AIRPORT
US-23 / New Kings Rd
I-95
US-17 / N. Main St
I-295
BROWARD RIVER
TIMUCUAN ECOLOGICAL & HISTORIC PRESERVE
IMESON PARK
RIVERVIEW
TROUT RIVER
BLOUNT ISLAND
MAYPORT
RIBAULT
PANAMA PARK
NORTHWEST JACKSONVILLE
MILL COVE
BULLS BAY PRESERVE
PAXON
EASTSIDE
ARLINGTON
EAST ARLINGTON
INTRACOASTAL WATERWAY
ATLANTIC BEACH
US-90 / W Beaver St.
MCCOYS CREEK
DOWNTOWN
RIVERSIDE
NEPTUNE BEACH
I-10
MURRAY HILL
CRYSTAL SPRINGS
SAN MARCO
POTTSBURG CREEK
SOUTHSIDE ESTATES
SANDALWOOD
Normandy Blvd
CEDAR RIVER
ORTEGA
ST. JOHNS RIVER
SOUTHPOINT
WINDY HILL
DUVAL COUNTY
CEDAR HILLS
J. Turner Butler Blvd
ST. JOHNS COUNTY
SAN JOSE
BAYMEADOWS
JACKSONVILLE HEIGHTS
N.A.S. JACKSONVILLE
PABLO CREEK
DUCLAY
ORTEGA RIVER
I-95
US-1 / Phillips Highway
DEERCREEK
MANDARIN STATION
I-295
CLAY COUNTY
MANDARIN
DEL RIO
JULINGTON CREEK
US-1 / Phillips Highway
I-95
ADAPTATION ACTIONS
ST.JOHNS COUNTY

28 | Develop relocation plans for vulnerable critical assets that can be moved outside the floodplain.

Some assets do not need to remain in high-risk areas to preserve critical functions and can be relocated to areas of lower flood risk. This may depend on factors such as the cost of future maintenance or weighing costs to harden against costs to relocate. Understanding when and why these critical assets should be moved will be important for formulating plans that can consider changing risks over time. Instances when the City is considering major upgrades or replacement of an asset at the end of its useful lifespan can be ideal moments to consider relocating an asset to a less flood-prone location.

Shocks and Stressors Addressed

Flooding / Chronic Flooding / Sea Level Rise / Infrastructure Failure

Implementation Partners

Resilience / Public Works

Potential Funding Mechanisms

FEMA HMGP

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	Medium-Term (2035)	**Long-Term (2050)**

Relative Cost

$ (10,000s)	$$ (100,000s)	$$$ (1,000,000s)	**$$$$ (10,000,000s)**

28.1 **Develop plans for moving City-owned critical assets where alternative adaptation options are infeasible.**

Often, offlining an asset and rebuilding it somewhere else is costly and should only be used when no other alternatives exist. However, the period of time at the end of an asset's life is an opportunity to consider where that asset should be located (with level of risk as one of the many factors to account for) before investing in major renovations or upgrades. The City's vulnerability assessment data can guide the identification of the City's highest-risk assets, and though there may not be many high-risk assets right now, this data can help the City anticipate what may need to be relocated in the future and allow the City to proactively plan for shifting risk, including incorporating relocation for some critical assets into the Capital Improvement Plan.

28.2 **Work with utilities and independent agencies to develop and implement relocation plans for their critical assets.**

As levels of risk continue to grow, utilities and other independent agencies across Jacksonville are sometimes faced with questions about relocating critical assets. As the City makes decisions for City-owned assets, the Office of Resilience will also communicate current and future risks to outside agencies to provide guidance for relocation of critical assets, ensure that plans for relocation are in alignment, and help inform long-term capital planning.

29 | Streamline voluntary residential buyout and relocation programs for high-risk areas.

Accepting a buyout and relocating one's home and life is one of the most difficult and emotionally taxing events that anyone can experience. As climate risks and impacts increase over time, however, more people will have their lives threatened and disrupted by repetitive flood damage and may be willing to consider a buyout. A streamlined buyout program should be easy to access, straightforward to complete, and considerate of the financial and emotional cost of relocating. A successful buyout program will also need to take into consideration people's options for relocation and the relative housing costs in buyout and potential relocation areas. Decreasing the number of vulnerable people and structures in areas that flood has a strong resilience benefit, but doing so through relocation is only feasible with careful design and management of buyout programs. A key factor for success is understanding the geographic scope of risk, vulnerability, and relocation potential prior to future hazard events; if more program design and outreach can be completed before a damaging flood event occurs, the faster that program can move to assist after the event.

Action Description

The City will conduct research and analysis of the best practices in buyout program design, looking at examples like New Jersey's Blue Acres program to understand how to stand up a long-term, streamlined, accessible, proactive, and voluntary buyout program for homes that repeatedly flood. The City will use current and future data to research and identify the areas of the city most likely to experience displacement from repetitive flood damage, as well as how housing costs and development pressure may impact where people can relocate. These research efforts will also proactively seek to understand interest in and resistance to buyout programs among Jacksonville residents. Any buyout program will likely need to leverage federal funding, and the City will actively work with agencies like the Federal Emergency Management Agency (FEMA) and the U.S. Department of Housing and Urban Development (HUD) to communicate on the ground needs and push for improvements at the federal level to improve residents' experiences navigating these funding streams.

Shocks and Stressors Addressed

Chronic Flooding / Sea Level Rise / Hurricanes / Housing Instability

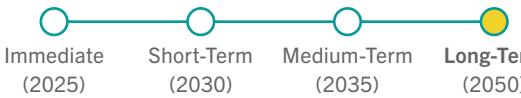
Implementation Partners

JFRD - Emergency Preparedness / Neighborhoods Department - Housing Division

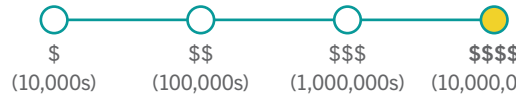
Potential Funding Mechanisms

FEMA HMGP / HUD CDBG

Implementation Timeframe



Relative Cost



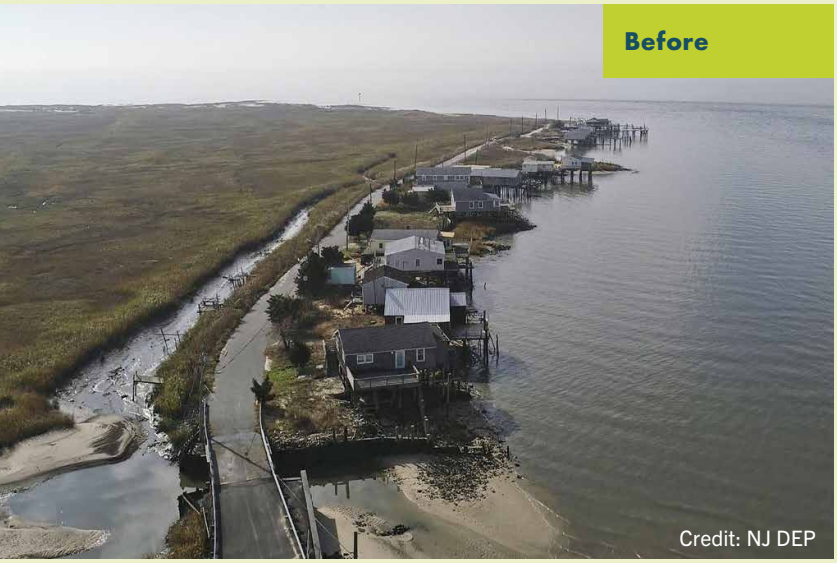
CASE STUDY

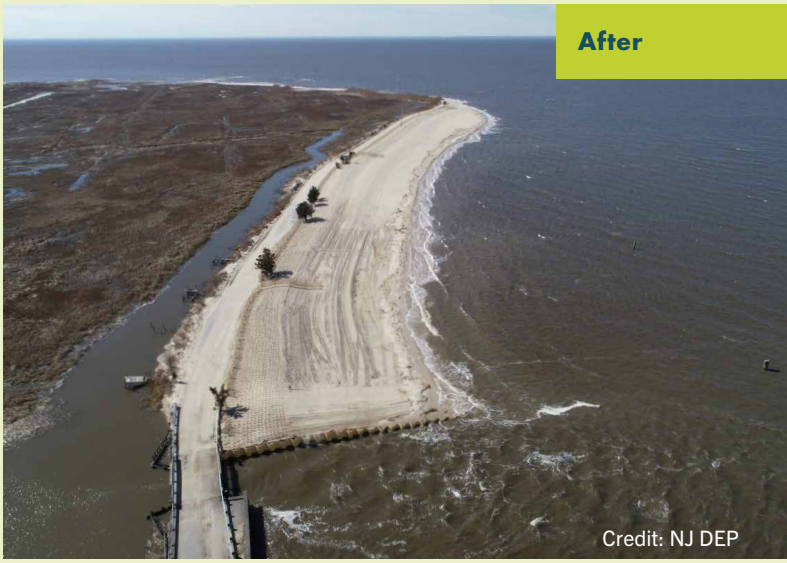
BLUE ACRES BUYOUT PROGRAM

New Jersey | 2012

Blue Acres is a voluntary, application-based state buyout program that prioritizes the facilitation of home buyouts on the homeowner's schedule and terms. The program grew significantly in the wake of Hurricane Sandy and is funded by FEMA, HUD, and a portion of the state's corporate business tax. Blue Acres focuses on moving families away from potential harm in ways that are efficient and transparent for homeowners. Blue Acres team members serve as homeowner advocates—using pre-storm market valuations and requiring appraisers to consider pre-storm photos when assessing conditions, ensuring that participating sellers are not responsible for transfer fees, real estate taxes, or realtor fees, and anticipating homeowners' needs ahead of their schedules to ensure the process continues to move forward. The program is also known for successfully supporting tenant relocation. To support renters more efficiently, the Blue Acres program increased its capacity by adding a tenant relocation team solely dedicated to assisting renters and landlords during the buyout process.[35]

To avoid disrupting community cohesion, where possible, the Blue Acres program considers areas for buyouts that contain clustered or contiguous parcels. After acquiring flood-prone properties, the Blue Acres program converts these areas to open green space—preserved in perpetuity—that provides opportunities for passive recreation as well as flood mitigation benefits.





PEOPLE

Resilience Approaches and Actions that focus on residents, communities, businesses, organizations, and partnerships.

SUPPORT

Invest in the health and quality of life of Jacksonville residents.

The well-being of Jacksonville residents is essential to achieving Jacksonville's vision for the future and will rely on significant investments in public health and safety. For example, while Floridians are no strangers to hot weather, extreme heat events which can have serious health impacts, including death, have become more common, more severe, and longer-lasting.[36] A support approach calls for a shared commitment to ensuring that the built environment serves all Jacksonville residents and includes actions that provide resources to Jacksonville residents in navigating challenges today and into the future.

THRIVE

Ensure shared prosperity for Jacksonville's people and businesses for the long-term.

Sustaining Jacksonville's strong local economy and securing future opportunities for all residents will require deliberate investment in Jacksonville's youth and a commitment to job creation and business development that is aligned to resilience goals and accounts for future conditions. For Jacksonville to be a global business center, it must be proactive about addressing risk and recognize that resilience is an economic opportunity that can increase jobs, investments, and revenues.

COLLABORATE

Strengthen partnerships and coordination among City departments, between government agencies, with civic organizations, and in support of regional coalitions.

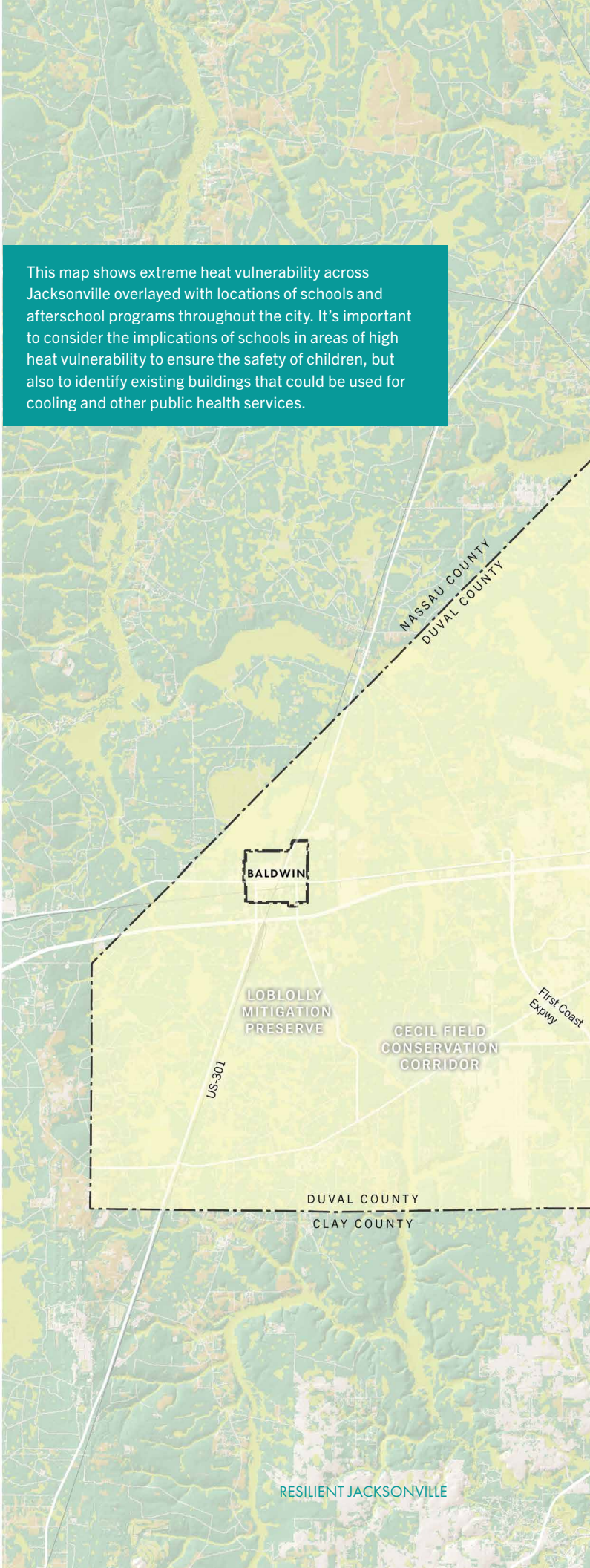
Resilient Jacksonville provides a foundation for the city's resilience actions and investments over the next 30 to 50 years, but long-term success and institutionalization of resilience requires tactical and sustained coordination at the decision maker and staff levels across departments, agencies, and organizations. A Collaborate approach contains Actions focused on interagency planning and an expansion of Jacksonville's resilience work to strengthen regional partnerships and benefit from additional resources to support local resilience.

SUPPORT

Invest in the health and quality of life of Jacksonville residents.

Actions Include:

30. Strengthen the citywide response to **extreme heat** and other **public health emergencies**.
31. Increase **mental and physical health and well-being** across Jacksonville through tailored resource delivery.
32. Improve housing condition and quality.
33. Develop, implement, and monitor plans in support of **eliminating all bicycle and pedestrian deaths** in Jacksonville.
34. Strengthen **community cohesion** in all of Jacksonville's neighborhoods through quality public spaces, events, and activities.



This map shows extreme heat vulnerability across Jacksonville overlayed with locations of schools and afterschool programs throughout the city. It's important to consider the implications of schools in areas of high heat vulnerability to ensure the safety of children, but also to identify existing buildings that could be used for cooling and other public health services.

LEGEND

Extreme Heat Vulnerability

Category

- Low
- Medium
- High
- Schools and After School Programs

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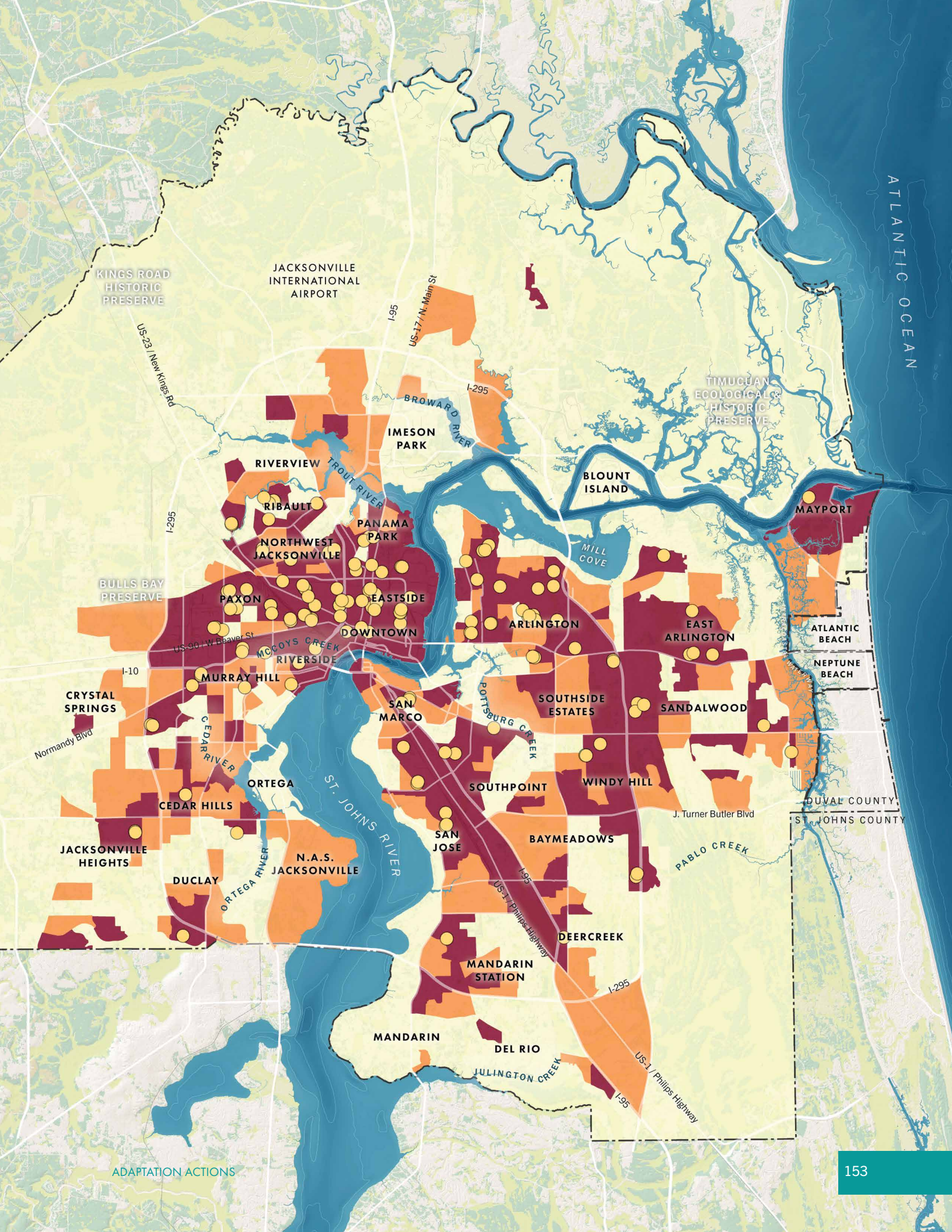

ATLANTIC OCEAN
KINGS ROAD HISTORIC PRESERVE
JACKSONVILLE INTERNATIONAL AIRPORT
US-23 / New Kings Rd
I-95
US-17 / N Main St
I-295
BROWARD RIVER
TIMUCUAN ECOLOGICAL & HISTORIC PRESERVE
IMESON PARK
RIVERVIEW
TROUT RIVER
BLOUNT ISLAND
MAYPORT
RIBAULT
PANAMA PARK
NORTHWEST JACKSONVILLE
MILL COVE
BULLS BAY PRESERVE
PAXON
EASTSIDE
DOWNTOWN
ARLINGTON
EAST ARLINGTON
ATLANTIC BEACH
US-90 / W Beaver St
MCCOYS CREEK
RIVERSIDE
NEPTUNE BEACH
I-10
MURRAY HILL
CRYSTAL SPRINGS
SAN MARCO
POTTSBURG CREEK
SOUTHSIDE ESTATES
SANDALWOOD
Normandy Blvd
CEDAR RIVER
ORTEGA
ST. JOHNS RIVER
SOUTHPOINT
WINDY HILL
CEDAR HILLS
DUVAL COUNTY
J. Turner Butler Blvd
ST. JOHNS COUNTY
SAN JOSE
BAYMEADOWS
JACKSONVILLE HEIGHTS
N.A.S. JACKSONVILLE
PABLO CREEK
ORTEGA RIVER
DUCLAY
I-95
US-17 / Philips Highway
DEERCREEK
MANDARIN STATION
I-295
MANDARIN
DEL RIO
JULINGTON CREEK
US-1 / Philips Highway
I-95

30 | Strengthen the citywide response to extreme heat and other public health emergencies.

Extreme heat events, which are increasing in both frequency and severity, can be dangerous and even fatal to human health.[37] This is particularly true for populations identified as vulnerable to heat such as older adults, young children, people who work or play sports outside, and lower income households. Extreme heat also has negative impacts on the economy—reducing labor productivity, adding stress to infrastructure and utilities, decreasing agricultural yields, and disrupting trade.[38] Recent research even suggests a correlation between extreme heat and surges in crime.[39] In addition to extreme heat, Jacksonville must prepare for both pandemics and vector-borne diseases. The COVID-19 global pandemic demonstrated the need for adaptable plans that could adjust to local trends. On the other hand, vector-borne diseases are often regional, and specific plans to address these regional threats must be prioritized at this level. According to the New England Journal of Medicine, increases in the rates of vector-borne diseases at given locations are often associated with changes in the local climate.[40] To support the health and well-being of all Jacksonville's residents, it is crucial that the City has a strong and coordinated response in the face of these public health threats and is able to provide residents with accurate information before, during, and after these hazards take place.

Shocks and Stressors Addressed

Extreme Heat / Pandemic / Chronic and Infectious Disease

Implementation Partners

Jax Ready / Mayor's Office / Health Department / DCSP / JEA

Potential Funding Mechanisms

Increased Staff Capacity and Operations Funding

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$ (100,000s)**	$$$ (1,000,000s)	$$$$ (10,000,000s)

30.1 **Expand JaxReady alert system for high heat days.**

During the summer of 2023, the City's first-Chief Health Officer worked with the Emergency Preparedness Division to expand JaxReady emergency communication and ensure that messaging before and during extreme heat events was both informative and action-oriented. JaxReady now delivers messaging that includes but is not limited to: expected heat index values; times that residents should stay indoors to avoid the heat; how to differentiate between symptoms of heat exhaustion and heat stroke; locations of cooling centers, splash pads, and pools; and transportation options available to access these resources. As future heat events become stronger and more frequent, ensuring consistency in messaging will be critical for preventing the worst public health impacts of extreme heat.

30.2 **Extend open hours and access to cooling infrastructure and air-conditioned public facilities during high heat days.**

Along with improved messaging, the City also increased access to and use of public cooling infrastructure such as splash pads, pools, and cooling centers by extending open hours, communicating hours and locations through JaxReady alerts and consistent messaging through the City's website, and coordinating with Jacksonville Transportation Authority (JTA) to make sure that public transportation routes connect to the City's cooling infrastructure. Future expansions of multimodal infrastructure should consider the locations of these cooling and recreation centers, and future cooling centers would best serve Jacksonville's residents by considering nearby transit resources. To ensure that efforts to expand access are targeted in the highest need areas, the City will identify neighborhoods where urban heat island effects are the greatest—for example, in historically redlined communities that contain less tree canopy cover and more paved, industrial areas.

30.3 **Provide heat trainings for schools and youth sports organizations.**

Children engaging in outdoor youth sports are at an elevated risk of heat illness and may be less likely to recognize the symptoms. Duval County Public School (DCPS) athletes and coaches have already started to address heat safety education, and DCPS as well as youth sports providers can continue to reduce this risk by adopting more expansive standardized heat trainings for DCPS teachers and coaches outside of the school district.[41] To ensure the safety of students and youth athletes, the City's Chief Health Office will develop and organize heat training materials from the Centers for Disease Control and Prevention (CDC) and other state resources to provide to Duval County Public School staff and youth sports providers across the city.

30.4 **Provide guidance on outdoor work standards for employers.**

Recent public health research suggests that human physical and cognitive performance is highly sensitive to heat, and hotter temperatures significantly increase injuries in predominantly outdoor industries.[42] The U.S. Department of Labor (DOL) and the Occupational Safety and Health Administration (OSHA) are working to institute a rule to prevent heat illness in outdoor and indoor work settings, and Jacksonville has the opportunity to be a leader in enforcement of outdoor work standards. The City will work with partners, such as JAX Chamber and local trade groups, to provide standard guidance for outdoor work and ensure these standards are adopted within City departments and agencies that operate outdoors, such as the Parks Department and Department of Public Works. The City will share this guidance with major employers in the region and encourage their participation in implementing outdoor work standards.

30.5 **Ensure robust and dynamic public health planning for vector-borne diseases and pandemics.**

While climate change is making heat waves more common, it is also causing a gradual increase in overall temperatures, which can spread the risk of vector-borne diseases. Vector-borne diseases in Florida generally derive from mosquitos, ticks, and invasive species, and the development of citywide plans to address illnesses such as the Zika virus, Malaria, and Dengue Fever will be particularly important as global climates continue to change.

The COVID-19 global pandemic has been characterized by unpredictable trends that are often localized. Because of this, there is a need for flexible public health emergency planning at the city level, and future updates to plans must maintain high levels of adaptability. To support the well-being of Jacksonville's residents in the event of any public health emergency, the Office of Resilience will work with the City's Chief Health Officer to inventory existing public health plans related to both pandemics and vector-borne diseases and make recommendations about where updates are most needed.

31 | Increase mental and physical health and well-being across Jacksonville through tailored resource delivery.

Prioritizing both the physical and mental health of Jacksonville's residents is critical to achieving our resilience vision. Healthy populations are better positioned to prepare for, withstand, and recover from shocks and stressors. The City of Jacksonville's Chief Health Officer and Jacksonville's many local, state, and federal partners will be key in expanding collaboration efforts centered around increasing access to mental and physical health resources available in Jacksonville and making sure these resources get to the residents most in need.

Shocks and Stressors Addressed

Lack of Healthcare / Poverty / Social Inequality / Housing Instability / Food Insecurity / Chronic and Infectious Disease

Implementation Partners

Chief Health Officer / Military and Veterans Affairs / Parks / Economic Development / Blue Zones / United Way / Feeding Northeast Florida / Sulzbacher

Potential Funding Mechanisms

Public Private Partnerships / Philanthropy

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	**Medium-Term (2035)**	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	**$$$ (1,000,000s)**	$$$$ (10,000,000s)

31.1 Support the Blue Zones Project to improve community health and well-being.

The Blue Zones Project, based on research from places where people live the longest, focuses on community transformations to support longevity and well-being through people, places, and policy. Blue Zones Project Jacksonville is supported by many community partners, including the city's major health systems and philanthropic organizations, and is positioned to make impacts aligned with this resilience strategy. For example, many of the Blue Zones policy initiatives on the built environment, like increasing public spaces and bicycle paths, will also impact resilience. Led by a steering committee of civic leaders and local experts, the Blue Zones Project Jacksonville is already partnering with effective organizations like LIFT JAX to ensure streamlined work without duplication of effort. As Jacksonville works to become a Blue Zones Community, the City will support the Blue Zones Project's work streams, particularly where they intersect with the Actions and Sub-Actions in this Strategy.

Credit: Blue Zones

31.2 Ensure residents can easily connect to available public and nonprofit resources and services.

Many Jacksonville organizations provide valuable services for seniors, children, families, veterans, and neighbors, but connecting to these resources can be a challenge. United Way of Northeast Florida operates the region's 211 hotline, available 24/7 to connect people to free resources. 988 is the City's mental health hotline, which is operated by trained crisis managers from multiple local mental health service groups. The 988 hotline has been successful; referring less than 1.3% of the calls to the emergency room or 911. Additionally, the City's Department of Parks, Recreation, and Community Services operates critical social and senior services, like emergency financial assistance, HIV/AIDS services, programs for victims of crime, and more. These services are accessible through the hotline (904) 630-CITY. Other resources, like the opioid overdose reversal drug Narcan, are being made available throughout Jacksonville by the Florida Department of Health, Jacksonville Fire and Rescue, and additional partners. The City will work with the region's social service providers to support the continued coordination, regular updating, and expansion of these and similar resources to improve service delivery to residents in need.

31.3 Improve food security and healthy food access in all neighborhoods.

Access to nutritious food is essential for a healthy city. Like many other cities across the U.S., a significant percentage of Jacksonville residents rely on Supplemental Nutritional Assistance Program (SNAP) retailers, and must be able to access these providers before, during, and after extreme weather events take place. The 2019 USDA Food Access Research Atlas identifies 38 census tracts within the city as "Low Income and Low Access," which are areas where residents have limited access to healthy food in combination with limited buying power. Baltimore's FreshCrate program[43] is an example of an initiative that takes a multifaceted approach to reducing the number of food deserts. This program addresses the supply issue but also focuses on consumer education, provides coupons to residents within the same ZIP code as participating stores, and works with local universities to pilot programs that help eliminate barriers between residents and healthy food options. Using data from Jacksonville's vulnerability assessment, the City will work with the Economic Development Department to identify stores that accept SNAP benefits, are located in areas with the greatest need, and face significant flood risk. Identifying these areas will help the City and local nonprofit partners facilitate the supply of affordable and nutritious food. Additionally, the City will work with Feeding Northeast Florida to support continued development of their ongoing work, including the expansion of urban and community farming practices.

31.4 Prioritize veteran and servicemember health services.

Veterans and servicemembers are valuable members of Jacksonville's community, and the health of veterans impacts both their families and larger networks. According to the National Alliance on Mental Illness, research suggests that 11–20% of veterans experience post-traumatic stress disorder (PTSD) in a given year.[44] Providing veterans with both mental and physical health services is a priority, and the City will coordinate with Veterans Affairs to ensure that all of Jacksonville's veterans are receiving the support they need to thrive in Jacksonville.

31.5 Identify and connect with housebound seniors and people with disabilities.

The City will work with the Health Department, the Emergency Preparedness Division, the Parks Department's Senior Services Division, and local nonprofits to identify and connect with housebound seniors, residents with disabilities, and other vulnerable populations ahead of extreme heat days and other extreme weather threats to provide the support needed to keep people safe during these events. JaxReady already has a robust list of elderly individuals with special needs that they help connect with shelters during weather-related emergencies, and Jacksonville Transportation Authority (JTA) provides each registered resident with transportation to and from special needs shelters. However, the City will expand communications about the registry to ensure that these services reach more of Jacksonville's senior residents. The City will also explore the possibility of reinstating the collaborative efforts that existed at the height of the COVID-19 pandemic to feed senior residents at least one fresh meal a day.

31.6 Continue the existing collaboration between organizations serving homeless individuals.

Like many cities across the U.S., a significant number of people within Jacksonville have experienced homelessness or are currently unhoused. Sustaining a healthy population is an important part of strengthening city resilience, and providing services to help unhoused individuals access basic needs is one step the City can take to ensure Jacksonville's people are prepared to cope with hazards such as extreme weather events or public health emergencies. Without a home or shelter, people are far more vulnerable to extreme weather and other shocks. When the COVID-19 pandemic reached Jacksonville, the city's homeless-serving organizations, like Sulzbacher and Changing Homelessness, came together to coordinate services and rapidly change their service delivery model. This collaboration has endured, allowing for partnerships addressing veteran homelessness, building supportive housing, and more. The City will continue to facilitate and encourage these collaborations to serve people experiencing homelessness and build more housing.

32 | Improve housing condition and quality.

A safe home is one of the strongest defenses against hazards like heat and flooding. While homeowners often have access to financial and other resources to improve the safety of their homes, tenants are dependent on the property owner to enact upgrades and ensure that their home has, for example, a working air-conditioning unit during an extreme heat event. Ultimately, any home is safer than no home at all, which is why offering tenants legal representation in eviction proceedings can help to slow down evictions—the primary cause of homelessness. By keeping people in their homes, and making those homes safer, Jacksonville residents will be much more resilient to hazards like heat and flooding.

Shocks and Stressors Addressed

Housing Instability / Social Inequality / Extreme Heat

Implementation Partners

Neighborhoods Department / Jacksonville Housing / Housing and Legal Aid Nonprofit Organizations

Potential Funding Mechanisms

Public Private Partnerships / General Fund / IIJA

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$ (100,000s)**	$$$ (1,000,000s)	$$$$ (10,000,000s)

32.1 **Develop a rental registry and enforce minimum habitability requirements.**

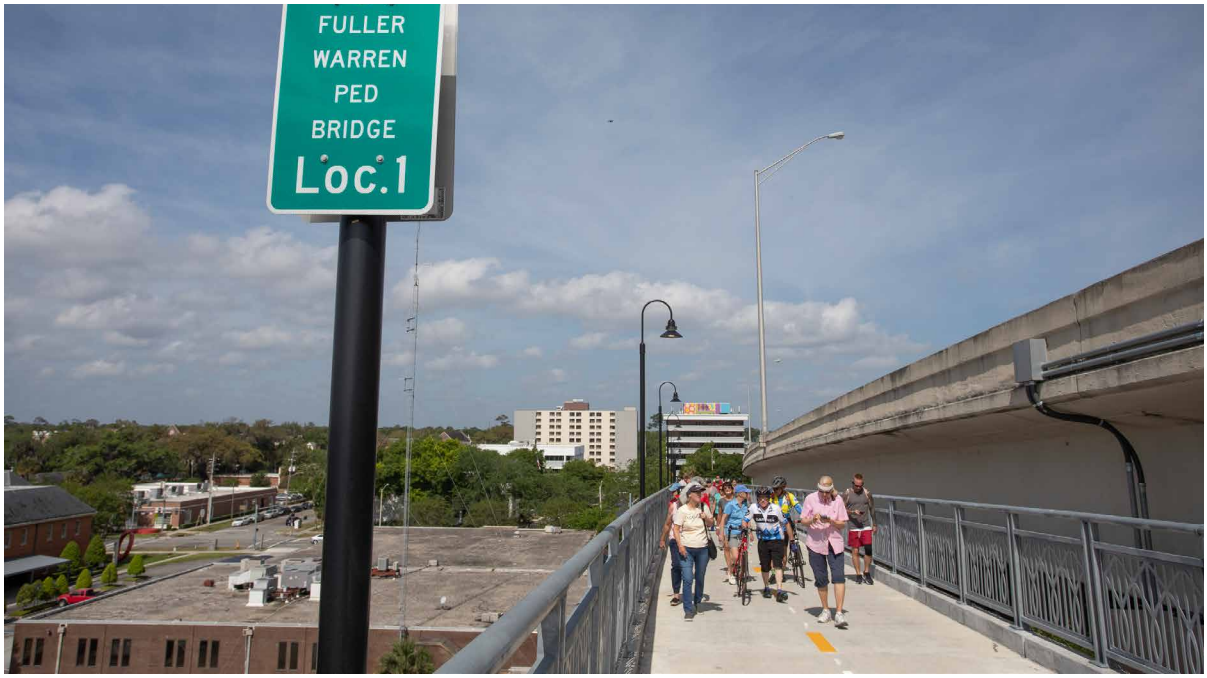
While code enforcement often operates on a complaint basis—where residents or neighbors complain about a violation of code, a city inspector investigates, and violations are enforced if warranted—some cities are shifting to a proactive inspection model to enforce minimum standards of habitability. These inspection programs can take different forms, including rental registries, where landlords would be required to register their properties with the city at a prescribed frequency and subject to inspections. Boston's ordinance covers 140,000 rental units and requires annual registration with inspections every 5 years. These registries can also help track property ownership to help understand changing patterns of rental ownership throughout the city, providing more information to encourage more affordable housing. The City will examine case studies of rental registries to determine if a proactive inspection model would fit in Jacksonville, and will also explore adding minimum cooling requirements to its habitability standards, which would help tenants cope with increasing extreme heat.

32.2 **Establish right to counsel for evictions.**

While Jacksonville has historically had lower housing costs that enabled rapid population growth, the city now faces an affordable housing crisis like many cities across the country. An hourly wage of more than $25 is necessary to afford an average two-bedroom home in Duval County.[45] Most poor renting families spend at least half their income on housing costs, where one misstep or emergency can lead to an eviction filing—and recent research from the National Low Income Housing Coalition has found that eviction filings are associated with increases in homelessness.[46] Eviction has enormous consequences for tenants, and can lead to losing one's job, possessions, children, health, and even one's life. Eviction and homelessness are costly for the whole city. A new report from the group CityHealth and partners, *Addressing America's Housing Crisis*, includes a recommendation for legal support for tenants. Providing tenants at risk of eviction with an attorney can help to protect the basic right of representation and keep people housed while furthering racial and health equity.[47] A right to counsel pilot program is under consideration in St. Petersburg, where $100,000 would fund a community law program to represent tenants within their Community Redevelopment Area (CRA) pro bono. The City and City Council will work with interested agencies to see if a similar pilot program could be established in Jacksonville to prevent evictions.[48]

33 | Develop, implement, and monitor plans in support of eliminating all bicycle and pedestrian deaths in Jacksonville.

Jacksonville is located within the Federal Highway Administration's (FHWA) designated "MPO Focus Area" due to the higher-than-national-average reported pedestrian fatalities and was ranked 3rd most dangerous metropolitan area in the nation for bicyclists between 2017–2021, based on reported fatalities per capita. Smart Growth America also ranked Jacksonville 6th most dangerous metropolitan area in the U.S. for pedestrians between 2016 and 2020, based on fatalities per 100,000 residents, in their 2022 *Dangerous by Design* report. This loss of life is tragic, preventable, and expensive. The costs of crashes with injuries and fatalities go beyond any individual medical costs and include the time and effort of emergency responders, repairs to infrastructure, time cost of road closures, and the mental costs of witnessing and experiencing trauma. Safer streets are more resilient streets, with benefits for the whole city. The City will work with public and private agencies, residents, and safety practitioners to develop safety plans, targeting the elimination of bicycle and pedestrian fatalities by 2030, to be adopted by Jacksonville's mayor and implemented by City staff.



Shocks and Stressors Addressed

Lack of Reliable Transportation

Implementation Partners

Planning & Development / Blue Zones

Potential Funding Mechanisms

Safe Routes to School Grants

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$ (100,000s)**	$$$ (1,000,000s)	$$$$ (10,000,000s)

33.1 **Complete a Vision Zero Action Plan with a goal of zero traffic fatalities and serious injuries among all roadway users by 2035.**

Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries while increasing safe, healthy, equitable mobility for all. Derived from an approach implemented in Europe, many American cities have now developed Vision Zero Action Plans that meet certain criteria. A Vision Zero Action Plan must identify recommended countermeasures for safer roadways, policies and actionable items, a prioritized "high-injury" corridor network for targeted safety improvements, and measurable short- and long-term performance targets. The process of developing the plan requires participation from all stakeholders, including elected officials, local, regional, and state governments, private sector and nonprofit agencies, as well as residents. Mayoral adoption of the final plan is required to officially be recognized as a Vision Zero Community within the nationwide Vision Zero Network. The City will develop a Vison Zero Action Plan to support the goal of zero traffic fatalities by 2035.

33.2 **Complete and update additional plans in support of the Vision Zero Action Plan, including the Pedestrian and Bicycle Master Plan, Pedestrian Safety Action Plan, and Mobility Plan.**

Building transportation infrastructure often requires specific, focused plans to use certain funds to remain in compliance with state or federal requirements, or to continue already-established programs. Jacksonville will use these plans to further the goals of the Vision Zero Action Plan. The City completed a Pedestrian and Bicycle Master Plan in 2017 that guides investments in infrastructure to support walking and biking; this included a recommendation to update the plan every 5 years. City staff will review and update the existing plan by 2024 and seek its adoption. The 2024 version of the plan will include revised policy recommendations, an actionable items list, recommended safety countermeasures, new performance targets, and an updated projects list. In addition, the City will develop a standalone Pedestrian Safety Action Plan that will complement the Pedestrian and Bicycle Master Plan (2024 Update) and the Vison Zero Action Plan to enhance existing goals and policies with a more targeted focus on pedestrian safety. The Pedestrian Safety Action Plan will identify the most impactful projects and provide guidance for decision makers on budgeting for both new construction and sidewalk repair projects. Finally, the City will update the current Mobility Plan to further enhance the City's framework and strategies for long-range transportation planning (estimated 2025). The revised Mobility Plan will detail the City's focus on safety and multimodal transportation options, including a recommendation to complete a Sidewalk Master Plan.

34 | Strengthen community cohesion in all of Jacksonville's neighborhoods through quality public spaces, events, and activities.

Accessible and enjoyable public parks and spaces are integral to building strong community cohesion. As the widespread use of digital interactions such as remote meetings, social media, and text messaging oftentimes replaces in-person interaction, providing spaces and opportunities for residents to meet and interact in-person is crucial to improving mental health and well-being and serves a greater purpose as well. The strength of community connections is often the single biggest factor in survival of disaster events, as was seen after the devastating heat wave of 1995 in Chicago.[49] This event proved the importance of social cohesion during disaster events; communities with solid social infrastructure were more likely to get lifesaving help from family, friends, and neighbors. Neighbors helping neighbors is critical in disaster response and recovery, and the City will encourage residents to connect with their neighbors through investment in public spaces that strengthen community and build mutual support.[50]

Action Description

Jacksonville's neighborhood and community organizations will work with the City and each other to build community cohesion throughout Jacksonville by developing and maintaining quality public spaces and parks and providing engaging programming for residents of all ages. These efforts will be tailored to the individual needs and characteristics of Jacksonville's many neighborhoods. Currently, the Parks Department conducts a range of activities throughout the city for all age groups, and ongoing partnerships with local nonprofits can add even more value to these community events.

Shocks and Stressors Addressed

Social Isolation

Implementation Partners

Blue Zones / Build Up Downtown / Parks

Potential Funding Mechanisms

Public Private Partnerships / Philanthropy

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$ (100,000s)**	$$$ (1,000,000s)	$$$$ (10,000,000s)

Credit: Ennis Davis

EXAMPLE

PHOENIX ARTS & INNOVATION DISTRICT

The Phoenix Arts & Innovation District spans more than 8 acres—mostly in the North Springfield neighborhood of Jacksonville. The goal for this community has been to facilitate the growth of local businesses and artists by repurposing underutilized areas within the community campus into housing, offices, and commercial space. An organization called Future of Cities plans to give back 40% of greenspace through the buildout of trails and pocket parks. Additionally, PHX JAX—the organization managing these efforts—has been partnering with Groundwork Jacksonville to ensure that the district is walkable and bikeable, with direct access to the Emerald Trail.

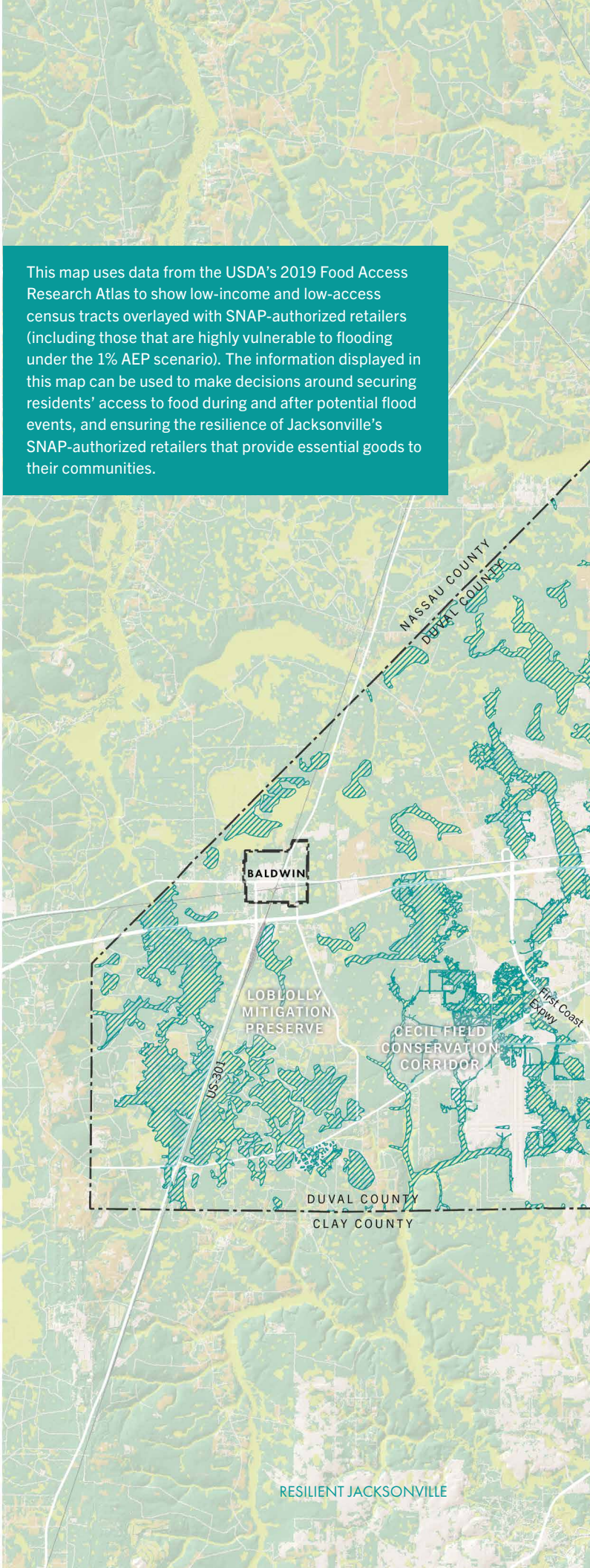
THRIVE

Ensure shared prosperity for Jacksonville's people and businesses for the long-term.

Actions Include:

35. Engage **Jacksonville's youth** to guide future resilience and climate action.
36. Create **new jobs, training, and business development opportunities** by leveraging funding spent on resilience projects and programs.
37. Expand **digital and financial infrastructure** necessary for full economic participation.
38. Market Jacksonville's **resilient business climate** to attract new companies and investment.
39. Address rising **flood and homeowners' insurance costs** by investing in risk reduction.

This map uses data from the USDA's 2019 Food Access Research Atlas to show low-income and low-access census tracts overlayed with SNAP-authorized retailers (including those that are highly vulnerable to flooding under the 1% AEP scenario). The information displayed in this map can be used to make decisions around securing residents' access to food during and after potential flood events, and ensuring the resilience of Jacksonville's SNAP-authorized retailers that provide essential goods to their communities.



LEGEND

2019 Food Access Research Atlas (USDA)

- Low-Income and Low-Access Census Tract
- SNAP-Authorized Retailer
- Highly Vulnerable

Flooding

- 1% Annual Exceedance Probability Flood Extent

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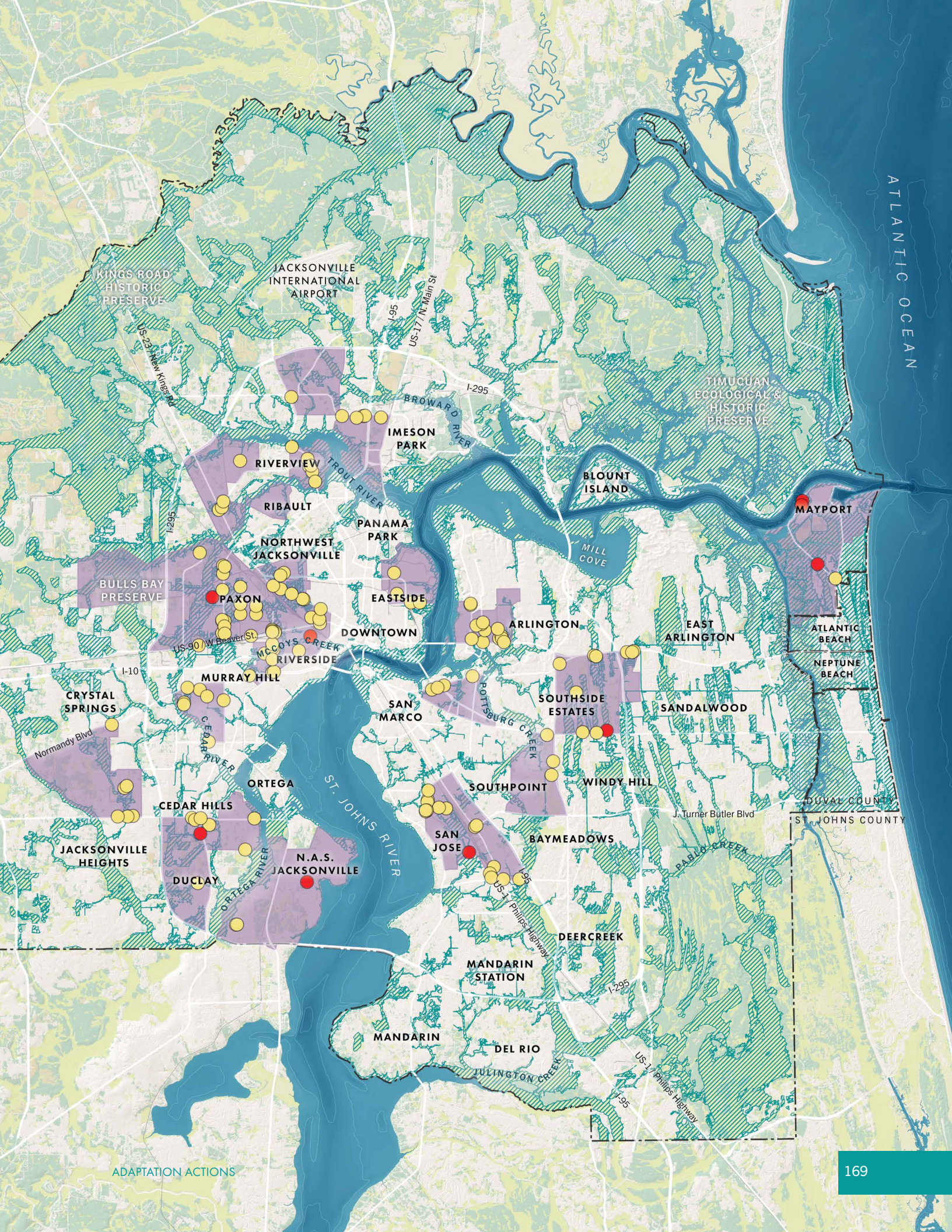
ATLANTIC OCEAN
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MILL COVE
BULLS BAY PRESERVE
PAXON
EASTSIDE
ARLINGTON
EAST ARLINGTON
ATLANTIC BEACH
NEPTUNE BEACH
DOWNTOWN
US-90 / W Beaver St
MCCOYS CREEK
RIVERSIDE
I-10
MURRAY HILL
CRYSTAL SPRINGS
SAN MARCO
POTTSBURG CREEK
SOUTHSIDE ESTATES
SANDALWOOD
Normandy Blvd
CEDAR RIVER
ORTEGA
ST. JOHNS RIVER
SOUTHPOINT
WINDY HILL
DUVAL COUNTY
J. Turner Butler Blvd
ST. JOHNS COUNTY
CEDAR HILLS
SAN JOSE
BAYMEADOWS
JACKSONVILLE HEIGHTS
N.A.S. JACKSONVILLE
ORTEGA RIVER
DUCLAY
PABLO CREEK
US-1 / Philips Highway
I-95
DEERCREEK
MANDARIN STATION
I-295
MANDARIN
DEL RIO
JULINGTON CREEK
US-1 / Philips Highway
I-95

35 | Engage Jacksonville's youth to guide future resilience and climate action.

Survey results from Duval County Public School students indicate that out of 215 respondents, 83% are concerned about climate change, and their daily lives have been disrupted by increasingly frequent flooding and extreme heat events. Jacksonville's young people are capable and smart, and they need opportunities for resilience and climate action leadership. Organizations that work closely with youth are key partners for nurturing the next generation of environmental stewards in Jacksonville and can also provide an avenue for amplifying young voices to city decision makers.

Shocks and Stressors Addressed

All Shocks and Stressors

Implementation Partners

Resilience / Mayor's Young Leaders Advisory Council / Kids Hope Alliance / St. Johns Riverkeeper

Potential Funding Mechanisms

Public Private Partnerships / Philanthropy

Implementation Timeframe

Immediate (2025) | Short-Term (2030) | Medium-Term (2035) | Long-Term (2050)

Relative Cost

$ (10,000s) | $$ (100,000s) | $$$ (1,000,000s) | $$$$ (10,000,000s)

35.1 Foster youth leadership through the Mayor's Youth Council and Kids Hope Alliance.

Young people living in Jacksonville today can aspire to grow where they are planted if they can see a future for themselves in the city. The Mayor's Youth Council is an important mechanism to ensure talented young people in Jacksonville are set up for success and have a voice in shaping the city's future. Additionally, programs managed through the Kids Hope Alliance (KHA) ensure that young people are getting the resources they need to succeed in Jacksonville. Recently, KHA has established a working group focused on workforce development that anticipates growing employment sectors and discrete skills that will be needed to succeed within these sectors. KHA will also be working with local academic institutions to provide appropriate training for these industries of the future. These partnerships can build resilience in young people and allow them to step into climate leadership.

35.2 Incorporate resilience education and materials into Jacksonville youth programs.

Jacksonville's youth will constitute the next generation of decision makers in the city. To ensure that Jacksonville's young people are equipped to make informed decisions about the city's future, it is important that youth programs serving kids across the city are prepared to teach about resilience, the environment, and the risks that Jacksonville is currently facing and will face in the future. The St. Johns Riverkeeper is an organization that has already built out a robust series of programs and field trips for Jacksonville's youth to engage with the St. Johns River. The Office of Resilience will partner with this group as well as other local organizations that serve the city's youth to help build resilience concepts into existing curriculum and expand hands-on opportunities through experiences with Jacksonville's many water bodies and natural areas.

36 | Create new jobs, training, and business development opportunities by leveraging funding spent on resilience projects and programs.

When done strategically, strengthening city resilience can provide new jobs and increase the capacity of Jacksonville's workforce. Investing time and resources into Jacksonville's workforce in the near term will ensure that local workers benefit financially from their role in the implementation of projects and benefit from the projects themselves. The City will develop partnerships with local educational institutions to expand training programs and connect graduates to new job opportunities in the field of resilience as well as support development of the specialized skills needed to execute resilience-related projects.

Shocks and Stressors Addressed

Social Inequality / Poverty

Implementation Partners

Economic Development / Academic Institutions

Potential Funding Mechanisms

SBA Grants / IIJA / Inflation Reduction Act / Florida Commerce

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

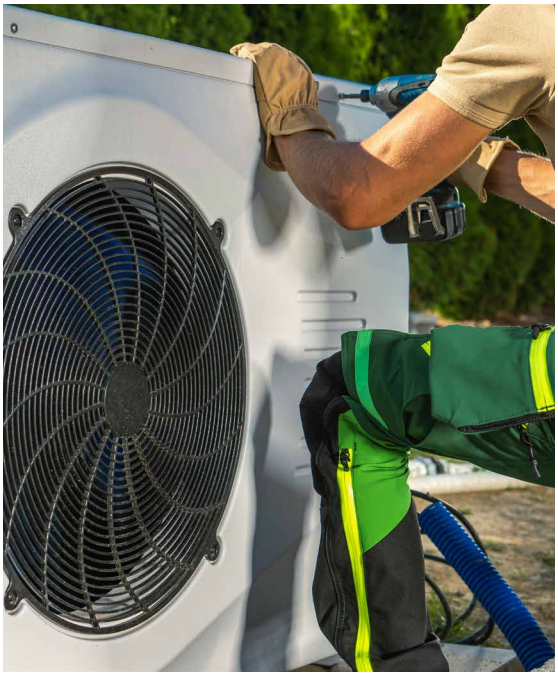
$ (10,000s)	**$$ (100,000s)**	$$$ (1,000,000s)	$$$$ (10,000,000s)

36.1 **Coordinate with local educational institutions to offer specialized training for jobs that are needed to meet resilience goals.**

Many actions laid out in *Resilient Jacksonville* will lead to expanded public investment in green infrastructure, building retrofits, and other resilience projects, which will ultimately require the support of a specialized workforce. Expanding partnerships with local educational institutions is a systematic way to prepare the workforce for these opportunities. The City will work with these institutions to make sure that Jacksonville's workers are trained to respond to and benefit from the forthcoming demand for these emerging technical skills and that public investments in resilience are captured within the local economy.

36.2 **Encourage small business formation, specialization, and expansion into resilience work.**

In addition to new workforce training, businesses in Jacksonville will need new skills, approaches, or designs that may not be common among the city's established businesses today. For example, some HVAC contractors may not be experienced with efficient heat pump installation but could add that to their service offerings to compete for facility retrofit projects (see Sub-Action 21.2). The City will encourage existing and new businesses to pursue expansion into these new opportunities in both the public and private sectors. These diverse skillsets and business lines will further expand Jacksonville's economy and workforce, ensuring that there are local businesses that can successfully design, install, and maintain resilience projects.



37 | Expand digital and financial infrastructure necessary for full economic participation.

Internet and banking are two of the basic needs for participation in American life. People without bank accounts rely on cash, money orders, and payday lenders, making them vulnerable to thefts and civil forfeiture. Without broadband internet, people rely on libraries, friends and family, and mobile data plans. Without internet and bank access, it is harder to access resources that are increasingly only available online. This only becomes more critical in an emergency situation, such as after a hurricane, when stores and banks are closed, and the most up-to-date information is needed. Improving access to digital and financial resources increases the stability and resilience of Jacksonville residents.


Credit: LIFT JAX

Shocks and Stressors Addressed

Poverty / Social Inequality

Implementation Partners

Planning & Development / Florida DEO / LIFT JAX / VySar Credit Union

Potential Funding Mechanisms

Florida DEO

Implementation Timeframe

Immediate (2025)	**Short-Term (2030)**	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	**$$ (100,000s)**	$$$ (1,000,000s)	$$$$ (10,000,000s)

37.1 **Maximize resources available for expansion of broadband citywide.**

Providing access to broadband internet is a major step that cities can take to expand opportunities for residents and establish a more inclusive economy. According to the City of Jacksonville Broadband Report (currently in development), "digital equity is the condition in which individuals and communities have the information technology capacity for full participation in society and the economy."[51] Following the lead of the Florida Department of Economic Opportunity's (DEO) Office of Broadband, the City of Jacksonville, by adopting policies into the 2045 Comprehensive Plan, initiated a similar local effort to capitalize on federal resources to promote equitable access to digital infrastructure. This effort to increase the availability and effectiveness of broadband internet throughout the city is currently underway and is prioritizing areas currently lacking access.

37.2 **Support new models of community banking.**

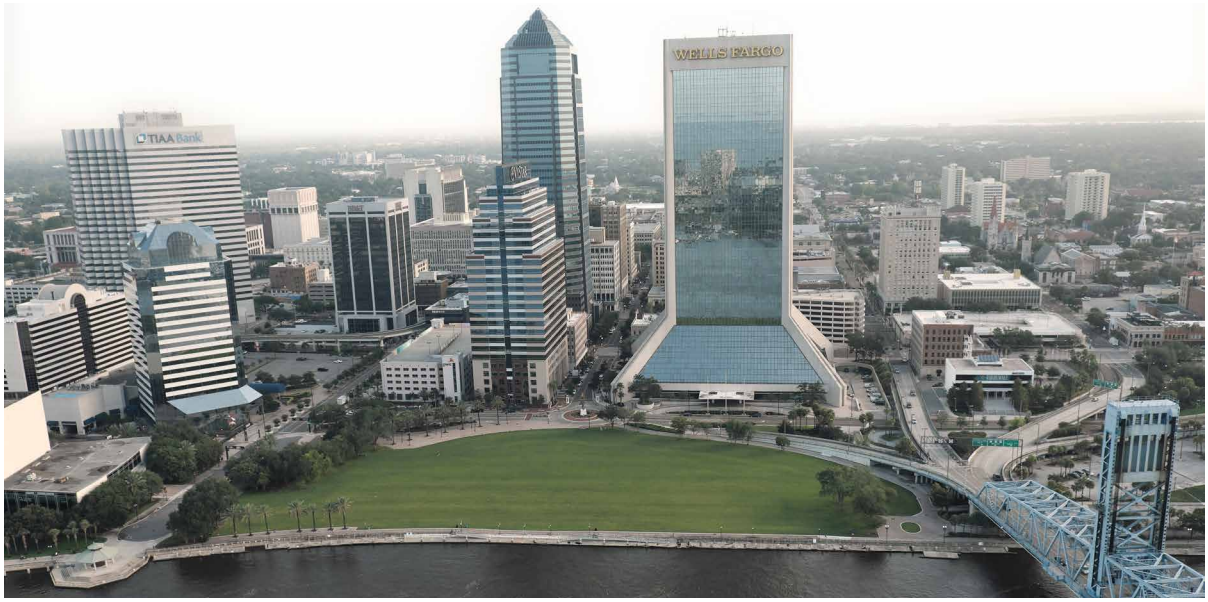
LIFT JAX is working with Historic Eastside community leaders, prioritizing the neighborhood's longtime residents in a cooperative revitalization effort. Part of this strategy is restoring the Debs Store and bringing fresh food retail back to the Eastside. The Debs Store will also include access to financial services through a partnership with VyStar Credit Union. Adding financial services through a credit union to this neighborhood will support financial planning and help people increase their savings and access services like online banking and bill payment. This partnership model can be replicated in other neighborhoods where high-interest payday lenders and postal money orders may be the only available alternative.

38 | Market Jacksonville's resilient business climate to attract new companies and investment.

Jacksonville's business attraction efforts typically center around the city's low cost of living, business-friendly climate, beach access, growing downtown, and other attributes. However, the City's efforts to proactively invest in resilience, address shocks and stressors, and plan for the future offer an opportunity to make a different kind of business case for investing in Jacksonville. Telling this story can help to improve Jacksonville's overall business climate and attract new investors and entrepreneurs who may not have previously considered Northeast Florida. With the potential to further diversify the regional economy, broadening the Jacksonville "story" can help sustain the economy through future downturns and power a more sustainable kind of growth. These efforts can also assist the City in maintaining its strong investment-grade municipal bond ratings by appealing to socially conscious investors.

Action Description

The City, JAXUSA, JAX Chamber, the DIA, and other aligned organizations will build on their existing collaborative efforts to market Jacksonville by telling the story of how the city is investing in resilience and working with businesses to become more resilient.



Shocks and Stressors Addressed

Poverty / Social Inequality

Implementation Partners

COJ / JAXUSA / JAX Chamber / DIA / Visit Jacksonville

Potential Funding Mechanisms

Improved Bond Rating

Implementation Timeframe

Immediate (2025) | Short-Term (2030) | Medium-Term (2035) | Long-Term (2050)

Relative Cost

$ (10,000s) | $$ (100,000s) | $$$ (1,000,000s) | $$$$ (10,000,000s)

EXAMPLE

ATTRACTING NEW INVESTMENT THROUGH RESILIENCE

Companies are more likely to prioritize investments where there is reliable asset protection, higher levels of safety for employees and customers, and a lower risk of disruption to business. JAX Chamber and City partners have visited other U.S. cities to better understand what large companies are considering when deciding where to invest resources. These trips also give Jacksonville more insight into the role that resilience plays in attracting new investment. Many of the actions laid out in the Strategy can support Jacksonville in becoming a destination for other cities to visit and learn how to strengthen resilience.


Credit: JAX Chamber


Credit: JAX Chamber


Credit: JAX Chamber

39 | Address rising flood and homeowners' insurance costs by investing in risk reduction.

The rising costs of homeowners' (hazard) and flood insurance policies are a major risk to future growth in Jacksonville. As financial institutions generally require sufficient insurance to issue a mortgage, affordable insurance is critical for maintaining the market for residential property in the city. While there are many contributing factors to the issue of increasing costs and decreasing availability, the main driver is insurance companies' perceptions of risk. As a result, proactive investments in risk reduction can impact premiums and ensure the continued availability of affordable insurance. Those investments, and their impacts, must also be communicated back to the insurance companies and to the National Flood Insurance Program (NFIP) to ensure that risk is appropriately re-evaluated.

Jacksonville is an NFIP community and participates in the Community Rating System (CRS) program that provides flood policy premium discounts based on floodplain management activities. By investing in risk reduction and communicating these reductions to the relevant insurance companies, Jacksonville can work to address the heart of the cost issue, which is the companies' assessments of risk.

Shocks and Stressors Addressed

Hurricane / Flooding / High Winds / Wildfire / Social Inequality

Implementation Partners

FEMA

Potential Funding Mechanisms

Private Sector Funding / CRS Flood Insurance Premium Discounts

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	**Medium-Term (2035)**	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	**$$$ (1,000,000s)**	$$$$ (10,000,000s)

39.1 **Maintain participation in FEMA's CRS program to lower flood insurance premiums based on risk reduction activities.**

The Federal Emergency Management Agency's (FEMA's) Community Rating System (CRS) is part of the National Flood Insurance Program (NFIP). NFIP communities participate in the CRS program to track and earn points for their floodplain management activities, such as requiring elevations of homes in flood-prone areas or limiting development in regulatory floodways. Those points translate to discounts on flood insurance premiums for Jacksonville policyholders. Jacksonville is currently a Class 6 community in the CRS program, which translates to a 20% premium discount for those in a special flood hazard area (SFHA), or a 10% discount for those outside of a SFHA. Under the NFIP's new Risk Rating system for premiums, these CRS discounts are important for maintaining affordable flood insurance. The City will continue to regulate the floodplain under NFIP rules and maintain or improve its CRS class to ensure that those floodplain management activities result in premium discounts.

39.2 **Explore new and emerging models of hazard insurance for homeowners.**

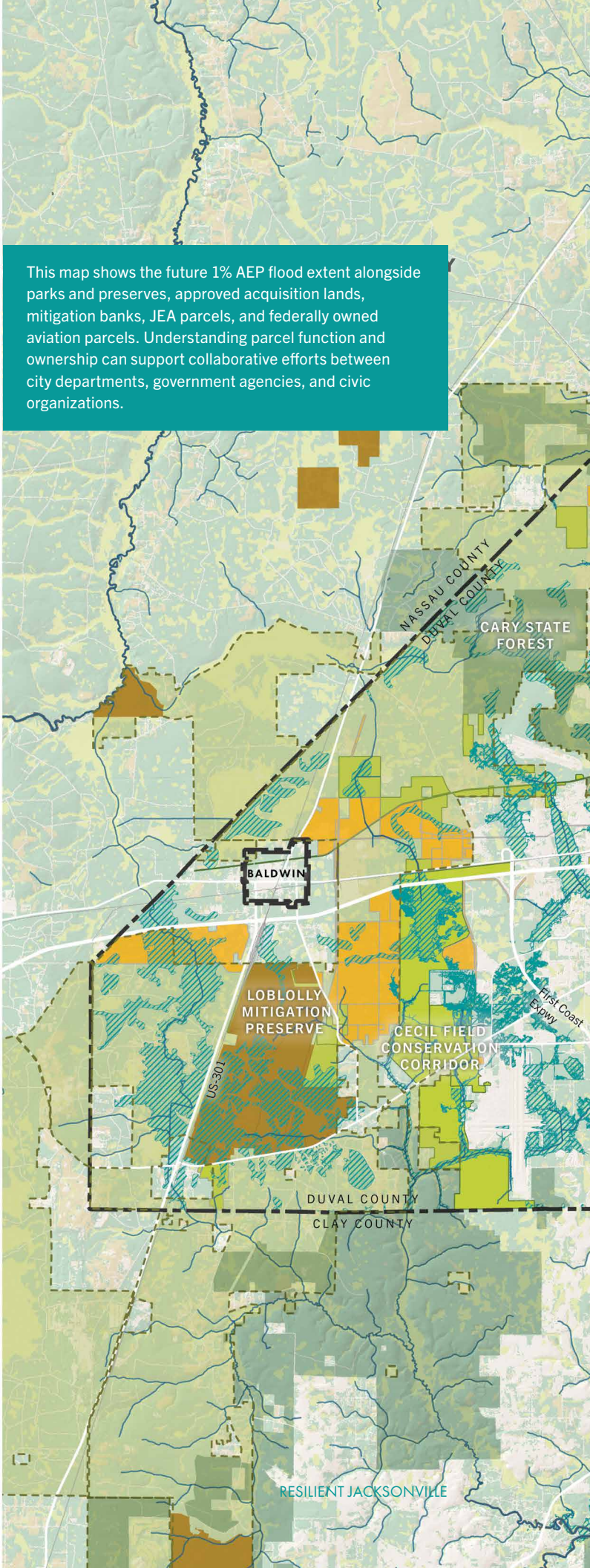
The availability and affordability of hazard insurance (homeowners' insurance) is increasingly a stress for many Florida residents, including residents in Jacksonville. While this issue is driven partially by state-level action, there are new models of hazard insurance, such as parametric insurance, that can supplement a traditional indemnity policy. Parametric insurance insures a policyholder against the occurrence of a specific event, such as a hurricane, by paying a set amount based on the magnitude of the event, such as recorded wind speeds or surge heights. In contrast to an indemnity policy, which pays out based on a claim on the magnitude of losses, a parametric policy pays out much faster and does not require a claim process. The City will work with the private sector to explore how these emerging models of insurance can support future growth and development in Jacksonville.

COLLABORATE

Strengthen partnerships and coordination among city departments, between government agencies, with civic organizations, and in support of regional coalitions.

Actions Include:

40. Establish an **Office of Resilience** to facilitate the ongoing implementation of the Resilience Strategy.
41. Expand **community knowledge and participation** in resilience actions.
42. Coordinate **resilience actions and policies** across agencies and relevant independent authorities.
43. Develop a **Climate Action Plan** that aligns Jacksonville's resilience goals with actions to promote sustainability.
44. Support **regional resilience efforts**.
45. Coordinate and leverage resilience investments with **federal partners and resources**, including military partners.

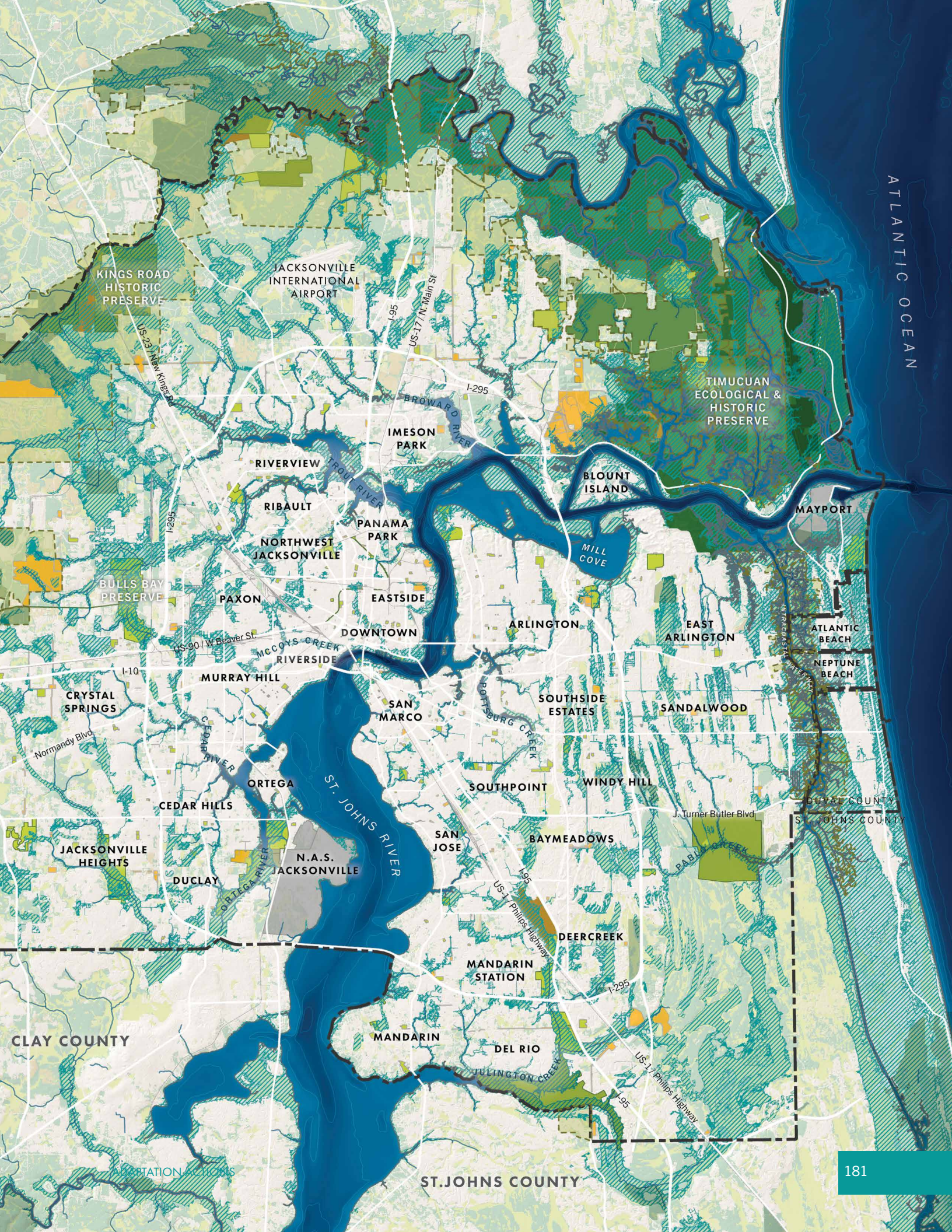


This map shows the future 1% AEP flood extent alongside parks and preserves, approved acquisition lands, mitigation banks, JEA parcels, and federally owned aviation parcels. Understanding parcel function and ownership can support collaborative efforts between city departments, government agencies, and civic organizations.

LEGEND

- City Boundaries
- Creeks and Streams
- Open Water
- 2070 1% Annual Exceedance Probability Flood Extent
- Timucuan Historical & Ecological Preserve
- Florida State Parks & Conservation Land
- COJ Preservation Parks
- Florida Forever Board of Trustees Approved Lands for Acquisition
- Mitigation Banks
- Jacksonville Electric Authority (JEA) Parcels
- Federally-Owned Parcels (Aviation)

0 2 4 8 mi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RIVERVIEW
TROUT RIVER
BLOUNT ISLAND
MAYPORT
RIBAULT
PANAMA PARK
NORTHWEST JACKSONVILLE
MILL COVE
BULLS BAY PRESERVE
PAXON
EASTSIDE
ARLINGTON
EAST ARLINGTON
ATLANTIC BEACH
INTRACOASTAL WATERWAY
NEPTUNE BEACH
DOWNTOWN
US-90 / W Beaver St.
MCCOYS CREEK
RIVERSIDE
I-10
MURRAY HILL
CRYSTAL SPRINGS
BOTTSBURG CREEK
SOUTHSIDE ESTATES
SANDALWOOD
SAN MARCO
CEDAR RIVER
Normandy Blvd
ORTEGA
ST. JOHNS RIVER
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PABLO CREEK
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US-1 / Philips Highway
DEERCREEK
MANDARIN STATION
CLAY COUNTY
MANDARIN
DEL RIO
JULINGTON CREEK
ADAPTATION ACTIONS
ST.JOHNS COUNTY

40 | Establish an Office of Resilience to facilitate the ongoing implementation of *Resilient Jacksonville*.

To guarantee that the recommendations set forth in *Resilient Jacksonville* are coordinated and well-positioned for implementation, the City will establish and adequately staff an Office of Resilience. The office will be responsible for the ongoing implementation of *Resilient Jacksonville* by leading coordination across City departments and with external partners and collaborating with local academic partners to organize a system that tracks implementation progress. The office will also prioritize the development, sharing, and application of the best available data and science on climate projections, flood and heat risk, and other shocks and stressors to inform decisions across City government. The Office of Resilience will also ensure that the use of resilience data is managed ethically and accessed through the appropriate channels.

Shocks and Stressors Addressed

All Shocks and Stressors

Implementation Partners

COJ / The Water Institute / JU

Potential Funding Mechanisms

General Fund / FUSE Fellows

Implementation Timeframe

Immediate (2025) | Short-Term (2030) | Medium-Term (2035) | Long-Term (2050)

Relative Cost

$ (10,000s) | **$$** (100,000s) | $$$ (1,000,000s) | $$$$ (10,000,000s)

40.1 **Facilitate interdepartmental and interagency collaboration throughout City government and with external partners.**

The main purpose of establishing the Office of Resilience is to ensure all aspects of City government are well-coordinated, and that decisions are made holistically rather than in silos. The development of this Strategy began a process of inter-agency collaboration, and the success of *Resilient Jacksonville* will rely on the creation of collaborative processes that continue into implementation. By filling this role, the Office of Resilience can ensure that investments make the best use of taxpayer dollars and are aligned with resilience goals—that infrastructure is designed and built to withstand future conditions and that city staff are able to build stronger relationships across departments. Additionally, this office can help articulate a cohesive vision in partnership with other outside agencies to ensure that all key entities in Jacksonville are moving towards a shared future.

40.2 **Use the best available science and data to inform decisions.**

Just as *Resilient Jacksonville* was developed using the latest and most comprehensive science and data, continuing to develop and use the best available data will be critical for achieving the many goals set forth in this Strategy. The Office of Resilience will serve as the agency in charge of maintaining and deploying robust climate and vulnerability datasets across all departments and helping to contextualize data for city leaders to use in decision-making processes. More specifically, over the next two years, the Office of Resilience will be developing a compound flood model in conjunction with The Water Institute that will provide the City with the most advanced flood data in the state. This work will identify the most flood-prone areas of the city and guide project development. As new datasets become available—whether it be the compound flood model or future national climate assessments—the Office of Resilience will be responsible for updating policies and procedures that reflect the most accurate data.

41 | Expand community knowledge and participation in resilience actions.

Jacksonville's local non-governmental organizations are an integral part of the city's fabric and are often trusted community partners with pre-existing relationships at the neighborhood scale. To ensure that the actions laid out in *Resilient Jacksonville* are inclusive and far-reaching, it is critical that the City and non-governmental partners coordinate closely and proactively plan for productive public engagement. The City will expand partnerships with local organizations and nonprofits to prioritize public information sharing and other opportunities for public engagement and education. This will ensure that Jacksonville's residents understand the details of the Resilience Strategy and are well-positioned to participate in resilience actions across the city.

Credit: Groundwork Jacksonville

Shocks and Stressors Addressed

All Shocks and Stressors

Implementation Partners

CPACS / Neighborhoods Department / Local Nonprofits

Potential Funding Mechanisms

Resilience Office Budget

Implementation Timeframe

Immediate (2025) | Short-Term (2030) | Medium-Term (2035) | Long-Term (2050)

Relative Cost

$ (10,000s) | $$ (100,000s) | $$$ (1,000,000s) | $$$$ (10,000,000s)

41.1 Coordinate with local organizations, including nonprofits and philanthropy.

Local organizations in Jacksonville have been invaluable resources in the realm of public engagement and education for decades. The City can take the lead on many resilience actions, but partners are needed at the table to successfully implement much of this plan. To maintain collaboration and ensure that the Strategy succeeds, the City will continue to coordinate with trusted partners in both the nonprofit and philanthropic spaces through the Public Service Grant Program and the Nonprofit Gateway. Public Service grants are reserved for nonprofits that serve residents that fall under the category of "most vulnerable persons and/or needs," and often include people who are elderly, low-income, or have specific medical or social needs. The Nonprofit Gateway is a one-stop entry point for nonprofits to partner with the City of Jacksonville and provides the tools and resources nonprofits need to be able to initiate and maintain these collaborative efforts.

41.2 Coordinate public education and engagement activities.

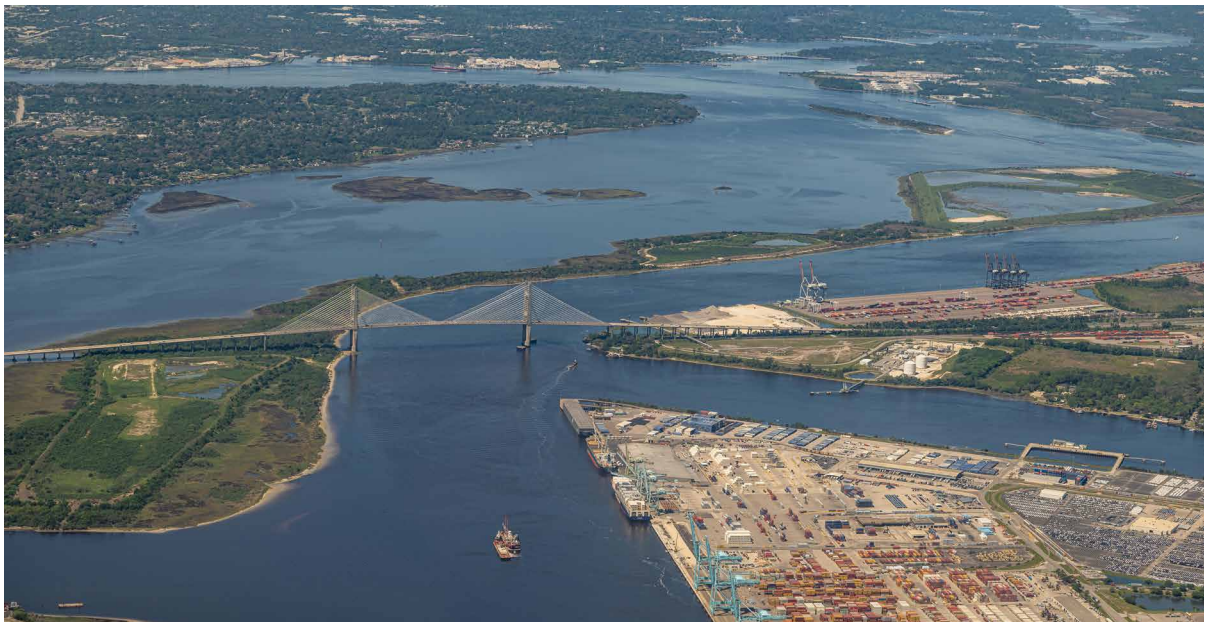
To make sure the public stays informed, the City, along with nonprofit partners, will collaborate to conduct the upfront educational work about what resilience is and what resilience outcomes will look like in different parts of the city. Part of this public education campaign will involve communicating risks for different neighborhoods and helping Jacksonville residents recognize what types of solutions they can expect to see. The place-based section of the Resilience Strategy is a first step in helping people understand how varying parts of the city may be impacted differently.

42 | Coordinate resilience actions and policies across agencies and relevant independent authorities.

Interagency collaboration is critical for achieving Jacksonville's resilience vision. To ensure that Jacksonville is capitalizing on federal funding opportunities, it is important that individual agencies approach their respective planning processes (i.e., scenario planning for extreme weather events) through an interagency coordination lens. The coordinating body will also be charged with planning for critical asset retrofits and maintenance responsibilities to maximize public benefits and ensure the longevity of investments.

Action Description

The City will stand up an interagency coordinating body that includes JEA, Jacksonville Transportation Authority (JTA), JAXPORT, Jacksonville Aviation Authority (JAA) and other aligned organizations to plan for and coordinate maintenance, streamline efforts to secure federal funding opportunities, conduct scenario planning to address power outage priorities and stockpiling for extreme weather events, lead decision making around retrofitting of critical assets outside of City control, and coordinate on data and cyber security.



Shocks and Stressors Addressed

Flooding / Extreme Heat / Extreme Cold / Wildfire / High Winds / Power Outage / Supply Chain Disruption

Implementation Partners

COJ / JEA / JAXPORT / JTA / JAA

Potential Funding Mechanisms

Staffing

Implementation Timeframe

Immediate (2025)	Short-Term (2030)	Medium-Term (2035)	Long-Term (2050)

Relative Cost

$ (10,000s)	$$ (100,000s)	$$$ (1,000,000s)	$$$$ (10,000,000s)

CASE STUDY

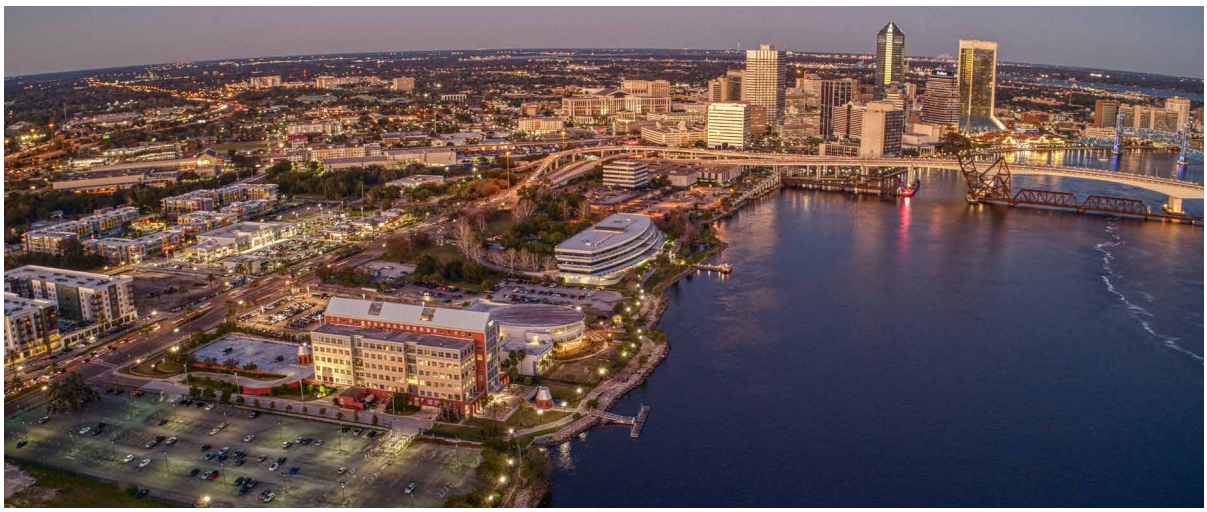
INTERAGENCY CLIMATE CHANGE ADAPTATION TASK FORCE

United States | 2009

In 2009, an executive order brought together more than 25 federal agencies to collaborate on planning for climate change and integrating resilience into their grant making and agency operations. Overseen by the White House Council on Environmental Quality, this task force collaborated to mainstream adaptation planning across the federal government, facilitated the integration of science into decision making, and addressed cross-cutting issues such as water resource management, climate change, and public health.[52]

43 | Develop a Climate Action Plan that aligns Jacksonville's resilience goals with actions to promote sustainability.

Addressing large-scale contributors to climate change, such as greenhouse gas emissions, is critical to reducing climate risks and strengthening the resilience of Jacksonville and the Northeast Florida region. The 2022 Inflation Reduction Act included funding for the U.S. Environmental Protection Agency (EPA) to administer a Climate Pollution Reduction Grant program. Jacksonville, as an eligible metropolitan area, is receiving $1 million in planning funding to develop a Priority Climate Action Plan (PCAP) and Comprehensive Climate Action Plan (CCAP) under the terms of this program. Though the Climate Action Plan will be developed at the regional level, Jacksonville, as the largest city by land area in the continental U.S., has the opportunity to achieve citywide outcomes at large scales. The Office of Resilience will coordinate with North Florida regional partners to lead the development of a Climate Action Plan. The City will ensure that the Climate Action Plan builds upon the goals of *Resilient Jacksonville*, is driven by the best available science and data, and provides funding pathways for actions discussed in this Strategy. Climate Action Plans for cities and metropolitan areas usually include actions to address emissions from transportation, buildings, electric power generation, and landfill waste. Many of the actions in *Resilient Jacksonville*, such as retrofitting buildings for energy efficiency, would also reduce greenhouse gas emissions and would be well positioned for inclusion in a Climate Action Plan.



Shocks and Stressors Addressed

Power Outage / Lack of Reliable Transportation / Aging Infrastructure / Air Quality / Water Quality

Implementation Partners

EPA / Northeast Florida Regional Council / Audubon Florida

Potential Funding Mechanisms

EPA Climate Pollution Reduction Grant Program

Implementation Timeframe

Immediate (2025) | Short-Term (2030) | Medium-Term (2035) | Long-Term (2050)

Relative Cost

$ (10,000s) | $$ (100,000s) | $$$ (1,000,000s) | $$$$ (10,000,000s)

43.1 **Lead the development of a Climate Action Plan for the North Florida region through the EPA Climate Pollution Reduction Grant.**

As part of the Climate Pollution Reduction Grant program, Jacksonville is receiving a planning grant to develop a Priority Climate Action Plan (PCAP) and Comprehensive Climate Action Plan (CCAP) under the terms of this program. These climate plans will inventory the Jacksonville region's greenhouse gas emissions, develop priority actions to reduce them, and engage with community stakeholders on continued implementation of climate mitigation actions. The City will lead the development of these plans in collaboration with the region's counties and municipalities.

43.2 **Secure federal funding to implement climate actions.**

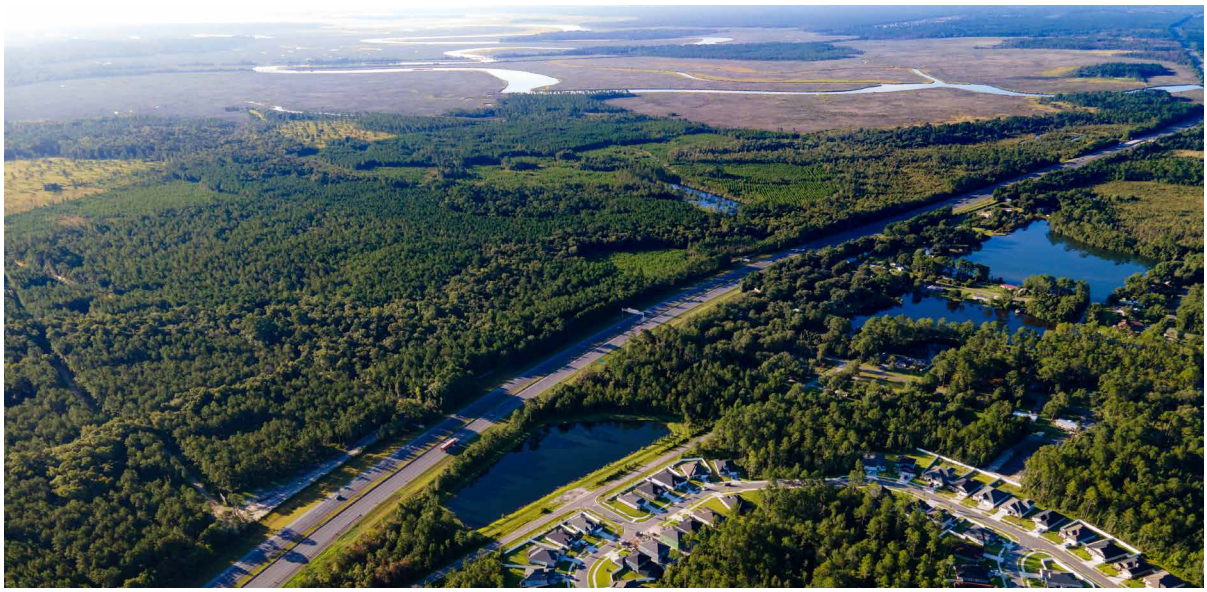
The Climate Pollution Reduction Grant program also includes funding for implementation; however, to be eligible for implementation grants, the projects must be included in the Priority Climate Action Plan (PCAP). Jacksonville's PCAP will include priority projects that are in alignment with this Resilience Strategy to ensure eligibility under this program. Jacksonville will maximize the opportunity of these implementation grants as well as other funding that may be available through the larger Inflation Reduction Act and other state and federal sources.

44 | Support regional resilience efforts.

Jacksonville isn't alone in facing the increasing risks of shocks and stressors. In recent years, Northeast Florida has been investing time and resources in the advancement of resilience work to maximize benefits throughout the entire region. Past initiatives, such as the Northeast Florida COVID-19 Economic Recovery Plan and the Northeast Florida Regional Analysis of Resilience Priorities, are examples of how Northeast Florida can continue to expand regional partnerships and demonstrate commitment to a shared vision for future resilience. By working together with regional partners, the City of Jacksonville can extend and amplify the impacts of this Resilience Strategy.

Action Description

To support regional resilience efforts, the City will continue to participate and form partnerships within Resilient First Coast collaborative, which is comprised of Baker, Clay, Duval, Flagler, Nassau, Putnam, and St. Johns counties in the Northeast Florida region, and includes partners from local governments, businesses, non-profits, academia, and federal and state agencies. As part of this collaboration, the City will also play a role in helping to lead the region's first Climate Action Plan.



Shocks and Stressors Addressed

All Shocks and Stressors

Implementation Partners

Northeast Florida Regional Planning Council

Potential Funding Mechanisms

General Fund

Implementation Timeframe

Immediate (2025) | Short-Term (2030) | Medium-Term (2035) | Long-Term (2050)

Relative Cost

$ (10,000s) | $$ (100,000s) | $$$ (1,000,000s) | $$$$ (10,000,000s)

CASE STUDY

SOUTH FLORIDA REGIONAL CLIMATE CHANGE COMPACT

South Florida | 2009

The South Florida Regional Climate Change Compact is a partnership between four counties in South Florida—Broward, Miami-Dade, Monroe, and Palm Beach—focused on reducing greenhouse gas emissions and instituting climate adaptation strategies at the regional scale. The compact works collaboratively to build public and political support for climate action, coordinates regional actions to strengthen resilience, and facilitates tool and knowledge sharing to build the local capacity needed for implementation.[53] The South Florida Regional Climate Change Compact has established a unified understanding of sea level rise projections, has partnered to acquire federal funding, and has coordinated on several other fronts to develop a common policy platform, a regional greenhouse gas inventory, a climate assessment tool, and several other resources.

45 | Coordinate and leverage resilience investments with federal partners and resources, including military partners.

To ensure that Jacksonville is well-positioned to apply for and benefit from federal resources that enhance city resilience, efforts should be well-coordinated to guarantee that the City and federal partners working within city boundaries are maximizing project benefits and tracking opportunities for collaboration. The interagency coordinating body (see Action 42) will build and maintain relationships and communication channels with federal partners across the city and develop a system for tracking these collaborative efforts.

Credit: DOD

Shocks and Stressors Addressed

All Shocks and Stressors

Implementation Partners

EPA / NOAA / USACE / USDOT / HUD / DOD / NASA / DOI

Potential Funding Mechanisms

Inflation Reduction Act /
Infrastructure Investment and Jobs Act

Implementation Timeframe

Immediate (2025) | Short-Term (2030) | Medium-Term (2035) | Long-Term (2050)

Relative Cost

$ (10,000s) | $$ (100,000s) | $$$ (1,000,000s) | $$$$ (10,000,000s)

45.1 **Leverage federal grants, data, tools, and other resources.**

Applying for and acquiring federal resources is a significant effort that must be undertaken to support resilience project planning and implementation across Jacksonville. Federal funding programs like the Federal Emergency Management Agency's (FEMA's) Hazard Mitigation Grant Program (HMGP) and Building Resilient Infrastructure and Communities (BRIC) program, the U.S. Department of Housing and Urban Development's (HUD's) Community Development Block Grant (CDBG) program, and other grant programs available through the National Fish and Wildlife Foundation (NFWF), the Environmental Protection Agency (EPA), and the National Oceanic and Atmospheric Administration (NOAA) are a few examples of reliable federal resources that the City can leverage to bring project ideas to fruition. In collaboration with Jacksonville-based federal partners, the Office of Resilience will strategically track and apply for federal funding opportunities that can support the advancement and implementation of specific actions laid out in *Resilient Jacksonville*.

45.2 **Build relationships with military and other federal partners to maximize resilience investments.**

Jacksonville's people and economy have a strong connection to the military through area bases including Naval Air Station Jacksonville, Naval Station Mayport, and others. Other federal entities such as the National Park Service manage areas adjacent to the city, while agencies such as the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency (EPA), FEMA, and HUD serve as key partners in building, co-funding, or permitting projects that can impact the city's resilience. To maximize its resilience investments, Jacksonville will need to continue building its relationships with military and other federal partners in the region. Actions that the Office of Resilience and the interagency coordinating body can take to strengthen collaboration and coordination include but are not limited to: hosting background information sessions or planned site visits to inform federal partners about complex issues related to resilience; attending federal project meetings or site visits to better understand how the City can maximize project benefits and secure future funding; conducting regular meetings ensure both groups are aware of ongoing efforts; and holding interagency strategic planning sessions to identify mutually beneficial opportunities where, for example, Jacksonville might serve as a local partner or sponsor on federally-led efforts that provide local resilience benefits.

PLACE-BASED STRATEGIES

Defining Development Types

What characteristics influence a neighborhood's vulnerability to climate threats?

	URBAN	SUBURBAN		RURAL
Age / Era of Development	Historic / pre-World War II	Post-World War II to 1978	1978 to today	Primarily undeveloped
Density of Development	High density	Medium density	Low density	Rural residential
Street + Roadway Network	Gridded, connected, walkable	Mostly gridded, mostly connected, somewhat walkable	Curvilinear, disconnected, designed for motorized transit	Primarily highways, interstates and state roads
Residential + Commercial Urban Form	Mixed-use	Long linear commercial corridors	Regional commercial hubs	Makes use of regional commercial hubs
Stormwater + Wastewater Infrastructure	Curbs and gutters + sewered	Curbs and gutters + septic / sewered mix	Ditches + ponds + septic / sewered mix	Ditches + septic tanks
Use of + Relationship to Waterbodies	Oriented to waterfront	No access to water	Adjacent to open water / wetlands	Adjacent to open water / wetlands
Impervious Surface + Vegetated Cover	Significant impervious surface with limited tree canopy	Older, large mature tree canopy and small lots	Large lots of lawn and impervious surface with new small trees	Older, more dense vegetation and less impervious surface

ADVANCING RESILIENCE CITYWIDE

THE ROLE OF DEVELOPMENT TYPES

Jacksonville is a big place. As the largest city by land area in the continental United States, different parts of the city can have very different styles of development or exposures to hazards like flooding. The vast scale of the city is part of what makes Jacksonville unique, but it also presents planning challenges. Effective strategies for adapting to climate threats and improving resilience will need to vary across Jacksonville's 500+ neighborhoods. What works Downtown may be very different from what works in Northwest Jacksonville or Mandarin. Building the resilient Jacksonville of tomorrow will require city services, infrastructure, and planning to comprehensively address risks across Duval County while considering site and neighborhood-specific factors.

To identify where in Jacksonville different Adaptation Approaches and Actions might be most effective, eight types of development were established to provide a framework for resilience opportunities that are tailored to different conditions on the ground in Jacksonville communities. These Development Types include:

- **Downtown**
- **Historic Walkable Neighborhoods**
- **Post-War Suburbs**
- **Contemporary Suburbs**
- **Rural Mosaic**
- **Coastal Communities**
- **Protected Lands**
- **Industrial Riverfront**

Each of these Development Types represents multiple neighborhoods that share many physical characteristics. Together, they encompass the broad spectrum of neighborhoods, land uses, and development patterns that make up Jacksonville, from the urban grid of Downtown to the sparsely populated woods of the Rural Mosaic. They provide a manageable framework for identifying the specific actions in this strategy that are most appropriate or highest priority for different parts of Jacksonville. They help to answer the question of where to pursue certain actions and facilitate a tangible vision for what a resilient future can look like across every neighborhood in Jacksonville. These categorizations can also be carried forward in future planning and implementation efforts, allowing Jacksonville to achieve resilience objectives through individual projects more easily by providing a more strategic approach to standardizing and scaling actions across the city.

It is important to understand that these types do not recommend patterns of future land use and development for Duval County. Rather, these Development Types identify patterns in Jacksonville's built environment as it exists today. We use these patterns to explore the ways Jacksonville's built environment influences the different ways that shocks and stressors are experienced across the city. These Development Types have been defined by shared characteristics likely to influence their vulnerability to flooding and other climate threats, as detailed in the table on the left. This categorization is not meant to replace or diminish the importance of unique places and site-specific considerations within each of these Development Types. By identifying shared characteristics and vulnerabilities, we can identify similarly shared and scalable opportunities for implementing resilience actions.

HOW TO READ THIS CHAPTER

This chapter presents each Development Type through maps and diagrams that illustrate the approximate extent of each type, its defining characteristics, its unique risk profile, and its most promising opportunities to enhance resilience. Note that the diagrams on the following pages do not depict specific places or neighborhoods. Through visual diagrams, this chapter illustrates the features and patterns that make each Development Type unique. This chapter follows a consistent format for discussing each of the Development Types.

Overview

Each Development Type begins with an overview and corresponding map showing the geographic location and neighborhoods that make up the Development Type. The map also depicts information on natural and man-made shorelines and the location of critical facilities (e.g., hospitals, utilities), parks, wetlands, and vacant lots. This map also depicts the extent of areas that are expected to have a 1% or greater chance of flooding in a given year (referred to as 1% AEP) under predicted future conditions (2070) (see the Evolving Challenges section for more information on exposure to flooding in Jacksonville).

Character

This section summarizes the physical characteristics that make the Development Type unique, grounded in the social and political history that shaped how each of these areas were developed. The character information diagram and example photos are representative of the physical characteristics seen in the neighborhoods that make up the Development Type. This section also includes "By the Numbers" data on land area (total and undeveloped);[1] number of critical facilities (e.g., utilities and emergency services), residential parcels;[2] vacant parcels; and total population.[3] Citywide totals for these data are shown in the following table. For each Development Type, the data are contextualized as a percentage of the citywide total. Where the data represents the highest total across Development Types, it is highlighted in **bold** text.

Jacksonville By the Numbers		*% of Citywide*
Total Land Area	834 sq mi	*100%*
Undeveloped Land Area	499 sq mi	*100%*
Critical Facilities	2,452	*100%*
Residential Properties	308,449	*100%*
Vacant Properties	32,759	*100%*
People	949,611	*100%*

Exposure, Vulnerability, and Risk

The process to develop this Strategy included a geographic assessment of the exposure, vulnerability, and risks associated with four climate threats—flooding, heat, high winds, and wildfires—across each Development Type for a suite of community assets. This section summarizes the unique risk profile of each Development Type to these shocks and other relevant stressors, such as aging infrastructure. The illustrations in this section highlight the risks and vulnerabilities specific to each Development Type.

Included in this section is a table summarizing the percentage of residential properties and critical facilities in each Development Type that are vulnerable to a 1 in 10 chance of coastal flooding under current conditions in any given year (representing a more recurrent risk of flooding today, 10% AEP), a 1 in 100 chance of combined inland and coastal flooding under 2070 conditions in any given year (representing a reasonable

floodplain extent to guide long-range planning, 1% AEP), high winds, and wildfires (where relevant). For each Development Type, the percentages are shown in ***bold italic*** text where they represent the highest percentage across Development Types, **bold** text where they are above the citywide average, and regular text where they are equal to or below citywide average. Citywide averages and percentages are included in the following table and are repeated in smaller grey text below the Development Type figures for comparison.

The analysis in this section draws from the *Resilient Jacksonville Vulnerability Assessment*.[4] See the Evolving Challenges chapter of this Strategy for more background on the shocks and stressors facing Jacksonville. To learn more about how specific climate threats, assets, and vulnerabilities presented here are defined, assessed, and calculated, please reference the *Resilient Jacksonville Vulnerability Assessment* report.

Citywide *Percentage of Assets Vulnerable to Climate Threats*	Residential Properties	Critical Facilities
Current 10% AEP **Coastal Flooding**	2% *2%*	2% *2%*
2070 1% AEP **Inland & Coastal Flooding**	7% *7%*	8% *8%*
Wind	60% *60%*	73% *73%*
Wildfire	1% *1%*	6% *6%*

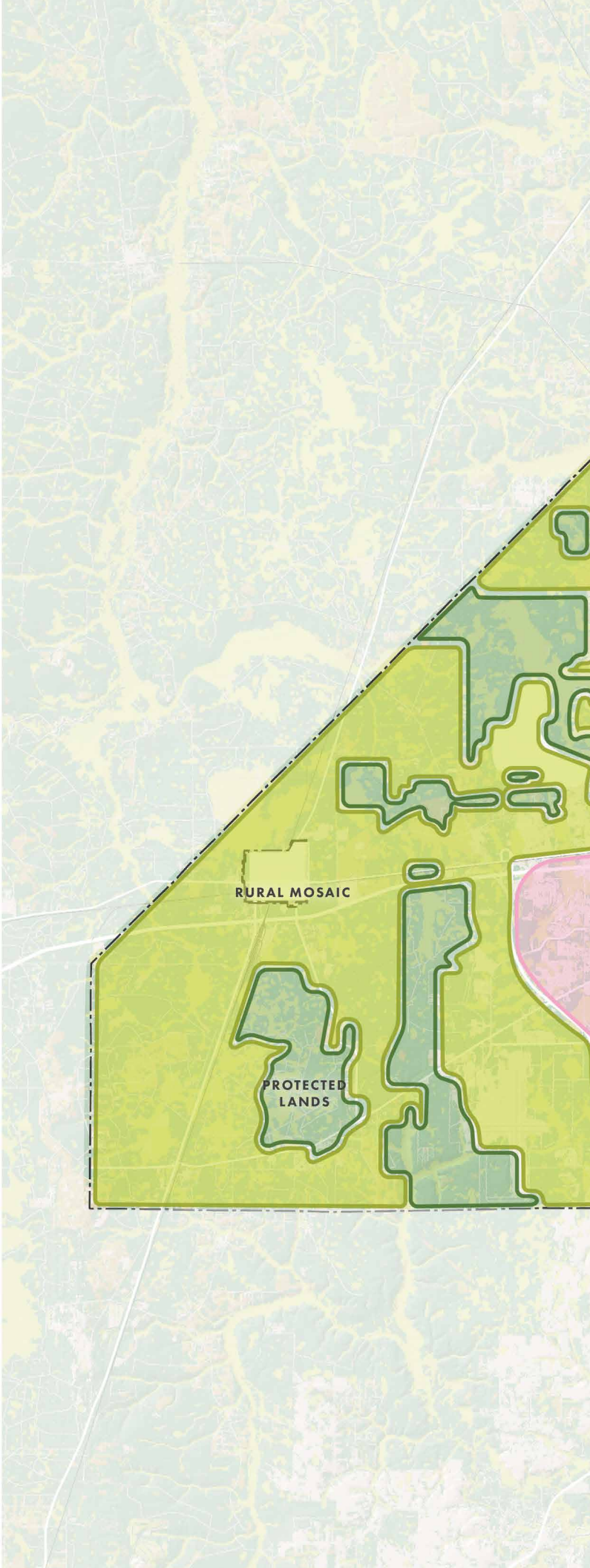
Resilience Opportunities

This section draws on the character and risk profile for each Development Type to identify resilience opportunities that are most applicable and highest priority for these areas. This section connects the Actions in the previous chapter to where and how to implement them. The text highlights several priority themes for focus, each of which references one or multiple specific actions. The illustrations in this section depict how several actions, implemented in coordination, can create a more resilient future for the neighborhoods within each Development Type. This suite of actions is unique to each Development Type, but together they provide a framework for citywide implementation of *Resilient Jacksonville*.

DEVELOPMENT TYPES

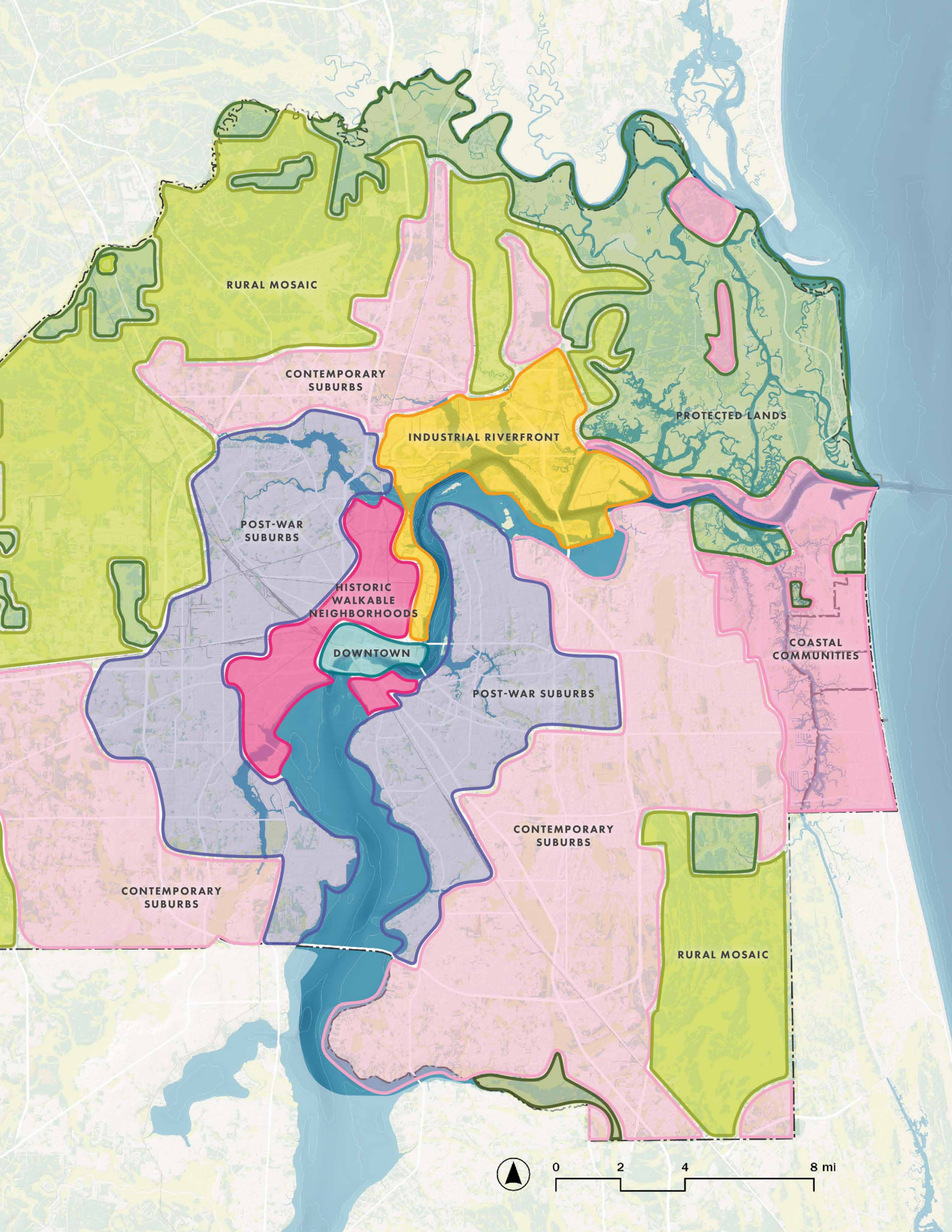
MAPPING THE TYPES ACROSS THE CITY

The eight Development Types encompass the entirety of Duval County. Each type is defined by its unique patterns of development, infrastructure, and relationship to water. These factors in turn influence the way shocks and stressors are felt in different parts of the city, as well as how and where resilience actions are most effectively implemented. These types do not recommend patterns of land use, but rather describe the nature of Jacksonville's built environment as it exists today.



DEVELOPMENT TYPES

- Downtown
- Historic Walkable Neighborhoods
- Post-War Suburbs
- Contemporary Suburbs
- Industrial Riverfront
- Coastal Communities
- Rural Mosaic
- Protected Lands

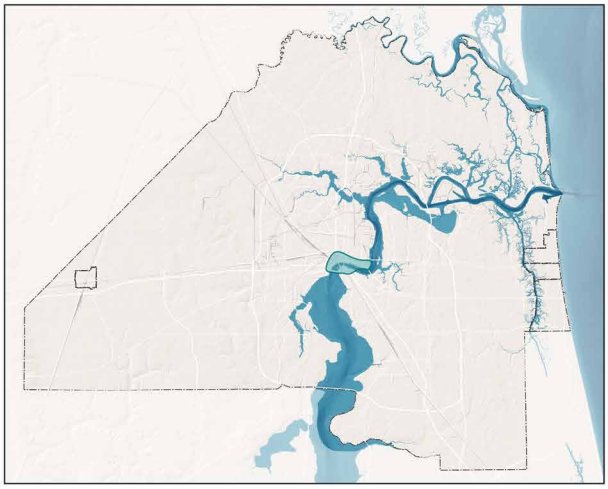

RURAL MOSAIC
CONTEMPORARY SUBURBS
INDUSTRIAL RIVERFRONT
PROTECTED LANDS
POST-WAR SUBURBS
HISTORIC WALKABLE NEIGHBORHOODS
DOWNTOWN
COASTAL COMMUNITIES
POST-WAR SUBURBS
CONTEMPORARY SUBURBS
CONTEMPORARY SUBURBS
RURAL MOSAIC
0
2
4
8 mi

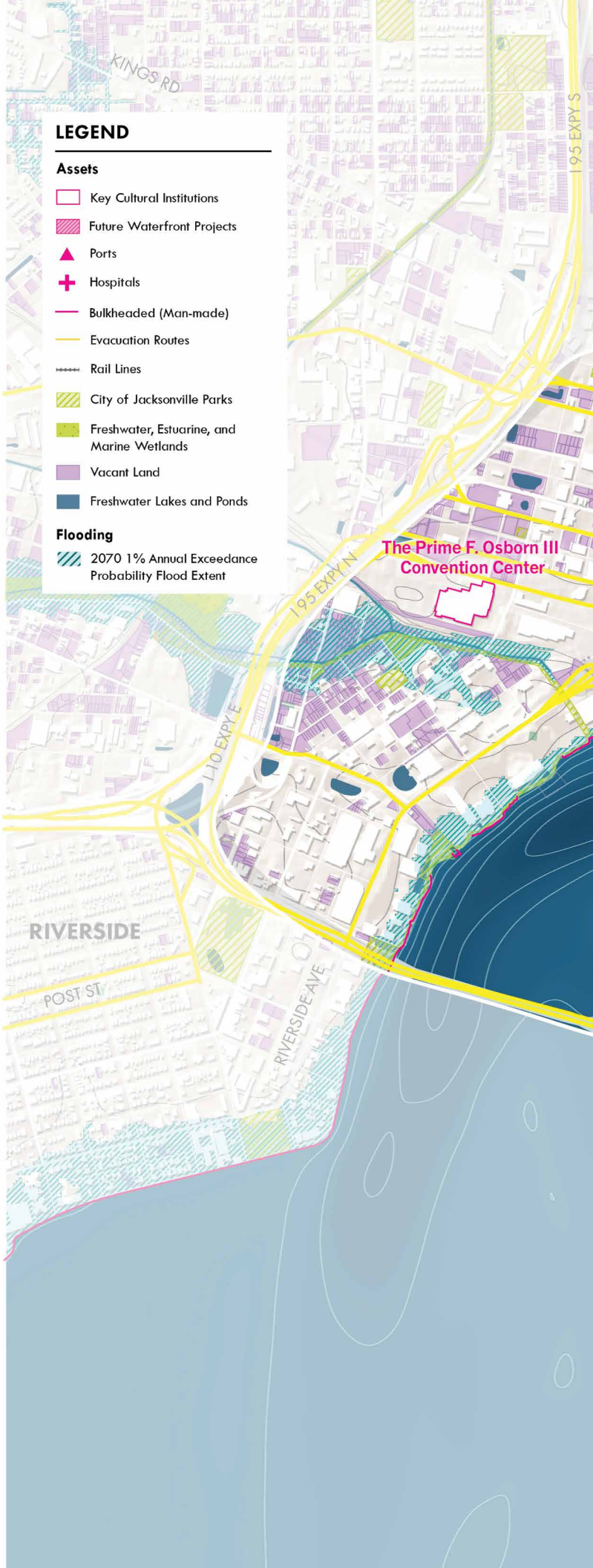
DOWNTOWN

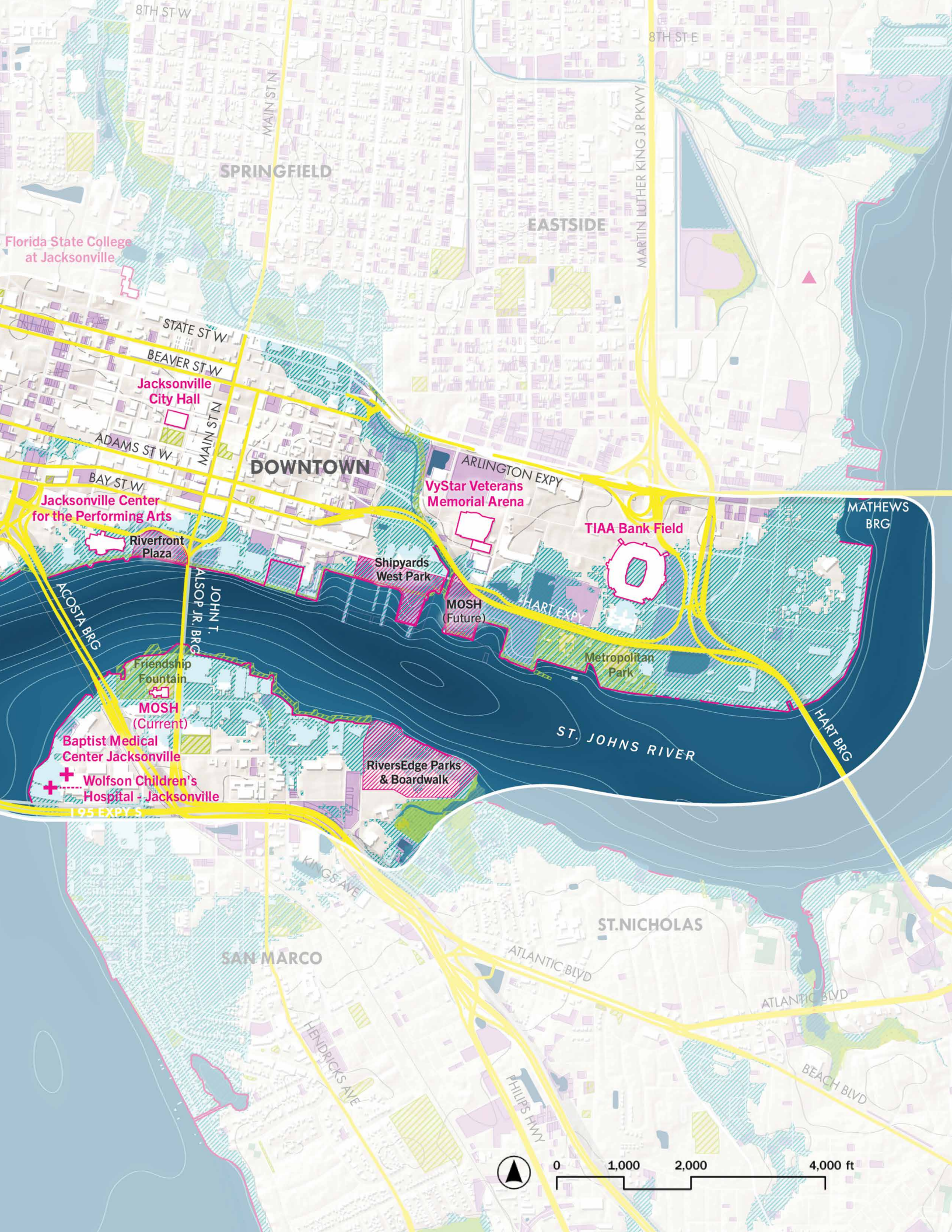
OVERVIEW

Downtown lies at the geographic center of the city. It was the first area of Jacksonville to be developed and contains features typical of American downtowns: gridded streets, high-rise buildings, mixed land uses, and many civic and entertainment destinations. Downtown Jacksonville's orientation along the St. Johns River has driven its economic growth, but also makes it vulnerable to coastal flooding, as evidenced by the impacts of Hurricane Irma in 2017. Despite this risk, Downtown is key to Jacksonville's resilient future. Its central location, potential to support density, and access to economic and cultural resources make it ideally suited for the resilient, sustainable development that will be needed to accommodate future population growth.

KEY MAP






8TH ST W
8TH ST E
MAIN ST N
MARTIN LUTHER KING JR PKWY
SPRINGFIELD
EASTSIDE
Florida State College at Jacksonville
STATE ST W
BEAVER ST W
Jacksonville City Hall
MAIN ST N
ADAMS ST W
DOWNTOWN
BAY ST W
ARLINGTON EXPY
VyStar Veterans Memorial Arena
Jacksonville Center for the Performing Arts
Riverfront Plaza
TIAA Bank Field
MATHEWS BRG
Shipyards West Park
MOSH (Future)
HART EXPY
ACOSTA BRG
JOHN T. ALSOP JR. BRG
Metropolitan Park
Friendship Fountain
MOSH (Current)
ST. JOHNS RIVER
HART BRG
Baptist Medical Center Jacksonville
Wolfson Children's Hospital - Jacksonville
RiversEdge Parks & Boardwalk
I-95 EXPY S
KINGS AVE
ST.NICHOLAS
SAN MARCO
ATLANTIC BLVD
ATLANTIC BLVD
HENDRICKS AVE
PHILIPS HWY
BEACH BLVD
0
1,000
2,000
4,000 ft

DOWNTOWN
CHARACTER

Downtown is Jacksonville's economic center and home to many of the city's businesses, government buildings, healthcare facilities, and major cultural and entertainment destinations. Downtown is also an important transportation hub and crucial throughway for commuters, with several of Jacksonville's bridges connecting the North Bank and the South Bank. With 5.6 miles of public riverfront access on the St. Johns River and strong connections to transit and existing infrastructure, Downtown has seen substantial new investment and redevelopment in recent years.

Downtown Jacksonville is home to approximately 9,300 residents, less than 1% of the city's total population. Downtown includes a mix of commercial, residential, civic, and industrial land uses, with residents primarily living in mixed-use and multifamily developments of varying scales. This area provides abundant park access, with riverfront parks, parks along Hogans and McCoys creeks, neighborhood parks, and several future parks planned. As a result, most of Downtown is within a 10-minute walk of a park. [5]

Economic, Civic, Cultural, and Transportation Hub

Downtown is home to Fortune 500 companies, sports and entertainment attractions, museums, and performing arts destinations. Four professional sports franchises, including the Jacksonville Jaguars, are located here. These attractions draw hundreds of thousands of visitors Downtown every week. Downtown also hosts five major medical facilities, many of the city's support services, and a significant number of government and utility facilities, including City Hall and the newly completed JEA downtown headquarters. These businesses, facilities, and services employ more than 54,000 people.[6]

Downtown is well-connected, offering a variety of transportation options. The Jacksonville Transit Authority provides robust bus service into and out of Downtown, with routes ending at the Jacksonville Regional Transportation Center (JRTC) at LaVilla. The Jacksonville Skyway offers service along a 2.5-mile elevated track. Downtown also has an extensive sidewalk network and a walkable connection over the St. Johns River via the Main Street Bridge and the Fuller Warren shared-use path. Additionally, once completed, the Emerald Trail System will connect Downtown to approximately 30 miles of additional active transportation options.

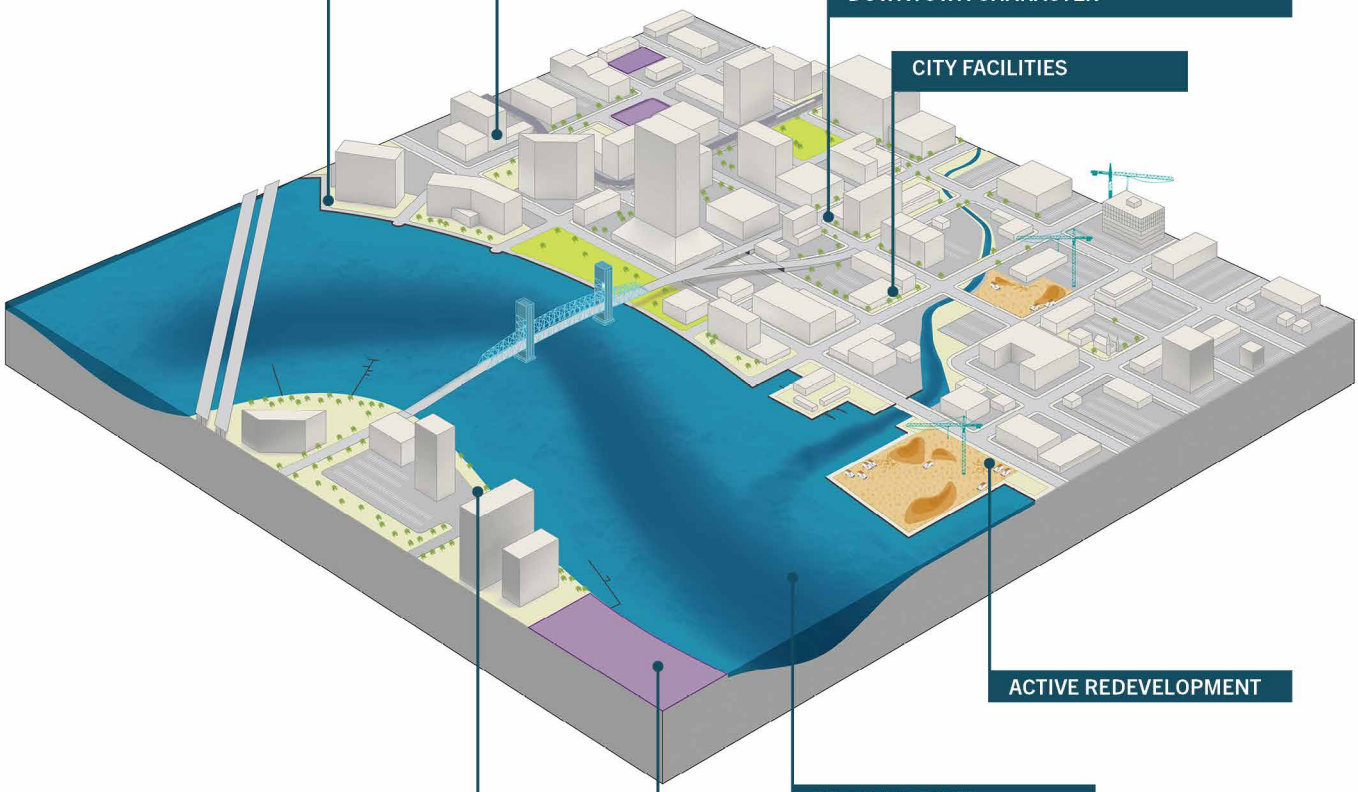
Downtown By the Numbers		*% of Citywide*
Total Land Area	4 sq mi	*0.5%*
Undeveloped Land Area	1.6 sq mi	*0.3%*
Critical Facilities	70	*3%*
Residential Properties	1,250	*0.4%*
Vacant Properties	661	*2%*
People	9,305	*1%*

NORTH BANK RIVERWALK

DOWNTOWN CHARACTER

BUSINESS DISTRICT

CITY FACILITIES



ACTIVE REDEVELOPMENT

ST. JOHNS RIVER

VACANT LAND

Approximately 660 parcels are vacant Downtown (2% of citywide)

SOUTH BANK RIVERWALK

Scale: Tile above represents approximately 0.5 sq miles.

DOWNTOWN

EXPOSURE, VULNERABILITY, AND RISK

Flooding

The St. Johns riverfront is central to Downtown's economy and identity. It also poses flood risks for people who live and work on the river's edge. Flood exposure Downtown is concentrated in low-lying areas along the St. Johns River as well as along the two smaller tributaries that cut through Downtown: Hogans and McCoys creeks . Many areas of Downtown are already experiencing more frequent coastal flooding, and in the next few decades, high tide flood events could start to happen multiple times per year in the lowest lying waterfront areas. Currently, 13% of Downtown residential properties and 11% of Downtown critical facilities are vulnerable to relatively frequent coastal flooding with at least a 1 in 10 chance of occurring in a given year (10% AEP). In addition, nearly 20% of the almost 1,600 commercial properties Downtown are vulnerable today to coastal flooding. As the economic and jobs hub for Jacksonville, flood risk in Downtown could have a large impact on Jacksonville's economy.

Another factor in Downtown's flood exposure is stormwater flooding. The majority of Downtown is covered by impervious surfaces, meaning water runs off quickly and the drainage system is often overtaxed. This results in pockets of Downtown that encounter stormwater ponding as well as increased flooding from Hogans and McCoys creeks during heavy rain events.

Without action, the risk of Downtown flooding as a result of stormwater and coastal flooding will only increase. Almost 1 in 5 residential properties and more than 1 in 6 critical facilities are vulnerable to projected 2070 1% AEP flooding versus 7% of properties citywide (1 in 100 chance of occurring in a given year).

Heat

Areas like Downtown, with its expanses of paving and tall masonry buildings that absorb heat and minimal natural landscapes, are among the greatest contributors to the urban heat island effect. Downtown can be as many as 12°F warmer than the coolest neighborhoods on a hot summer day. Vulnerability to heat can be related to financial stability, housing quality, access to medical care, and reliable transportation. Considering these factors, 80% of Downtown residents live in areas highly vulnerable to extreme heat. Urban heat island effects as observed Downtown can exacerbate the effects of extreme heat, making whole neighborhoods uncomfortable, increasing energy use, and disrupting city services.

Wind

While less than 10% of residential properties Downtown are vulnerable to high winds, 85% of critical facilities are classified as vulnerable. This is because these critical facilities Downtown were built before wind-related building requirements went into effect in 1974.

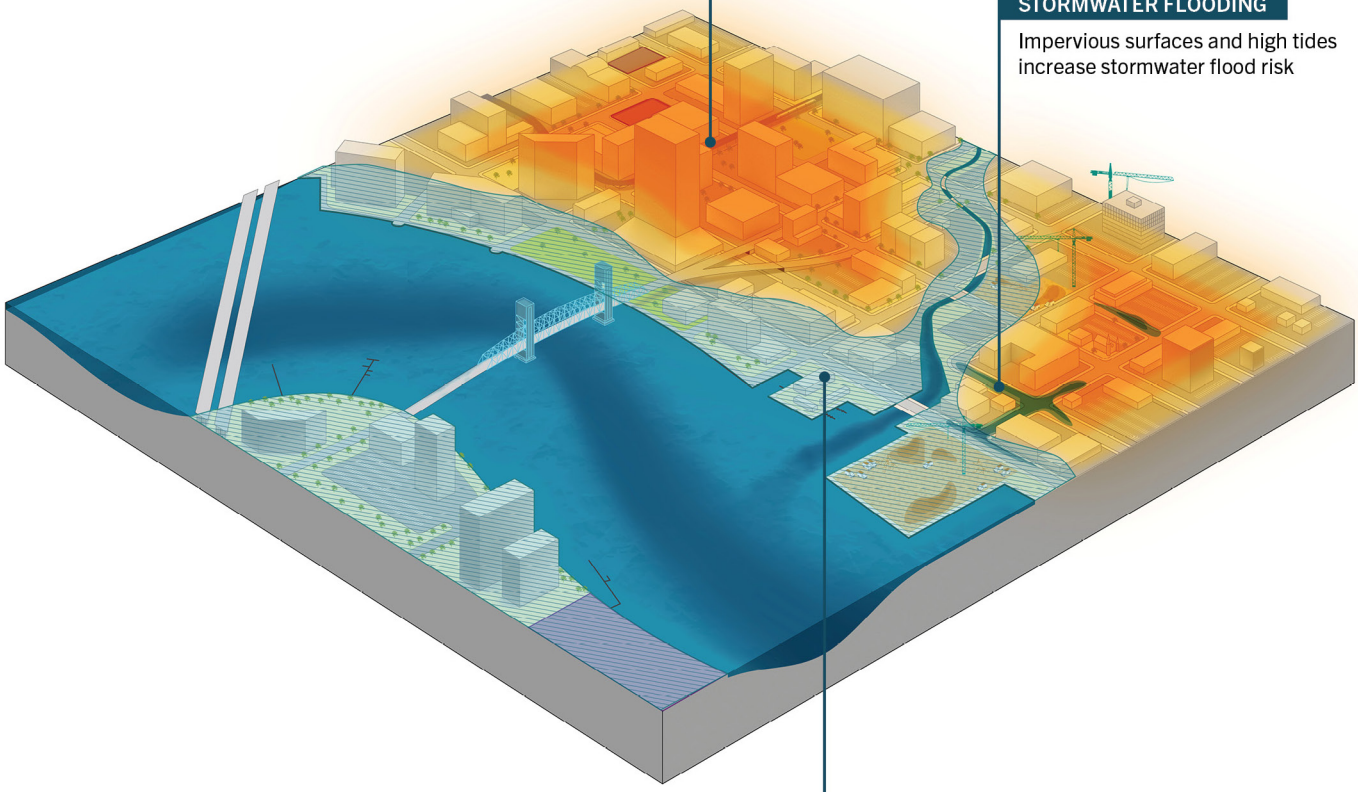
Downtown *Percentage of Assets Vulnerable to Climate Threats*	Residential Properties	Critical Facilities
Current 10% AEP **Coastal Flooding**	**13%** *2%*	**11%** *2%*
2070 1% AEP **Inland & Coastal Flooding**	**19%** *7%*	**17%** *8%*
Wind	10% *60%*	**85%** *73%*
Wildfire	0% *1%*	0% *6%*

HEAT

Buildings and impervious surfaces create strong urban heat island effect. 80% of Downtown residents are highly vulnerable to extreme heat.

STORMWATER FLOODING

Impervious surfaces and high tides increase stormwater flood risk



FLOODING

Flood exposure Downtown concentrated in low-lying areas along the St. Johns River and smaller tributaries

- Floodplain
- Stormwater Flooding
- Urban Heat

DOWNTOWN
RESILIENCE OPPORTUNITIES

Increase Density

A vibrant, thriving Downtown is crucial to building the resilient Jacksonville of tomorrow. Because of its wealth of amenities, proximity to jobs and services, and strong transportation connections, there is ample opportunity to increase density while addressing vulnerability and providing multiple resilience benefits across Jacksonville. Downtown development allows for more efficient deployment of city resources by relying on existing infrastructure and enables the preservation of undeveloped open space by reducing development pressures elsewhere.

Downtown has many sites ripe for redevelopment with differing degrees of exposure to risk. There are many active and planned redevelopment projects on the riverfront, for instance, but these sites are already exposed to flood risk. As a result, it is critical that these projects are designed to reduce vulnerability to flooding and other climate hazards. New structures within future flood risk areas should be built to flood-adapted design standards. Existing structures can be retrofitted with floodproofing (e.g., elevated heating and cooling systems) or be modified to accommodate ground-floor flooding during high-water events. The City is currently working to create a continuous riverfront park network, reserving the most flood-prone areas for floodable public open space and vastly increasing shaded, vegetated areas Downtown. Strategic investment in elevating and/or hardening the shoreline may still be warranted in select locations to protect specific high-value assets.

See Actions 1, 4, 8, 16, 21, 22, 27, 38

Invest in Mobility and Transportation Alternatives

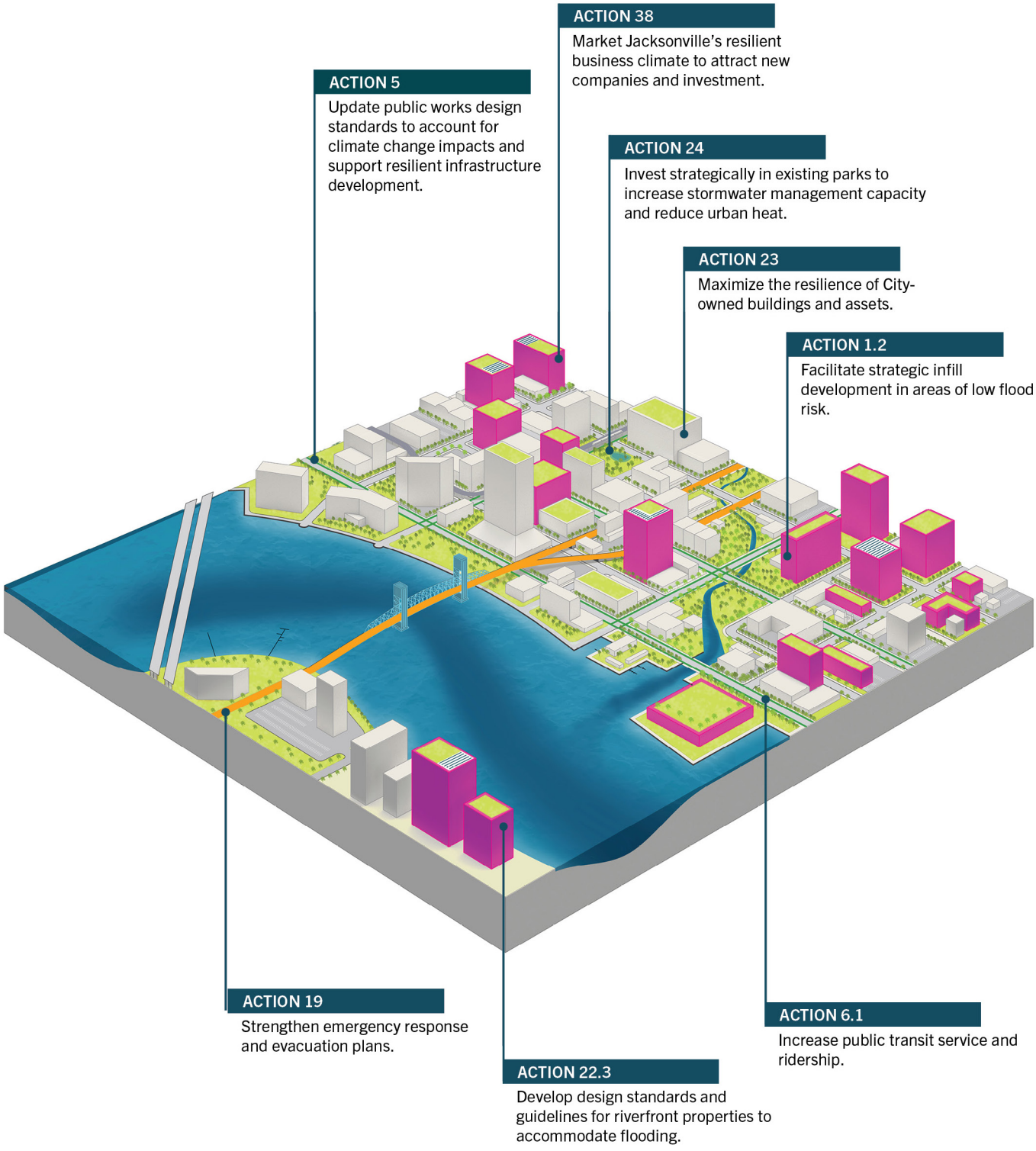
Because Downtown serves as a hub, plans for its future must consider residents as well as people who work in, visit, and travel through Downtown. Accommodating these visitors requires a comprehensive mobility network. Mass transit, biking infrastructure, improved pedestrian connections, and multiuse trail networks like the Emerald Trail can provide affordable and accessible options for traveling to Downtown. Providing multiple transportation options can also assist during emergency response and evacuation scenarios. Downtown is where Jacksonville can most easily and effectively achieve connected, multimodal transportation options. A well-functioning transportation system is essential for accommodating redevelopment and increased density Downtown.

See Actions 2, 5, 6, 19, 33

Mitigate Urban Heat

Potential strategies for reducing urban heat in Downtown include both public and private investments in public spaces, the street network, and buildings. These strategies include increasing urban tree cover and open space, constructing green roofs, deploying shade structures and cooling features, and increasing use of reflective building and paving materials that don't absorb solar radiation. Government buildings Downtown can lead by example by deploying green roofs and reflective building materials and minimizing impervious surface cover. New buildings built Downtown can also incorporate these features wherever feasible. Streetscapes can be retrofitted to create room for healthy, long-lived urban shade trees. Finally, expanding open hours and access to public facilities during high-heat days can provide critical cooling for residents.

See Actions 5, 10, 21, 22, 23, 24, 30

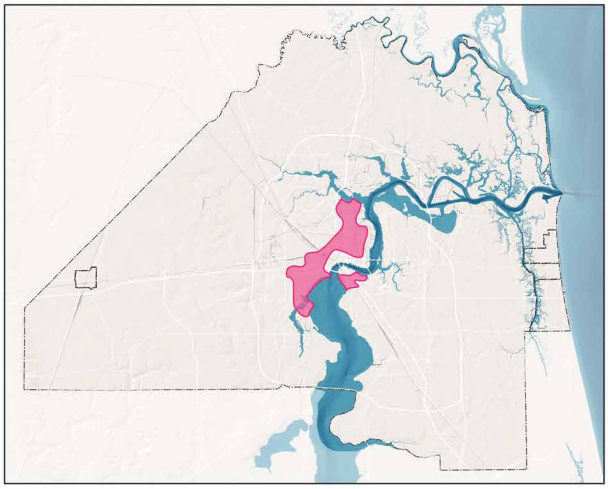

ACTION 38
Market Jacksonville's resilient business climate to attract new companies and investment.
ACTION 5
Update public works design standards to account for climate change impacts and support resilient infrastructure development.
ACTION 24
Invest strategically in existing parks to increase stormwater management capacity and reduce urban heat.
ACTION 23
Maximize the resilience of City-owned buildings and assets.
ACTION 1.2
Facilitate strategic infill development in areas of low flood risk.
ACTION 19
Strengthen emergency response and evacuation plans.
ACTION 22.3
Develop design standards and guidelines for riverfront properties to accommodate flooding.
ACTION 6.1
Increase public transit service and ridership.
Resilient development
Improved evacuation routes
Solar panels or green roof
Resilient streetscapes

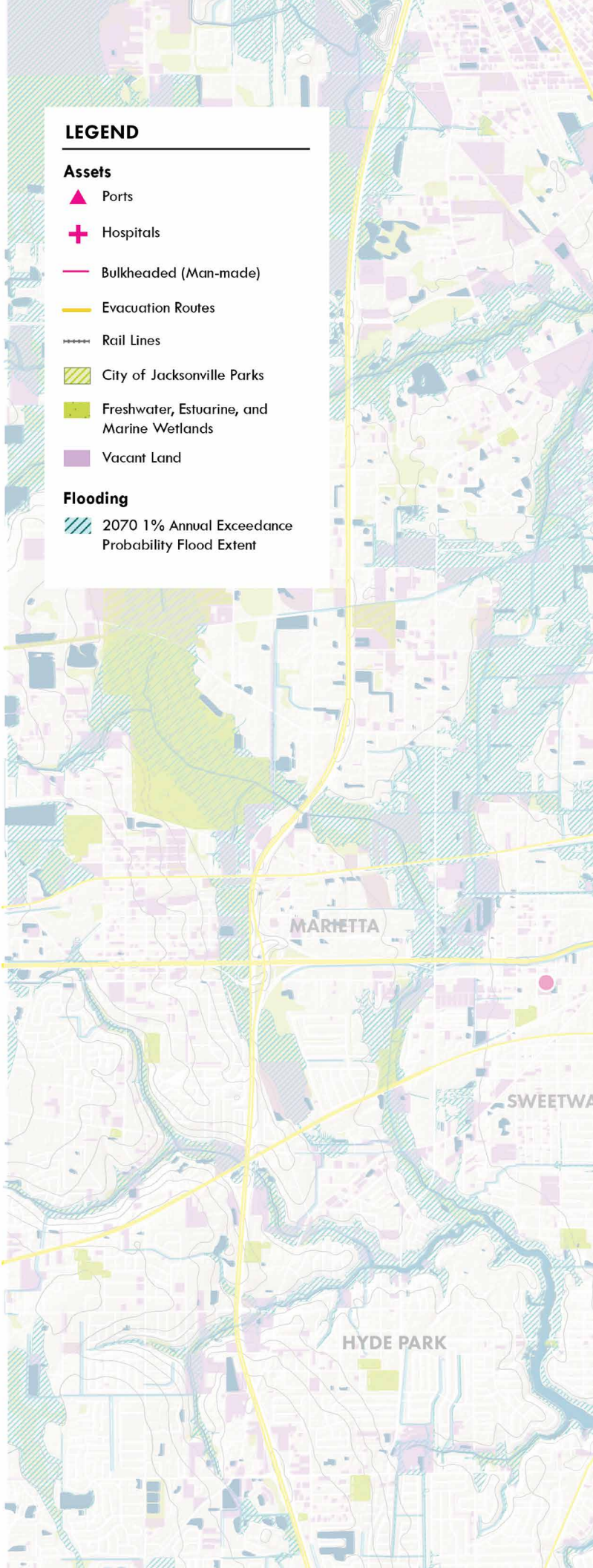
HISTORIC WALKABLE NEIGHBORHOODS

OVERVIEW

As in many American cities, the first wave of development beyond Downtown Jacksonville favored walkable and compact residential districts designed to provide easy access to jobs, commerce, and community. Today, these same qualities have driven the popularity of neighborhoods like San Marco, Riverside, and Springfield, while other neighborhoods developed in this era, like Eastside and New Town, still struggle under the weight of disinvestment, the legacy of redlining and unmet promises from Jacksonville's 1968 consolidation. Historic Walkable Neighborhoods share extensive pedestrian infrastructure and human-scale commercial corridors, making them ideal for medium-density infill and redevelopment, some of which is already taking place. Some areas within this type of development may face coastal, compound, or stormwater flood risk depending on local factors such as elevation, distance to water, and topography. Enhancing resilience in these neighborhoods will require ensuring that the resources, investments, and benefits of future development are equitably shared.

KEY MAP






LAKE FOREST
RIBAULT
TALLULAH/ NORTH SHORE
PANAMA PARK
MAGNOLIA GARDENS
MONCRIEF PARK
BRENTWOOD
Gulf Terminal International
MID-WESTSIDE
UF Health Jacksonville
SPRINGFIELD
Hoggans Creek
NEWTOWN
PAXON
EASTSIDE
McCoys Creek
DOWNTOWN
LACKAWANNA
MURRAY HILL
RIVERSIDE
Ascension St. Vincent's Riverside
ST.NICHOLAS
SAN MARCO
AVONDALE
SPRING PARK
FAIRFAX
LAKESHORE
ST. JOHNS RIVER
MIRAMAR
ENGLEWOOD
PINE FOREST
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HISTORIC WALKABLE NEIGHBORHOODS

CHARACTER

Located in the neighborhoods adjacent to Downtown, the Historic Walkable Neighborhoods comprise much of what is known as the "urban core." Primarily built prior to the mid-1940s, these neighborhoods tend to have connected grids of narrower streets lined with large, older trees. They also include commercial corridors near residential areas, giving them a walkable scale for pedestrians. The Historic Walkable Neighborhoods contain buildings of a variety of types, sizes, styles, conditions, and ages. In some areas, homes and buildings original to the area's first era of development are well-maintained. In other areas, disinvestment has led to numerous vacant lots and structures with deferred maintenance. As a result, there is a disproportionately high percentage of vacant properties in some Historic Walkable Neighborhoods compared to the rest of the city.

Approximately 75,000 residents live in Historic Walkable Neighborhoods, more than Downtown's population, but substantially fewer than the number of residents living in Jacksonville's expansive suburbs. Most of this area is within a 10-minute walk of a park.[8]

Disparate Development Trajectories

Segregation and systemic racism caused dramatic disinvestment in some neighborhoods versus others in the latter decades of the 20th century. The resulting economic disparities are evident today. In the late 1930s many predominantly White neighborhoods like Avondale, San Marco, and Riverside were described as "best" and "desirable" for lending and investment by the Federal Home Owners Loan Corporation (HOLC), while predominantly Black neighborhoods north and northwest of Downtown, including Eastside, Phoenix, and New Town, were classified as "hazardous" in a practice known as redlining.[9] This classification and guidance from the federal government significantly limited access to lending, investment, and homeownership for Black residents living in redlined neighborhoods and further reinforced unequal distribution of city services and infrastructure in these neighborhoods.

Today, lines drawn by the HOLC still influence residents' economic wealth, personal health, and climate vulnerability. For example, some areas of Eastside remain underserved and underpopulated, with large numbers of vacant parcels and empty storefronts. By contrast, other neighborhoods like Springfield and Murray Hill are seeing new investment, though this has come with concerns about displacement and gentrification.

Historic Walkable Neighborhoods By the Numbers		*% of Citywide*
Total Land Area	24 sq mi	*3%*
Undeveloped Land Area	5 sq mi	*1%*
Critical Facilities	367	*15%*
Residential Properties	32,236	*11%*
Vacant Properties	6,099	*19%*
People	75,503	*8%*

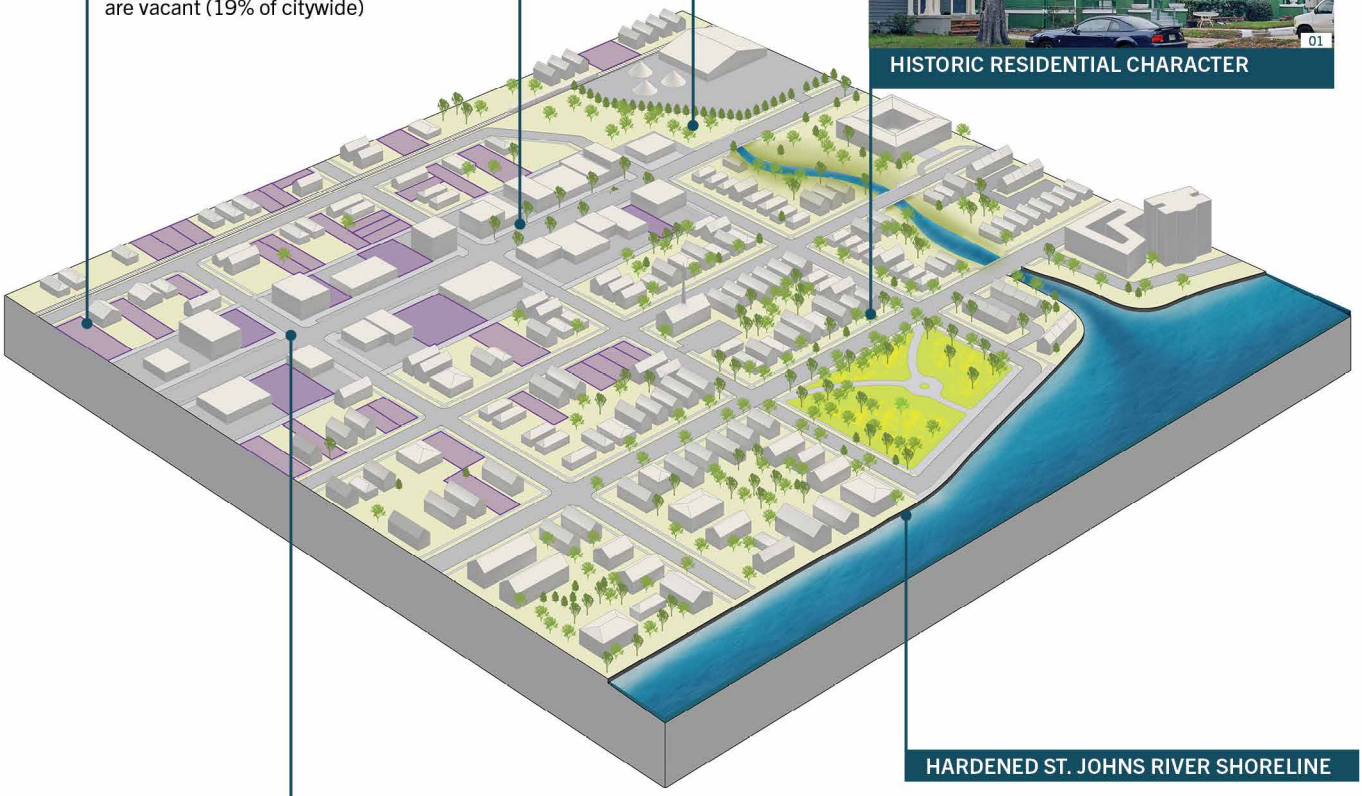
WALKABLE COMMERCIAL CORRIDORS

COVERED TRIBUTARIES

HISTORIC RESIDENTIAL CHARACTER

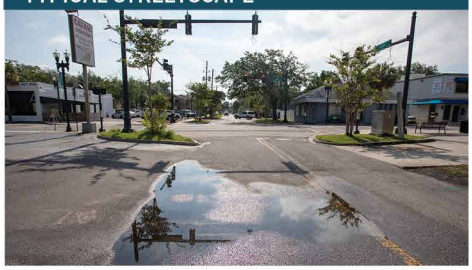
VACANT LAND

Approximately 6100 parcels are vacant (19% of citywide)



HARDENED ST. JOHNS RIVER SHORELINE

TYPICAL STREETSCAPE



Scale: Tile above represents approximately 0.1 sq miles.

HISTORIC WALKABLE NEIGHBORHOODS

EXPOSURE, VULNERABILITY, AND RISK

Flooding

While overall vulnerability to coastal flooding across the Historic Walkable Neighborhoods is lower than in other Development Types, more than 1,000 residential properties in these neighborhoods located close to the St Johns River or its larger tributaries are currently vulnerable to this type of flooding (10% AEP). Generally, these vulnerable properties are concentrated in narrow bands along the St Johns River or along McCoys, Hogans, Long Branch, and Fishweir creeks; however, as evidenced by the volume of resident-reported 630-CITY flood data,[10] there are other expansive low-lying areas of Historic Walkable Neighborhoods that are also subject to stormwater ponding during periods when heavy rainfall is combined with high tides. These areas include the Hospital District, most of San Marco, and portions of the Murray Hill and Panama Park neighborhoods.

Flooding in this Development Type is expected to increase with climate change. By 2070, more than 2,600 residential properties in the Historic Walkable Neighborhoods are projected to be vulnerable to multiple types of flooding (1% AEP). Additionally, without action, 59 of the critical facilities in this Development Type will be vulnerable to future flooding.

Heat

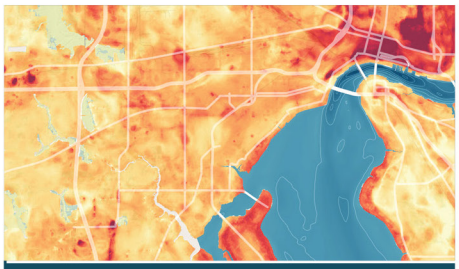
More than half of the people living in Historic Walkable Neighborhoods live in areas vulnerable to extreme heat. However, high heat exposure is not distributed evenly across these areas. As the presence of natural landscapes, such as parks and trees, can mitigate the effects of extreme heat, an inconsistent tree canopy in this type of development means that areas like Springfield and East End have high heat exposure and vulnerability, while other neighborhoods with robust tree canopies, like Avondale, are cooler and less vulnerable to heat.

These disparities are not random but rather a consequence of neighborhood redlining.[11] Several historically Black neighborhoods that were redlined in 1937, such as Mixontown and Eastside, are dealing today with the effects of disinvestment, including inconsistent tree coverage.[12] Certain areas in the urban core—areas that are consistent with historically redlined neighborhoods—can be as much as 12°F hotter than adjacent, historically White neighborhoods.[13] Notably, many areas highly vulnerable to extreme heat in this Development Type also contain school buildings and afterschool programming centers.

Wind

More than 28,000 residential properties and critical facilities located in Historic Walkable Neighborhoods are vulnerable to wind. This number is higher than the vulnerability to wind citywide and is due to the age of many of the buildings in these areas, which largely predate more modern wind-resistant building codes.

Historic Walkable Neighborhoods *Percentage of Assets Vulnerable to Climate Threats*	Residential Properties	Critical Facilities
Current 10% AEP **Coastal Flooding**	**3%** *2%*	1% *2%*
2070 1% AEP **Inland & Coastal Flooding**	**8%** *7%*	**16%** *8%*
Wind	***88%*** *60%*	***90%*** *73%*
Wildfire	0% *1%*	0% *6%*



HEAT

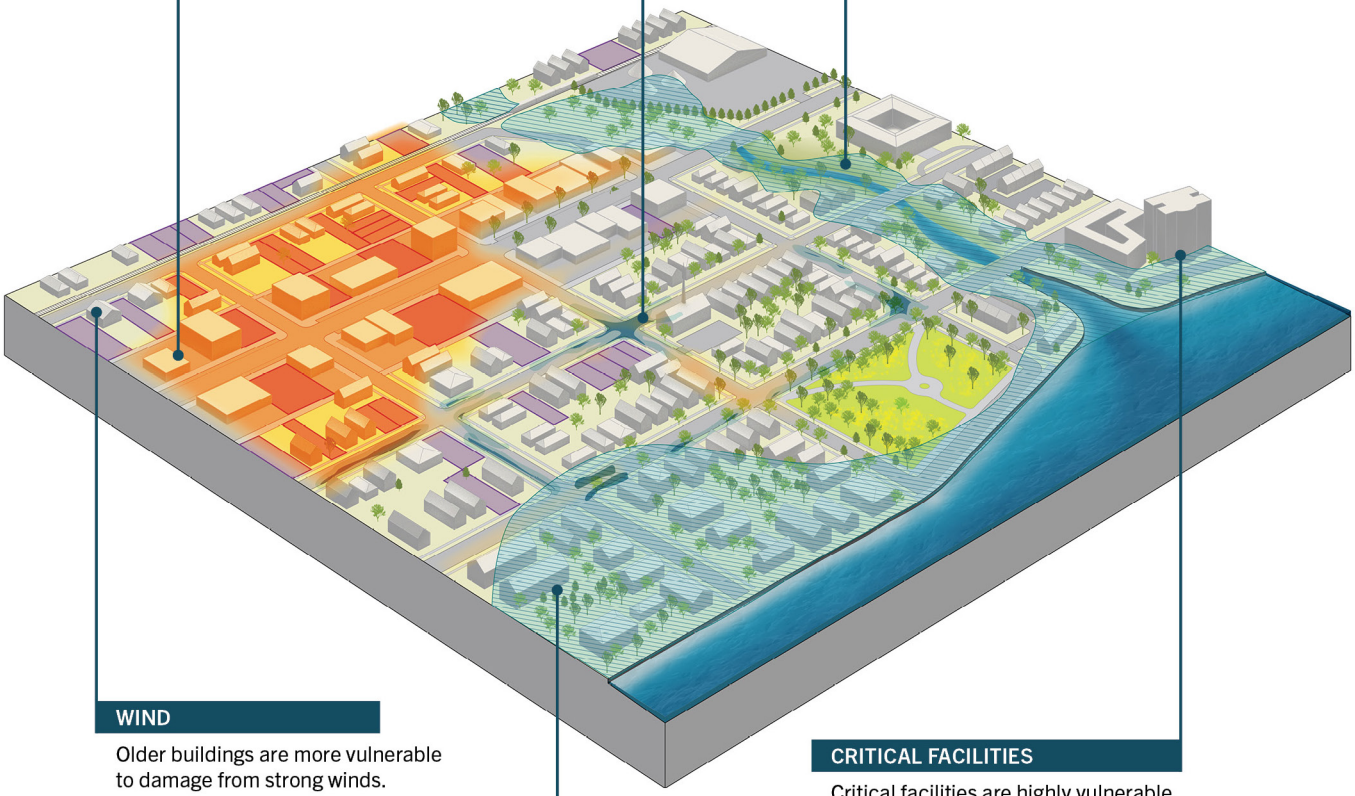
Neighborhoods with fewer trees are more vulnerable to extreme heat. 51% of residents are highly vulnerable to extreme heat.

STORMWATER FLOODING

High tides and coastal flood events back up drainage, causing stormwater flooding further upland.

COMPOUND FLOODING

Areas along creeks and tributaries are exposed to compound flood risk when heavy rains fall during coastal flooding.



WIND

Older buildings are more vulnerable to damage from strong winds.

CRITICAL FACILITIES

Critical facilities are highly vulnerable to future coastal and riverine flooding.

COASTAL FLOODING

The extent of coastal flood exposure varies with topography.

Floodplain
Stormwater Flooding
Urban Heat

HISTORIC WALKABLE NEIGHBORHOODS

RESILIENCE OPPORTUNITIES

Encourage Resilient Infill and Redevelopment

The Historic Walkable Neighborhoods are a prime opportunity for re-investing in resilience. This area includes many underutilized parcels at lower flood risk: 18% of Jacksonville's vacant properties are located here, but fewer than 5% of these properties are vulnerable to future flooding. These neighborhoods are also centrally located and well-connected by streets and trails. Together, these factors create opportunities for resilient infill development to increase housing and economic opportunities for many Jacksonville residents without increasing flood exposure or risk.

A comprehensive approach to resilient redevelopment in Historic Walkable Neighborhoods includes equitable improvements to the infrastructure that support healthy and thriving communities, such as safer streets, multimodal transportation connections, green stormwater infrastructure, upgraded park amenities, and an expanded tree canopy in urban heat islands. Coupling this with a focus on safeguarding and expanding affordable housing options in Historic Walkable Neighborhoods can help to ensure that investments benefit and do not displace existing residents, particularly communities of color that have faced historic disinvestment.

See Actions 1, 4, 5, 6, 9, 10, 24, 25, 34

Make Room for Creeks

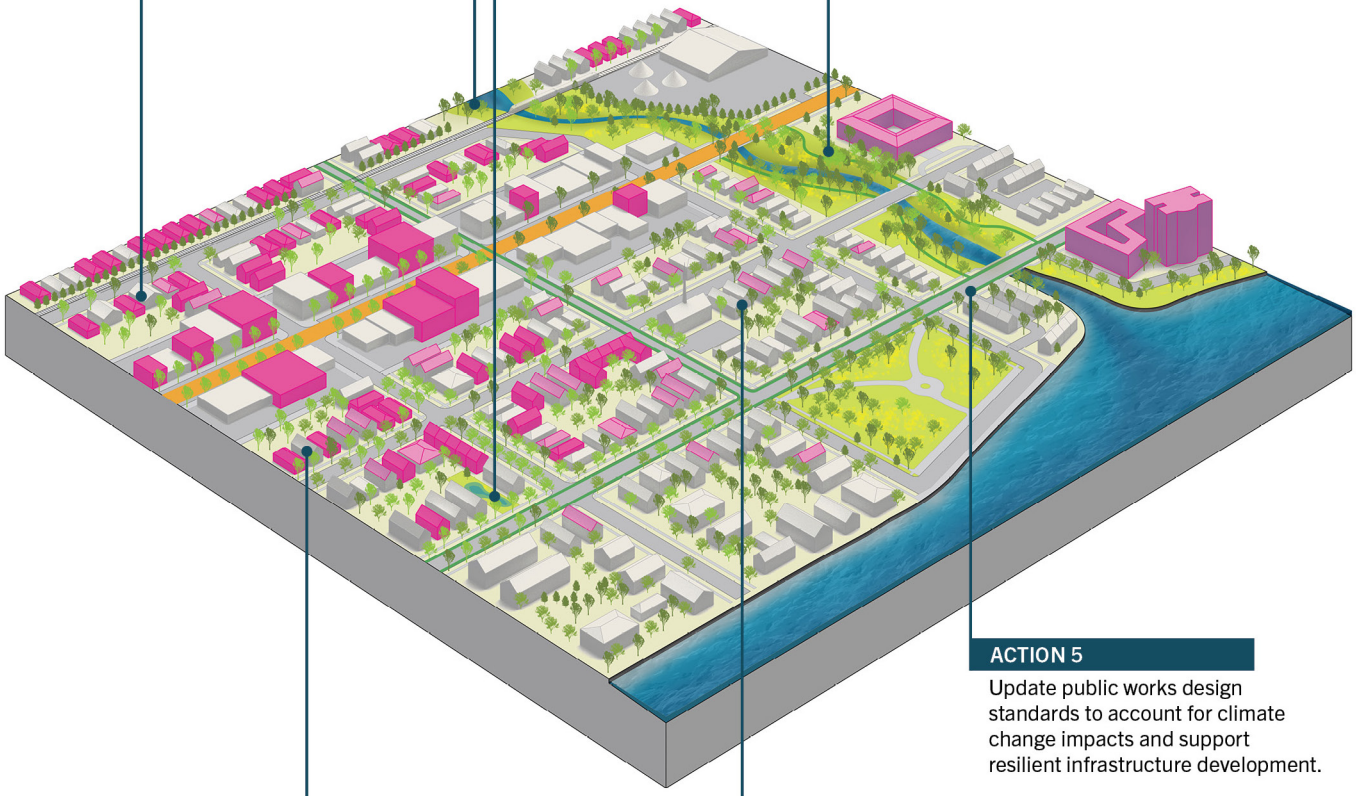
In areas of frequent flooding, converting land along the tributaries into floodable parks can help to reduce flood exposure while providing recreational opportunities, ecosystem services, better water management, and improved quality of life. This can be implemented in tandem with building and connecting trails to provide multimodal transportation and recreation benefits. This is already underway along McCoys Creek and Hogans Creek as part of the Emerald Trail and creek restoration projects and can be employed in other tributaries as well.

See Actions 7, 8

Improve Existing Building Stock

While the Historic Walkable Neighborhoods have a similar level of flood risk when compared to the entire city, the age of building stock makes many properties highly susceptible to wind damage and hazards from extreme temperatures. Retrofitting buildings so that they better withstand extreme weather conditions and improving housing conditions and quality for renters and homeowners will safeguard the vitality of these neighborhoods and the people that call them home.

See Actions 21, 22, 32



ACTION 7.1
Support the continued buildout of and safe connections to the Emerald Trail.

ACTION 1.2
Facilitate strategic infill development in areas of low flood risk.

ACTION 8
Make room for the river and tributaries.

ACTION 25
Repurpose vacant land for uses that best support resilience goals.

ACTION 5
Update public works design standards to account for climate change impacts and support resilient infrastructure development.

ACTION 21.1
Expand existing retrofit programs.

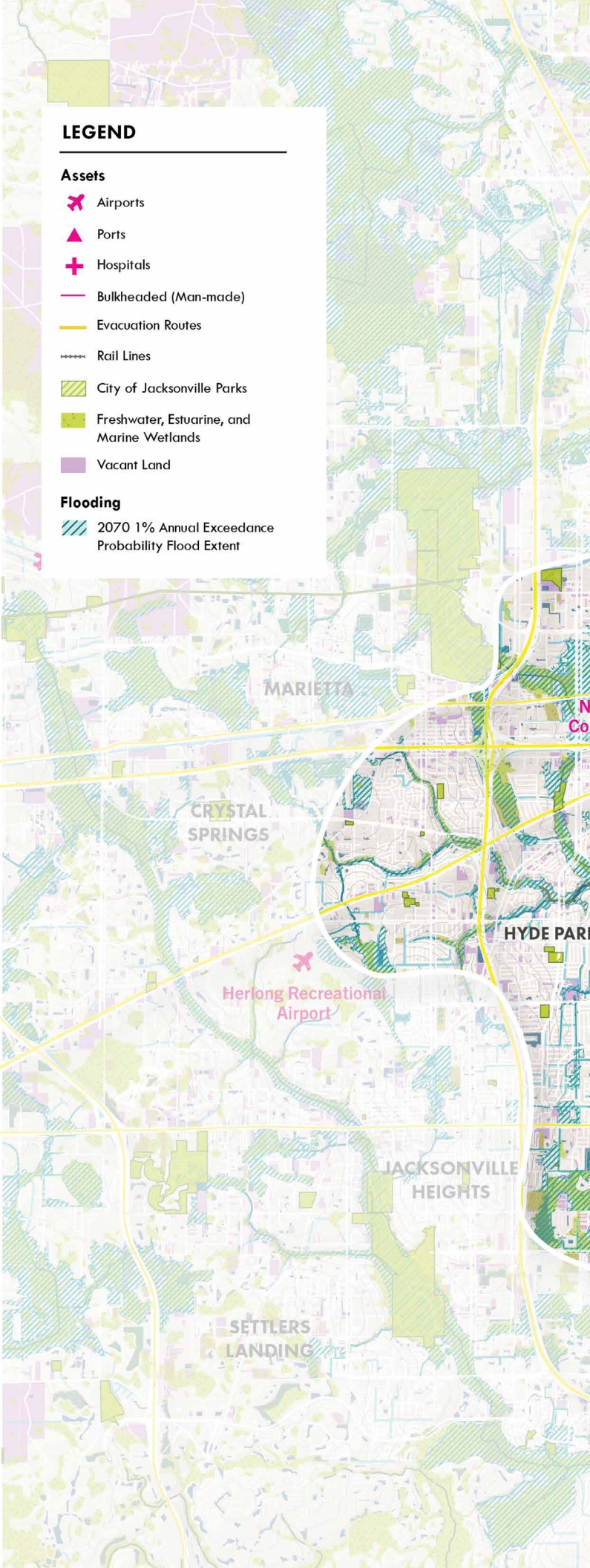
ACTION 4
Increase and safeguard the supply of affordable housing in low-risk and well-connected neighborhoods.

- Resilient development
- Improved evacuation routes
- Resilient streetscape
- Building retrofits

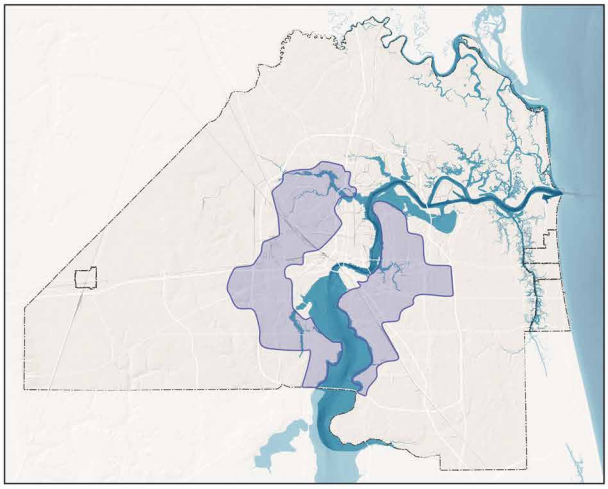
POST-WAR SUBURBS

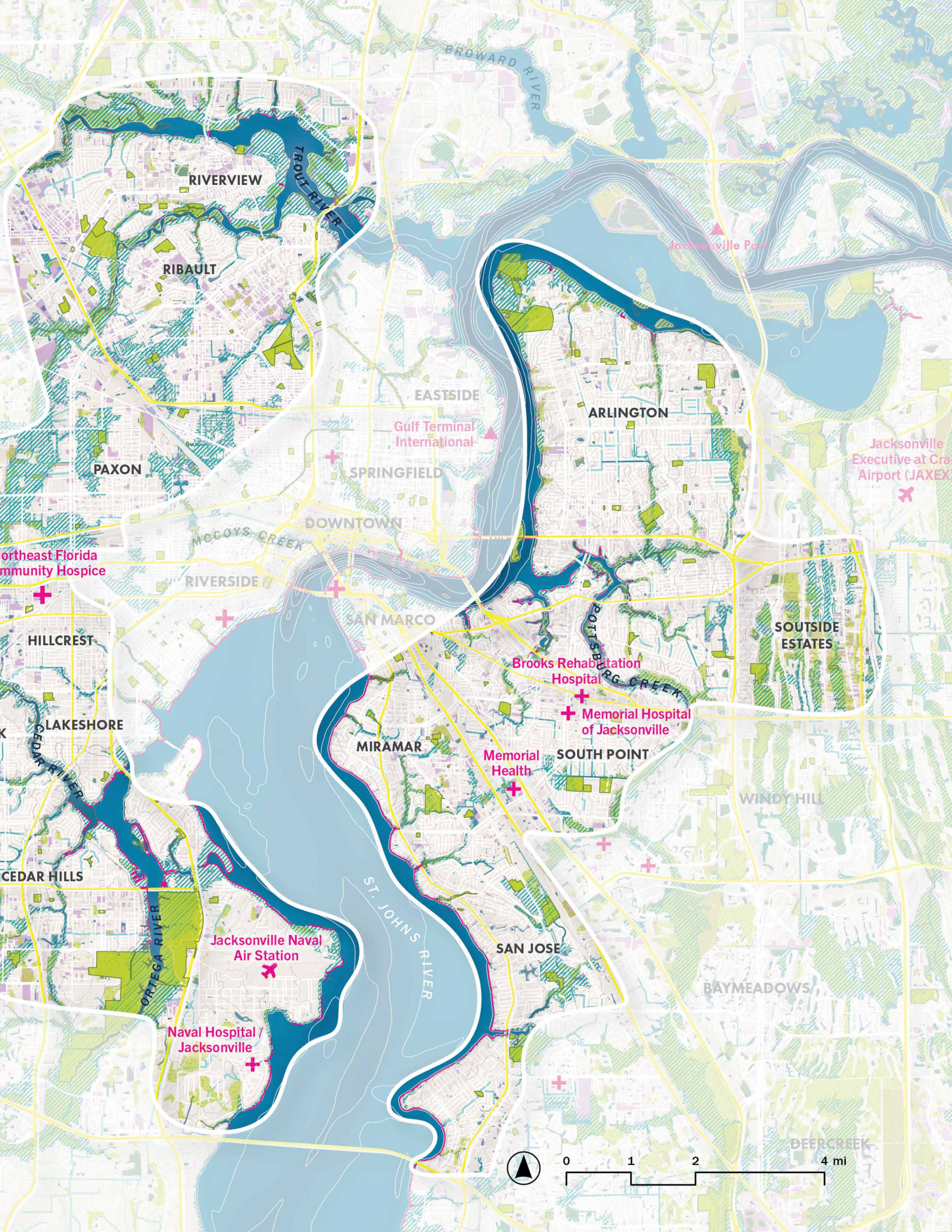
OVERVIEW

World War II and the era immediately following brought tremendous changes to the scale, pace, and character of development in Jacksonville. New industries, families, and wealth led to the proliferation of new subdivisions further from the urban core. The increase of personal automobiles allowed residents to travel greater distances from their homes. At the same time, new building materials, construction techniques, and architectural styles gave these neighborhoods a look and feel wholly different from the historic neighborhoods closer to Downtown. While this development proceeded at a rapid pace, it sometimes suffered from poor decision making, leading to neighborhoods being built in wetlands and floodplains. More than 60 years later, these challenges are compounded by aging infrastructure and building stock, rising sea levels, and more intense rainfall events. Building resilience in these areas will require re-evaluating the decisions of the past and embracing maintenance, repair, and redevelopment of existing community assets.



KEY MAP




BROWARD RIVER
TROUT RIVER
RIVERVIEW
RIBAULT
PAXON
EASTSIDE
SPRINGFIELD
Gulf Terminal International
Jacksonville Port
ARLINGTON
Jacksonville Executive at Cra Airport (JAXEX
DOWNTOWN
McCOYS CREEK
ortheast Florida mmunity Hospice
RIVERSIDE
SAN MARCO
HILLCREST
LAKESHORE
CEDAR RIVER
FORT SBURG CREEK
SOUTSIDE ESTATES
Brooks Rehabilitation Hospital
Memorial Hospital of Jacksonville
MIRAMAR
Memorial Health
SOUTH POINT
WINDY HILL
CEDAR HILLS
ST. JOHNS RIVER
ORTEGA RIVER
Jacksonville Naval Air Station
SAN JOSE
BAYMEADOWS
Naval Hospital / Jacksonville
DEERCREEK
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POST-WAR SUBURBS
CHARACTER

Located outside the urban core, neighborhoods in the Post-War Suburbs are less densely developed and are characterized by larger residential parcels and commercial corridors with significant impervious cover. Though certain areas have walkable streets, most neighborhoods located in the Post-War Suburbs are more easily accessible by car. They also include a significant amount of waterfront properties with many neighborhoods located along the St. Johns River or along the lower reaches of some of its largest tributaries.

Approximately 29% of Jacksonville residents live in Post-War Suburbs. While these areas are predominantly residential, there are many significant commercial corridors and industrial zones. More than one-third of industrial properties in Jacksonville are located in Post-War Suburbs. Many residents must walk more than 10 minutes to get to a park, and the Post-War Suburbs include the greatest number of neighborhoods that are ranked as "very high priority" for new parks.[14]

A Boom in Development

Largely driven by the population and real estate boom following World War II, the Post-War Suburbs embody the first wave of development that celebrated the prevalence of the automobile and a new standard of American living.

The pace and scale of this new Development Type also impacted how and where neighborhoods, infrastructure, and services were built. Many new areas relied heavily on septic systems for wastewater treatment rather than waiting for the city's sewer system to catch up to the pace of development. Subdivisions were also constructed adjacent to major tributaries of the St. Johns River, such as the Arlington, Ortega, Ribault, and Trout rivers. In some cases, they were built in wetlands, or on former wetlands that had been filled in with incinerator ash.

The first of the Post-War Suburbs are nearly 80 years old. Changes in demographics, continued development trends away from the urban core, and preferences for new construction have led to disinvestment in some of these areas today. Once-bustling malls and shopping centers have struggled to maintain tenants, leading to large, underutilized commercial properties and empty parking lots. As homes age, homeowners in some areas have struggled to keep up with maintenance.

Post-War Suburbs By the Numbers		*% of Citywide*
Total Land Area	119 sq mi	*14%*
Undeveloped Land Area	35 sq mi	*7%*
Critical Facilities	***923***	***38%***
Residential Properties	93,275	*30%*
Vacant Properties	9,159	28%
People	275,743	*29%*

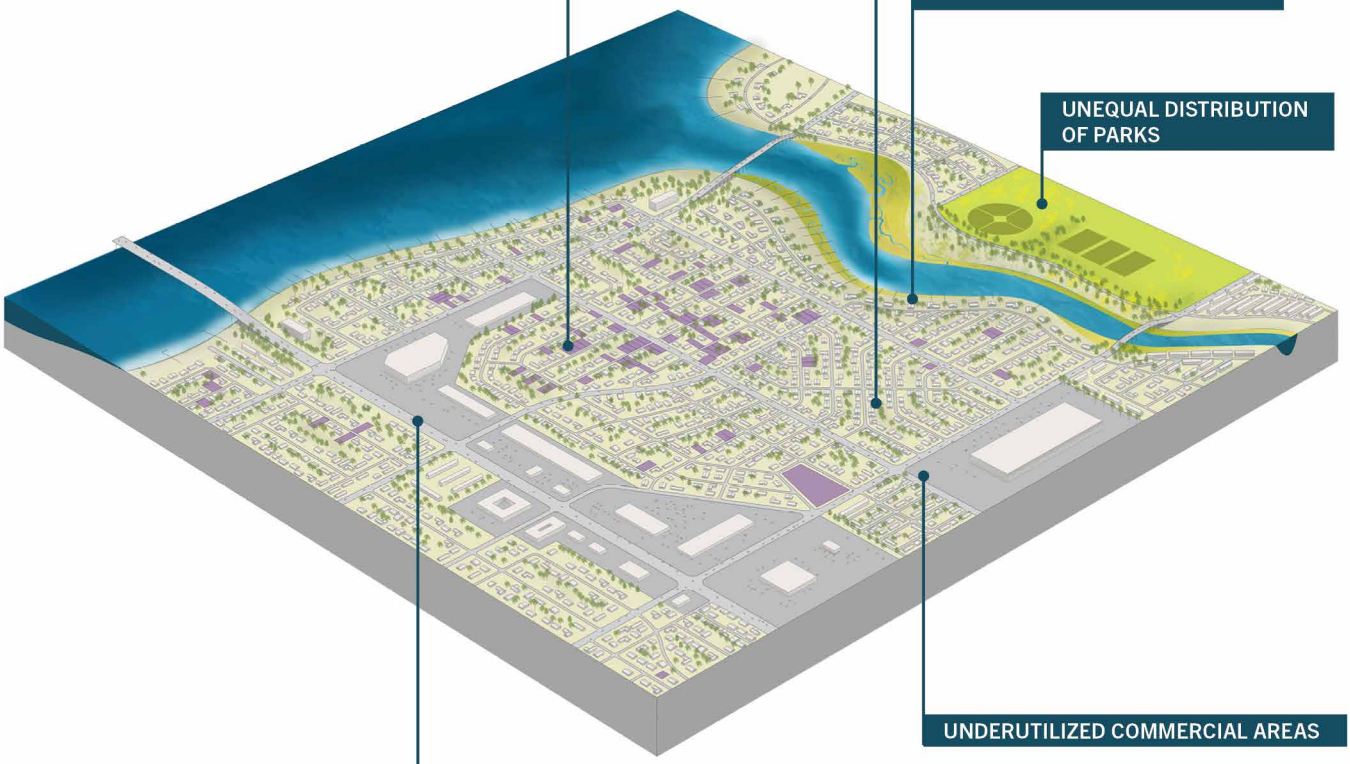
NEIGHBORHOOD CHARACTER

VACANT LAND

Approximately 9100 parcels are vacant (28% of citywide)

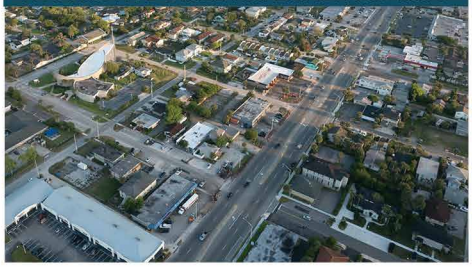
DEVELOPMENT ON TRIBUTARIES AND TIDAL WETLANDS

UNEQUAL DISTRIBUTION OF PARKS



UNDERUTILIZED COMMERCIAL AREAS

AUTOMOTIVE-SCALE ARTERIAL ROADWAYS



Scale: Tile above represents approximately 2 sq miles.

POST-WAR SUBURBS

EXPOSURE, VULNERABILITY, AND RISK

Flooding

Flood risk is highly variable within the Post-War Suburbs and contingent on local conditions such as distance to water, elevation, and topography. Areas of the Post-War Suburbs include extensive waterfronts on the St Johns River and the lower reaches of some of its largest tributaries, exposing many neighborhoods to compound flooding—particularly areas along the Ortega River, Cedar River, and Trout River on the North Bank; the Arlington River, Pottsburg Creek, and Little Pottsburg Creek on the South Bank; and the St. Johns River on both banks. Additionally, there are several neighborhoods in this Development Type built on incinerator ash fill which can affect water quality in these areas.[15]

Compared to other Development Types, Post-War Suburbs have the greatest number of residential properties vulnerable to coastal flooding (more than 2,700 properties with at least a 10% chance of occurring in a given year (10% AEP)). While this represents a small percentage of total homes in the Post-War Suburbs, a significant number of residents are vulnerable to displacement from repetitive flooding, and this risk will only increase over time due to climate change. The Post-War Suburbs also contain the greatest number of residential properties vulnerable to future 1% AEP flooding (more than 7,600 properties).

Commercial corridors in the Post-War Suburbs often include wide roadways, paved parking lots, little vegetation, and a high concentration of impervious surfaces that contribute to local stormwater flooding during heavy rain events. Street flooding in commercial areas can make it difficult for residents to access retailers that provide goods and services that support daily life, like grocery stores and pharmacies.

Heat

High heat exposure in the Post-War Suburbs is concentrated in commercial and industrial areas and along major road and highway corridors with large areas of paved and impervious surfaces and little vegetation. 37% of residents in the Post-War Suburbs live in areas vulnerable to heat.

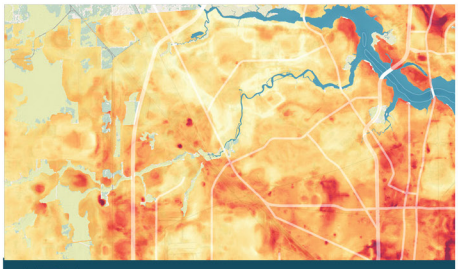
Wind

Most residential properties and critical facilities in the Post-War Suburbs were built before Florida's first building code went into effect in 1974, indicating a lack of general structural design requirements and a higher vulnerability to high winds when compared to newer build areas or the city average.

Aging Infrastructure

The most recently developed Post-War Suburbs are nearly 50 years old, an age that often marks the end of useful service life for many materials used in infrastructure, roads, and buildings. As development and population trends favor other areas of Jacksonville, the Post-War Suburbs risk missing out on critical maintenance and upgrades with new technologies, materials, and best practices in resilient design. Increased flooding and extreme heat will only exacerbate the strain on this already-taxed infrastructure.

Post-War Suburbs *Percentage of Assets Vulnerable to Climate Threats*	Residential Properties	Critical Facilities
Current 10% AEP **Coastal Flooding**	**3%** *2%*	0% *2%*
2070 1% AEP **Inland & Coastal Flooding**	**8%** *7%*	**8%** *8%*
Wind	**87%** *60%*	**85%** *73%*
Wildfire	0% *1%*	0% *6%*

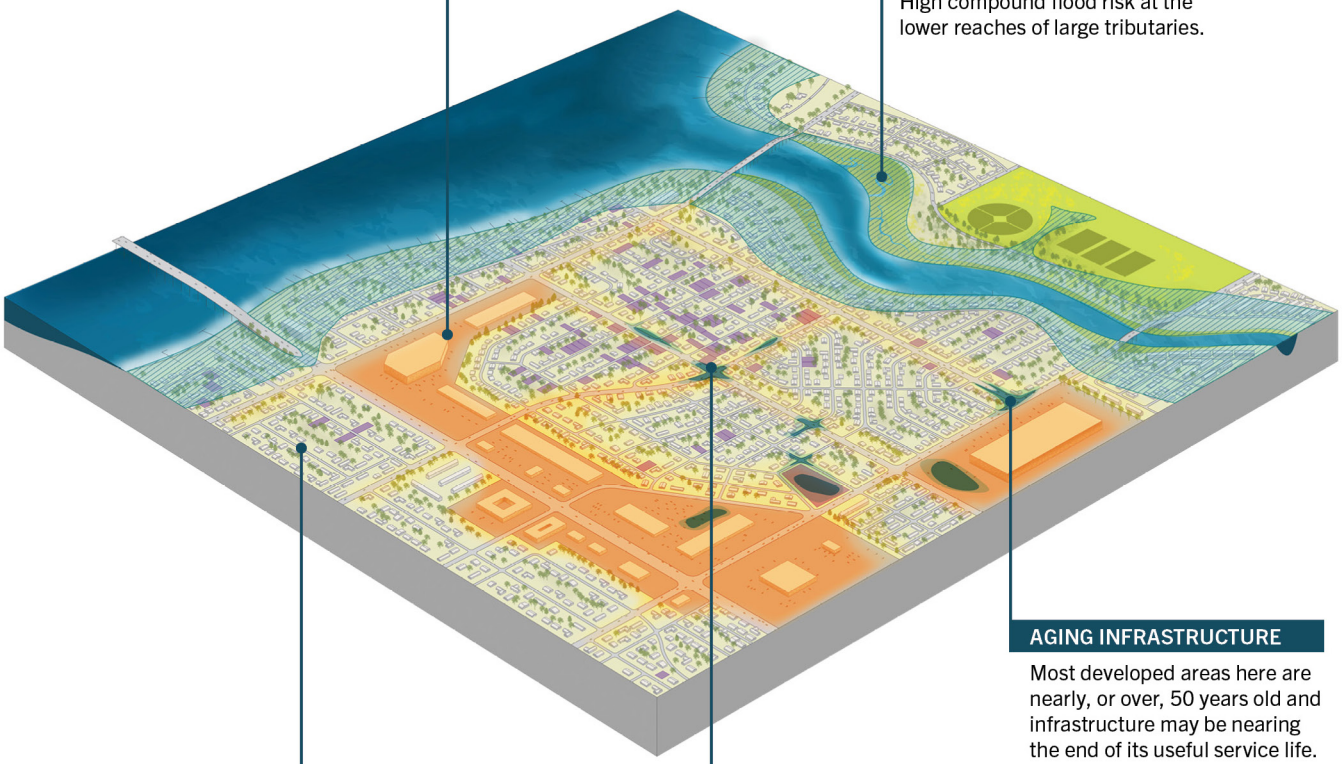


HEAT

Large expanses of paving with minimal tree cover, like parking lots, contribute to urban heat island effect.

COMPOUND FLOODING

High compound flood risk at the lower reaches of large tributaries.



AGING INFRASTRUCTURE

Most developed areas here are nearly, or over, 50 years old and infrastructure may be nearing the end of its useful service life.

STORMWATER FLOODING

Localized stormwater flooding in areas with impervious surfaces and aging infrastructure.

WIND

Older buildings are more vulnerable to damage from strong winds.

Floodplain

Stormwater Flooding

Urban Heat

POST-WAR SUBURBS
RESILIENCE OPPORTUNITIES

Prioritize Infrastructure Investment, Maintenance, and Stewardship

A focus on maintenance and upgrades to infrastructure that draw on best practices and innovation will be key to Post-War Suburbs thriving in the face of climate threats. This includes redesigning streets and commercial corridors to mitigate urban heat and absorb stormwater, upgrading stormwater and sewer system capacity, improving septic system maintenance practices, and caring for and expanding the urban tree canopy.

Improvement and stewardship of underutilized open spaces in Post-War Suburbs can also provide multiple resilience benefits. Flood-prone vacant lots in or near residential areas present opportunities for conversion to neighborhood pocket parks that take high-risk land off the market for development while also storing stormwater, mitigating urban heat, and improving quality of life for residents. River and creekfront parks with wide, healthy riparian corridors and spaces designed to accommodate high water events can improve water quality and help mitigate coastal and compound flooding.

See Actions 5, 8, 9, 10, 15, 25

Provide Options for Residents in Flood-Prone Areas

Some residents who live in flood-prone areas have already been forced to face difficult decisions about whether to rebuild or relocate in the wake of a flood event. Soon, many homeowners may be facing financial stress from rising homeowner's insurance costs or even loss of coverage. Renters may be subject to decisions out of their control. Streamlining and strengthening assistance programs in flood-prone areas can increase residents' understanding of their existing and future risks and provide meaningful options and agency in the decisions they make about their future. This includes resources to make retrofits and upgrades and creating pathways to relocation that respect residents' economic conditions, social networks, and cultural preferences.

See Actions 21, 29

Encourage Adaptive Reuse

Underutilized or vacant legacy commercial spaces may no longer serve as prime commercial real estate, but, if not exposed to flooding and other hazards, they can be ideally suited for medium-density affordable housing, mixed-use, and transit-oriented development. Redeveloping these areas for housing—planned and developed with contemporary livability and resilience in mind—could help relieve development pressures elsewhere, increase housing stock availability and quality in the area, and provide an economic boost to struggling and underutilized spaces. These developments could also provide housing for homeowners and renters who choose to participate in voluntary buyout programs in flood-prone or repetitive loss areas.

See Actions 1, 4, 26

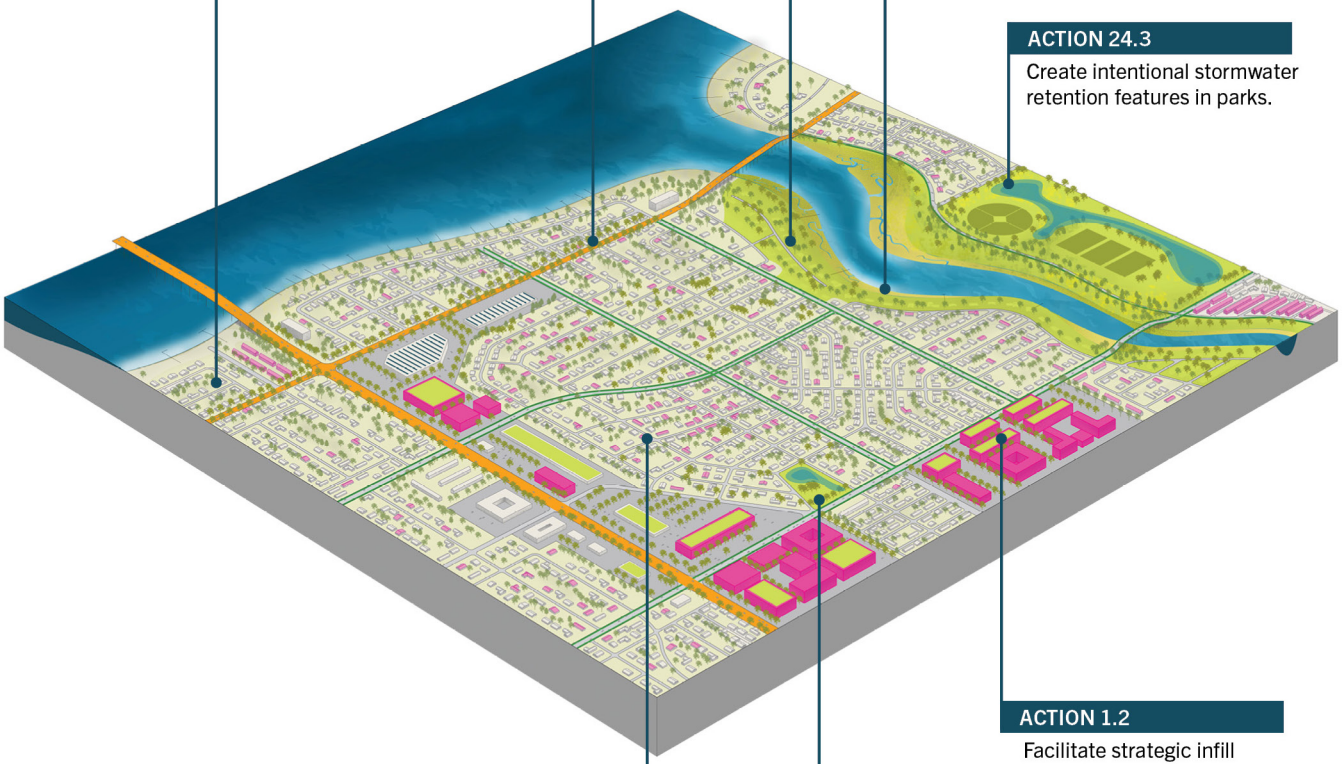
ACTION 5.2
Update the standard details and specifications for City of Jacksonville street designs.

ACTION 10
Expand Jacksonville's tree canopy.

ACTION 8
Make room for the river and tributaries.

ACTION 29
Streamline voluntary residential buyout and relocation programs for high-risk areas.

ACTION 24.3
Create intentional stormwater retention features in parks.



ACTION 1.2
Facilitate strategic infill development in areas of low flood risk.

ACTION 25
Repurpose vacant land for uses that best support resilience goals.

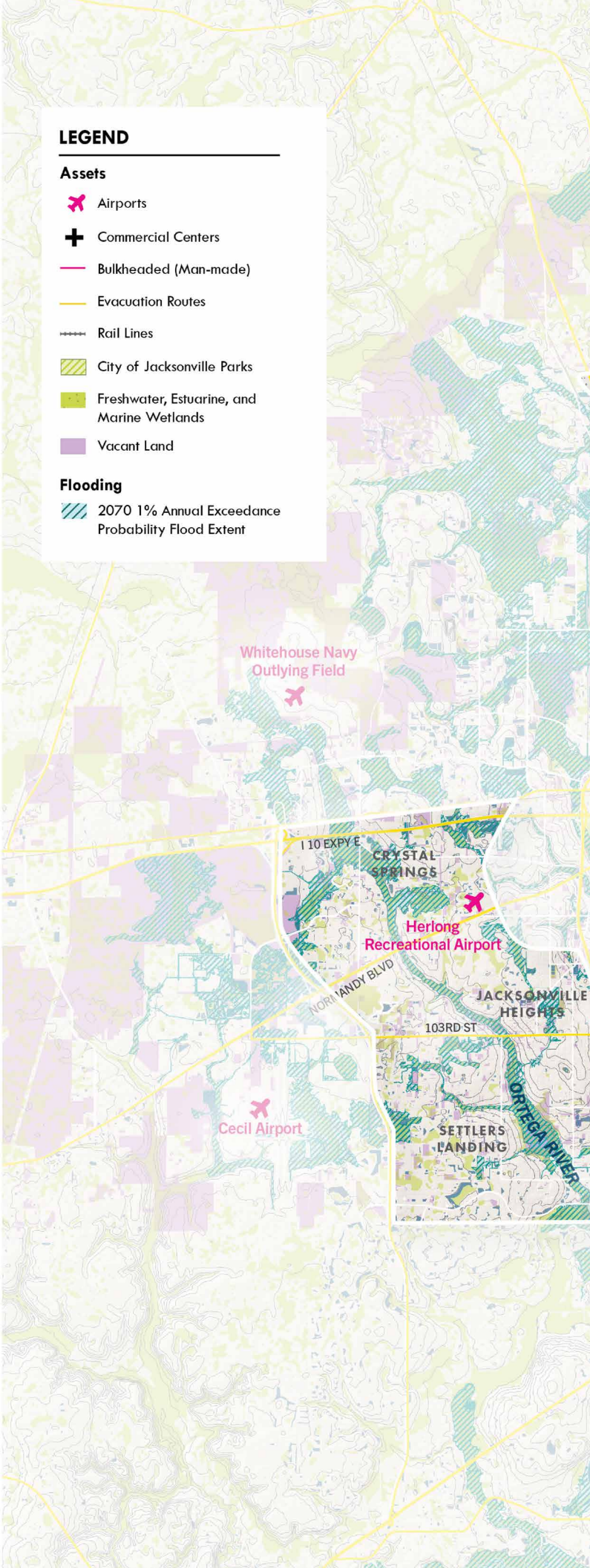
ACTION 21.2
Leverage federal funding to improve community awareness of lower-cost floodproofing, heat, and energy performance upgrades.

- Resilient development
- Improved evacuation routes
- Resilient streetscape
- Solar panels or green roof
- Building retrofits

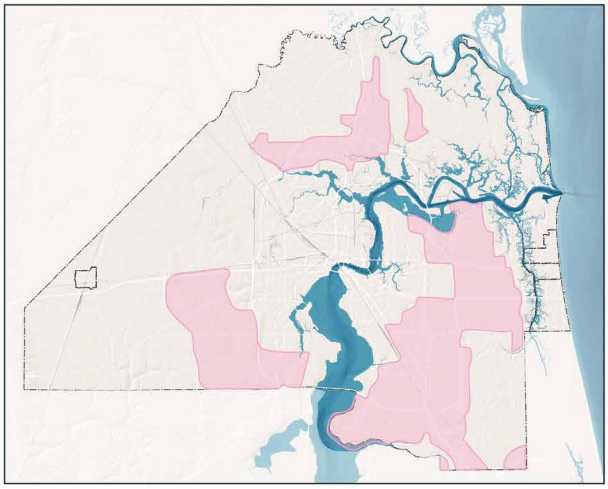
CONTEMPORARY SUBURBS

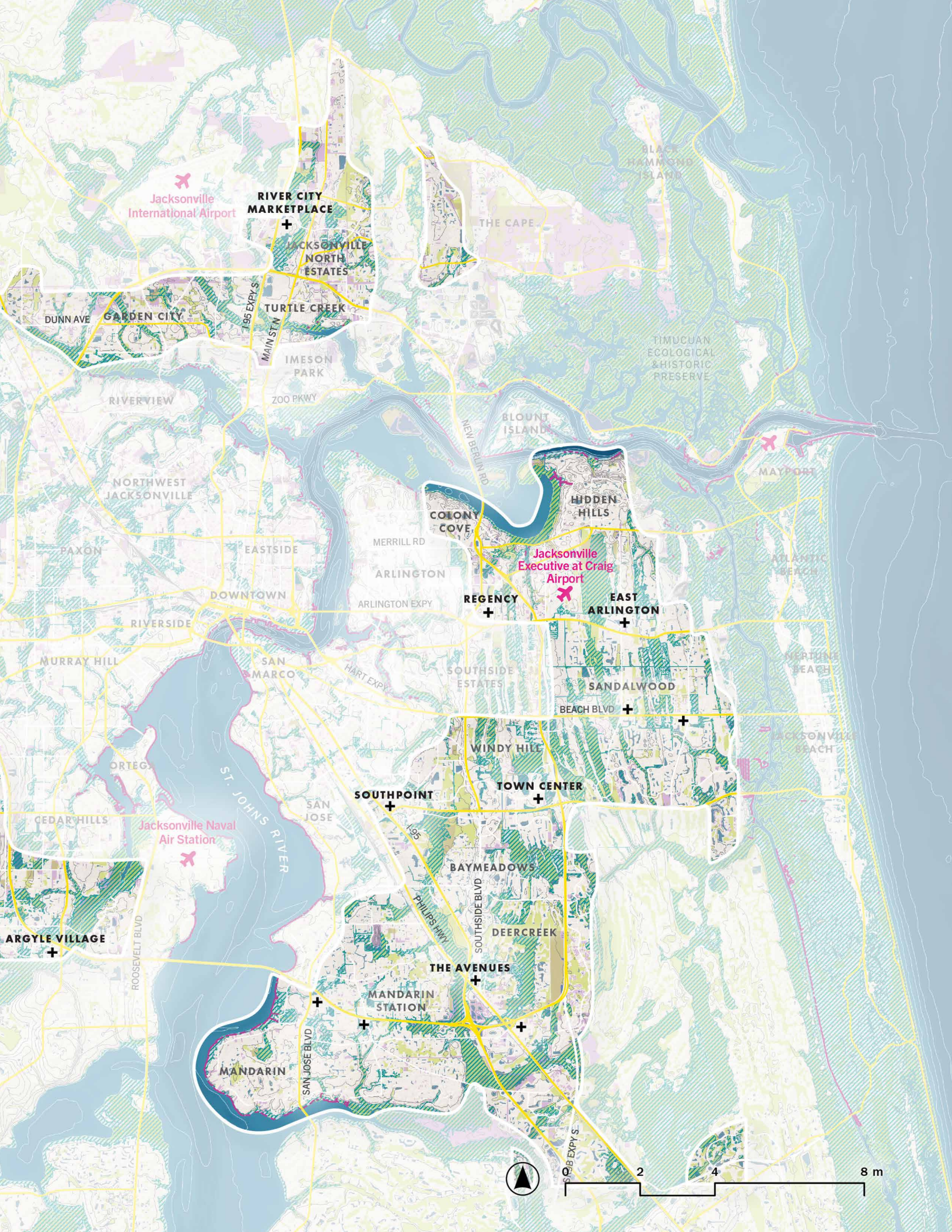
OVERVIEW

As Jacksonville recovered from the economic downturns of the late 1970s and early 1980s, a new pattern of suburban development emerged: Contemporary Suburbs. Built between approximately 1980 and today, Contemporary Suburbs are self-contained residential developments defined by curved streets, cul-de-sacs, and large stormwater ponds. This approach has dramatically expanded the city's residential footprint in recent decades, often converting the rural and vegetated landscape outside Jacksonville's urban areas into new development. Although they offer convenience and sought-after amenities to car-owning residents, this style of suburban development can encroach on wetlands and other green spaces, reducing Jacksonville's capacity to store water and mitigate extreme heat. Stormwater ponds help manage runoff and mitigate flood risk, but often lack ecological value and require routine maintenance to function properly.



KEY MAP




Jacksonville International Airport
RIVER CITY MARKETPLACE
JACKSONVILLE NORTH ESTATES
THE CAPE
BLACK HAMMOCK ISLAND
DUNN AVE
GARDEN CITY
TURTLE CREEK
I-95 EXPY S
MAIN ST N
IMESON PARK
ZOO PKWY
TIMUCUAN ECOLOGICAL & HISTORIC PRESERVE
RIVERVIEW
BLOUNT ISLAND
NEW BERLIN RD
MAYPORT
NORTHWEST JACKSONVILLE
HIDDEN HILLS
COLONY COVE
PAXON
EASTSIDE
MERRILL RD
ATLANTIC BEACH
ARLINGTON
Jacksonville Executive at Craig Airport
DOWNTOWN
ARLINGTON EXPY
REGENCY
EAST ARLINGTON
RIVERSIDE
MURRAY HILL
SAN MARCO
HART EXPY
SOUTHSIDE ESTATES
SANDALWOOD
NEPTUNE BEACH
BEACH BLVD
WINDY HILL
JACKSONVILLE BEACH
ORTEGA
TOWN CENTER
SOUTHPOINT
ST. JOHNS RIVER
SAN JOSE
CEDAR HILLS
Jacksonville Naval Air Station
I-95
BAYMEADOWS
PHILIPS HWY
SOUTHSIDE BLVD
DEERCREEK
ARGYLE VILLAGE
ROOSEVELT BLVD
THE AVENUES
MANDARIN STATION
MANDARIN
SAN JOSE BLVD
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CONTEMPORARY SUBURBS
CHARACTER

Contemporary Suburbs are the dominant type of development in Jacksonville today. Defined by their expansive, car-dependent, self-contained residential developments and large commercial centers, these areas are connected by major highways, interstates, and arterial thoroughfares. In addition to manmade stormwater ponds, the Contemporary Suburbs include large, scattered areas of intact wetlands, especially freshwater forested wetlands. These wetlands provide critical stormwater storage and filtration, benefitting residents of both adjacent neighborhoods and downstream communities.

Comprised of 24% of Jacksonville's total land area, the Contemporary Suburbs are home to approximately 440,000 people, a little more than half the city's total population. Commercial development in this Development Type is typically concentrated in large shopping centers with extensive surface parking usually located near highway intersections or other major thoroughfares. Residential developments typically have curvilinear, disjointed street grids with cul-de-sacs and, in some cases, limited points of connection to major roadways or neighboring subdivisions. Most neighborhoods here lack neighborhood-scale parks and are not walkable.[16] Despite the recent active development in this area, more than one-third of the total citywide vacant properties are located in the Contemporary Suburbs.

Policy Impacts on Development

As the housing demand for large lots and a car-centric lifestyle grew in the 1970s and 1980s, Jacksonville's development expanded into rural and vegetated areas of the city. Planned Urban Development (PUD), or master-planned communities, emerged as a strategy to develop large tracts of land, cohesively integrating commercial, residential, and transportation needs. Intended to provide developers flexibility, the relative ease of developing these communities on large tracts of land encouraged the use of previously undeveloped areas.

In Jacksonville, the undeveloped areas surrounding these developments are often densely vegetated forests, wetlands, or open water. The survival of these wetland landscapes can be attributed to stricter federal and state regulations that prohibit or place strict limitations on development within wetlands. Stormwater is managed through large retention basins that collect and store a development's runoff and release it at a slowed, controlled rate, improving water quality; however, this practice also requires significant space.

While designed to combat negative impacts of sprawl, land use and stormwater regulations have continued to enable low-density development that continues to expand into previously undeveloped areas.

Contemporary Suburbs By the Numbers		*% of Citywide*
Total Land Area	203 sq mi	*24%*
Undeveloped Land Area	71 sq mi	*14%*
Critical Facilities	828	*34%*
Residential Properties	**156,825**	***51%***
Vacant Properties	**10,804**	***33%***
People	**439,390**	***46%***

RESIDENTIAL CHARACTER

MANY ELEVATED INTERSTATE CORRIDORS

LARGE-SCALE COMMERCIAL DEVELOPMENT

Commercial developments tend to be clustered around major highway interchanges.

STORMWATER RETENTION PONDS

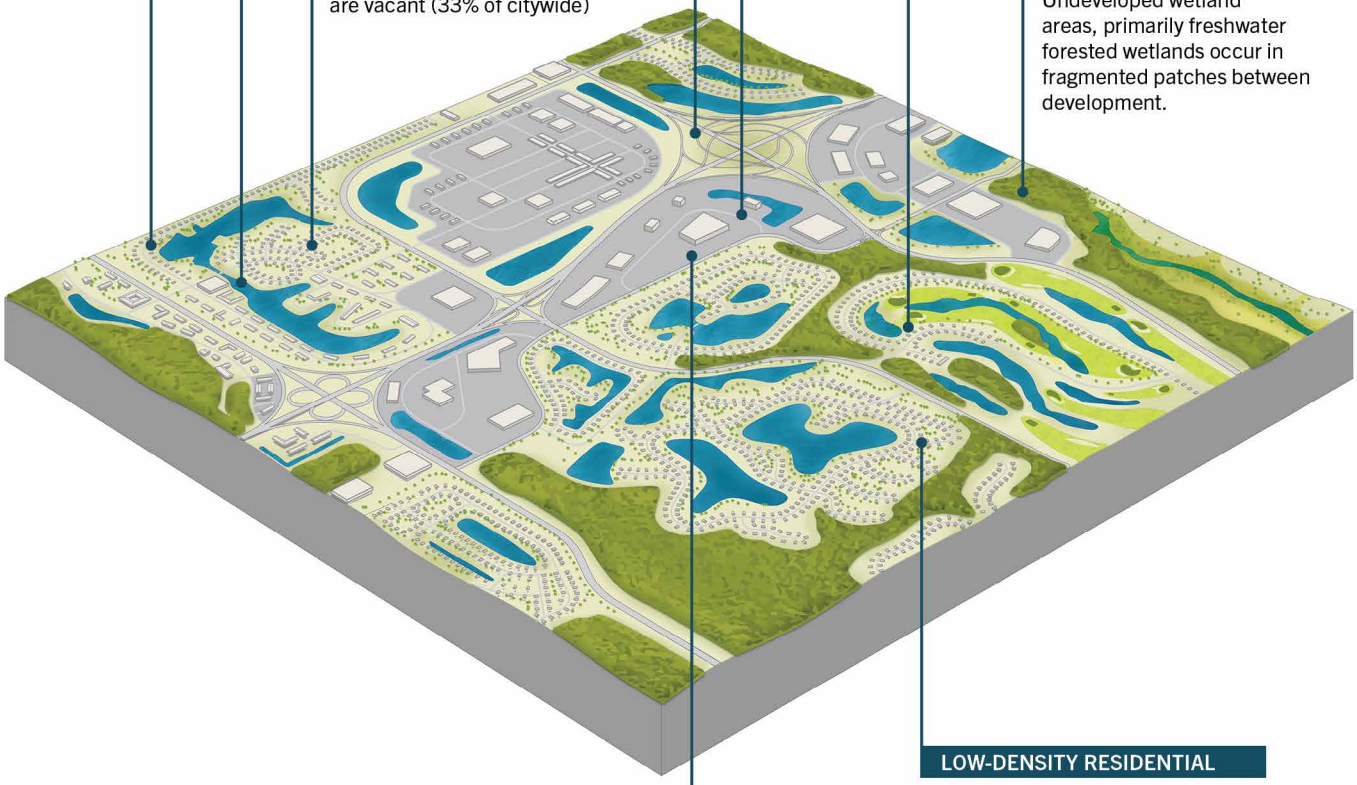
CURVILINEAR ROAD NETWORK

VACANT LAND

Approximately 10,800 parcels are vacant (33% of citywide)

WETLAND PATCHES

Undeveloped wetland areas, primarily freshwater forested wetlands occur in fragmented patches between development.



LOW-DENSITY RESIDENTIAL

EXPANSIVE COMMERCIAL HUBS

Scale: Tile above represents approximately 12 sq miles.

CONTEMPORARY SUBURBS

EXPOSURE, VULNERABILITY, AND RISK

Flooding

While the percentage of residential properties vulnerable to multiple types of flooding is lower in the Contemporary Suburbs than other areas, because more than half of all residential properties in the city are in these areas this still translates to a significant number of properties at risk. More than 1,000 residential properties in neighborhoods that are located closer to the St. Johns River and its tributaries, such as Mandarin and Hidden Hills, are currently vulnerable to more frequent 10% AEP coastal flooding (1 in 10 chance in a given year). By 2070, more than 6,000 residential properties and 35 critical facilities in the Contemporary Suburbs will be vulnerable to inland or coastal flooding with at least a 1% chance of occurring in a given year (1% AEP).

While many neighborhoods may remain high and dry even during an extreme flooding event, access in and out of them may be cut off if roads become inundated, especially in subdivisions with limited access points. These areas could become inaccessible to emergency services during a major flood event, leaving the residents of these areas especially vulnerable.

Heat

As in the Post-War Suburbs, Contemporary Suburbs are vulnerable to high heat exposure where large, paved, commercial centers exist. 30% of residents in the Contemporary Suburbs live in areas that are vulnerable to extreme heat. Considering that nearly 50% of Jacksonville's population live in these areas, this means that more than 130,000 residents are vulnerable to heat.

While modern residential buildings in the Contemporary Suburbs may be fitted with more effective and efficient air conditioning than buildings in older areas of the city, the Contemporary Suburbs have a limited number of public cooling centers. This poses a greater risk of isolation and health impacts for residents, particularly older adults and other vulnerable members of the community, when extreme heat coincides with a power outage.

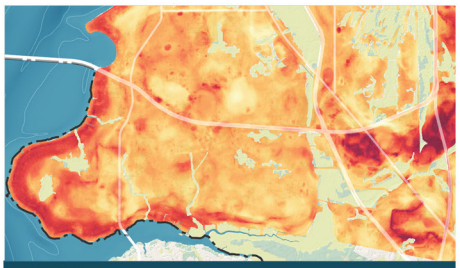
Wind

Although the housing stock in the Contemporary Suburbs is generally newer than in other areas of the city, 40% of residential properties—63,000 properties in total—are still vulnerable to high wind. Similarly, more than half of the critical facilities in this Development Type are vulnerable to this threat. This indicates that a major storm event with hurricane-force winds has the potential to cause significant damage to properties and critical facilities across the Contemporary Suburbs.

Wildfire

About 1,300 residential properties in the Contemporary Suburbs are vulnerable to wildfire. This vulnerability is concentrated where more recent development has occurred adjacent to wildland areas. Although most critical facilities in the Contemporary Suburbs are not currently vulnerable to wildfire, this risk will continue to increase for all properties if current patterns of growth into vegetated areas continue.

Contemporary Suburbs *Percentage of Assets Vulnerable to Climate Threats*	Residential Properties	Critical Facilities
Current 10% AEP **Coastal Flooding**	1% *2%*	0% *2%*
2070 1% AEP **Inland & Coastal Flooding**	4% *7%*	4% *8%*
Wind	40% *60%*	58% *73%*
Wildfire	1% *1%*	0% *6%*

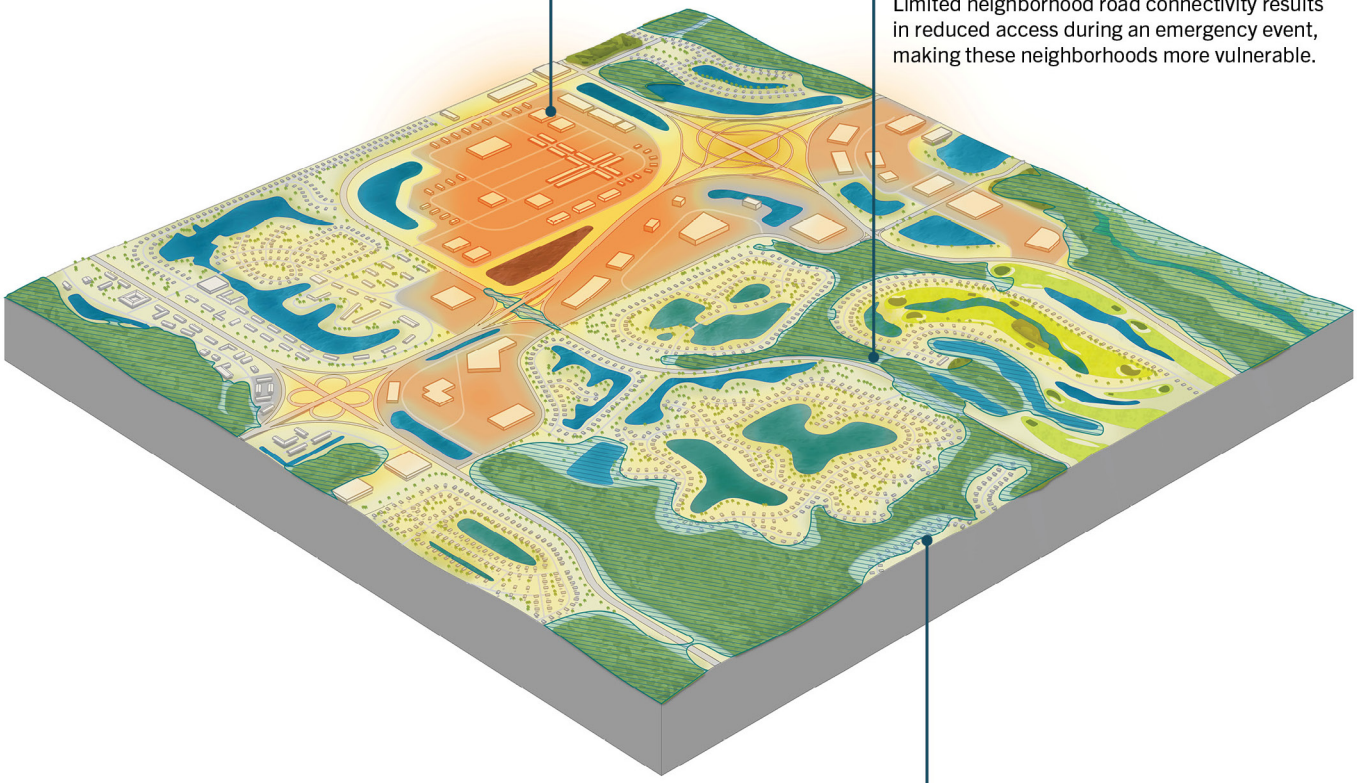


HEAT

Large commercial developments with limited tree cover create urban heat islands. 30% of Contemporary Suburbs residents are highly vulnerable to heat.

EMERGENCY RESPONSE

Limited neighborhood road connectivity results in reduced access during an emergency event, making these neighborhoods more vulnerable.



FLOODING

Development adjacent to smaller tributaries experience flooding more frequently from smaller storms.

- Floodplain
- Stormwater Flooding
- Urban Heat

CONTEMPORARY SUBURBS
RESILIENCE OPPORTUNITIES

Strengthen Connectivity

Many neighborhoods in the Contemporary Suburbs are designed with few connections to main thoroughfares and emergency access routes. Flooding or damage to a single road could render whole communities inaccessible to first responders and emergency services. Adding redundancy and flexibility to neighborhood street networks and creating new connections between neighborhoods and main arterial and collector roads can reduce this risk.

Additional points of entry and exit can also support multimodal connectivity. New inter-neighborhood trails and greenway systems can provide access to recreation, improve neighborhood social interaction, and create opportunities for green infrastructure that increase stormwater storage, reduce flood risk, and enhance ecosystems.

See Actions 3, 6, 7, 19, 33, 34

Protect and Enhance Wetland Landscapes

Wetland preservation can reduce flood risk and contribute to community health and resilience citywide. Despite existing regulations, however, Jacksonville continues to lose wetlands to new development. Establishing clear guidelines and enforceable requirements for new development and providing ample buffers to existing wetlands and natural areas will help protect these critical resources. Resilience benefits will be better realized by enforcing these requirements uniformly without waivers or exemptions.

In existing developments, regular maintenance of stormwater ponds is critical for their function. In addition to routine maintenance, adding a vegetated area at the water line (also called a littoral shelf) and native vegetation along the edges of stormwater ponds can improve aesthetics, deter potential water-related accidents, enhance regional ecology, reduce erosion and sedimentation, improve water quality, and provide an amenity to community open space.

See Actions 12, 13, 14, 21

Build Tomorrow's Resilient Communities

New suburban developments that prioritize preservation of natural areas and wetlands, walkability, energy efficiency, and other resilience investments are attractive to residents and make communities safer. Updated design standards in newly constructed or redeveloped residential communities could include solar energy generation, energy efficiency, open space conservation, resilient construction methods, and a moratorium on new septic tanks coordinated with sewer service extensions.

Commercial areas that include large rooftops and extensive parking lots also present opportunities for improving resilience through retrofits and updated design standards. Green roof systems can help reduce the urban heat island effect, reduce heating and cooling costs, and manage stormwater runoff. Rooftop photovoltaic installations (i.e., solar) can power entire developments, while solar carports can provide shade in parking lots. Integrating stormwater management features like bioswales and permeable pavement can improve water quality, reduce strain on drainage infrastructure, and provide shade and community improvements to commercial centers.

See Actions 2, 3, 21, 22, 26

ACTION 5.2
Update the standard details and specifications for City of Jacksonville street designs.

ACTION 21.1
Expand existing retrofit programs.

ACTION 7.3
Connect open spaces and ecosystems to establish habitat corridors and improve water management.

ACTION 14
Discourage development in current and future undeveloped high-risk areas and mitigate downstream impacts in the watershed.

ACTION 22.2
Increase compliance of Florida Building Code standards, particularly on retrofits.

ACTION 3
Develop design guidelines for climate adaptive and low-impact new subdivisions, neighborhoods, and planned developments.

ACTION 21.4
Explore retrofits for stormwater ponds.

ACTION 7.2
Support the expansion of Jacksonville's regional trail system.

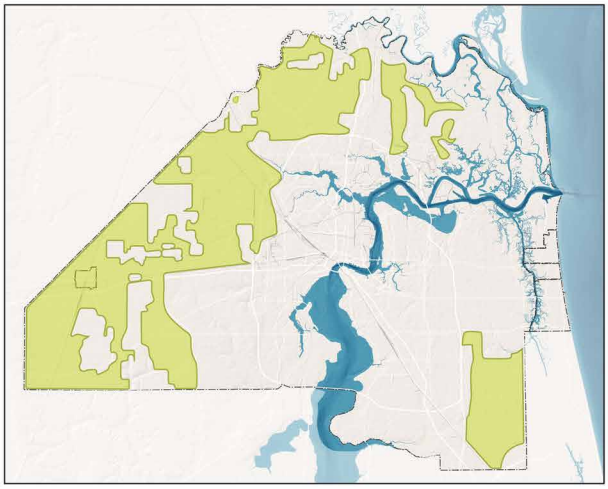
- Resilient development
- Improved evacuation routes
- Resilient streetscape or greenway
- Solar panels or green roof
- Subdivision additional access

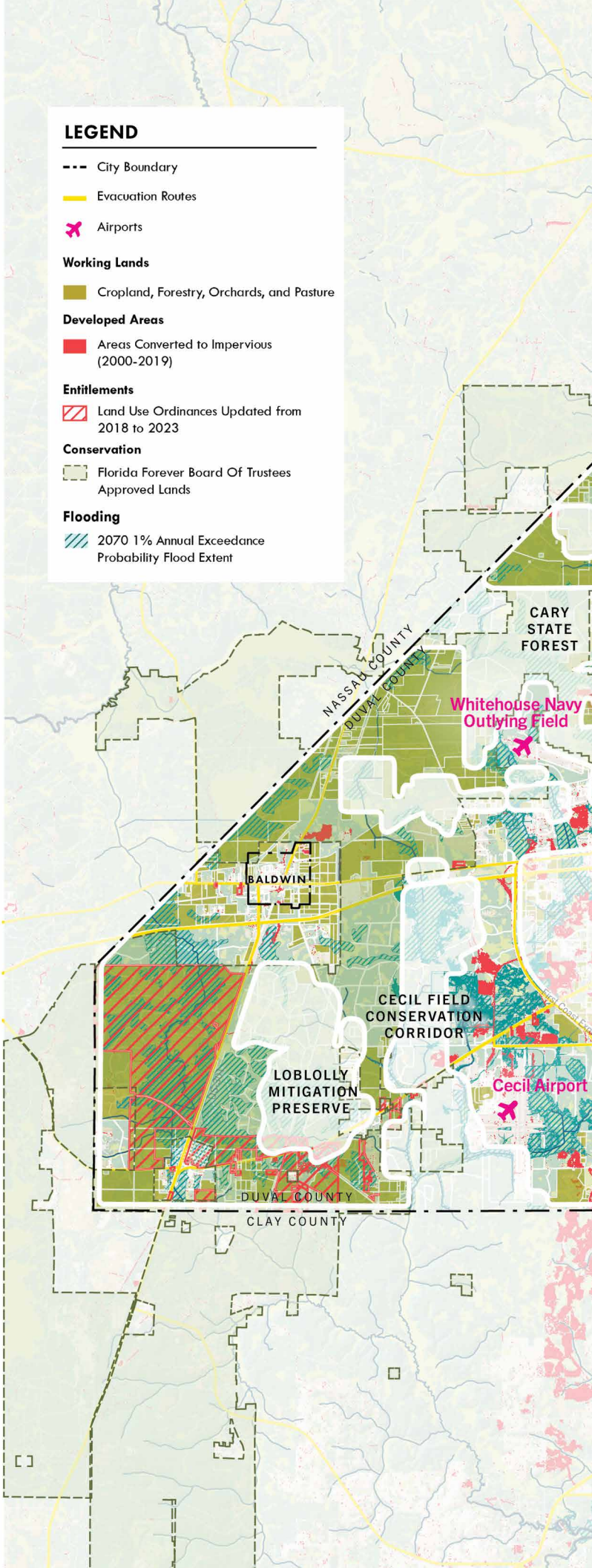
RURAL MOSAIC

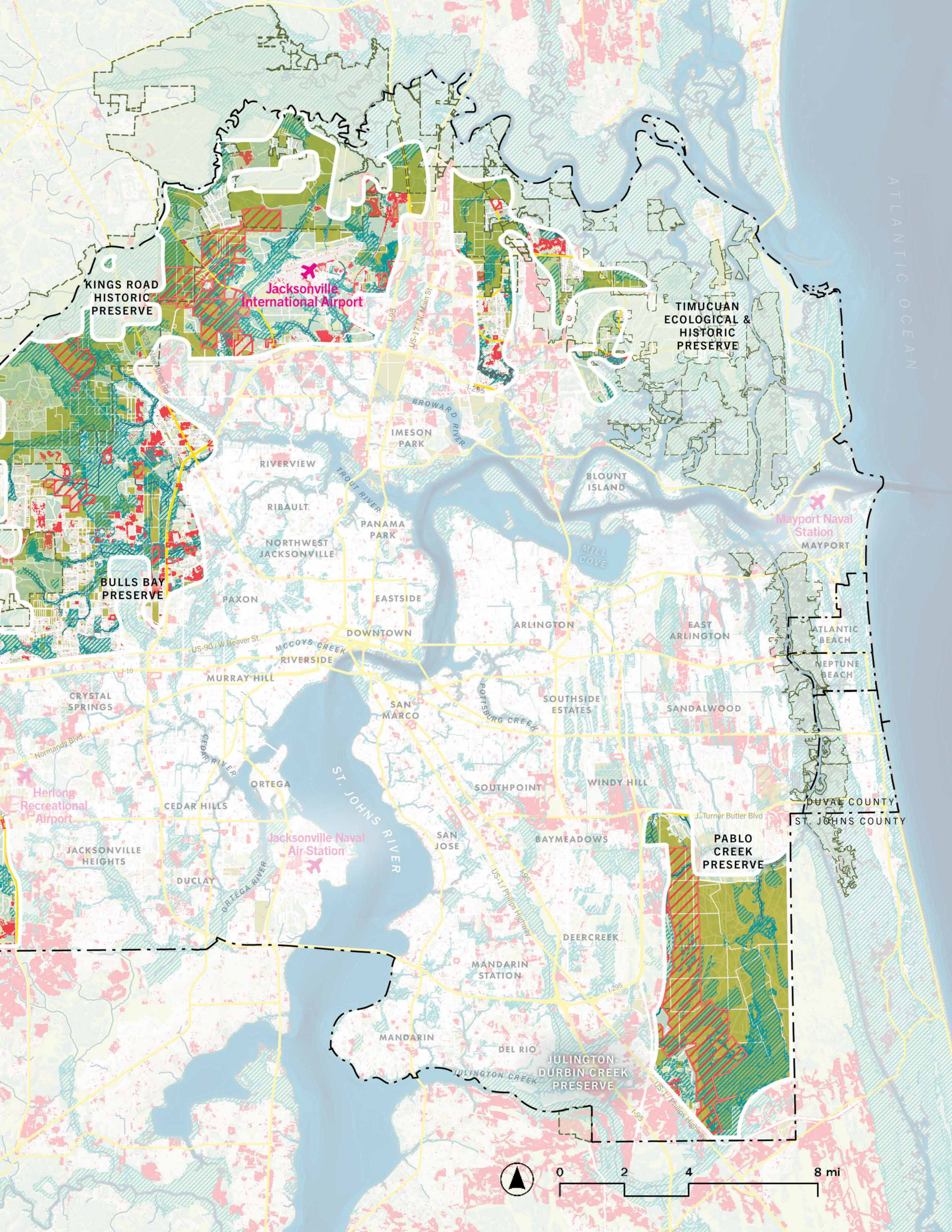
OVERVIEW

A unique quality of Jacksonville is its expansive natural areas and the patchwork of rural lands found outside the developed areas of the city. At more than 300 square miles, the Rural Mosaic represents more than one-third of the city's entire land area. Defined by its relatively low density, the Rural Mosaic provides important ecosystem services for the rest of the city by storing and slowing stormwater that falls in the upper reaches of watersheds. Development pressures from the surrounding contemporary suburbs represent a major risk to these important functions and underscores the need for resilient development guidelines to maintain the Rural Mosaic's function while supporting Jacksonville's resilient growth.

KEY MAP






KINGS ROAD HISTORIC PRESERVE
Jacksonville International Airport
TIMUCUAN ECOLOGICAL & HISTORIC PRESERVE
ATLANTIC OCEAN
BULLS BAY PRESERVE
RIVERVIEW
IMESON PARK
BROWARD RIVER
TROUT RIVER
RIBAULT
PANAMA PARK
NORTHWEST JACKSONVILLE
BLOUNT ISLAND
Mayport Naval Station
MAYPORT
MILL COVE
PAXON
EASTSIDE
DOWNTOWN
ARLINGTON
EAST ARLINGTON
ATLANTIC BEACH
NEPTUNE BEACH
US-90 / W Beaver St.
MCCOYS CREEK
RIVERSIDE
MURRAY HILL
CRYSTAL SPRINGS
SAN MARCO
POTTSBURG CREEK
SOUTHSIDE ESTATES
SANDALWOOD
Normandy Blvd
CEDAR RIVER
ORTEGA
ST. JOHNS RIVER
SOUTHPOINT
WINDY HILL
DUVAL COUNTY
ST. JOHNS COUNTY
Herlong Recreational Airport
CEDAR HILLS
Jacksonville Naval Air Station
J. Turner Butler Blvd
PABLO CREEK PRESERVE
JACKSONVILLE HEIGHTS
SAN JOSE
BAYMEADOWS
DUCLAY
ORTEGA RIVER
US-1 / Philips Highway
I-95
DEERCREEK
MANDARIN STATION
I-295
MANDARIN
DEL RIO
JULINGTON-DURBIN CREEK PRESERVE
JULINGTON CREEK
0
2
4
8 mi

RURAL MOSAIC
CHARACTER

The Rural Mosaic includes the large expanse of the city's western and northern regions which are less developed than the rest of Jacksonville. This area includes a wide range of conditions in a mosaic-like pattern, including biodiverse and undisturbed forests and wetlands, timber and ranch lands, farmland, large country estates, rural neighborhoods, logistics facilities and industrial warehouses, and newly developed suburban housing. This is an area in flux and has seen the greatest land type change in recent years. In addition to new suburban developments, logistics and industrial facilities have capitalized on large parcel sizes and proximity to major interstate transportation routes.

The Rural Mosaic includes more than one-third of Jacksonville's total land area, but only 5% of residents live here. More than 250 square miles in this area are undeveloped—greater than the total land area of Chicago.

Jacksonville's Differentiator

To have such a vast and resource-rich landscape within the city limits is a unique part of Jacksonville. The presence of dense vegetation of various ecosystems including large coniferous forests, deciduous forests, mixed forests, shrubland, grassland, and freshwater wetlands is an asset to the rest of the city and its residents. This area provides land for ranching, horseback riding, and other activities not common in large cities. The Rural Mosaic includes more than 50% of the city's undeveloped land. These pervious surfaces absorb, slow, and store rainwater where it falls, helping to improve limited capacity downstream systems.

The Rural Mosaic also provides ample space for large-scale projects and new kinds of endeavors that meet the region's changing economic and climate demands.

Rural Mosaic By the Numbers		*% of Citywide*
Total Land Area	**316 sq mi**	***38%***
Undeveloped Land Area	**263 sq mi**	***53%***
Critical Facilities	164	*7%*
Residential Properties	15,234	*5%*
Vacant Properties	4,122	*13%*
People	50,077	*5%*

WORKING LANDS

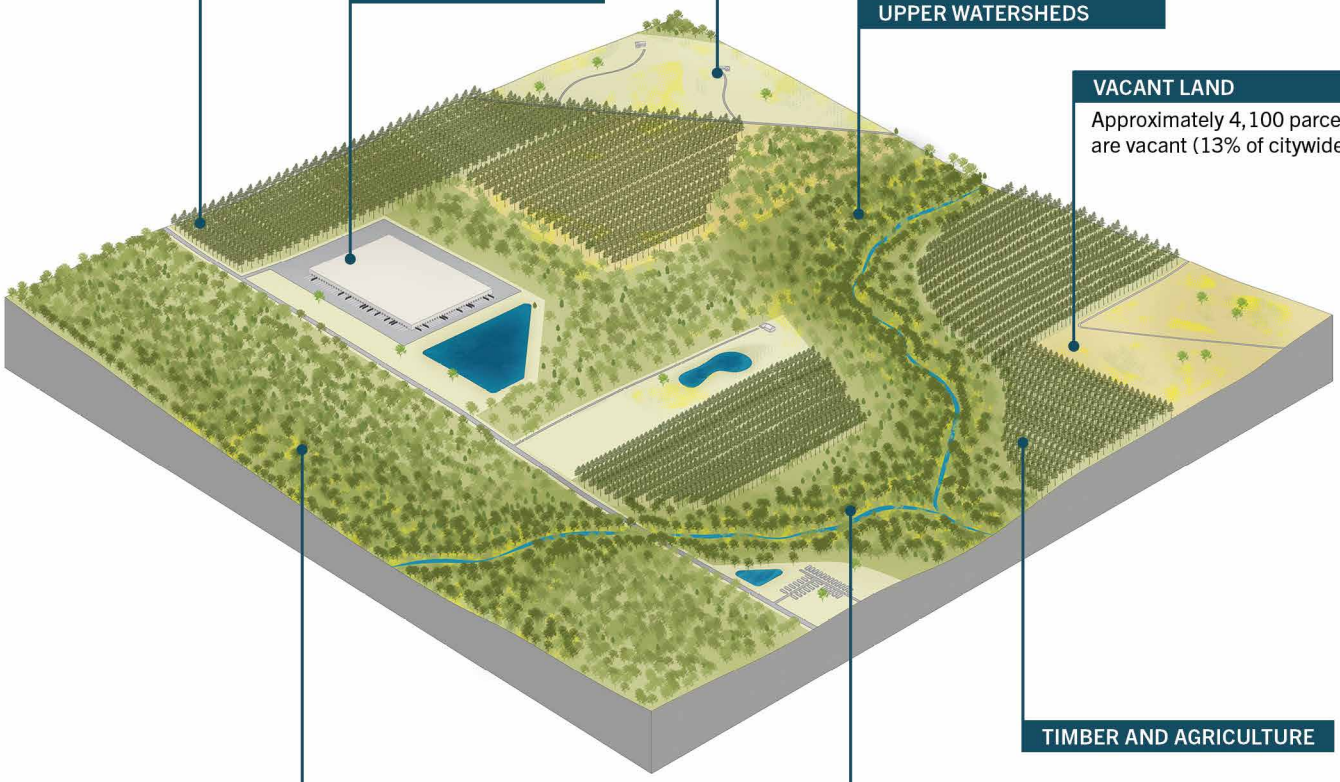
LOW-DENSITY RESIDENTIAL AND HISTORIC SITES

LOGISTICS FACILITIES

UPPER WATERSHEDS

VACANT LAND

Approximately 4,100 parcels are vacant (13% of citywide)



TIMBER AND AGRICULTURE

UNDEVELOPED FORESTS AND WETLANDS

OUTDOOR RECREATION

Scale: Tile above represents approximately 2 sq miles.

RURAL MOSAIC

EXPOSURE, VULNERABILITY, AND RISK

Flooding

Positioned at the outer edges of both of Jacksonville's watersheds (the St. Johns River and the St. Marys-Satilla River), much of the Rural Mosaic has relatively higher elevations. Starting near I-295, the west side of the city is approximately 50 feet higher than sea level, which is 20 feet higher in places than a large portion of the city to the east. This topography results in low vulnerability to coastal and riverine flooding.

Due to the presence of significant undeveloped pervious land and greater water storage potential, vulnerability to stormwater flooding is also lower in the Rural Mosaic. Still, more than 1,300 residential properties and 8 critical facilities are vulnerable to flooding under the 2070 1% AEP scenario. If a critical facility, such as a fire station, is damaged by flooding, many residents in the Rural Mosaic may be left without critical care alternatives.

Flooding could become a greater concern in this area if increased development results in downstream impacts on stormwater runoff. Planning for development that considers this future flood vulnerability will result in safer neighborhoods with more secure access to services.

Heat

Heat is less of a concern in the Rural Mosaic. This is due largely to the predominance of tree canopy in the area, which can lower the impact of extreme heat. As is observed in the Contemporary Suburbs, if current development patterns persist, meaning more paved commercial centers and the disruption or development of natural areas, heat vulnerability in the Rural Mosaic will increase.

Wind

More than half of the residential properties and 48% of critical facilities located in the Rural Mosaic are vulnerable to wind. While high, these percentages are lower than other areas of the city due to roof standard requirements for new buildings.

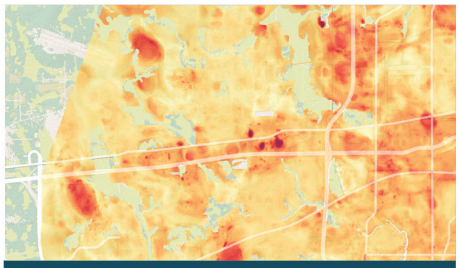
Wildfire

16% of residential properties in the Rural Mosaic are vulnerable to wildfire. These properties are concentrated in areas that are near wildland areas, where potential wildfire is most easily fueled. If development in the Rural Mosaic continues to encroach on the wild-urban interface, wildfire risk in this area will grow.

Development Pressure

Almost 250 square miles of the Rural Mosiac are undeveloped. As Jacksonville continues to grow, there is heavy development pressure on these areas. If current patterns of development and growth continue, 150 square miles of new suburban development would occur, converting the entire Rural Mosaic to Contemporary Suburbs by 2070.[17] This would result in the loss of important natural areas that store water and mitigate extreme heat.

Rural Mosaic *Percentage of Assets Vulnerable to Climate Threats*	Residential Properties	Critical Facilities
Current 10% AEP **Coastal Flooding**	2% *2%*	0% *2%*
2070 1% AEP **Inland & Coastal Flooding**	**8%** *7%*	5% *8%*
Wind	52% *60%*	48% *73%*
Wildfire	***16%*** *1%*	***27%*** *6%*

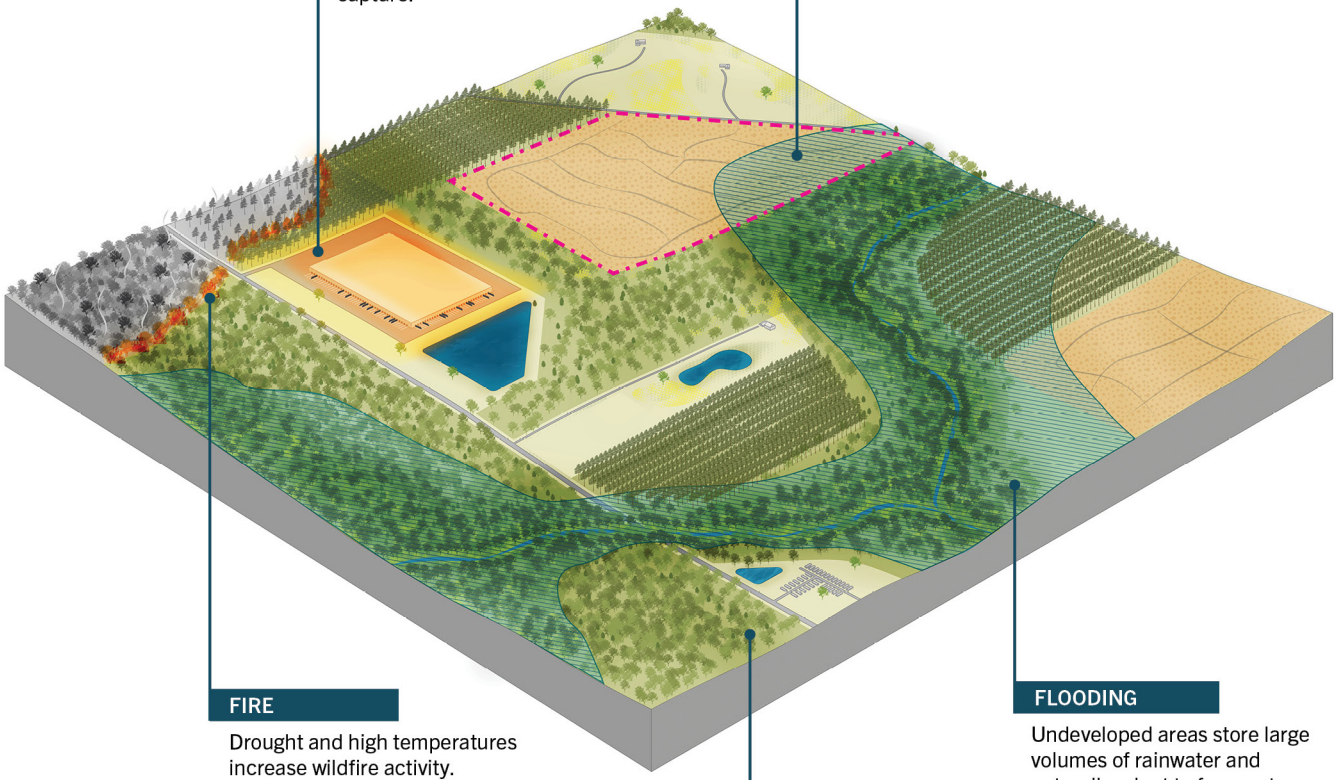


HEAT

Only 2% of residents are vulnerable to heat due to the cooling abilities of trees and open spaces. However, impervious surfaces and structures increase heat capture.

CONVENTIONAL DEVELOPMENT

New development is often sited in floodplains and with disregard for existing woodland and wetlands.



FIRE

Drought and high temperatures increase wildfire activity. Development encroaching into wildlands increases wildfire risk.

FLOODING

Undeveloped areas store large volumes of rainwater and naturally adapt to frequent flooding.

INVASIVE SPECIES

Invasive plant and animal species can disrupt native ecological systems, reducing the benefits those systems provide.

Floodplain
Wildfire
Urban Heat

RURAL MOSAIC
RESILIENCE OPPORTUNITIES

Coordinate Land Use Decisions and Infrastructure Investments

Of all the Development Types, the Rural Mosaic holds the widest range of possible futures. If decisions about where and how Jacksonville grows are not risk-aware and thoughtful about their impacts on the city's resilience, future development and infrastructure expansion in the Rural Mosaic may significantly exacerbate Jacksonville's risks. The City can guide resilient growth in this area through its complementary tools of land use regulations and infrastructure investments. Strategically aligning infrastructure investments in ways that support resilient land use priorities will establish the backbone for new development. This approach is proactive in making decisions regarding future land use rather than responsive to a single project. The City, in partnership with local and state agencies, can coordinate updates to land development regulations, the extension of utilities such a sewer lines, and infrastructure such as road construction, to guide growth in the Rural Mosaic to areas at lower risk of flooding and distanced from valuable natural resources, such as wetlands. Infrastructure planning that limits investments in and to areas where development is ill-advised or discouraged by planning guidance will support a resilient city and ultimately better provide for future demands.

See Actions 1, 2, 11, 14

Preserve and Steward Valuable Open Spaces

One of Jacksonville's most valuable assets is the undeveloped land in the Rural Mosaic. Forests, farms, timber operations, and rural residential landscapes with vegetated, pervious cover capture and store rainwater, recharge groundwater, and mitigate flash flooding downstream. Vegetation in the Rural Mosaic also helps to regulate air temperatures, and, if properly managed, can buffer developed areas from wildfires. These areas provide important habitat corridors and patches for wildlife, as well as scenic and recreational amenities. Jacksonville's abundant open spaces are important to its identity and to people's desire to move to and stay in the city. Protecting and stewarding existing preserve lands in perpetuity and expanding the area of preserved lands by acquiring lands that support important ecological functions can protect these resources for future generations. Prioritizing properties that link existing preserved land and offer opportunities for water management and cooling benefits supports long-term resilience.

See Actions 1, 7, 12, 13, 14

Plan Climate Adaptive New Developments

Development and land conservation can be complementary activities in the Rural Mosaic. Site design for climate-adaptive planned developments can preserve and leverage natural areas on-site while maintaining the planned number of housing units. This can serve to contribute to the preservation of larger ecological corridors while also providing value to nearby residents and recreational uses for the community.

Where development is permitted, it can be a catalyst for new standards of living resiliently in a changing climate. Future developments in Jacksonville are an opportunity to construct energy-efficient buildings, improve walkability, diversify housing types through mixed-use and higher density, and increase access to jobs, services, and community. Future development in Jacksonville can incorporate green infrastructure, more shade trees, and be designed to protect existing natural resources.

See Actions 3, 7, 10, 12, 22, 33

ACTION 1.1

Update the city's land development regulations.

ACTION 3

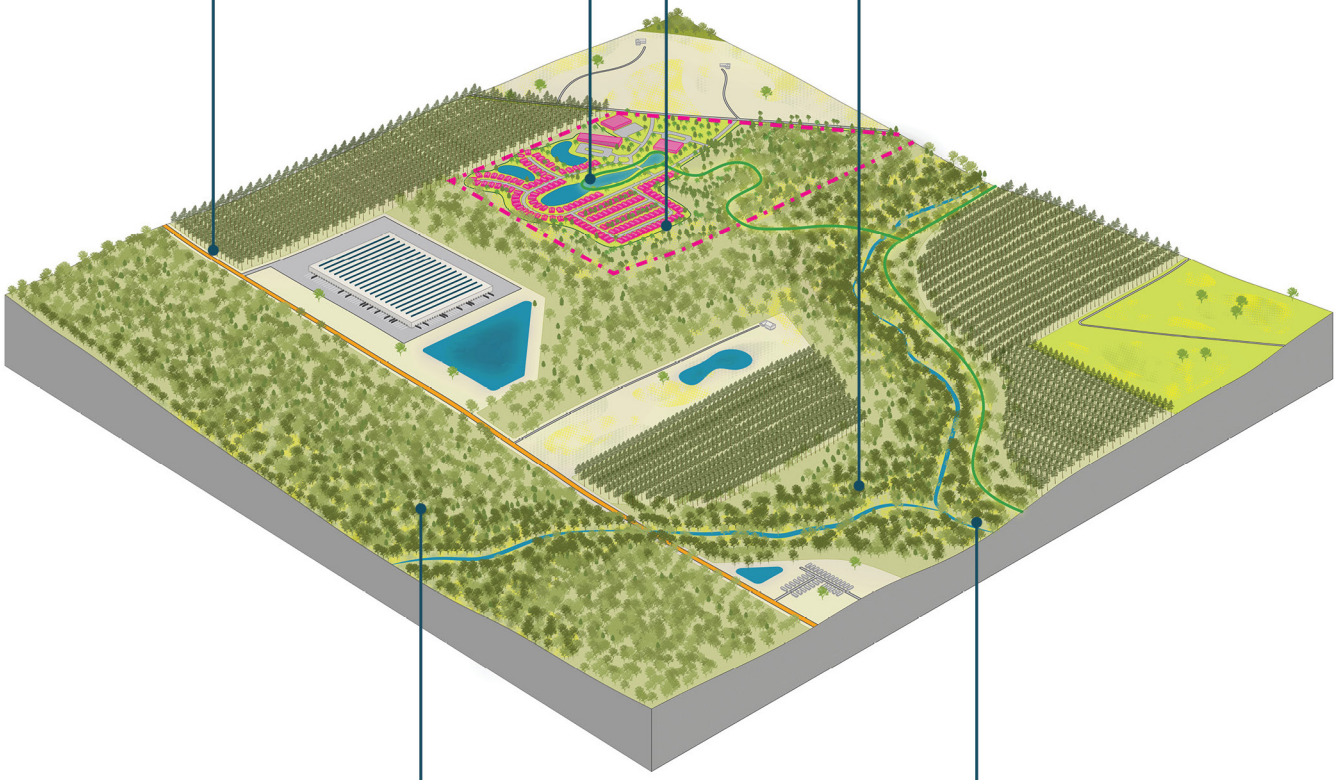
Develop design guidelines for climate adaptive and low-impact new subdivisions, neighborhoods, and planned developments.

ACTION 2

Ensure infrastructure investments are aligned with land use priorities for growth and conservation.

ACTION 12.2

Support strategic land acquisition for conservation.



ACTION 13.2

Manage invasive species and nuisance animals.

ACTION 14

Discourage development in current and future undeveloped high-risk areas and mitigate downstream impacts in the watershed.

- Resilient development
- Improved evacuation routes
- Greenway trail
- Solar panels or green roof

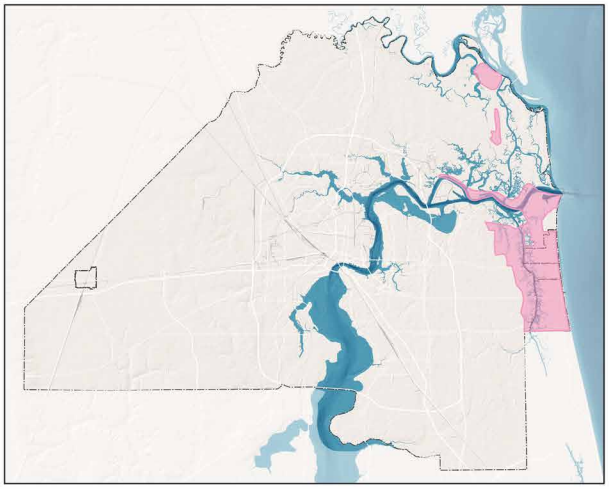
COASTAL COMMUNITIES

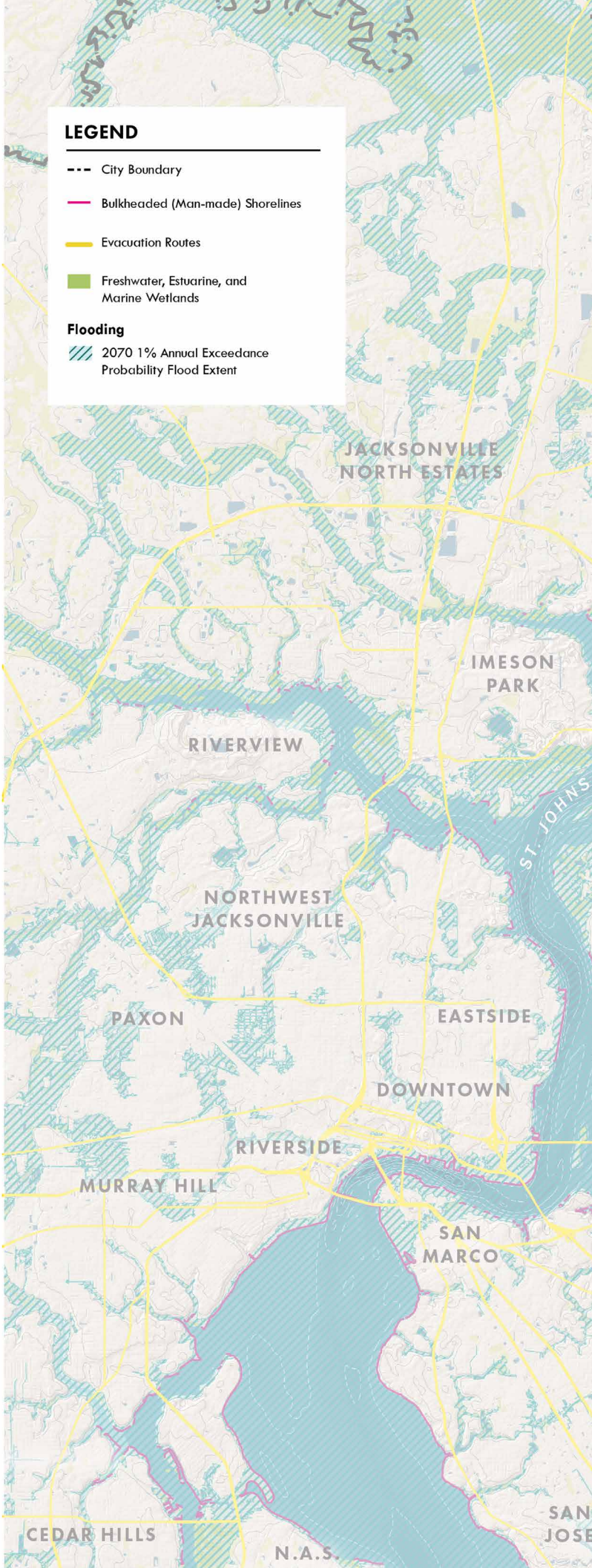
OVERVIEW

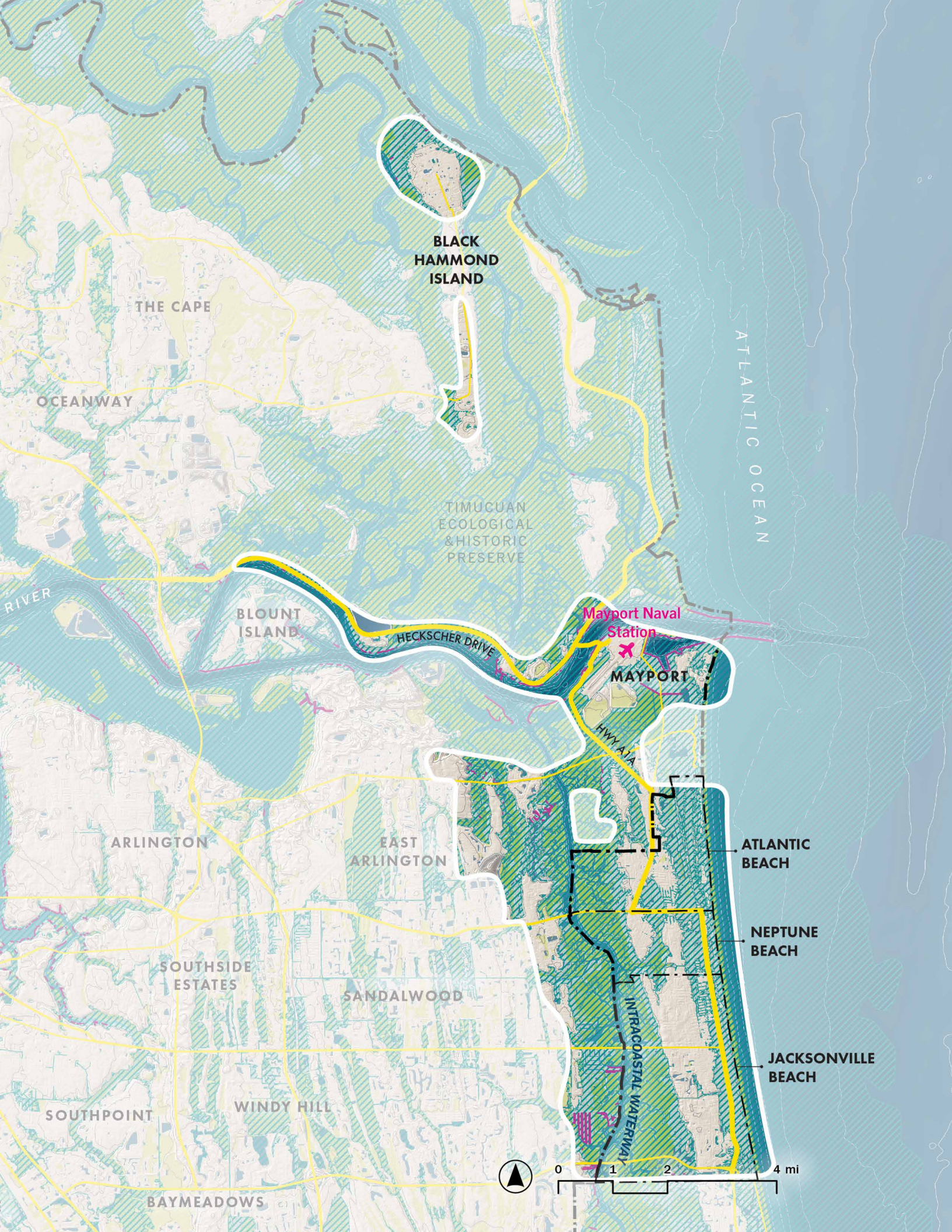
Defined by their relationship to the Atlantic Ocean, the Intracoastal Waterway, and tidal wetlands, the Coastal Communities are a unique Development Type within Jacksonville. They offer the allure and economic potential of beach tourism, and their proximity to water continues to drive their vitality and people's desire to live here today; however, this proximity to water can carry significant risks. Coastal storm flooding has the potential to cause significant destruction in this area, while sea level rise will introduce chronic stressors and strains on the area's infrastructure.

This area follows Route A1A and is largely located on Jacksonville's barrier islands. Other neighboring municipalities share these development conditions and are shown here to assist in coordinated efforts with Atlantic Beach, Neptune Beach, Jacksonville Beach, and Mayport, as well as Jacksonville's Naval installations.

KEY MAP






BLACK HAMMOND ISLAND
THE CAPE
OCEANWAY
ATLANTIC OCEAN
TIMUCUAN ECOLOGICAL &HISTORIC PRESERVE
RIVER
BLOUNT ISLAND
HECKSCHER DRIVE
Mayport Naval Station
MAYPORT
HWY A1A
ARLINGTON
EAST ARLINGTON
ATLANTIC BEACH
NEPTUNE BEACH
SOUTHSIDE ESTATES
SANDALWOOD
INTRACOASTAL WATERWAY
JACKSONVILLE BEACH
SOUTHPOINT
WINDY HILL
BAYMEADOWS
0
1
2
4 mi

COASTAL COMMUNITIES
CHARACTER

As an area with some of Jacksonville's earliest known settlements at the mouth of the St. Johns River, the Coastal Communities have developed over many different eras and thus include a mix of characteristics found in Historic Walkable Neighborhoods, Post-War Suburbs, and Contemporary Suburbs. Overall, the Coastal Communities are low- to medium-density, with commercial activity primarily along Route A1A and in the downtown centers of Jacksonville Beach, Neptune Beach, and Atlantic Beach. In contrast to other areas, the beach communities are some of the most walkable and bike-friendly in the County. This Development Type is defined by its proximity to water on all sides—the Atlantic Ocean, the Intracoastal Waterway, tidal waterbodies, and wetlands. Access to water, water-based recreation, the beach, and associated natural resources is a key driver of economic activity and way-of-life here.

Approximately 75,000 residents live in the Coastal Communities, with around 37,000 residents living within the City of Jacksonville limits and the rest in the independent beach communities within Duval County. While Neptune Beach, Atlantic Beach, and Jacksonville Beach manage their own municipal services, plans, and codes, the City of Jacksonville coordinates emergency response and shore protection with the beach communities on behalf of all of Duval County. While the population of Coastal Communities is lower than some other areas of Jacksonville, they accommodate as many as 9 million tourists annually.

Life on the Coast

Life in the Coastal Communities is defined by access to water and water-based resources. In addition to the oceanfront beaches, the Intracoastal Waterway provides boat access, as well as other water-based recreation opportunities. Many homes here have private, direct water access in the form of frontages or private docks. Areas north of the St. Johns River along Hecksher Drive and A1A have similar qualities.

Because the Coastal Communities are made up of islands or portions of islands, they are also relatively isolated from the rest of the city, connected by a limited number of bridges.

Coastal Communities By the Numbers		*% of Citywide*
Total Land Area	34 sq mi	*4%*
Undeveloped Land Area	13 sq mi	*3%*
Critical Facilities	50	*2%*
Residential Properties	9,589	*3%*
Vacant Properties	1,163	*4%*
People	74,656	*8%*

TIDAL WETLANDS

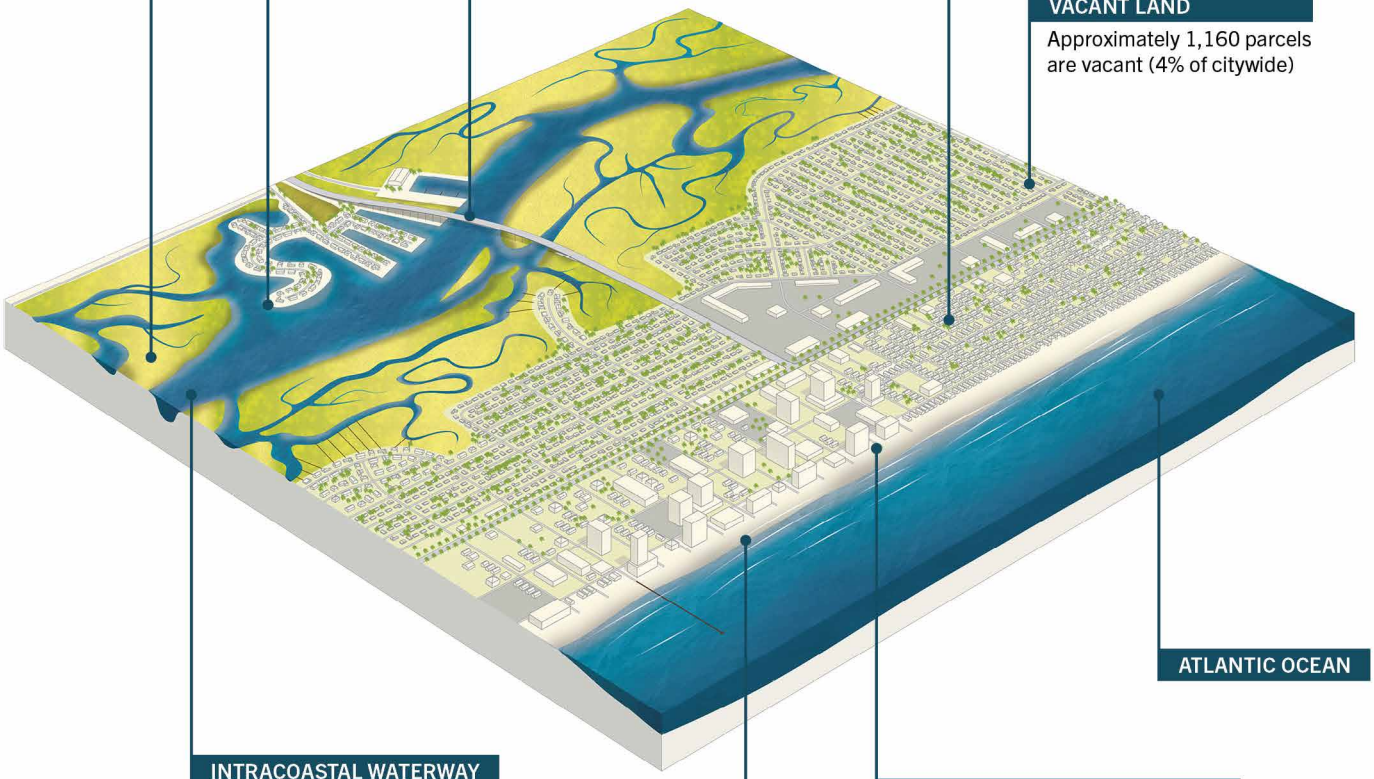
LOW-DENSITY NEIGHBORHOODS

DEVELOPMENT IN TIDAL WETLANDS

BRIDGE CONNECTIONS TO CITY CORE

VACANT LAND

Approximately 1,160 parcels are vacant (4% of citywide)



ATLANTIC OCEAN

INTRACOASTAL WATERWAY

OCEANFRONT DEVELOPMENT

BEACH EXPERIENCES

Scale: Tile above represents approximately 4 sq miles.

COASTAL COMMUNITIES
EXPOSURE, VULNERABILITY, AND RISK

Flooding

The Coastal Communities are some of the areas most vulnerable to flooding in Jacksonville. While other areas of the city experience storm surge from coastal storms, some areas of Coastal Communities experience the added threat of wave action from the Atlantic Coast, putting their most exposed areas at a greater risk of damage in the event of a storm. Even in areas of Coastal Communities that are not exposed to wave action, "backdoor flooding" from the Intracoastal Waterway and wetlands poses a significant risk. As a result, nearly a third of residential properties and nearly a quarter of critical facilities are vulnerable to coastal flooding with at least a 10% chance of occurring in a given year (10% AEP).

The threat of flooding to Coastal Communities will continue to increase over the next 50 years. More than one-third of the residential properties in Coastal Communities are vulnerable to flooding under the 2070 1% AEP scenario. Additionally, because of their generally low elevation and proximity to the coast, Coastal Communities are particularly susceptible to the cascading effects of sea level rise. Rising sea levels will increase storm surge elevations over time, threaten to raise groundwater levels, create saltwater intrusion, and overwhelm drainage systems.

In addition to risks to structures, flooding in Coastal Communities could also significantly impact the safety and quality of life of residents in these areas. The majority of Coastal Communities neighborhoods have the potential to become inaccessible to emergency services and other travel during a major flood event because of inundated roadways.

Heat

Despite coastal breezes, residents in Coastal Communities can still experience detrimental effects of extreme heat events. 17% of residents in Coastal Communities live in areas identified as vulnerable to extreme heat. Extreme heat is particularly concerning if it coincides with the aftermath of a storm event, corresponding power outages, and limited roadway access that may isolate vulnerable residents in Coastal Communities.

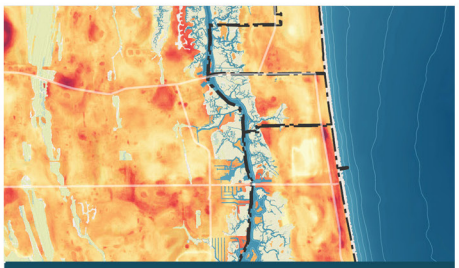
Wind

Although lower than the citywide average, more than half of all residential properties located within Coastal Communities are vulnerable to wind. The combined potential damages to homes and other properties from both wind and flooding in a coastal storm could significantly impact residents' ability to recover and rebuild.

Wildfire

Some areas within Coastal Communities are also vulnerable to wildfire because of their proximity to preserve lands and other forested wetlands. Approximately 6% of residential properties (more than 500 total) and 20% of critical facilities in Coastal Communities are vulnerable to wildfire.

Coastal Communities *Percentage of Assets Vulnerable to Climate Threats*	Residential Properties	Critical Facilities
Current 10% AEP **Coastal Flooding**	***30%*** *2%*	***24%*** *2%*
2070 1% AEP **Inland & Coastal Flooding**	***44%*** *7%*	***32%*** *8%*
Wind	57% *60%*	58% *73%*
Wildfire	**6%** *1%*	**20%** *6%*



HEAT

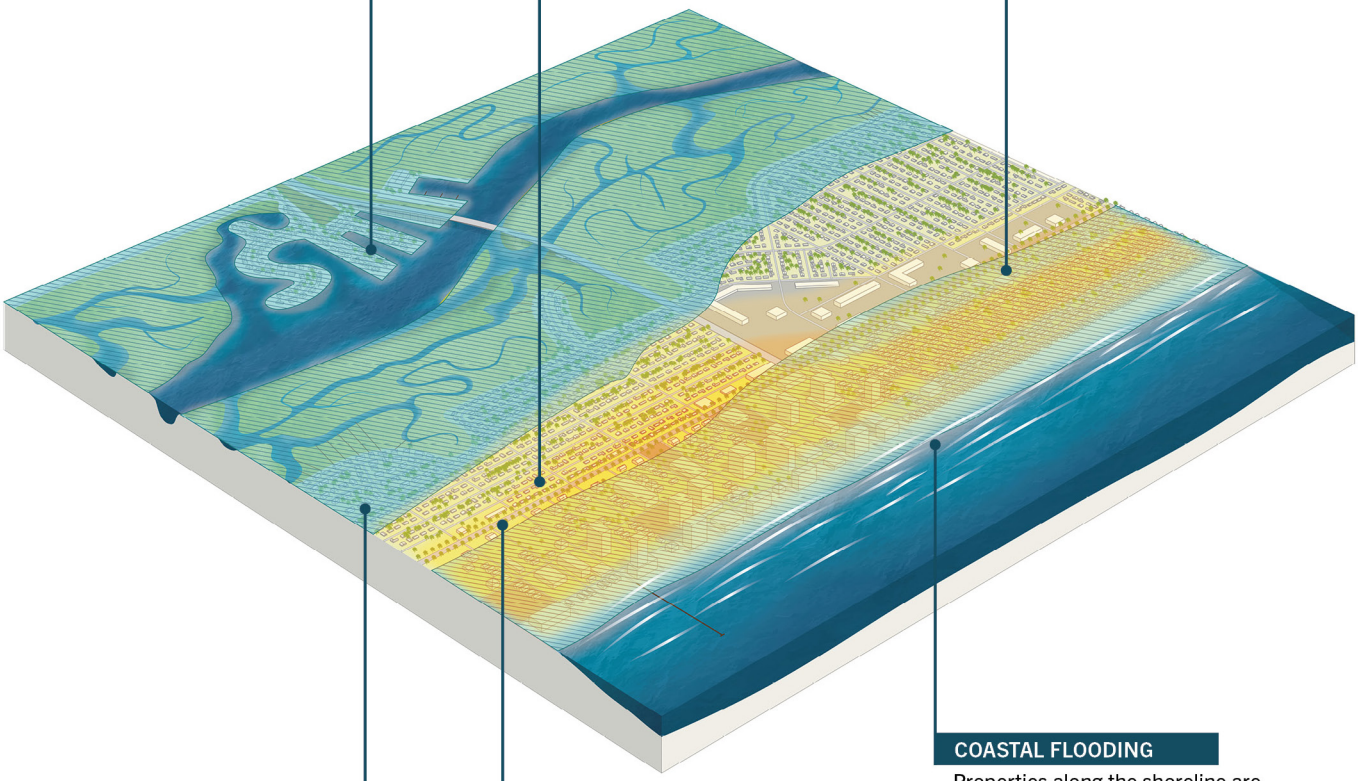
17% of Coastal Communities residents are highly vulnerable to extreme heat

SEA LEVEL RISE

Rising sea levels will lead to more frequent nuisance flooding in low-lying areas and wetland loss.

EMERGENCY RESPONSE

Flooded roadways may cut off access to critical facilities, evacuation routes, and emergency services in a flood event.



COASTAL FLOODING

Properties along the shoreline are exposed to coastal flood risk and strong wave action.

WIND

More than half of residential properties highly vulnerable to wind.

COASTAL FLOODING

Properties along the Intracoastal Waterway are exposed to “backdoor flooding” and wetlands.

Floodplain

Urban Heat

COASTAL COMMUNITIES
RESILIENCE OPPORTUNITIES

Maintain Access

Road access is a growing concern in Coastal Communities due to their vulnerability to coastal storms and increasing effects from sea level rise. Route A1A, a main thoroughfare and evacuation route for Coastal Communities, may flood during extreme high tides, blocking access into and out of key areas, including Mayport. With sea level rise, and during storm events, these disruptions will become more frequent, widespread, and potentially life-threatening. To maintain connectivity to critical facilities, some roadways may need to be elevated. Capital investment and adaptive management plans need to account for future elevations or strategic decommissioning of roads where necessary. Evacuation routes and roads connecting critical facilities will need to be prioritized. Coordination with relevant federal, state, and local agencies as well as community members will facilitate a process for upgrades to be continuous and provide connectivity into and out of vulnerable areas.

In addition to emergency access, increasing the access between Jacksonville and the beaches with improved bicycle and pedestrian infrastructure and public transit will provide community benefits and connectivity, including making it easier for Jacksonville residents to get to the beach to cool down during extreme heat days.

See Actions 6, 7, 19, 27, 28, 30

Build and Plan for Future Shocks

Living on the coast will always have some element of risk. Hurricanes and tropical storms are a fact of life in coastal areas. Improved building and construction standards minimize risks and help reduce financial burdens; however, long-term planning focused on relocation as well as rebuilding options after a catastrophic event, such as a major hurricane, is also needed to increase the safety and well-being of residents. Incorporating ways to streamline voluntary residential buyouts and relocation away from high-risk areas is necessary in areas that experience repetitive flooding. Developing such a plan prior to a major event will allow for faster recovery and can prevent post-disaster rushes to rebuild that often reinforce development patterns that place residents in the highest-risk areas. Doing so allows more time for a meaningful community engagement process, leading to more equitable outcomes and public support. Because the Coastal Communities are comprised of multiple municipalities and the U.S. Navy, coordination and collaboration will be important for the success of strategies to shift long-term risks in this area.

See Actions 14, 19, 29, 39, 41

Work with Nature

Within the built infrastructure and communities of this area, there are dynamic landscapes of dunes, marshes, and mudflats. Sustaining permanent development in this landscape requires constant maintenance, and will become increasingly complicated and costly with climate change. The City can explore opportunities where natural and nature-based engineering strategies can support resilient Coastal Communities. For example, strategic placement of sand can allow winds and currents to passively nourish and sustain beaches and dunes. Sediment dredged to maintain shipping channels can be reused to help tidal wetlands adapt to sea level rise. Living shorelines and oyster reef restoration can stabilize shorelines and create new marine habitat. In many cases, natural and nature-based features can be more effective than conventional engineering approaches and often cost less to construct.

See Action 17

ACTION 17.1
Conduct research and analyses to identify waterfront edges most suitable for natural and nature-based solutions.

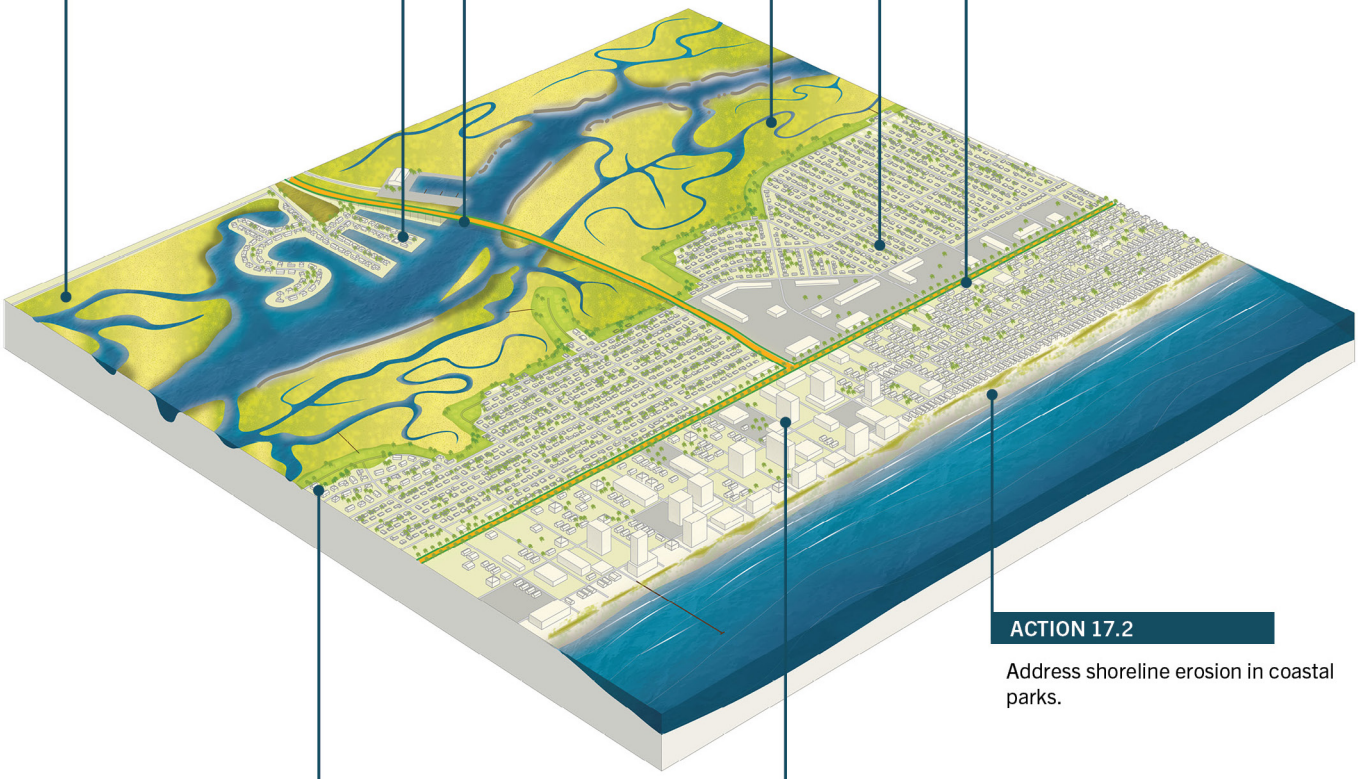
ACTION 27
Fortify vulnerable critical assets to mitigate flood damage and remain operable during storms.

ACTION 39.2
Explore new and emerging models of hazard insurance for homeowners.

ACTION 44
Support regional resilience efforts.

ACTION 7.2
Support the expansion of Jacksonville's regional trail system.

ACTION 19
Strengthen emergency response and evacuation plans.



ACTION 17.2
Address shoreline erosion in coastal parks.

ACTION 30
Strengthen the citywide response to extreme heat and other public health emergencies.

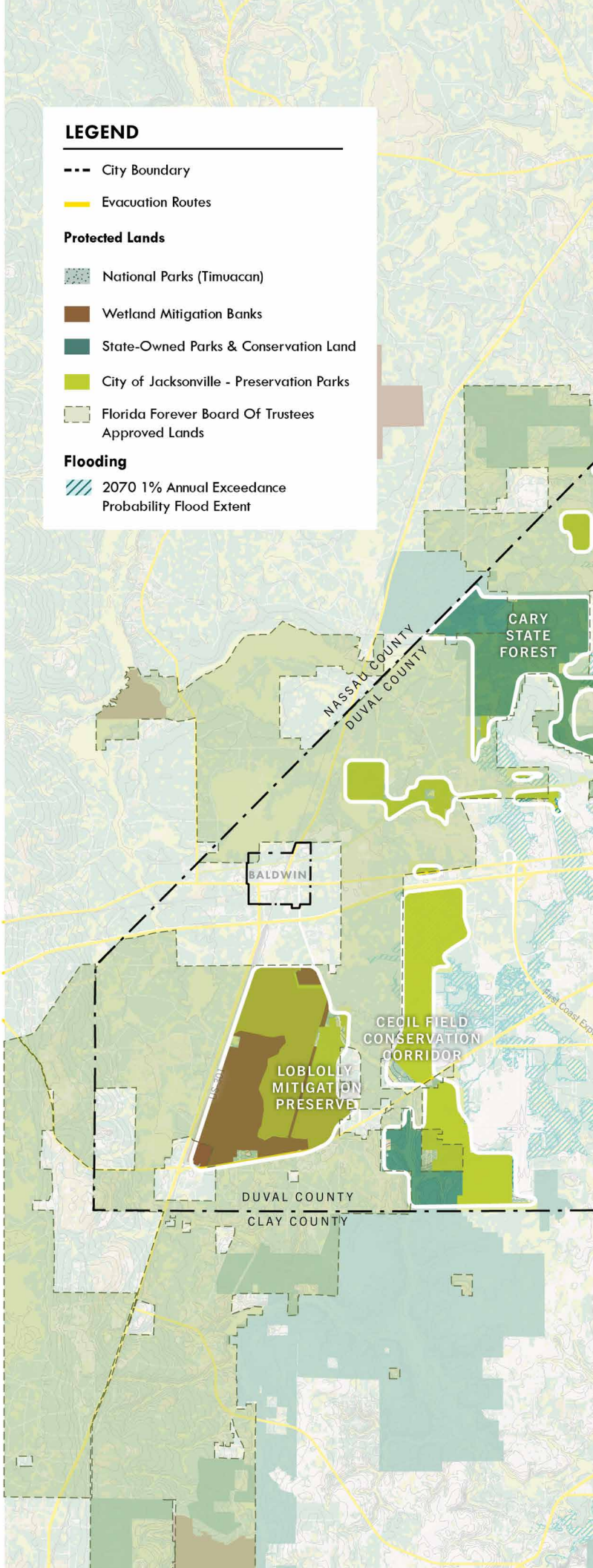
ACTION 29
Streamline voluntary residential buyout and relocation programs for high-risk areas.

- Improved evacuation routes
- Resilient streetscape or greenway
- Dune and beach restoration
- Living shorelines/ oyster reef restoration

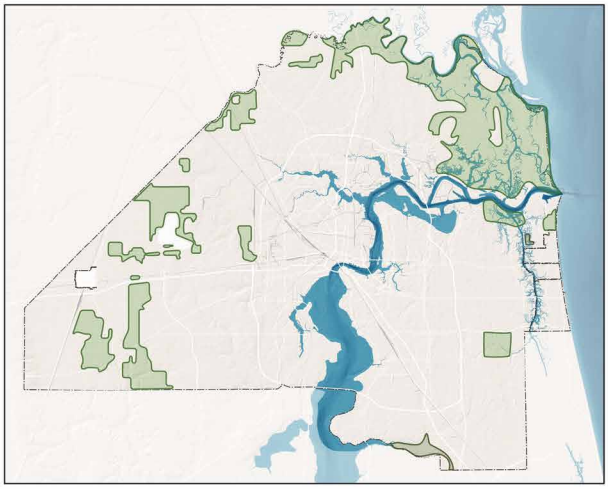
PROTECTED LANDS

OVERVIEW

Jacksonville's Protected Lands are areas with protected and specific uses outside of City authority and City-owned lands currently managed for preservation. These include federal lands, state lands, wetland mitigation banks, and City-owned preservation parks. A significant portion of this land is vegetated and includes large areas that mitigate coastal storm flooding, store rainwater, regulate air temperatures, sequester carbon, and support biodiversity. These areas are under threat from rising sea levels, volatile weather patterns, and continual development pressure. Planning for the continued survival of these Protected Lands will require coordination, maintenance of existing resources, expansion of protections, and establishment of connective corridors that allow ecological systems to change and move over time.



KEY MAP




KINGS ROAD HISTORIC PRESERVE
TIMUCUAN ECOLOGICAL & HISTORIC PRESERVE
BULLS BAY PRESERVE
PABLO CREEK PRESERVE
JULINGTON-DURBIN CREEK PRESERVE
ATLANTIC OCEAN
ST. JOHNS RIVER
TROUT RIVER
BROWARD RIVER
MCCOYS CREEK
ROTTSBURG CREEK
CEDAR RIVER
ORTEGA RIVER
JULINGTON CREEK
MILL COVE
I-95
I-295
I-10
US-17 / N. Main St
US-23 / New Kings Rd
US-90 / W Beaver St
US-1 / Phillips Highway
J Turner Butler Blvd
Normandy Blvd
IMESON PARK
RIVERVIEW
RIBAULT
PANAMA PARK
NORTHWEST JACKSONVILLE
PAXON
EASTSIDE
DOWNTOWN
RIVERSIDE
MURRAY HILL
CRYSTAL SPRINGS
SAN MARCO
ARLINGTON
EAST ARLINGTON
SOUTHSIDE ESTATES
SANDALWOOD
BLOUNT ISLAND
MAYPORT
ATLANTIC BEACH
NEPTUNE BEACH
SOUTHPOINT
WINDY HILL
ORTEGA
CEDAR HILLS
JACKSONVILLE HEIGHTS
N.A.S. JACKSONVILLE
DUCLAY
SAN JOSE
BAYMEADOWS
DEERCREEK
MANDARIN STATION
MANDARIN
DEL RIO
DUVAL COUNTY
ST. JOHNS COUNTY
0
2
4
8 mi

PROTECTED LANDS
CHARACTER

Jacksonville includes large and contiguous areas of undeveloped land with ecological significance, many of which are protected by federal, state, or City agencies and programs. These protected areas encompass more than 90 square miles and include wetlands, forests, swamps, and waterways that provide ecosystem services vital to Jacksonville's ecological, cultural, and economic resilience. These lands include many habitat types typical of northeast Florida as well as some of the most uncommon and rare ecosystems.

Many of these areas are owned and managed by non-City of Jacksonville entities, such as the Florida Department of Environmental Protection and the National Parks Service. The largest among these is the Timucuan Ecological and Historical Preserve, which is largely owned and managed by the National Parks Service. Notable state parks and conservation land include Cary State Forest, Seaton Creek Preserve, and Pumpkin Hill Creek Preserve State Park. Wetland mitigation banks are also included in this type, as they are protected land uses intended to create and preserve natural wetland areas. Properties within this type managed by the City of Jacksonville include preserved parks, which are properties held in conservation easements and managed primarily for preservation of natural areas. These include the Cecil Field Conservation Corridor, the Bulls Bay Preserve, Kings Road Historic Preserve, Julington-Durbin Creek Preserve, Kathryn Abbey Hanna Park, and the Pablo Creek Preserve.

Jacksonville's Natural Jewels

Protected Lands are part of what makes Jacksonville unique as a city. With more than 80,000 designated acres of city urban park space, Jacksonville has the largest urban park system in the United States. Additionally, Jacksonville residents are fortunate to have access to numerous, large federal and state preserves. The natural character of these parks and preserves plays a strong role in the overall character of Jacksonville in the context of a rapidly developing city. They provide nature-based recreation such as hiking, biking, horseback riding, boating, fishing, camping, picnicking, and bird-watching. Many of the properties within this category are considered ecologically significant, and they provide ecosystem services critical to the city's resilience. These areas protect some of Jacksonville's largest contiguous wetlands (Timucuan) and protect the upper reaches of many of Jacksonville's waterways from development pressures that could hinder natural flood control benefits, increase runoff, and decrease water quality. These large land areas also help mitigate the impacts of rising temperatures and urban heat effect. Forested natural areas are the coolest land cover type overall and range between 3–9°F cooler than average temperatures in urban areas.

Protected Lands By the Numbers		*% of Citywide*
Total Land Area	92 sq mi	*11%*
Undeveloped Land Area	84 sq mi	*12%*

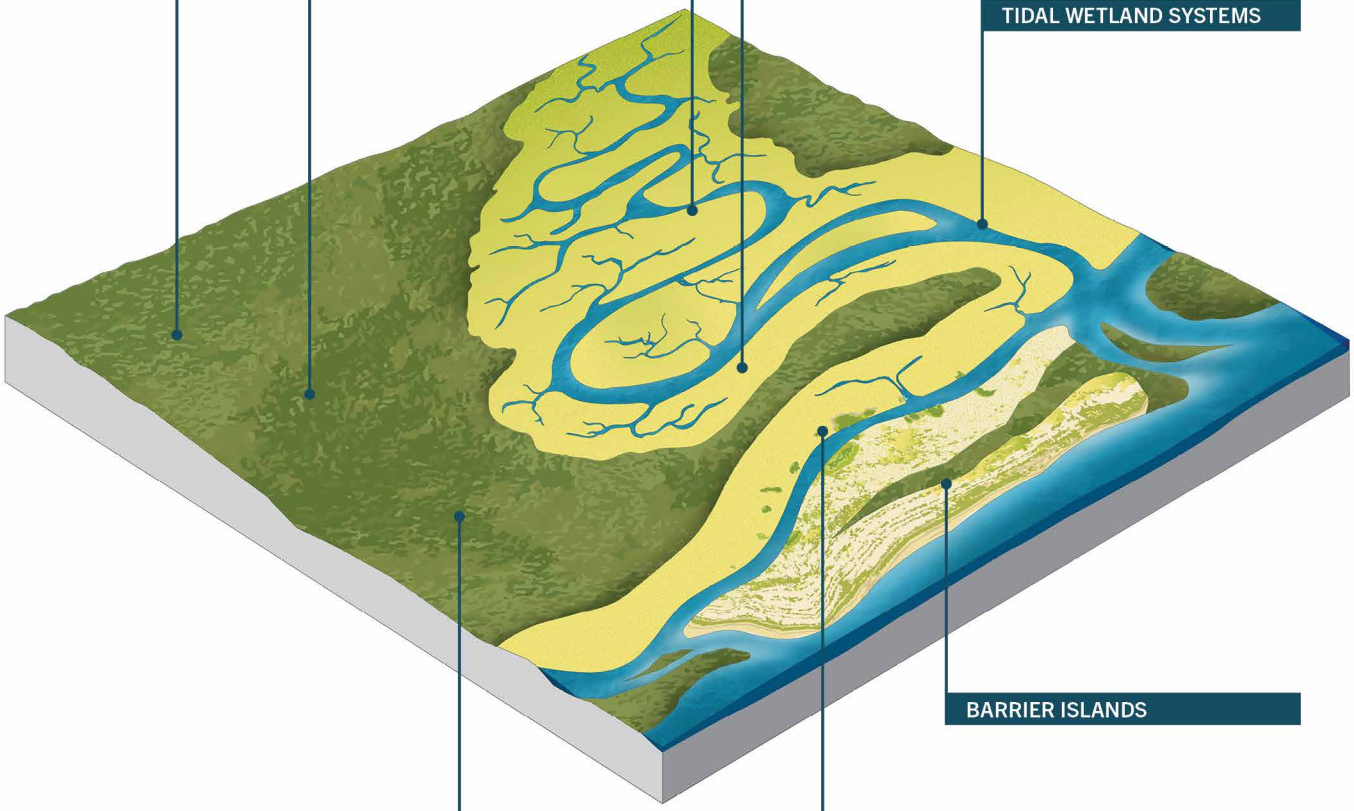
TRAILS AND EDUCATION

EXTENSIVE WETLAND NETWORK

ESTUARINE WATERWAYS

UPLAND FORESTS

TIDAL WETLAND SYSTEMS



BARRIER ISLANDS

SIGNIFICANT HISTORICAL SITES

EXPANSIVE BIODIVERSITY

Scale: Tile above is not to scale.

PROTECTED LANDS

EXPOSURE, VULNERABILITY, AND RISK

Flooding & Sea Level Rise

Whether coastal wetlands or upland forests, Protected Lands have the capacity to store large amounts of floodwater and can protect adjacent and downstream areas from flooding. While relatively resilient to periodic inundation, many of these areas are highly vulnerable to the impact of sea level rise. A large portion of Protected Lands, including most of Timucuan Ecological Preserve, consists of tidal wetlands which only survive and thrive in a narrow elevational range. Rising sea levels threaten to submerge tidal wetlands and beaches, resulting in their permanent loss and conversion to open water. Additionally, saltwater intrusion may alter the relationship between freshwater and saltwater ecosystems. In addition to the ecological impacts, loss of these vital ecosystems would leave adjacent areas more exposed to storms and flooding.

Heat & Drought

Protected Lands play an important role in reducing the city's overall vulnerability to heat. Recent studies have shown that large natural areas, particularly forests, are significantly cooler than other types of land cover, even landscaped areas like lawns and urban tree canopies. Forested natural areas are the coolest land cover type overall and range between 3–9°F cooler than average temperatures in cities.

While Protected Lands help to mitigate heat, they are also vulnerable to impacts from extreme temperatures. For example, rising temperatures can increase invasive species that can severely damage native ecosystems. Warming and extreme weather patterns are also predicted to result in more frequent drought conditions. Drought alters ecosystem processes, such as water cycling, and can result in insect and pathogen outbreaks and increased wildfire risk.[22]

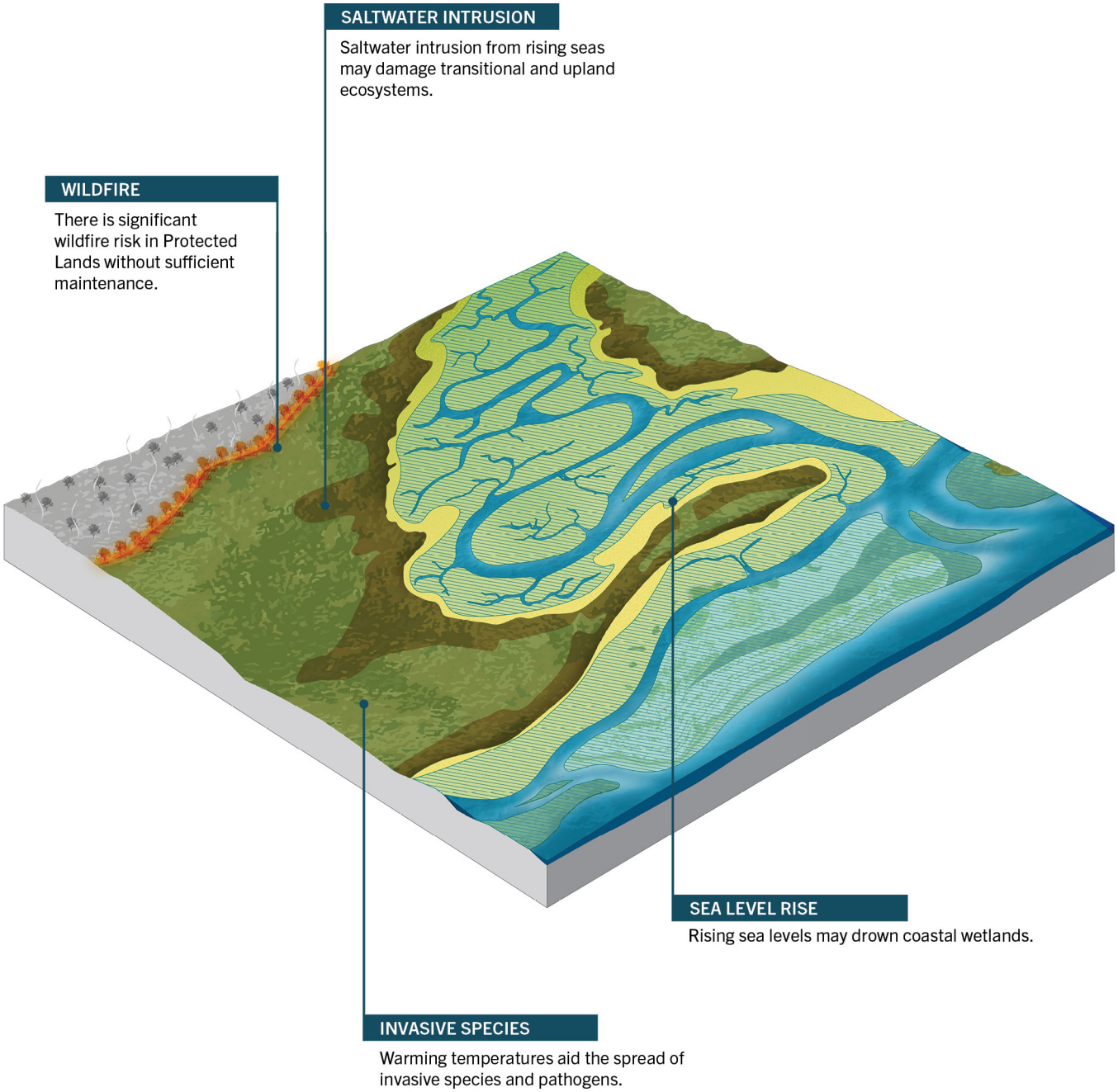
Wildfire

Protected Lands include areas in Jacksonville that are suitable for prescribed burns to prevent wildfires. As temperatures increase and drought conditions become more frequent, there will be an increasing and significant wildfire risk in Protected Lands without sufficient maintenance. As many of these lands are in areas close to Jacksonville's managed and working lands, wildfire risk could pose threats to Jacksonville's agriculture and timber producers.

Development Pressure & Landscape Fragmentation

New development adjacent to protected boundaries reduces Jacksonville's overall natural area and can break important physical connections between natural areas. This landscape fragmentation results in a patchwork of smaller, disconnected open spaces and can significantly decrease the resilience of ecosystems. It can reduce biodiversity, decrease the cooling effects of natural areas, result in continued marsh loss and saltwater intrusion, and reduce floodwater storage capacity.

Protected Lands, particularly those not protected by long-term legal restrictions on their use, may also be threatened by development pressures. Because of their capacity for water storage, their ecological value, and their value as natural space that provides recreational amenities for the public, Protected Lands are not suitable for development.


SALTWATER INTRUSION
Saltwater intrusion from rising seas may damage transitional and upland ecosystems.
WILDFIRE
There is significant wildfire risk in Protected Lands without sufficient maintenance.
SEA LEVEL RISE
Rising sea levels may drown coastal wetlands.
INVASIVE SPECIES
Warming temperatures aid the spread of invasive species and pathogens.
Floodplain
Wildfire

PROTECTED LANDS
RESILIENCE OPPORTUNITIES

Preserve and Expand

Large, contiguous natural areas within Jacksonville provide vital ecosystem services for the entire city. Flood storage, water quality enhancement, habitat provision, temperature regulation, and significant recreation opportunities are a few examples. For these reasons, it is critical that these areas remain protected and are expanded where possible. The protection of preservation parks and natural areas is a key strategy in reducing additional burden to existing infrastructure. Opportunities for protecting additional lands in Jacksonville can prioritize properties that expand or connect to already protected areas and are in line with state and regional land acquisition programs.

See Actions 7, 12

Manage for the Future

Preserving and expanding Protected Lands requires active management. Climate change is introducing additional complexity to land management practices. In coastal areas, sea level rise threatens to drown the tidal wetlands that make up vast expanses of Timucuan National Park, and saltwater intrusion may alter the relationship between freshwater and saltwater ecosystems. Navigating these changes will require innovative management techniques in partnership with state and federal agencies. Invasive species management can be strengthened with reporting, updated design standards, and enforcement of regulations regarding sale and use of invasive plant materials. Wildfire risk is mitigated through monitoring and removal of understory vegetation, including through controlled burns. Tidal wetlands can be maintained through thin-layer placement, living shorelines, and by creating room on the upland side of wetlands for marsh migration.

See Actions 13, 42, 44, 45

Build a Culture of Environmental Stewardship

Stewarding Jacksonville's natural areas will be more successful with a multi-agency and community-based approach focused on skill-building and coordination. Management of fragile native ecosystems requires specialized skillsets in forestry, ecology, and horticulture. Building capacity across many sectors will assist in meeting these challenging demands. Skills in resilient land management of Protected Lands can be applied to green infrastructure management in other areas of the city. Exposing young people to career opportunities in conservation and land management can improve the city's ability to sustain and expand its natural areas and preservation initiatives for generations to come.

See Actions 13, 36

ACTION 12.1

Protect existing park and preserve lands in perpetuity.

ACTION 36.1

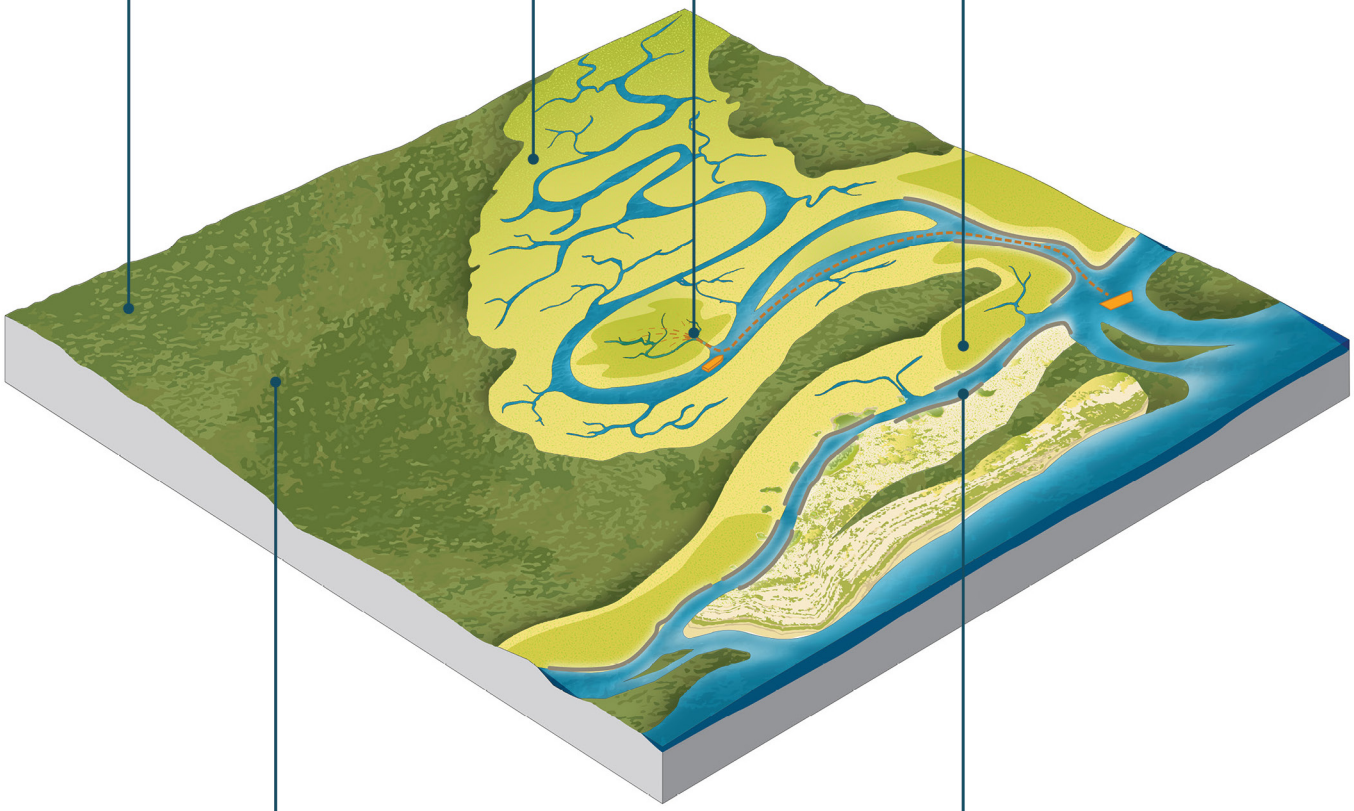
Coordinate with local educational institutions to offer specialized training for jobs that are needed to meet resilience goals.

ACTION 45.1

Leverage federal data, tools, and other resources.

ACTION 15.2

Address saltwater intrusion and rising groundwater threats.



ACTION 13

Improve land stewardship to enhance ecosystem value.

ACTION 42

Coordinate resilience actions and policies across agencies and relevant independent authorities.

Wetland nourishment

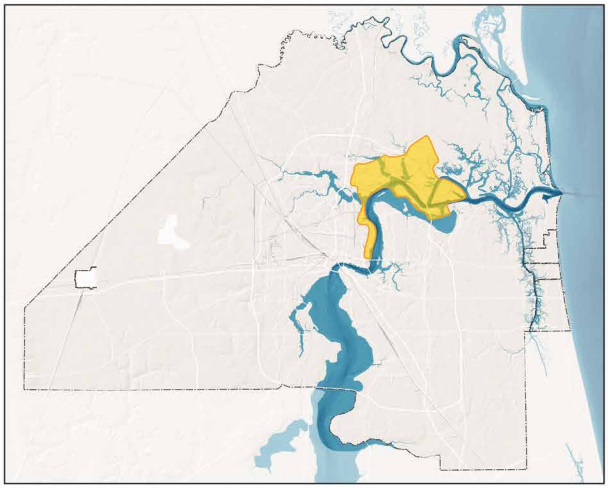
Living shorelines/oyster reefs

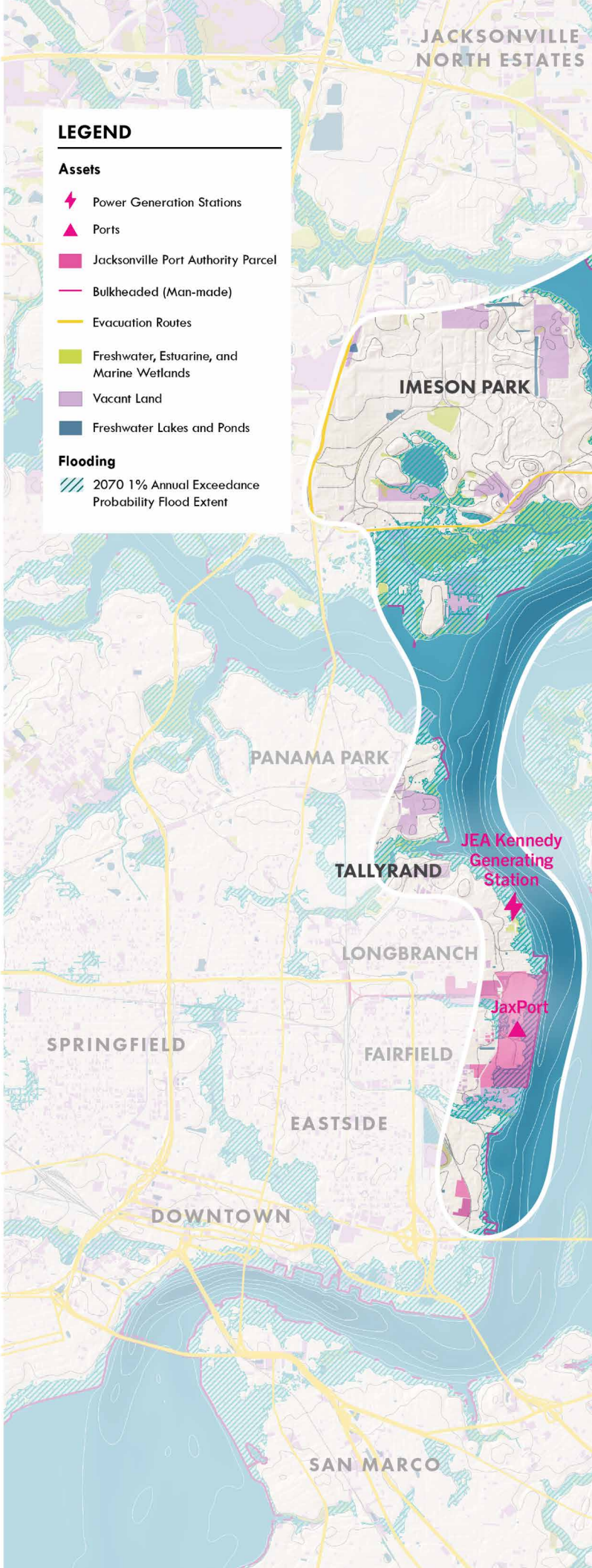
INDUSTRIAL RIVERFRONT

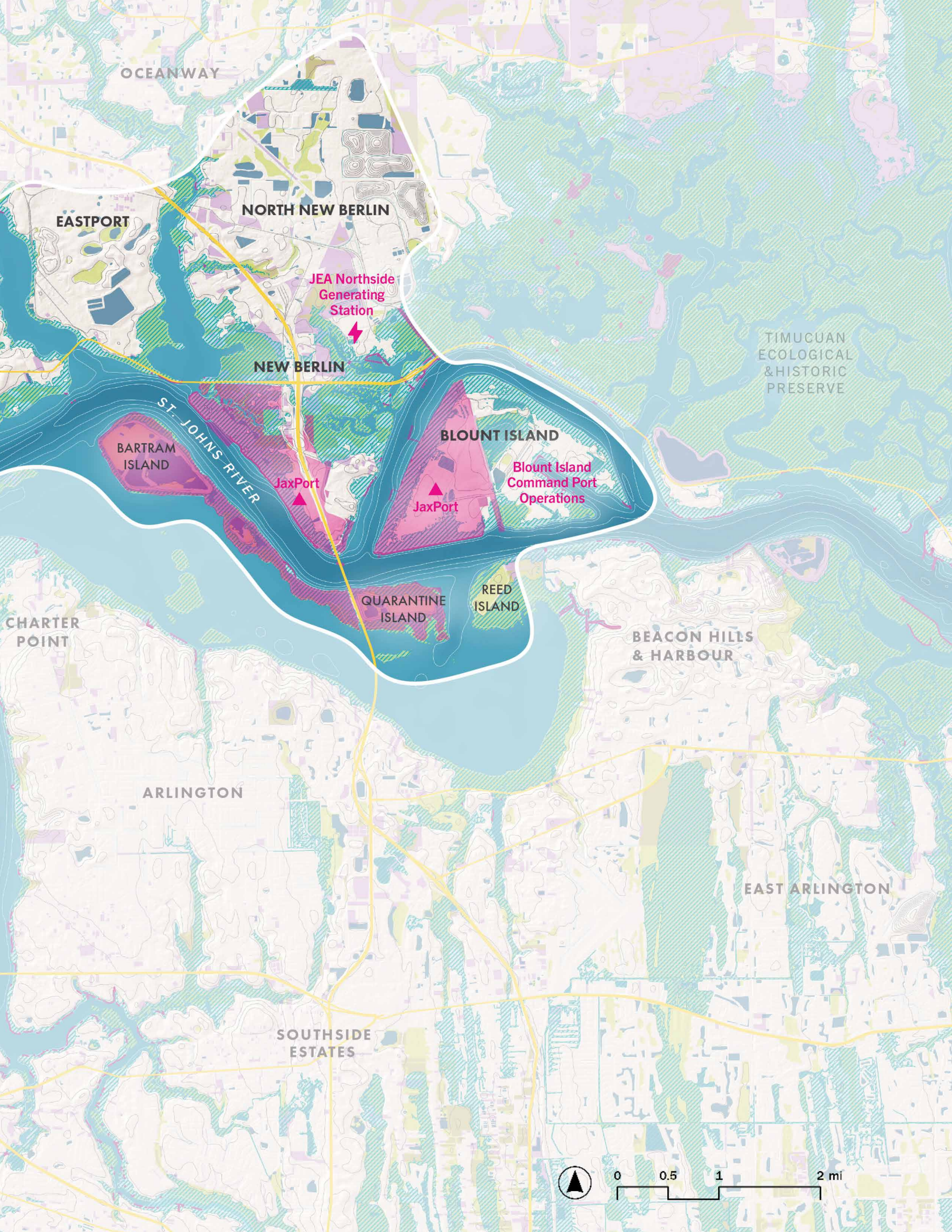
OVERVIEW

Shipping and logistics have been major drivers of economic activity in Jacksonville for more than 100 years. Cultivating this industry has led to extensively reshaping the St. Johns River, including dredging, stabilization, and even straightening. The Port of Jacksonville and other nearby shipping facilities rely on the river to operate, but this also puts them at risk of flooding. Investments in the Industrial Riverfront will assist in continuing Jacksonville's industrial legacy to adapt and thrive in the face of sea level rise, stronger storms, and changing economics. These industries can also be resilience leaders by embracing new technologies, strategies, and practices that enhance their adaptive capacity.

KEY MAP






OCEANWAY
NORTH NEW BERLIN
EASTPORT
JEA Northside Generating Station
NEW BERLIN
TIMUCUAN ECOLOGICAL &HISTORIC PRESERVE
ST. JOHNS RIVER
BARTRAM ISLAND
JaxPort
BLOUNT ISLAND
Blount Island Command Port Operations
JaxPort
QUARANTINE ISLAND
REED ISLAND
CHARTER POINT
BEACON HILLS & HARBOUR
ARLINGTON
EAST ARLINGTON
SOUTHSIDE ESTATES
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2 mi

INDUSTRIAL RIVERFRONT
CHARACTER

One of Jacksonville's economic advantages is its diverse industrial business sector and the presence of deep-water ports. The business sectors here draw workers in supply chain logistics to Jacksonville, significantly contribute to the transportation and warehousing sectors, and represent 9% of all business establishments in Jacksonville.[23] Leveraging the St. Johns River and the Atlantic Ocean has been core to Jacksonville's economy since the earliest known settlements. As shipping practices and industry have changed, the riverfront industry in Jacksonville has changed with it—with the construction of jetties at the mouth of the St. Johns in the late 1800s, the completion of the Intracoastal Waterway in the early 1900s, and the routine deepening and hardening of the river for larger and deeper ships today. These areas are comprised of primarily impervious surface coverage on facility yards, large parking lots, and large roof areas; however, due to their proximity to the shoreline, many wetlands and other vegetated areas exist within edges of industrial properties, sometimes adjacent to highly active areas of loading and operations.

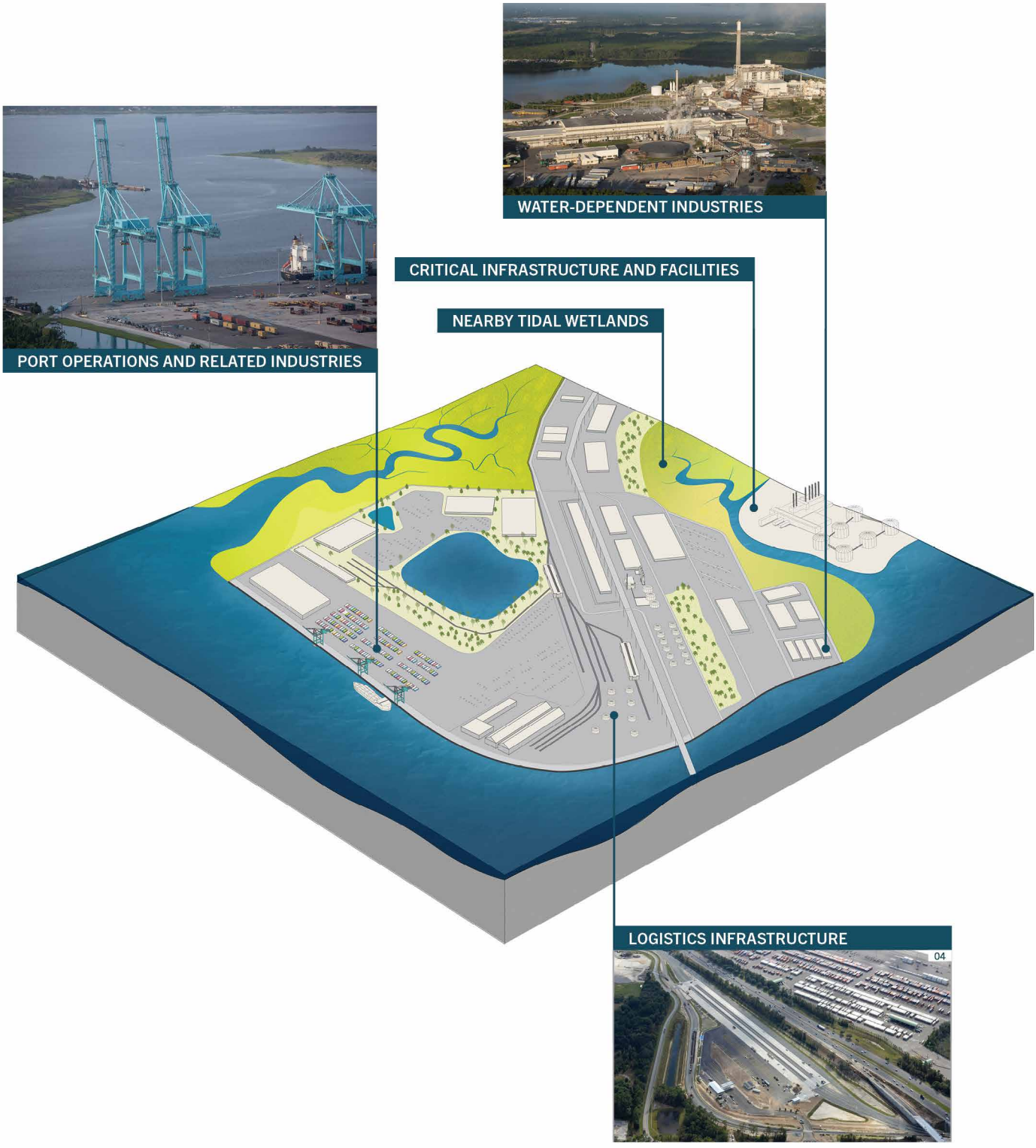
Today, Jacksonville's Industrial Riverfront is still concentrated along the St. Johns River and is heavily dependent on the use of the waterfront. For the purposes of this Strategy, the Industrial Riverfront is defined by the sites of the Jacksonville Port Authority (JAXPORT), New Berlin, JEA Northside Generation Facility, Eastport, North New Berlin, Imeson Park, Talleyrand, and Blount Island Command Port Ops.

Florida's Gateway to Global Commerce

JAXPORT is Florida's largest container port and one of the country's largest vehicle-handling ports. With shipping routes to 70 countries, more than 100 trucking firms and train access through CSX, NS, and the regional rail line, JAXPORT provides significant commerce to the city and region.[24] The industrial waterfront is an economic opportunity for the city as businesses invest in upgraded terminals, cranes and equipment, harbor improvements, modernization, and utility and infrastructure upgrades. The range of cargo types from containers, automobiles, and bulk and cruise operations support a broad-ranging economic mix for Jacksonville. In addition to the industry at JAXPORT, other industrial uses along the riverfront include oil and gas, power generation, and cruise terminals.

While the location of the riverfront is a key advantage for these industries, their location also puts them at risk of rising sea levels and increasing storms.

Industrial Riverfront By the Numbers		*% of Citywide*
Total Land Area	41 sq mi	*5%*
Undeveloped Land Area	26 sq mi	*5%*
Critical Facilities	42	*2%*



Scale: Tile above represents approximately 2 sq miles.

INDUSTRIAL RIVERFRONT

EXPOSURE, VULNERABILITY, AND RISK

Flooding

Given its location on the St. Johns River, the Industrial Riverfront is one of the areas of Jacksonville most vulnerable to coastal flooding. Industrial, commercial, government-owned, and critical facilities that fall within its borders are most vulnerable to this threat. 18% of the industrial properties, 21% of the commercial properties, 42% of the government-owned properties, and 36% of the critical facilities along the Industrial Riverfront are currently at risk from coastal flooding with at least a 1 in 10 change of occurring in a given year (10% AEP). As the working waterfront for Jacksonville, the flood vulnerability of the properties in this Development Type, which include JAXPORT and JEA's Northside Generation Station, pose a significant risk to the economic and ecological health for all of Jacksonville. Without action, the vulnerability of these assets is expected to increase in the next 50 years.

Heat

The landscape of the Industrial Riverfront is designed for commercial and industrial use, resulting in high percentages of paved areas and very little tree canopy. The working riverfront employs more than 26,000 people. Many of these jobs expose workers to the effects of extreme heat, which can not only lead to significant health impacts for employees, but also diminished economic productivity.[26]

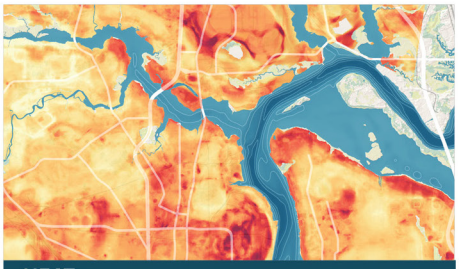
Wind

More than 50% of all Industrial Riverfront assets across all categories are vulnerable to high winds. As with vulnerability to flooding, wind vulnerability for critical facilities is particularly important to consider because of the impacts that disruptions to critical energy services could have across the entire city.

Wildfire

Although most of the Industrial Riverfront is not situated close to wildland areas, some parts of this Development Type fall alongside preserve areas, including the Timucuan Ecological Historic Preserve. As proximity to wildland areas increases wildfire vulnerability, these areas have an increased risk to this threat. 5% of all assets in the Industrial Riverfront are vulnerable to wildfire, including 17% of critical facilities in this Development Type.

Industrial Riverfront *Percentage of Assets Vulnerable to Climate Threats*	Industrial Properties	Critical Facilities
Current 10% AEP **Coastal Flooding**	**18%** *2%*	**36%** *2%*
2070 1% AEP **Inland & Coastal Flooding**	**27%** *7%*	**24%** *8%*



HEAT

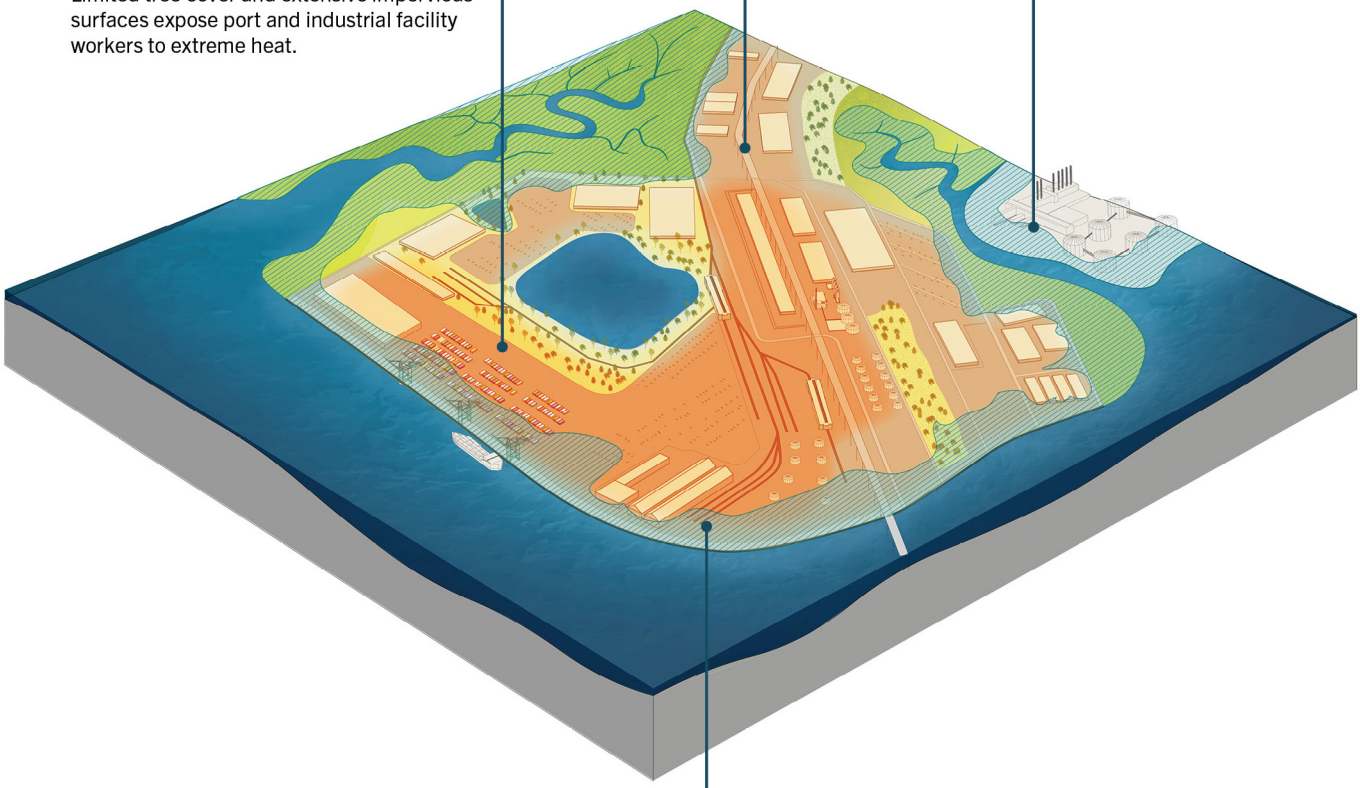
Limited tree cover and extensive impervious surfaces expose port and industrial facility workers to extreme heat.

COASTAL FLOODING

Low-lying roads, transit infrastructure, and commercial properties are exposed to coastal flood risk.

CRITICAL FACILITIES

Significant critical facilities are exposed to coastal flood risk.



SEA LEVEL RISE

Rising sea levels may disrupt water-dependent activities and industries.

Floodplain

Urban Heat

INDUSTRIAL RIVERFRONT

RESILIENCE OPPORTUNITIES

Protect Critical Assets

The Industrial Riverfront includes key infrastructure that power the economy of Jacksonville and the surrounding region, including JAXPORT and the JEA Northside Generation station. This area is also low-lying, with many of these critical facilities nestled in and among tidal wetlands. Disruption of operations at these facilities due to flooding would be expensive and even dangerous, and the chances of such an event will become more likely as sea levels rise in coming decades. In addition to increasing the probability of acute events such as a major flood, sea level rise will also bring an increased frequency of nuisance flooding during high tide events.

Given their low-lying location, exposure to flood risk, and importance for the regional economy, it is critical that these facilities be protected from these shocks and stressors to the extent practicable. This may include investments in strategic hardening and floodproofing. JAXPORT and JEA each have internal planning guidance in place or underway to address these challenges, and the City can strengthen its partnerships with these agencies to support the implementation of these plans.

See Actions 20, 27, 16, 30

Develop Alternative Energy Sources

As the site of Jacksonville's largest energy generation facility and numerous smaller industrial facilities, the Industrial Riverfront makes up an outsized proportion of Jacksonville's overall greenhouse gas emissions. Adoption of renewable energy resources in the Industrial Riverfront represents a prime opportunity to both reduce these emissions and to improve resilience to energy service and supply disruptions. JEA's 2023 Integrated Resource Plan calls for increasing renewable energy to 35% of its generation portfolio by 2030. JAXPORT and privately owned facilities within the Industrial Riverfront can participate in this transition by investing in rooftop solar generation and battery storage, potentially lowering energy costs, emissions, and service disruptions.

See Action 11

Contribute to a Healthy River and Tributaries

Reversing the historical negative impacts of industry on the riverfront can be achieved while supporting the vital industrial uses. Shipping channels within the St. Johns River are frequently dredged to create adequate depths for large container ships. This dredging produces large volumes of sediment, which has conventionally been viewed as a waste product and is disposed of in deep water or in confined disposal areas. Recently, engineers recognized the value of this sediment as a resource and have embraced so-called "beneficial reuse" of dredged material to achieve environmental objectives. In the Industrial Riverfront, this dredged sediment could prove valuable for helping wetlands lining the St. Johns River adapt to sea level rise. The City can partner with the U.S. Army Corps of Engineers to explore all options for beneficial reuse of dredged sediment locally.

See Action 17

ACTION 17.3

Identify sand and sediment resources for natural and nature-based solutions.

ACTION 11

Ensure water and energy utilities can meet the growing demands of the future.

ACTION 30.4

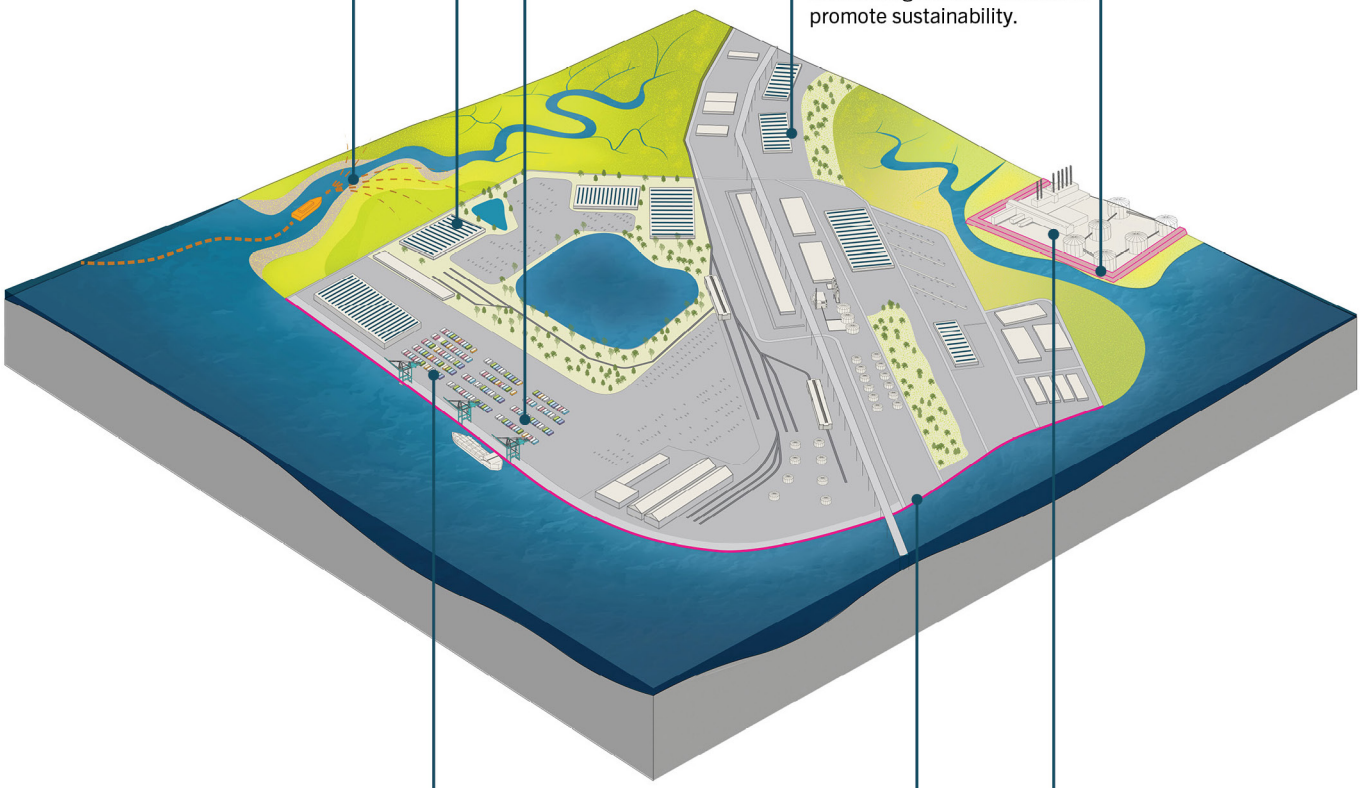
Provide guidance for outdoor work standards for employers.

ACTION 43

Develop a Climate Action Plan that aligns Jacksonville's resilience goals with actions to promote sustainability.

ACTION 27.2

Work with utilities and independent agencies to fortify their vulnerable critical assets.



ACTION 20.2

Maintain commerce into and out of the city through partnerships with the Port and other agencies.

ACTION 11.2

Improve utility resilience in Jacksonville's neighborhoods to minimize disruptions to service delivery.

ACTION 16

Invest strategically in hardened shorelines.

- Critical Facility flood-proofing
- Solar panels or green roof
- Beneficial reuse of dredge material

SCENARIOS FOR CITYWIDE ADAPTATION

Jacksonville's evolving patterns of development have come together to define the city as a rich tapestry of neighborhoods, each with a different feel and character. Although climate change, population growth, and other uncertain drivers will inevitably continue to change that tapestry, Jacksonville can shape what the future holds through the choices it makes in how, where, and to what degree adaptation approaches and associated actions are implemented.

This section describes a set of "what if?" future scenarios that were explored when drafting this Strategy. The focus of these scenarios is on the question of where new development occurs to accommodate projected population growth over the next 50 years and how those decisions impact risks to people, property, and ecosystems. If population trends continue, Jacksonville will see more than 685,000 additional residents by 2070, increasing the total population to upwards of 1.6 million. While there are many uncertain factors that may cause Jacksonville to see more or less population growth, this projection provides a useful benchmark for exploring trade-offs among patterns of development that may accommodate this growth.

What if...
recent development patterns continue?

More than 85% of Jacksonville's population growth over the last 20 years has been in the Contemporary Suburbs, expanding these neighborhoods into land that was previously rural. If this pattern of growth were to continue at the same rate over the next 50 years in new, low-density developments, the remainder of the existing Rural Mosaic would need to transition to Contemporary Suburbs to accommodate more than 685,000 new residents. Suburbs would dominate the landscape of Jacksonville, expanding from approximately 39% of the land area to more than 78%. Accommodating this expansion would require significant investment in new roads and other infrastructure, and many of these new residents would be vulnerable to flooding and other climate threats if deliberate action is not taken to focus expansion away from higher risk areas (See the Evolving Challenges chapter for more details on the projected consequences of this "Future Without Action" scenario).

Of course, Jacksonville's growth in the future does not have to look like its growth in the past. Just as public priorities and policies have reshaped development patterns in previous eras, Jacksonville can catalyze a new era of climate adaptable and resilient development. The City can encourage infill growth in lower risk areas of neighborhoods with capacity for higher density as described in previous sections.

What if...
growth is focused in the urban core?

If growth patterns in Jacksonville over the last 20 years were to continue, only about 1% of new residential development would occur in the urban core (defined here as inclusive of Downtown and the Historic Walkable Neighborhoods). But what if that were to change? Some cities in Florida and across the U.S. are seeing surges of population growth in the urban core as people seek out well-connected and walkable communities. What if growth patterns in Jacksonville—through deliberate action and/or market forces—shift toward a boom in people moving to areas in the urban core?

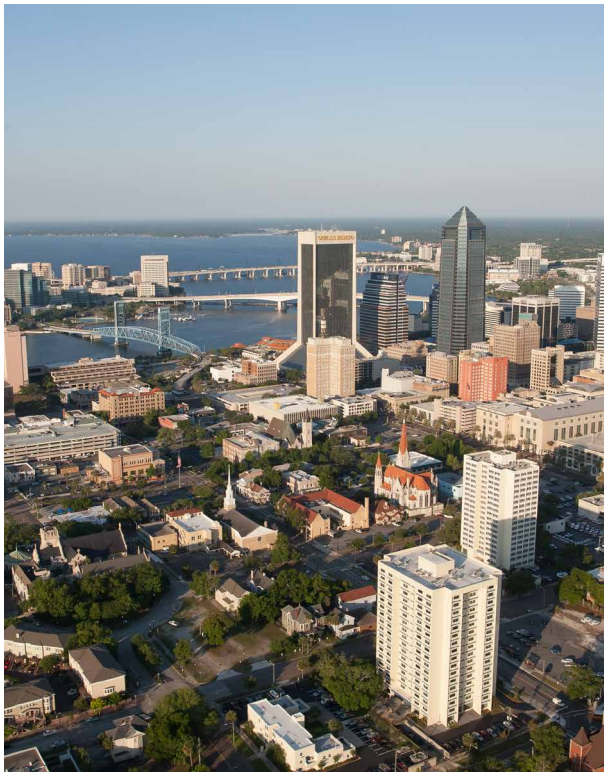
At present, the population density of Jacksonville's urban core areas is between about 2,000 people per square mile (Downtown) and 3,000 people per square mile (Historic Walkable Neighborhoods) with over 6,700 vacant properties. In addition, there is a significant amount of other underutilized spaces like surface parking lots, suggesting there is high potential for growth in this area while revitalizing the urban core. Increasing population density in areas where density and walkability are desired features could offset low-density suburban growth, helping to preserve existing open space in Jacksonville's Rural Mosaic.

At the extreme, more than 200 square miles of undeveloped land in the Rural Mosaic could be preserved by accommodating 100% of projected population growth over the next 50 years in areas of the urban core. It is unrealistic to imagine that every new resident would make this choice, and accommodating 685,000 new residents over this time may be beyond what Jacksonville would like to see for its urban core.

If half of all new residents, or approximately 340,000 people over the next 50 years, move to the urban core, the population density would increase by 6.5 times to more than 15,000 people per square mile. To put this number in context, it is a little less than the population density of greater downtown Miami. In this hypothetical scenario of 50% of projected growth in lower risk areas of the urban core, approximately 11,500 fewer residents would

be at risk of flooding and more than 80 square miles of open space would be preserved in the future compared to the previous "no action" scenario. However, if development patterns continued in a business-as-usual pattern to accommodate the other 50% of new residents, there would still be more residents at risk of flooding in the future than today, as well as significant open space still converted to new development in the Rural Mosaic.

Scenarios for growth in the urban core also underscore the importance of drawing from across *Resilient Jacksonville* Actions in implementation. If, for example, 100% of new Jacksonville residents move to the urban core without targeted action to reduce exposure to heat (Actions 10, 21, 24, 26, and 30), the number of residents vulnerable to heat could increase to more than one million people. Similarly, without preserving and expanding the supply of affordable housing in these areas (Action 4), existing communities could be displaced by wealthier residents and investments attracted to these areas. A resilient future requires coordinated implementation of actions outlined in this Strategy.



What if…
growth is focused in existing suburban areas?

As Jacksonville's population has grown, suburban development has expanded outward from the urban core, with new neighborhoods and associated infrastructure being built in formerly undeveloped areas that looked much like the Rural Mosaic does today. An alternate, more resilient vision could include more suburban infill within lower risk areas of the existing landscape of Contemporary and Post-War Suburbs to preserve more undeveloped land.

If this growth were focused in areas outside of the future floodplain, as many as 90,000 fewer residents would be at risk of flooding than if suburban growth were to occur without the actions outlined in this Resilience Strategy. There are close to 100 square miles of still undeveloped land interspersed within the suburban areas of Jacksonville. While much of this area may be unsuitable for new development because of its ecological value and/or exposure to flooding, some of this area could safely support considerable population growth. Models for building the resilient communities of tomorrow, as discussed in the Contemporary Suburbs section of this chapter, could provide a template. The population density of developed areas of the suburbs would still need to increase in this scenario, with Contemporary Suburbs increasing from current levels of approximately 3,000 people per square mile to close to 5,500 people per square mile.[28] This could be accommodated through, for example, development of smaller condos or mixed-used complexes in or near existing commercial centers. In general, only relying on infilling of existing suburban areas could require tradeoffs that might not be consistent with what Jacksonville residents want for their city in a resilient future.

Combining Strategies for Positive Change

Fortunately, as outlined throughout this section, Jacksonville has opportunities to encourage resilient growth across all the Development Types. Implementing a portfolio of these actions could help build city resilience while preserving and strengthening the unique character of Jacksonville. Under one potential future, actions could be taken to increase the number of new residents moving to the urban core while also encouraging suburban infill development.

One such "what if" scenario for Jacksonville's future might begin by looking to the past. In 1950, the population of Jacksonville was 205,000 people, living within a city that was 30 square miles. The footprint of the city prior to consolidation was similar to the boundaries of Downtown and the Historic Walkable Neighborhoods. Today, only 85,000 residents live in these areas of the urban core. If approximately 1 in 4 new residents moved to the urban core, it would be restored to approximately its 1950 population density over the next 50 years. These areas have accommodated significantly more residents in the past and could again in the future while restoring their economic vitality. [29]

If 1 in 10 new residents moved to lower risk areas of the Post-War Suburbs and 1 in 3 new residents moved to suburban infill areas of the Contemporary Suburbs, this growth could be accommodated through modest increases in population density. In this scenario, 1 in 3 new residents would still move to newly developed areas on the outer edges of the city. However, this scenario would result in close to 50 square miles of open space preserved in the Rural Mosaic, and potentially even more if climate adaptive new developments discussed earlier in this chapter are built.

This scenario is only one example of what Jacksonville might look like if a portfolio of opportunities for resilient growth are implemented through a deliberate approach that considers the character, needs, and opportunities in all neighborhoods across the city. While no one can predict the future, scenario analysis can be helpful to think through "what if?" outcomes of the actions outlined in this Strategy. Jacksonville will need to carefully consider both positive benefits and unintended consequences when moving from planning to implementation.

1946 Armistice Day parade on Adams St.
Credit: State Archives of Florida


MILE 6

GUIDING IMPLEMENTATION

GOVERNANCE AND ADAPTIVE MANAGEMENT

Implementation of *Resilient Jacksonville* will fall largely on the City, but everyone has a role to play. Many of the actions in this Strategy rely on partners: from Jacksonville's philanthropic and nonprofit organizations to partners in the state and federal government, implementation cannot proceed without collaborative efforts today and in the future.

As seen in Action 40, the Office of Resilience will facilitate the ongoing implementation of *Resilient Jacksonville*. While conditions can and will change over time, establishing this office will provide a central place of information sharing and progress tracking. Partners will know where to go to coordinate resilience actions, and City departments will have a clear forum for interdepartmental work.

The establishment of the Office of Resilience will also provide a transparent governance structure for *Resilient Jacksonville*. The office will be responsible for publishing annual progress updates, updating the strategy on a 5-year cycle, and adaptively managing implementation. As conditions change, the Office of Resilience will be best positioned to be a clearinghouse for updated science and data that tracks changing risks and vulnerabilities, and to put that information and context in the hands of project leaders, department heads, external partners, and other places where it is needed.

On a 5-year cycle, the Strategy's Actions and Sub-Actions will be revisited based on progress updates and other new information. While the vision, goals, and objectives will remain, the periodic updates can ensure that the Actions and Sub-Actions continue to be feasible and relevant. A set cycle for updating the Strategy makes it clear for everyone when and how these actions can be updated, with the Office of Resilience accountable and responsible for *Resilient Jacksonville*.

Challenges and Barriers

While *Resilient Jacksonville* has been developed with implementation in mind, the work of realizing the promise of this Strategy will require determination and fortitude. The future is unpredictable and environmental conditions will surely change. The greatest challenge is to ensure that new information furthers implementation of the Strategy. To do this, the Office of Resilience will continue to collect and synthesize the best available science and data on risks and vulnerabilities. For example, understanding the risks of compound flooding requires new kinds of probabilistic modeling that can account for how dynamics of different types of flooding interact with each other. The City is already engaged in developing a compound flooding model for Jacksonville over the next several years. This new risk information will inform implementation as it is developed.

Barriers to implementation usually include not enough money, not enough people, or not enough time. While this Strategy does not add hours to the day or dollars to the budget, it does provide a path to obtaining adequate funds: examining current spending to yield a resilience dividend, coordinating across departments and with partners to capitalize on opportunities for state and federal funds, and continued partnerships that extend the capabilities of City governmental staff. These investments do require time but offer tremendous benefits. The matrix of Actions and Sub-Actions below provides a summary of the overall suite, noting the key implementers and partners, projected timeframes, and relative costs.

Approach		Action	Subaction	Implementation Partners	Timeframe	Cost
Grow Resiliently	1	**Guide future growth in areas that are at low risk and well-connected to infrastructure.**	1.1 Update the City's land development regulations. 1.2 Facilitate strategic infill development in areas of low flood risk. 1.3 Incorporate resilience considerations into future land use.	Planning & Development / JEA / JTA / North Florida TPO / Development Community	Immediate	$$
Grow Resiliently	2	**Ensure infrastructure investments are aligned with land use priorities for growth and conservation.**	2.1 Ensure infrastructure investments are aligned with land use priorities for growth and conservation. 2.2 Prioritize utility expansion in high, dry, and connected areas.	Resilience / Planning & Development / Development Community	Short-Term	$$
Grow Resiliently	3	**Develop design guidelines for climate adaptive and low-impact new subdivisions, neighborhoods, and planned developments.**		Resilience / Planning & Development / Development Community	Immediate	$$
Grow Resiliently	4	**Increase and safeguard the supply of affordable housing in low-risk and well-connected neighborhoods.**	4.1 Expand property acquisitions and affordable housing development in low-risk areas. 4.2 Safeguard affordable housing by securing heirs' property rights.	JCLT / LISC / CDCs	Short-Term	$$$
Transform	5	**Update public works design standards to account for climate change impacts and support resilient infrastructure development.**	5.1 Align above-ground and below-ground infrastructure specifications and review process. 5.2 Update the standard details and specifications for City of Jacksonville street designs. 5.3 Incorporate green infrastructure features into drainage specifications.	Public Works / JEA / Subdivision Standards and Policy Advisory Committee / Context Sensitive Streets Committee	Immediate	$$
Transform	6	**Create connected and multimodal transportation options.**	6.1 Increase public transit service and ridership. 6.2 Strengthen first and last mile connections to transit. 6.3 Increase bicycle ridership through bike share and e-bike incentives.	Planning & Development / Public Works / JTA / FDOT	Medium-Term	$$$
Transform	7	**Build ecological and recreational connections across Jacksonville's parks and open spaces.**	7.1 Support the continued buildout of and safe connections to the Emerald Trail System. 7.2 Support the expansion of Jacksonville's regional trail system. 7.3 Connect open spaces and ecosystems to establish habitat corridors and improve water management.	Parks / Planning & Development / Public Works / North Florida TPO / JEA	Medium-Term	$$$
Transform	8	**Make room for the river and tributaries.**		Parks / Public Works / Groundwork Jacksonville / St. Johns Riverkeeper	Medium-Term	$$$
Transform	9	**Develop a green infrastructure program across Jacksonville based on the best available stormwater science and data.**		Resilience / Public Works / Parks	Medium-Term	$$$
Transform	10	**Expand Jacksonville's tree canopy.**	10.1 Plant more climate-adaptive trees to increase shade and ecosystem value. 10.2 Develop an Urban Forest Management Plan. 10.3 Improve the City's engagement with neighborhoods on the management and expansion of Jacksonville's tree canopy.	Parks / Public Works / Tree Commission / Greenscape	Medium-Term	$$
Transform	11	**Ensure water and energy utilities can meet the growing demands of the future.**	11.1 Support the implementation and regular updating of JEA's Integrated Resource Plans. 11.2 Improve energy resilience in Jacksonville's neighborhoods to minimize disruptions to service delivery.	JEA	Immediate	$
Preserve	12	**Preserve ecologically important areas with the capacity to manage water and mitigate extreme heat.**	12.1 Protect existing park and preserve lands in perpetuity. 12.2 Support strategic land acquisition for conservation.	Parks / SJRWMD / North Florida Land Trust	Short-Term	$$

Approach		Action	Subaction	Implementation Partners	Timeframe	Cost
Preserve	13	**Improve land management and stewardship to enhance ecosystem value, improve public safety, and reduce wildfire risk.**	13.1 Establish guidelines, resources, and trainings for resilient land management. 13.2 Manage invasive species and nuisance animals 13.3 Manage forests to reduce wildfire risk.	Parks / JFRD	Short-Term	$$
Preserve	14	**Discourage new development in current and future high-risk areas and mitigate downstream impacts in the watershed.**		Planning & Development	Short-Term	$
Preserve	15	**Enhance ecosystem and community health by improving water, soil, and air quality.**	15.1 Improve watershed health and water quality. 15.2 Address saltwater intrusion and rising groundwater threats. 15.3 Expand cleanups of toxic soils and brownfield sites. 15.4 Maintain healthy air quality.	Neighborhoods, Environmental Quality Division / SJRWMD / FDEP / JEA	Long-Term	$$$
Protect	16	**Invest strategically in hardened shorelines.**	16.1 Manage publicly owned bulkhead heights in accordance with best available flood data. 16.2 Set height standards for privately owned bulkheads. 16.3 Evaluate where additional publicly funded structural shoreline protection may be technically and financially feasible.	JCLT / LISC / CDCs	Medium-Term	$$$$
Protect	17	**Identify shorelines where natural and nature-based solutions can provide long-lasting ecosystem service benefits.**	17.1 Conduct research and analyses to identify waterfront edges most suitable for natural and nature-based solutions. 17.2 Address shoreline erosion in coastal parks. 17.3 Identify sand and sediment resources for natural and nature-based solutions.	Parks / USACE	Long-Term	$$$$
Protect	18	**Improve digital security of critical assets and infrastructure from cyberattacks.**		Information Technologies	Short-Term	$$
Prepare	19	**Strengthen emergency response and evacuation plans.**	19.1 Routinely refine the city's hurricane evacuation zones based on the best available data. 19.2 Identify high frequency flooding intersections for automated flood alert signage. 19.3 Create plans for extreme heat and freeze events	Resilience / JFRD - Emergency Preparedness / JEA / NEFRC	Immediate	$
Prepare	20	**Strengthen Jacksonville's lifelines and supply chains to withstand extended disruptions to regular operations and commerce.**	20.1 Work with critical service providers, like area hospital systems, to ensure adequate stockpile of resources. 20.2 Maintain commerce into and out of the city through partnerships with the Port and other agencies.	JAXPORT / CSX / JFRD - Emergency Preparedness / Hospitals	Short-Term	$
Accommodate	21	**Expand retrofit programs for residential and commercial buildings to improve building energy performance, storm fortification, cooling, and stormwater detention.**	21.1 Expand existing retrofit programs. 21.2 Leverage federal funding to improve community awareness of lower-cost floodproofing, heat, and energy performance upgrades. 21.3 Partner with Downtown building owners to adopt larger-scale retrofits like green roofs and shading. 21.4 Explore retrofits for stormwater ponds.	JEA / CDCs / LISC / SJRWM / Parks / DIA / HOAs / Academia	Medium-Term	$$$
Accommodate	22	**Implement resilient standards and codes for existing and new construction.**	22.1 Identify and promote standards that improve building and roof resilience to high winds. 22.2 Increase compliance of Florida Building Code standards, particularly on retrofits. 22.3 Develop design standards and guidelines for riverfront properties to accommodate flooding.	Parks / Public Works / Tree Commission / Greenscape	Medium-Term	$$

Approach		Action	Subaction	Implementation Partners	Timeframe	Cost
Accommodate	23	**Maximize the resilience of City-owned buildings and assets.**	23.1 Conduct energy benchmarking on City buildings. 23.2 Add green space, solar, and energy efficiency upgrades to school facilities and public buildings 23.3 Establish Resilience Hubs in strategically located public facilities. 23.4 Update the City's ADA Transition Plan to improve the safety and accessibility of public facilities.	Public Works / Parks / DCPS	Short-Term	$$$
Accommodate	24	**Invest strategically in existing parks to increase stormwater management capacity and reduce urban heat.**	24.1 Align resilience actions with the forthcoming Master Recreation Improvement Plan. 24.2 Create multi-beneficial park amenities with intentional stormwater retention.	Parks / Public Works	Medium-Term	$$$
Accommodate	25	**Repurpose vacant land for uses that best support resilience goals.**		Resilience / Public Works / DDRB / JCLT	Long-Term	$$$
Accommodate	26	**Retrofit parking lots and impervious surfaces to reduce urban heat and increase stormwater infiltration and storage.**		Resilience / Public Works / Tree Commission	Medium-Term	$$
Accommodate	27	**Harden vulnerable critical assets to mitigate damage from hazards and ensure continuity of operations.**	27.1 Fortify City-owned assets, such as evacuation roads and bridges. 27.2 Work with utilities and independent agencies to identify and fortify their vulnerable critical assets.	Public Works / JEA	Medium-Term	$$$$
Relocate	28	**Develop relocation plans for vulnerable critical assets that can be moved outside the floodplain.**	28.1 Develop plans for moving City-owned critical assets where alternative adaptation options are infeasible. 28.2 Work with utilities and independent agencies to develop and implement relocation plans for their critical assets.	Resilience / Public Works	Long-Term	$$$$
Relocate	29	**Streamline voluntary residential buyout and relocation programs for high-risk areas.**		JFRD - Emergency Preparedness / Neighborhoods - Housing Division	Long-Term	$$$$
Support	30	**Strengthen the citywide response to extreme heat and other public health emergencies.**	30.1 Expand JaxReady alert system for high heat days 30.2 Extend open hours and access to cooling infrastructure and air-conditioned public facilities during high heat days. 30.3 Provide heat trainings for schools and youth sports organizations. 30.4 Provide guidance on outdoor work standards for employers. 30.5 Ensure robust and dynamic public health planning for vector-borne diseases and pandemics.	Jax Ready / Mayor's Office / Health Department / DCSP / JEA	Short-Term	$$
Support	31	**Increase mental and physical health and well-being across Jacksonville through tailored resource delivery.**	31.1 Support the Blue Zones Project to improve community health and wellbeing. 31.2 Ensure residents can easily connect to available public and nonprofit resources and services. 31.3 Improve food security and healthy food access in all neighborhoods. 31.4 Prioritize veteran and servicemember health services. 31.5 Identify and connect with housebound seniors and people with disabilities. 31.6 Continue the existing collaboration between organizations serving homeless individuals.	Chief Health Officer / Military and Veterans Affairs / Parks / Economic Development / Blue Zones / United Way / Feeding Northeast Florida / Sulzbacher	Medium-Term	$$$
Support	32	**Improve housing condition and quality.**	32.1 Develop a rental registry and enforce minimum habitability requirements. 32.2 Establish right to counsel for evictions.	Neighborhoods Dept. / Jacksonville Housing / Housing and Legal Aid Nonprofit Organizations	Short-Term	$$

Approach		Action	Subaction	Implementation Partners	Timeframe	Cost
Support	33	**Develop, implement, and monitor plans in support of eliminating all bicycle and pedestrian deaths in Jacksonville.**	33.1 Complete a Vision Zero Action Plan with a goal of zero traffic fatalities and serious injuries among all roadway users by 2035. 33.2 Complete and update additional plans in support of the VZAP, including the Pedestrian and Bicycle Master Plan, Pedestrian Safety Action Plan, and Mobility Plan.	Planning & Development / Blue Zones	Short-Term	$$
Support	34	**Strengthen community cohesion in all of Jacksonville's neighborhoods through quality public spaces, events, and activities.**		Blue Zones / Build Up Downtown / Parks	Short-Term	$$
Thrive	35	**Engage Jacksonville's youth to guide future resilience and climate action.**	35.1 Foster youth leadership through the Mayor's Youth Council and Kids Hope Alliance. 35.2 Incorporate resilience education and materials into Jacksonville youth programs.	Resilience / YLAC / Kids Hope Alliance / St. Johns Riverkeeper	Immediate	$
Thrive	36	**Create new jobs, training, and business development opportunities by leveraging funding spent on resilience projects and programs.**	36.1 Coordinate with local educational institutions to offer specialized training for jobs that are needed to meet resilience goals. 36.2 Encourage small business formation, specialization, and expansion into resilience work.	Economic Development / Academic Institutions	Short-Term	$$
Thrive	37	**Expand digital and financial infrastructure necessary for full economic participation.**	37.1 Maximize resources available for expansion of broadband citywide. 37.2 Support new models of community banking.	Planning & Development / Florida DEO / LIFT JAX / VySar Credit Union	Short-Term	$$
Thrive	38	**Market Jacksonville's resilient business climate to attract new companies and investment.**		COJ / JAXUSA / JAX Chamber / DIA / Visit Jacksonville	Immediate	$
Thrive	39	**Address rising flood and homeowners' insurance costs by investing in risk reduction.**	39.1 Maintain participation in FEMA's CRS program to lower flood insurance premiums based on risk reduction activities. 39.2 Explore new and emerging models of hazard insurance for homeowners.	FEMA	Medium-Term	$$$
Collaborate	40	**Establish an Office of Resilience to facilitate the ongoing implementation of *Resilient Jacksonville*.**	40.1 Facilitate interdepartmental and interagency collaboration throughout City government and with external partners. 40.2 Use the best available science and data to inform decisions.	COJ / The Water Institute / JU	Immediate	$$
Collaborate	41	**Expand community knowledge and participation in resilience actions.**	41.1 Coordinate with local organizations, including nonprofits and philanthropy. 41.2 Coordinate public education and engagement activities.	CPACS / Neighborhoods Department / Local Nonprofits	Immediate	$
Collaborate	42	**Coordinate resilience actions and policies across agencies and relevant independent authorities.**		COJ / JEA / JAXPORT / JTA / JAA	Immediate	$
Collaborate	43	**Develop a Climate Action Plan that aligns Jacksonville's resilience goals with actions to promote sustainability.**	43.1 Lead the development of a Climate Action Plan for the North Florida region through the EPA Climate Pollution Reduction Grant. 43.2 Secure federal funding to implement climate actions.	EPA / Northeast Florida Regional Council / Audubon Florida	Immediate	$
Collaborate	44	**Support regional resilience efforts.**		Northeast Florida Regional Planning Council	Immediate	$
Collaborate	45	**Coordinate and leverage resilience investments with federal partners and resources, including military partners.**	45.1 Leverage federal data, tools, and other resources. 45.2 Build relationships with military and other federal partners to maximize resilience investments.	EPA / NOAA / USACE / USDOT / HUD / DOD / NASA / DOI	Immediate	$

ADA	Americans with Disabilities Act
ADU	Accessory Dwelling Unit
AIDS	Acquired Immunodeficiency Syndrome
Annual Exceedance Probability (AEP)	AEP is the probability that an area will experience a flood of a given magnitude or more within a year.
1% AEP flooding (future)	Flooding with a 1 in 100 chance of happening (or being exceeded) in a year is defined as 1% AEP flooding. This Strategy shows the future 2070 flood risk for 1% AEP.
10% AEP flooding	Flooding with a 1 in 10 chance of happening (or being exceeded) in a year.
Bioswale	A vegetated, shallow, landscaped area designed to capture, treat, and infiltrate stormwater as it moves downstream.
BRIC	Building Resilient Infrastructure and Communities (FEMA Grant Program)
Brownfield	A property with potential contamination from pollutants or hazardous substances.
Built environment	Structures and infrastructures built by humans.
Bulkhead	A dividing wall or barrier between parcels of land and water, often made of metal or concrete.
CAPA Heat Watch Program	Climate Adaptation Planning and Analytics Heat Watch Program.
CCAP	Comprehensive Climate Action Plan
CDC	Center for Disease Control and Prevention
CDCs	Community Development Corporations
CDGB	Community Development Block Grant (HUD Program)
CIP	Capital Improvement Plan
Cloudburst	A rain event that drops many inches of rainfall in a short period of time.
COJ	City of Jacksonville
Compound Flooding	When two or more flood drivers (e.g., tidal surge and heavy rains) occur simultaneously, resulting in more severe and/or frequent flooding.
CPAC	Citizens Planning Advisory Committee
CRA	Community Redevelopment Area
CRS	Community Rating System
Curvilinear grid	A spatial grid whose lines lie on curved lines (e.g., curved streets, cul-de-sacs) rather than straight lines.
DCPS	Duval County Public Schools
DDRB	Downtown Development Review Board
DIA	Downtown Investment Authority
Disjointed grid	A spatial grid with limited connections between regions.
DOD	U.S. Department of Defense
DOI	U.S. Department of the Interior
DOL	U.S. Department of Labor
Ecological corridor	A zone of passage between natural areas, allowing species to move more freely.
Ecosystem services	Goods or services provided by the natural environment to people.

EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
EQD	Environmental Quality Division - Neighborhoods Department
ESG	Environmental, Social, and Corporate Governance
EV	Electric vehicle
Exposure	The presence of people, assets, or ecosystems in places where they can be adversely affected by hazards.
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEGN	Florida Ecological Greenways Network
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
Floodplain	Low-elevation land near rivers prone to flooding.
Gray infrastructure	Conventional stormwater infrastructure, such as gutters, walls, drains, pipes, and retention areas.
Green infrastructure	Infrastructure replicating natural environments, such as permeable pavement, bioswales, and living shorelines.
Greenhouse gas	A gas, such as carbon dioxide, that retains heat and causes atmospheric temperatures to rise.
Groundwater	Water held underground in aquifers.
GSI	Green stormwater infrastructure
Heat dome	The trapping of hot ocean air in the atmosphere, resulting in pockets of hot air remaining in a geographic region for an extended time.
Heat index	The heat experienced from the combination of temperature and humidity.
HIV	Human Immunodeficiency Virus
HMGP	Hazard Mitigation Grant Program (FEMA)
HOA	Homeowner Association
HUD	U.S. Department of Housing and Urban Development
HVAC	Heating, Ventilation, and Air Conditioning
IIJA	U.S. Infrastructure Investment and Jobs Act
Impervious surface	An artificial or manmade structure covered with water-resistant materials (e.g., roads paved with asphalt).
Incinerator ash	Incinerator ash is ash generated by the burning of waste.
Infill development	The rededication of open or vacant property in cities to new construction.
Infrastructure	The fundamental structures and facilities (e.g. buildings, roads, power, water) that serve the city and its inhabitants.
Invasive species	A foreign species introduced to a new area that causes harm to native species.
IRA	U.S. Inflation Reduction Act
IRP	Integrated Resource Plan
JAA	Jacksonville Aviation Authority

JAX	Jacksonville International Airport
JAXPORT	Jacksonville Port Authority
JCLT	Jacksonville Community Land Trust
JEA	Jacksonville's community-owned electric, water, and sewer utility.
Jetty	A bulkhead or breakwaters designed to protect the mouth of a harbor or channel.
JFRD	Jacksonville Fire and Rescue Department
JRTC	Jacksonville Regional Transportation Center
JTA	Jacksonville Transportation Authority
JU	Jacksonville University
KHA	Kids Hope Alliance
Landscape fragmentation	The separation of natural areas, reducing the ability of species to move freely.
Land use	The human use of land, including various cultural and economic activities (e.g., commercial, industrial, residential, or recreational).
LED	Light-Emitting Diode
LEED	Leadership in Energy and Environmental Design
LISC	Local Initiatives Support Corporation
Littoral shelf	The shallow shelf in a body of water inhabited by aquatic vegetation.
Living shoreline	A stabilized shoreline made of plants, sand, and rock, as opposed to a bulkhead.
MOSH	Museum of Science and History
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standard
N.A.S. Jacksonville	Naval Air Station Jacksonville
NASA	National Aeronautics and Space Administration
NEFRC	Northeast Florida Regional Council
NERC	North American Electric Reliability Corporation
NFIP	National Flood Insurance Program
NFWF	National Fish and Wildlife Foundation
NOAA	National Oceanic and Atmospheric Administration
NORA	New Orleans Redevelopment Authority
North Florida TPO	North Florida Transportation Planning Organization
NS	Norfolk and Southern Railway
Nuisance flooding	Flooding that occurs during high tides and causes minor impacts, such as water in low-lying areas.
OSHA	Occupational Safety and Health Administration
PCAP	Priority Climate Action Plan
Photovoltaic	Relating to production of electricity from light.
Pocket park	A public park in municipal areas characterized by its small size.
Probabilistic modeling	A modeling approach that accounts for random occurrences or actions to forecast the possibility of future events.
PTSD	Post-Traumatic Stress Disorder

PUD	Planned Unit Development
PV	Photovoltaic
PWD	Philadelphia Water Department
Redlining	The discriminatory practice of refusing loans or other services to customers in a geographic area, usually due to race.
Resilience dividend	The net benefits to well-being that accrue from investments aimed at increasing resilience.
Resilience value	The contribution of an action to improve the capacity for resilience.
Riparian	Relating to rivers or the wetlands next to rivers.
Risk	A combination of the likelihood of a hazard; exposure and vulnerability of people, assets, or ecosystems to that hazard; and negative impacts from the hazard.
Saltwater intrusion	The contamination of fresh groundwater with saltwater, compromising the integrity of the fresh water.
SBA	U.S. Small Business Administration
SFHA	Special Flood Hazard Area
SJRWMD	St. Johns River Water Management District
SNAP	Supplemental Nutritional Assistance Program
SSPAC	Subdivision Standards and Policy Advisory Committee
Stormwater infiltration	The process by which stormwater flows into and through the soil.
Strategic hardening	Techniques and best practices for reducing vulnerability.
Surface water	The water held above ground in wetlands, streams, lakes, or other waterbodies.
Thin-layer placement	The application of dredged sediment in thin layers on shoreline or wetland restoration projects.
THIRA	Jacksonville Regional Threat and Hazard Identification and Risk Assessment; a report that explored acute shocks and chronic stressors as potential threats to Jacksonville.
TRUE	Total Resource Use and Efficiency
UNF	University of North Florida
Urban heat island	A metropolitan area experiencing higher-than-average temperatures due to increased pavement surface area, reduced shade, or other factors.
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
Utility corridor	A linear tract of land set aside for the placement of above- and below-ground infrastructure.
VCTC	Voluntary Cleanup Tax Credit
VMT	Vehicle Miles Traveled
Vulnerability	The tendency for an asset to be adversely affected if one or more hazards were to occur.
Watershed	The area of land that drains into a specific body of water.
Walkable scale	The accessibility of an area or amenities by foot.
Wetland mitigation banks	Protected or restored wetlands compensating for the degradation of wetlands in another area, usually due to coastal development.

JACKSONVILLE TODAY

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PLACE-BASED STRATEGIES

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Photo 01: Historic Walkable Neighborhoods Historic Residential Character. Photo Credit: Steven Martin

Photo 02: Post-War Suburbs Neighborhood Character. Photo Credit: Halff

Photo 03: Contemporary Suburbs Expansive Commercial Hubs. Photo Credit: Mike Kalasnik

Photo 04: Industrial Riverfront Logistics Infrastructure. Photo Credit: JAXPORT

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