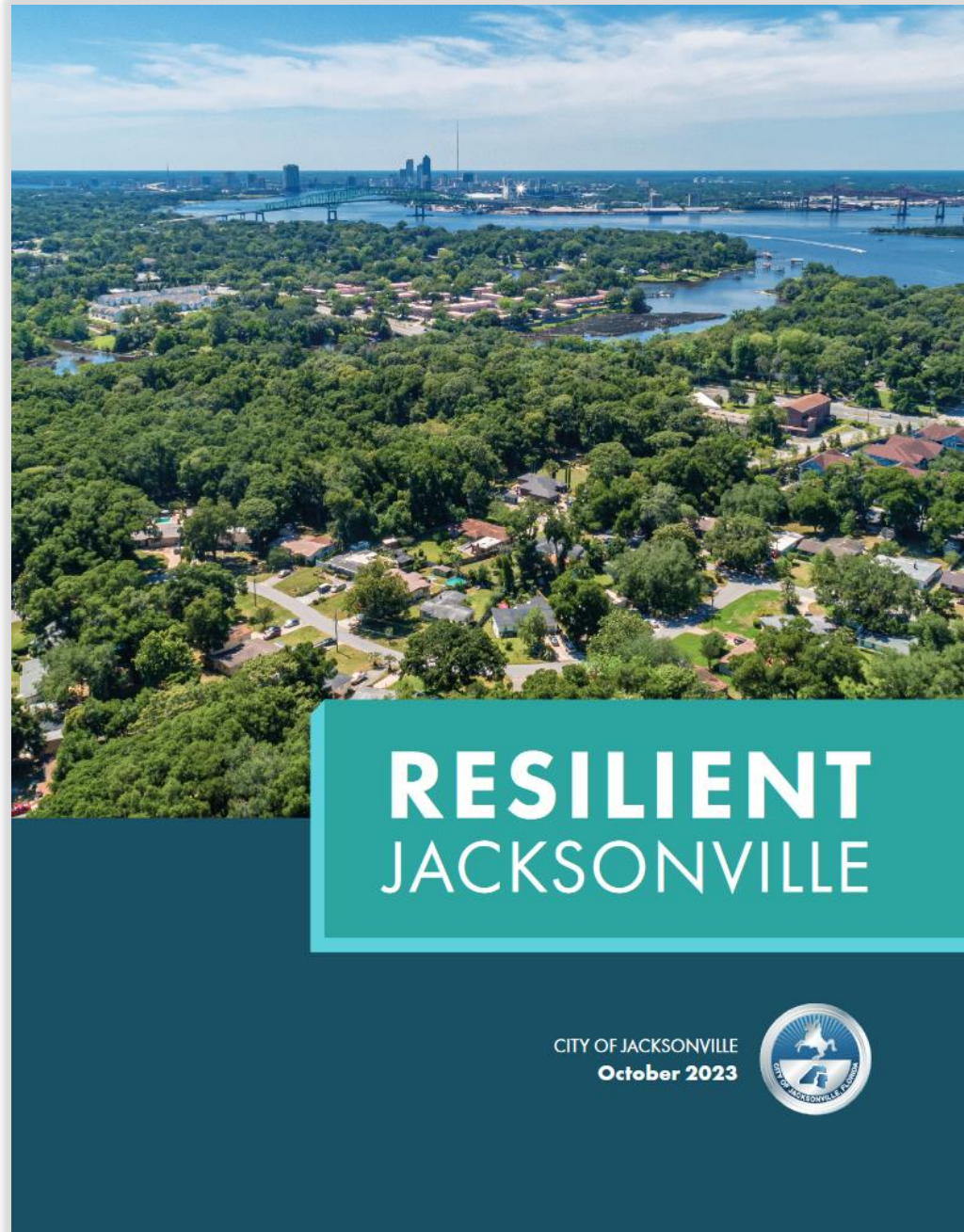




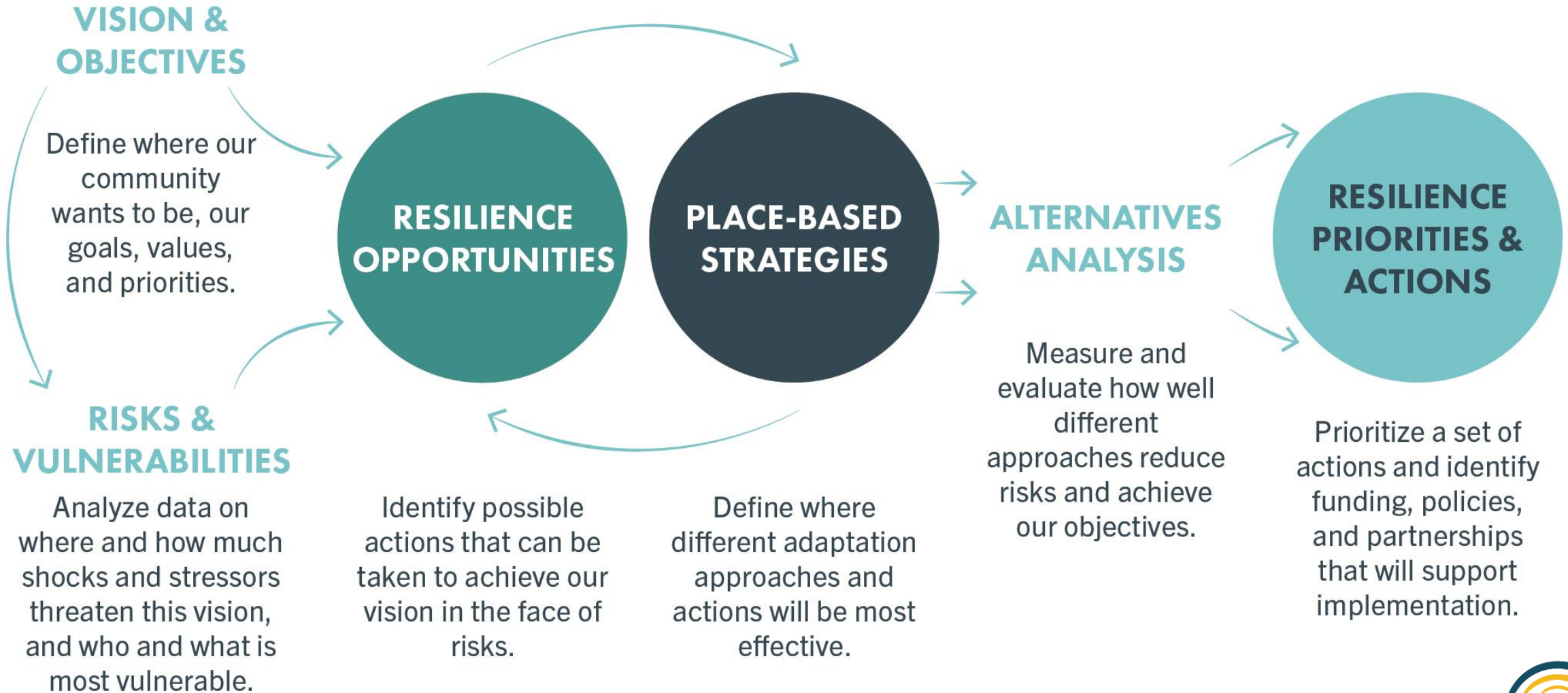
RESILIENT JACKSONVILLE

FSA Conference
November 29, 2023

50-year plan
to prepare
Jacksonville
for the future



A COLLABORATIVE PROCESS GROUNDED IN SOUND SCIENCE



A COMPREHENSIVE APPROACH

CITY RESILIENCE is the ability of city systems to **adapt** and **thrive** in the face of **acute shocks** and **chronic stressors**.



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

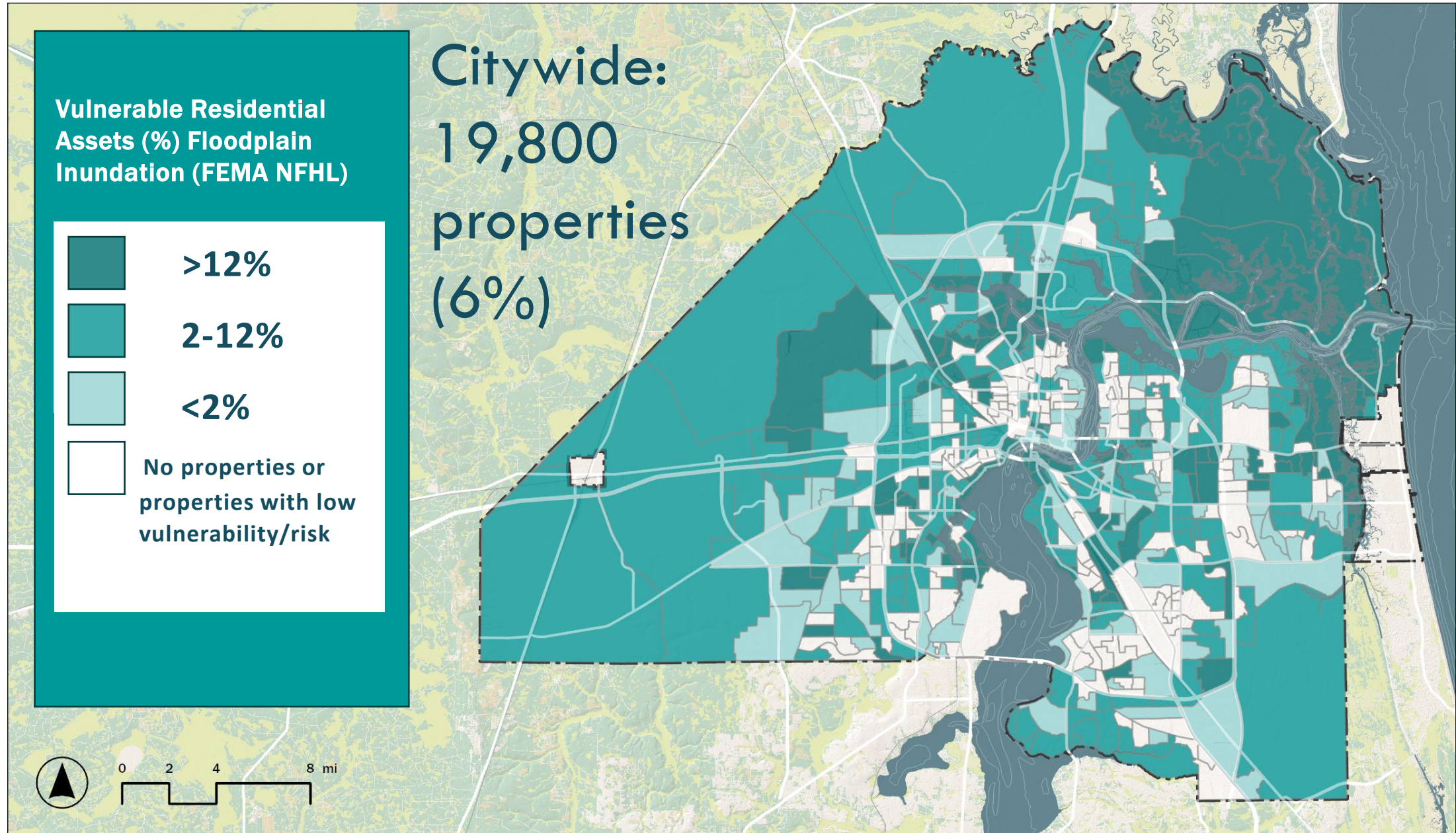
Long-term pressures that weaken the fabric of a community over time

- 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

Same exposure - different vulnerability

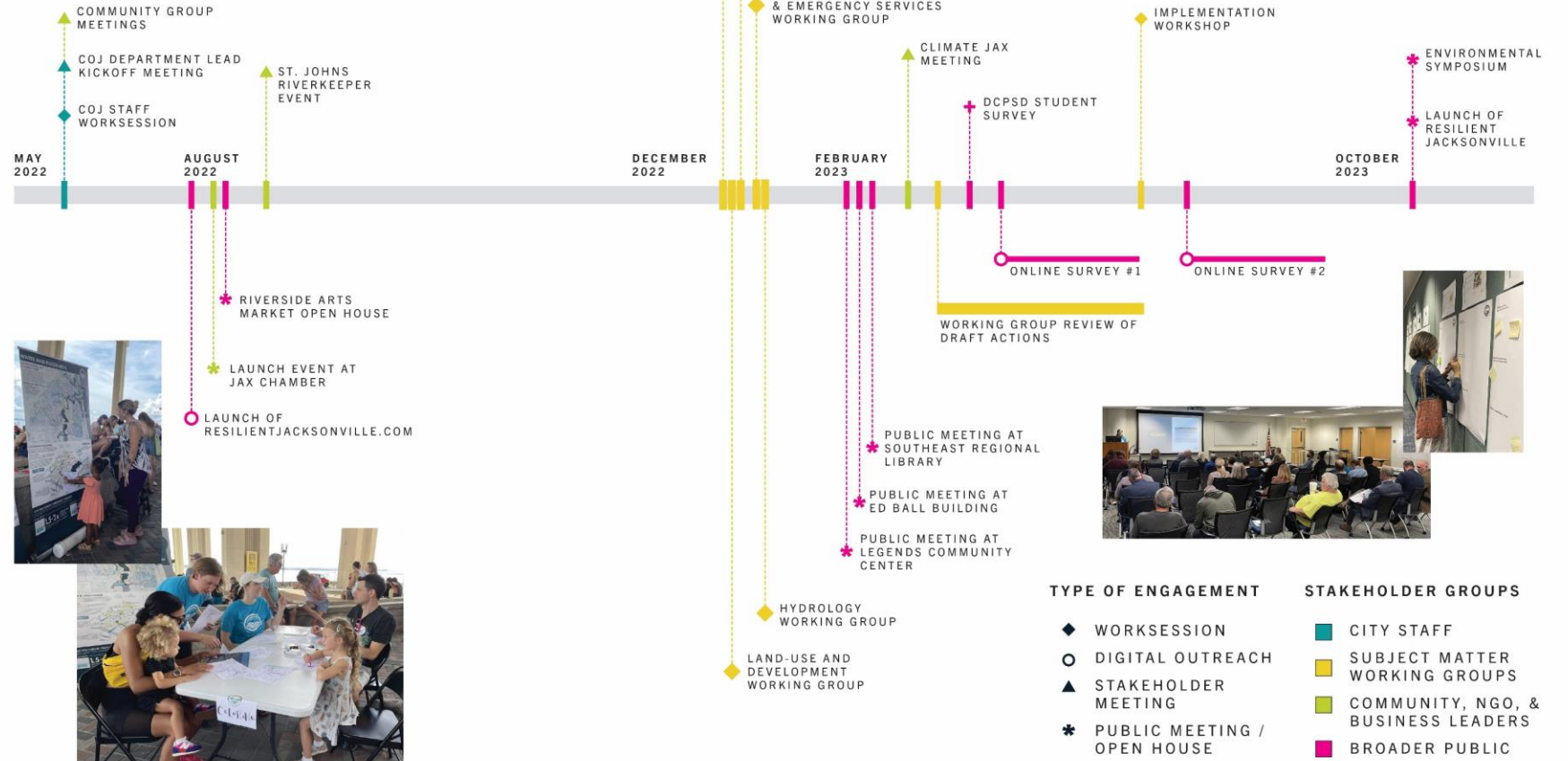
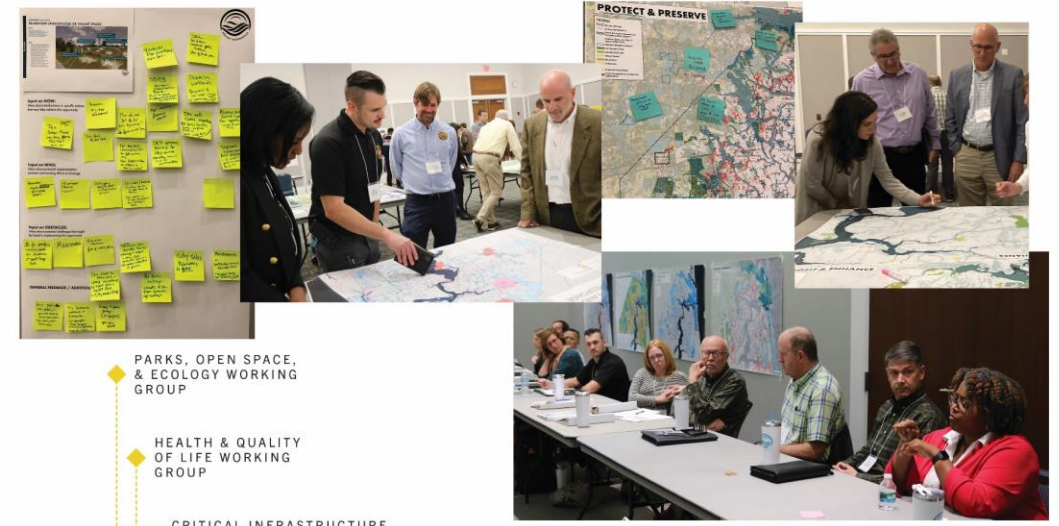


Widespread Residential Vulnerability to Current Floodplain Inundation (FEMA NFHL)



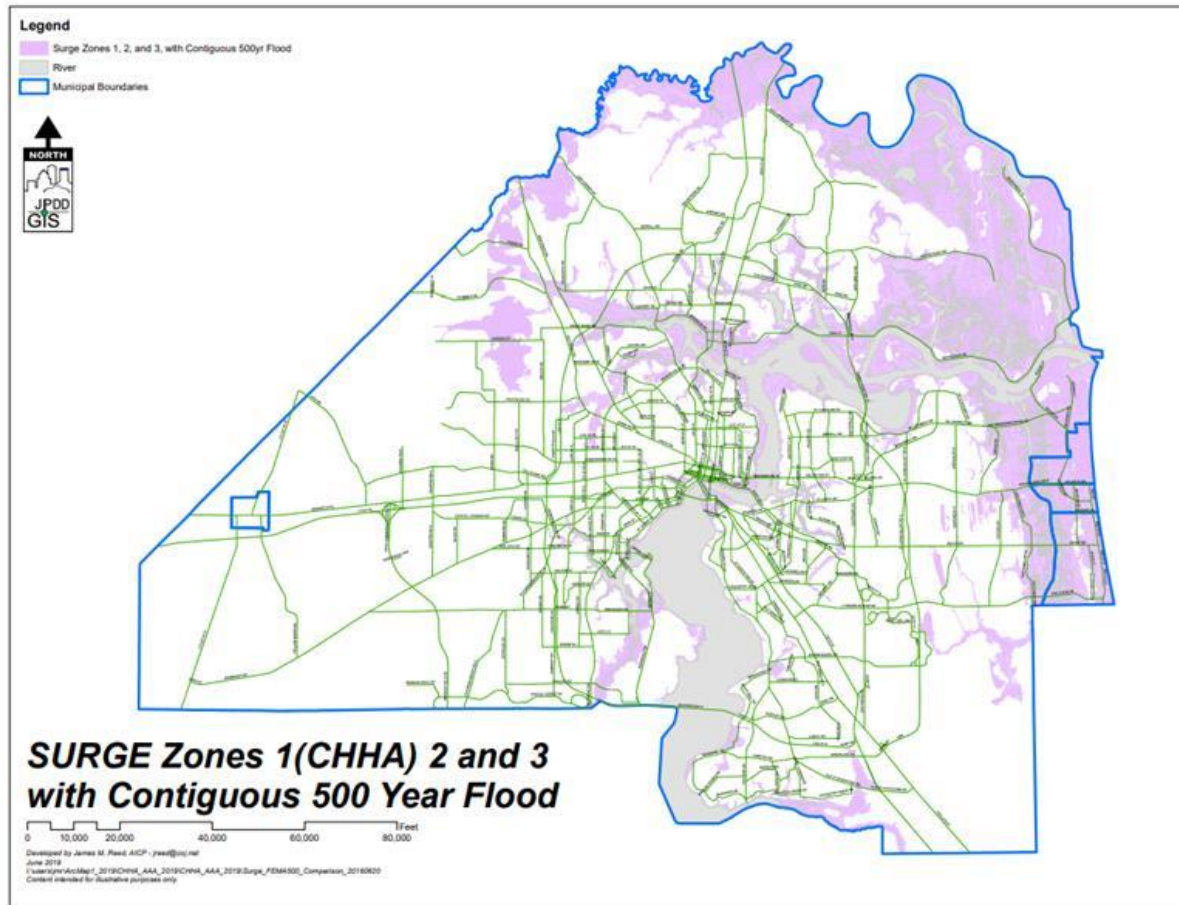
COLLABORATIVE DEVELOPMENT OF ACTIONS

- 45 Actions
- 90 Sub-Actions
- All identify implementation details, partners, funding mechanisms, timelines, and costs.



ADAPTATION APPROACHES:

Jacksonville Adaptation Action Area Working Group



- **Protection** strategies are those that directly protect vulnerable structures.
- **Accommodation** strategies provide for alterations that allow vulnerable structures to stay in place with modifications.
- **Relocation** strategies offer voluntary, incentivized, or gradual retreat where protection and accommodation are not efficient or effective.
- **Avoidance** strategies aim to guide new development away from vulnerable areas.

ADAPTATION APPROACHES:

Resilient Jacksonville



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.



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: Half

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



Relative Cost



SUB-ACTIONS

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.



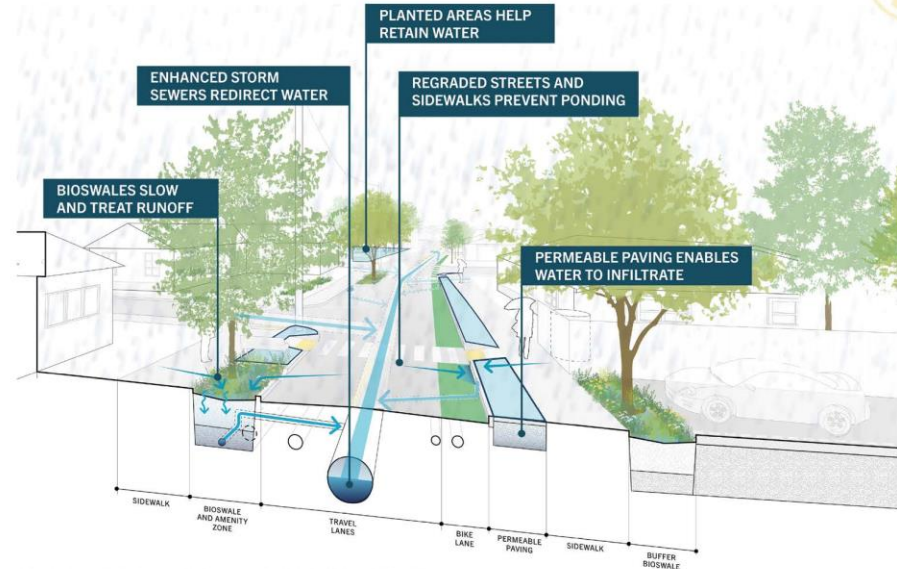
EXAMPLE
REDESIGNING STREET STANDARDS

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.

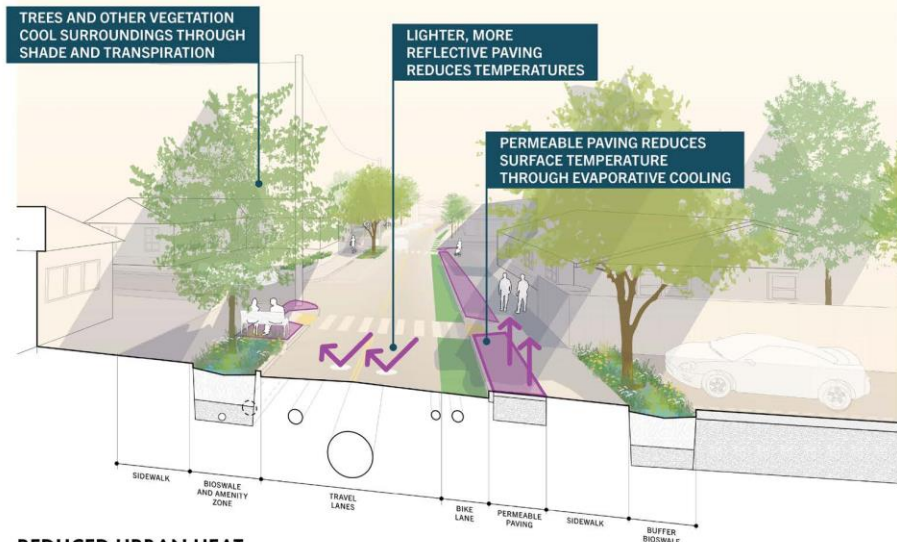
New design standards can apply to street renovation or reconstruction project as well as to new roads. Redesigning and augmenting Jacksonville's street design standards will provide new options for both the Department of Public Works and private developers.



IMPROVED STORMWATER MANAGEMENT



ENHANCED URBAN DESIGN



REDUCED URBAN HEAT

ADAPTATION APPROACHES:

Resilient Jacksonville



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.

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



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.

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.



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.

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.





RELOCATE

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

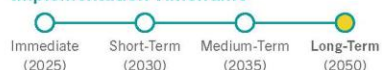
Implementation Partners

Resilience / Public Works

Potential Funding Mechanisms

FEMA HMGP

Implementation Timeframe



Relative Cost



SUB-ACTIONS

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.

ADAPTATION APPROACHES:

Resilient Jacksonville



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.



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



Relative Cost



SUB-ACTIONS

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.



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

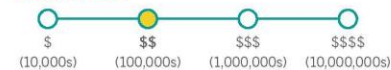
Potential Funding Mechanisms

General Fund / FUSE Fellows

Implementation Timeframe



Relative Cost



SUB-ACTIONS

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.

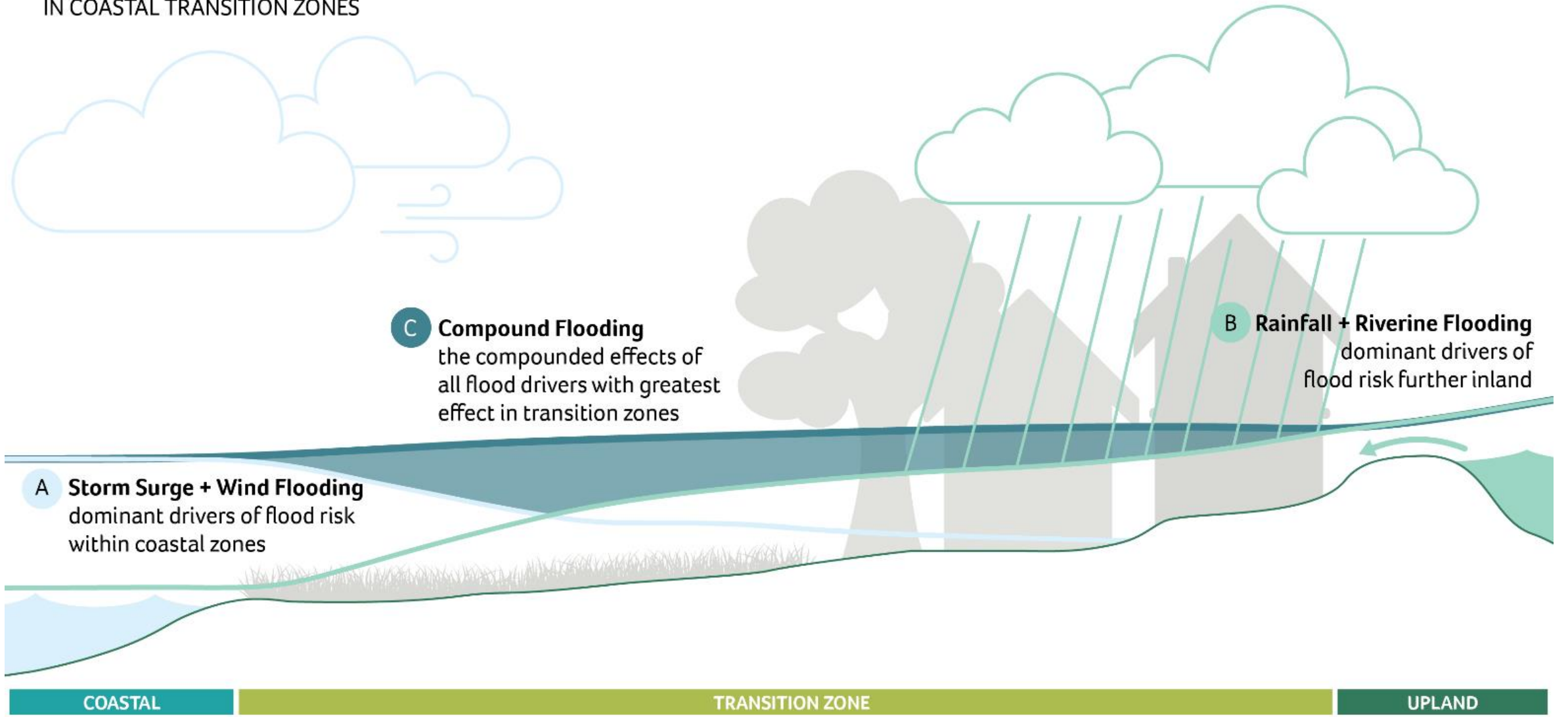
40.2 Use the best available science and data to inform decisions.

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.



COMPOUND FLOODING

IN COASTAL TRANSITION ZONES



Compound flooding occurs when rainfall, riverine flow, and storm surge hazards interact to produce combined flood hazards.

PLACE-BASED STRATEGIES

Defining *where* different adaptation approaches make sense



Adaptation approaches need to be tailored to different conditions on the ground in Jacksonville.



Our goal is 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.



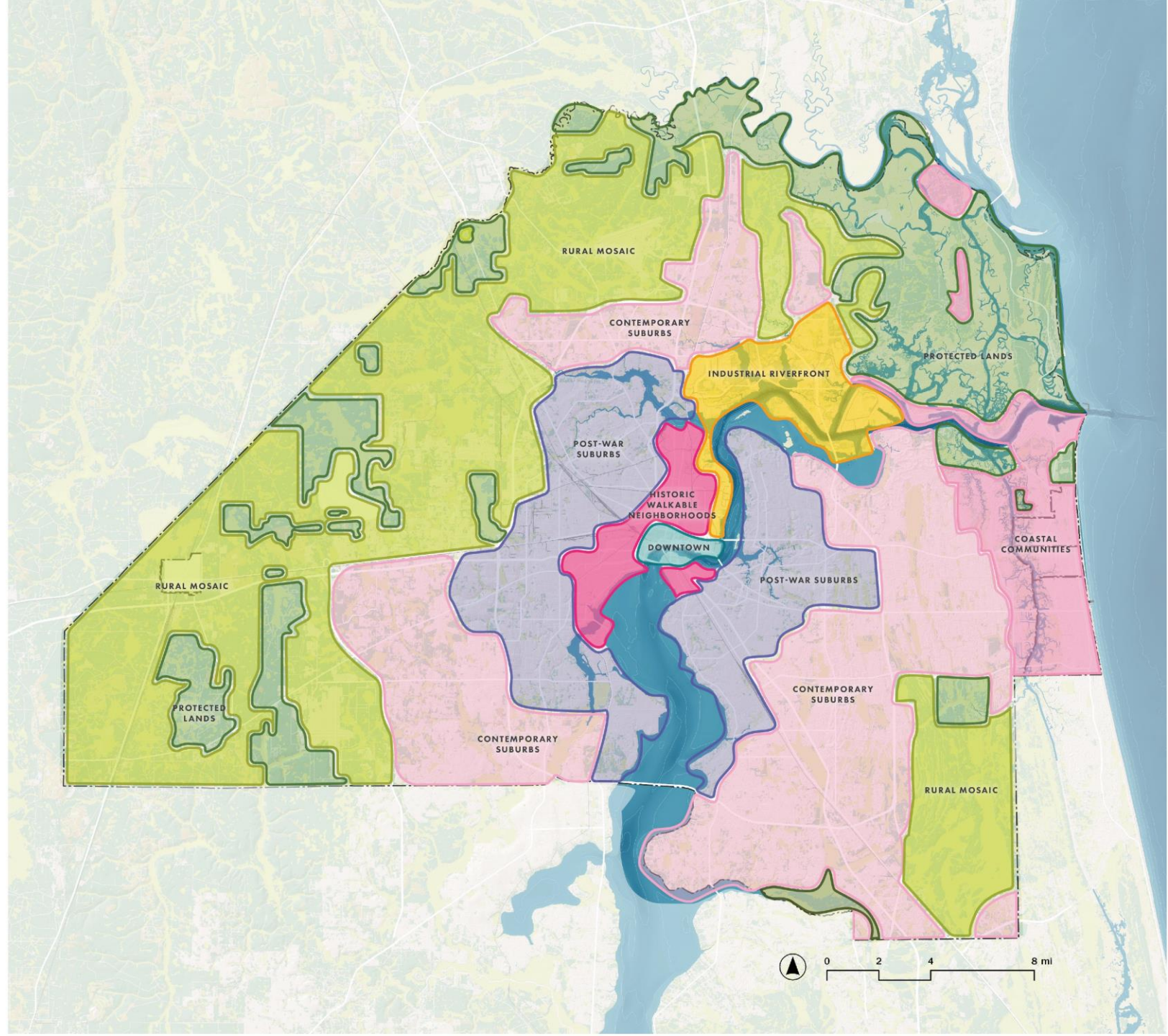
DEFINING DEVELOPMENT TYPES

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

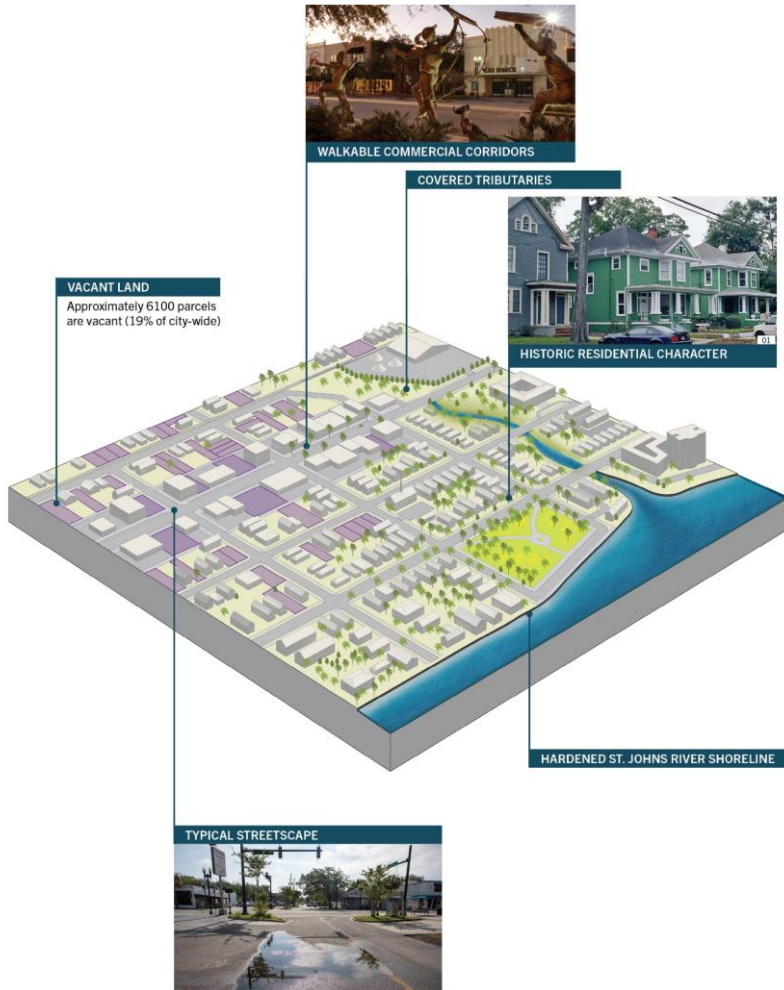
	Age/Era of Development	Density of Development	Street + Roadway Network	Residential + Commercial Urban Form	Stormwater + Wastewater Infrastructure	Use of + Relationship to Waterbodies	Impervious Surface + Vegetated Cover
URBAN	Historic / pre-WWII	High density	Gridded, connected, walkable	Mixed Use	Curbs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

DEVELOPMENT TYPES

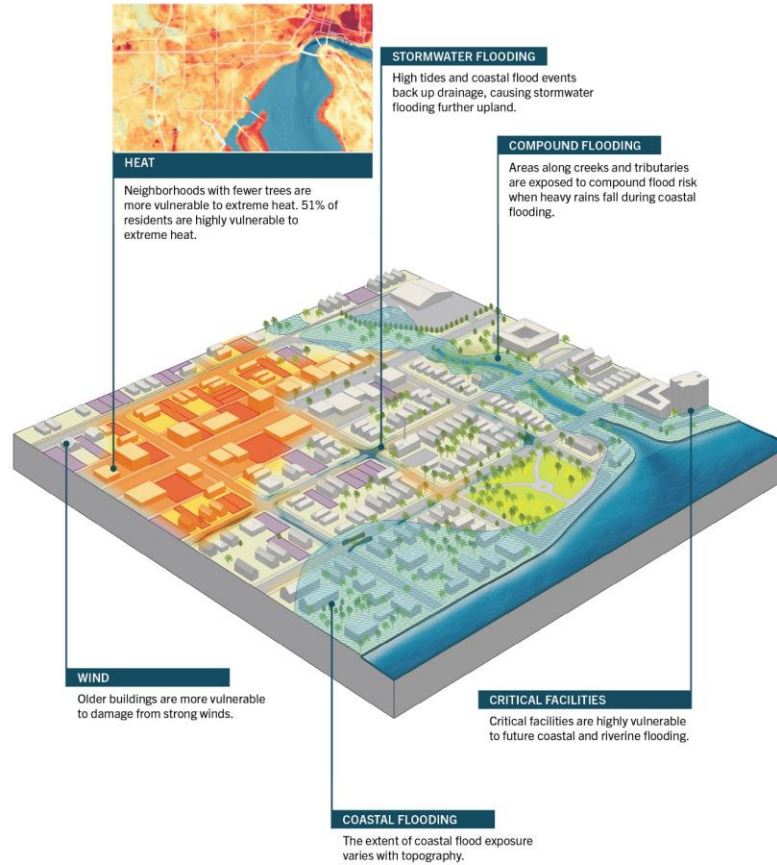
-  Downtown
-  Historic Walkable Neighborhoods
-  Post-War Suburbs
-  Contemporary Suburbs
-  Industrial Riverfront
-  Coastal Communities
-  Rural Mosaic
-  Protected Lands



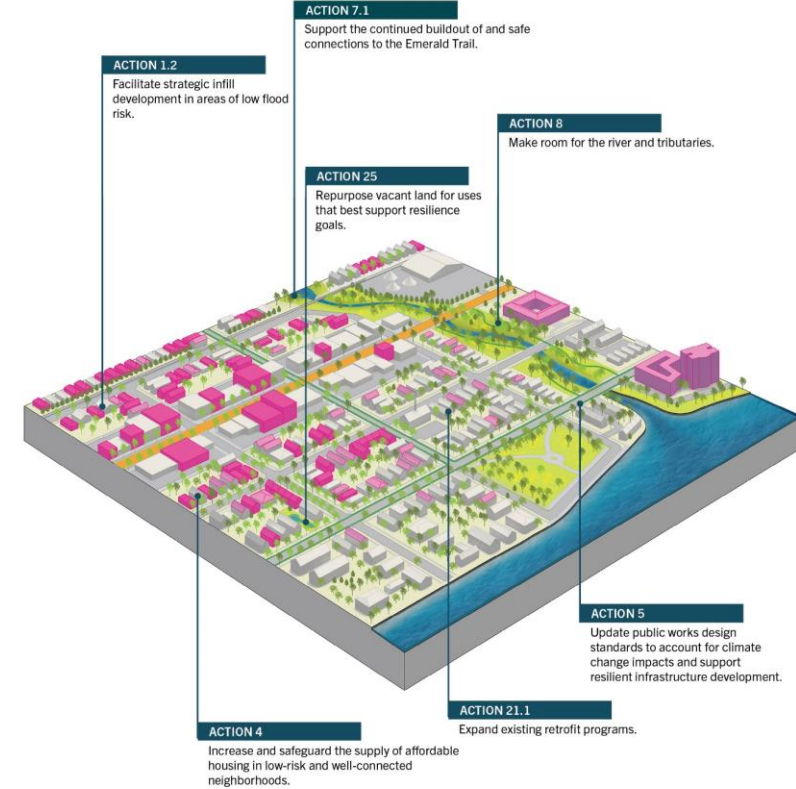
HISTORIC WALKABLE NEIGHBORHOODS



Scale: Tile above represents approximately 0.1 sq miles.



Floodplain
Stormwater Flooding
Urban Heat



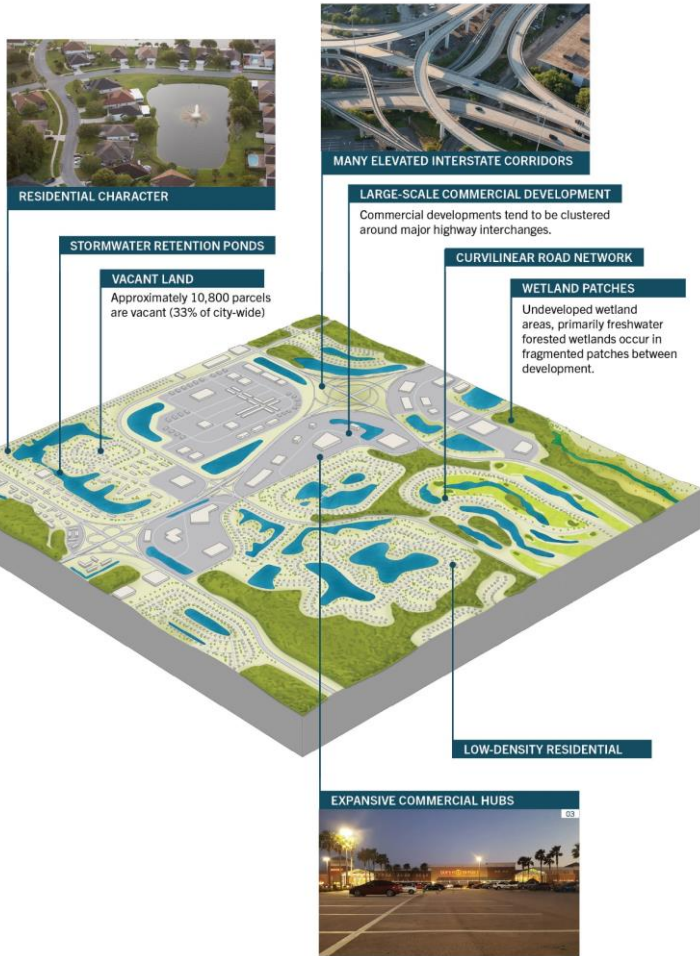
Resilient development
Improved evacuation routes
Resilient streetscape
Building retrofits

Character

Risks

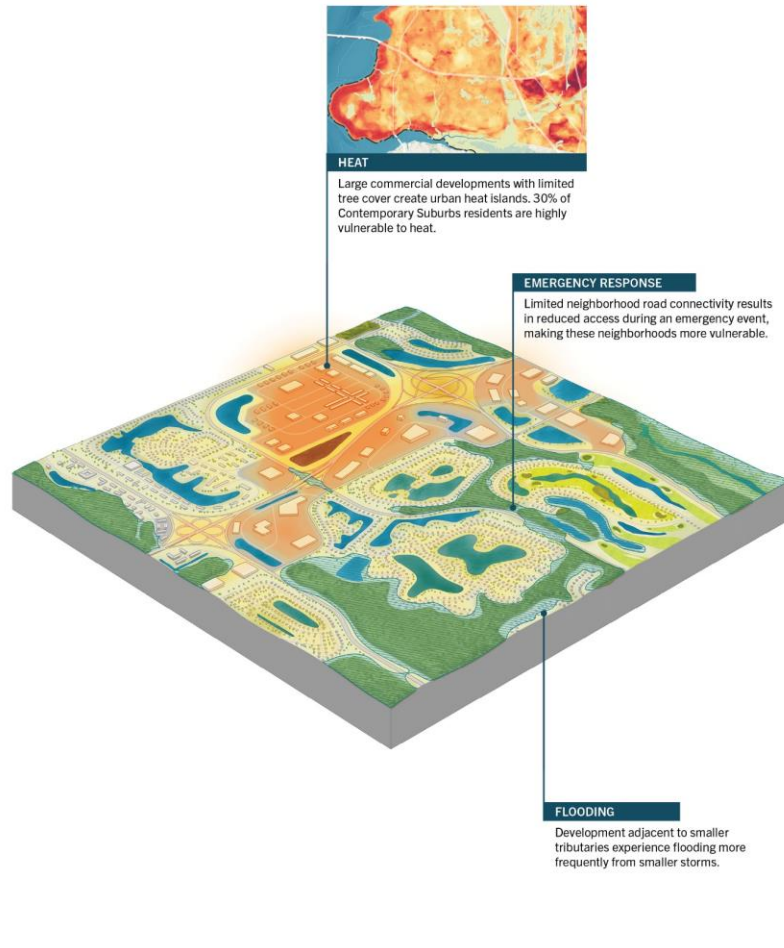
Opportunities

CONTEMPORARY SUBURBS



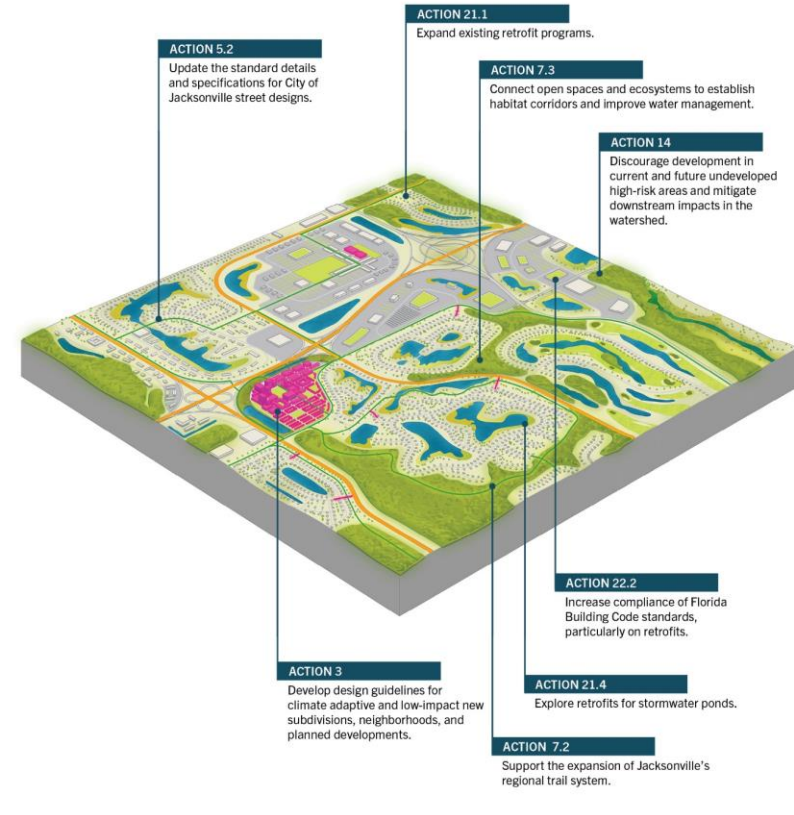
Scale: Tile above represents approximately 12 sq miles.

Character



Floodplain
Stormwater Flooding
Urban Heat

Risks



Resilient parking garage
Improved evacuation routes
Resilient streetscape or greenway
Solar panels or green roof
Subdivision additional access

Opportunities

RURAL MOSAIC



WORKING LANDS



LOW DENSITY RESIDENTIAL AND HISTORIC SITES

LOGISTICS FACILITIES

UPPER WATERSHEDS

VACANT LAND
Approximately 4,100 parcels are vacant (13% of city-wide)

TIMBER AND AGRICULTURE

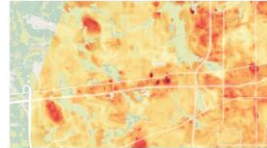
OUTDOOR RECREATION



UNDEVELOPED FORESTS AND WETLANDS

Scale: Tile above represents approximately 2 sq miles.

Character



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.

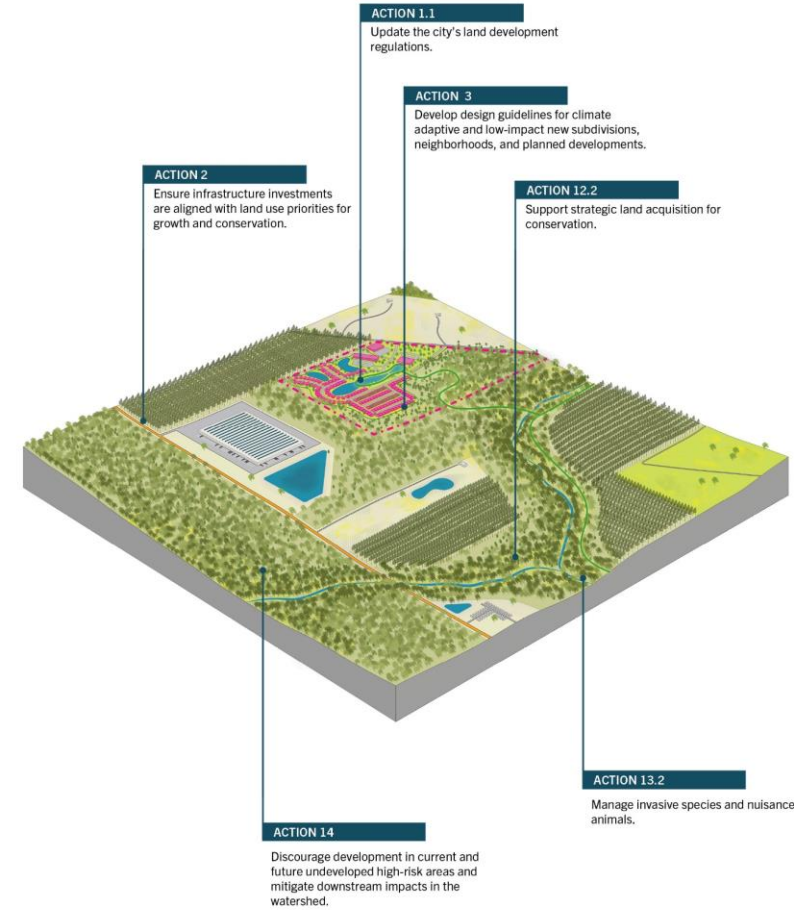
FIRE
Drought and high temperatures increase wildfire activity. Development encroaching into wildlands increases wildfire risk.

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.

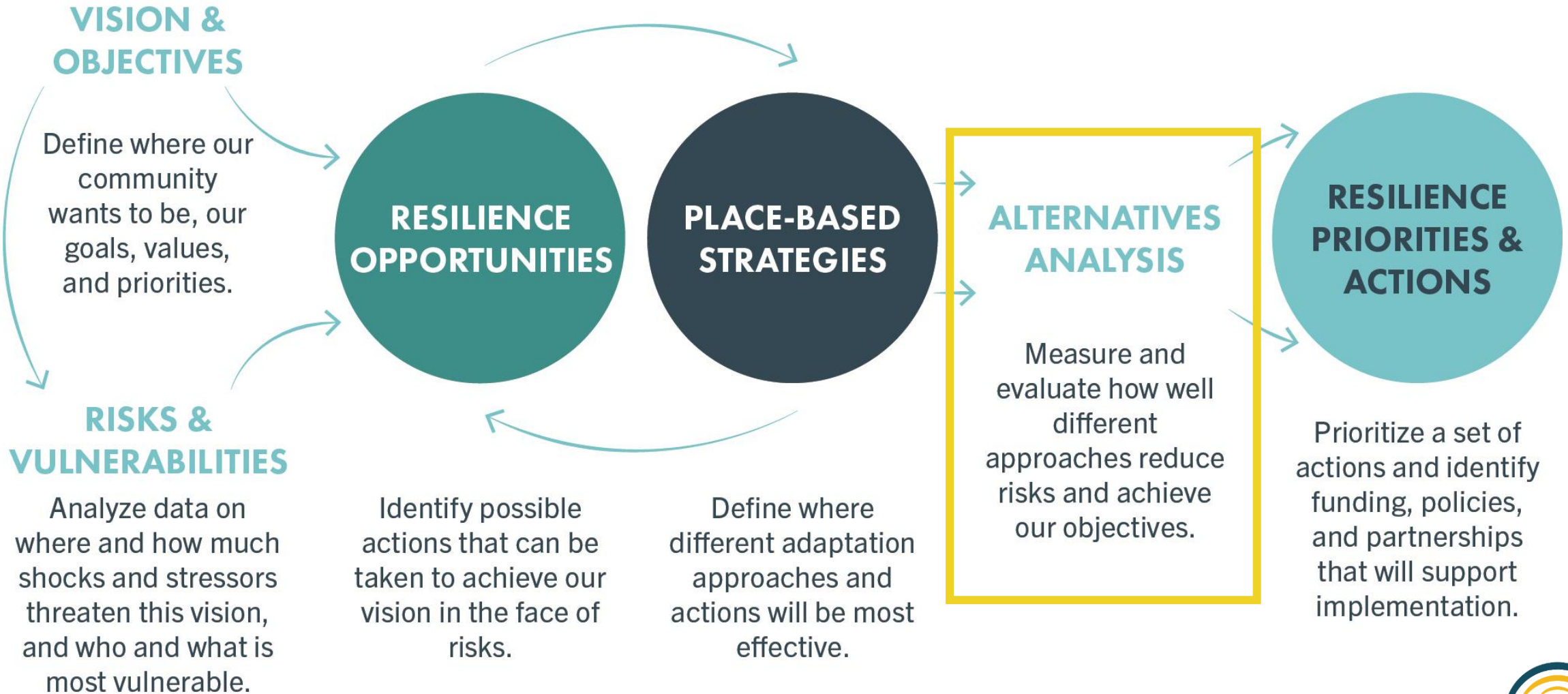
- Floodplain
- Wildfire
- Urban Heat

Risks

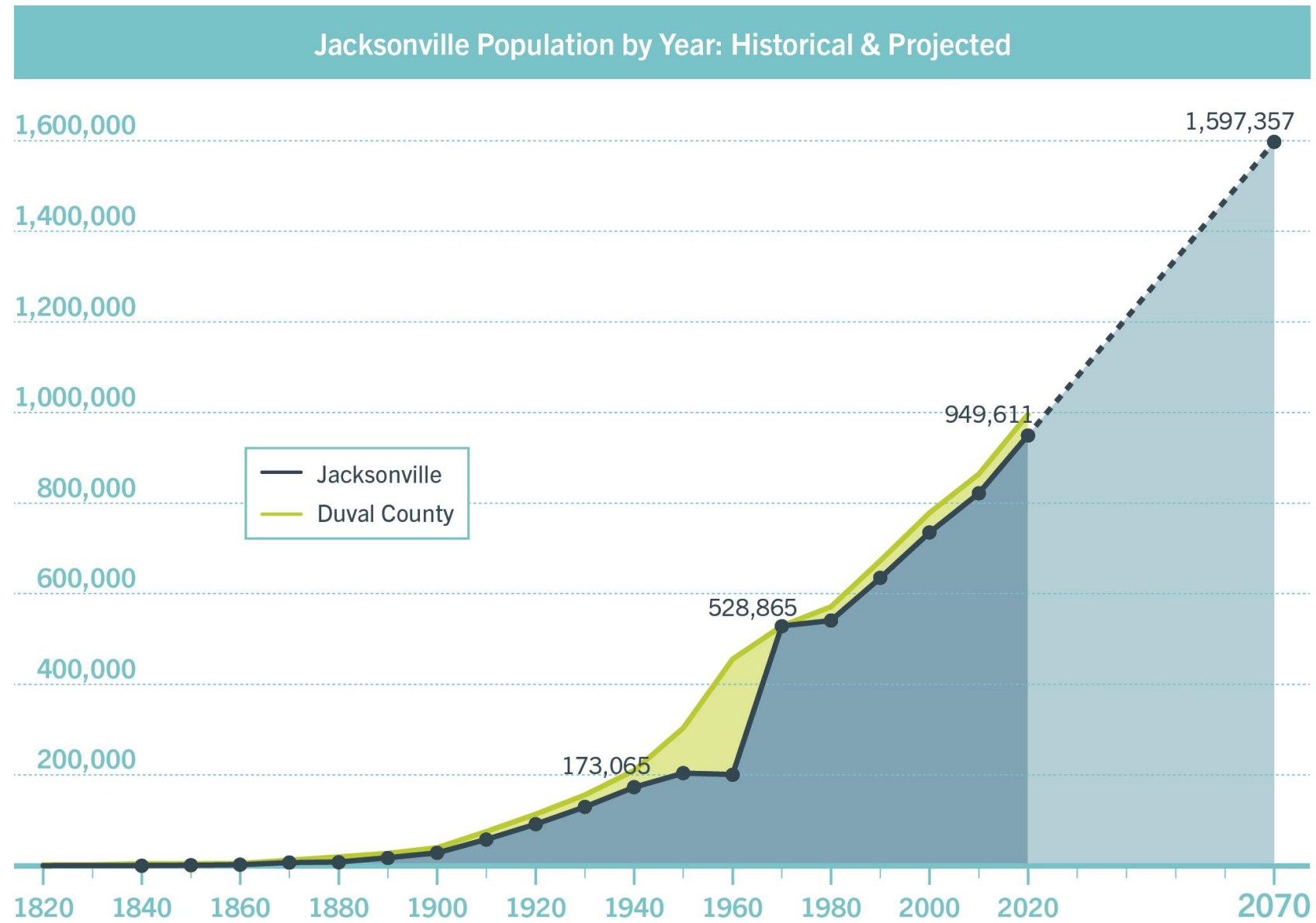


- Resilient development
- Improved evacuation routes
- Greenway trail
- Solar panels or green roof

Opportunities



If trends continue,
Jacksonville will grow by
685,000 people by 2070,
for a population of **1.6**
million.





*150 mi² of additional
development to
accommodate growth*



*Potential for most
remaining rural areas to
convert to suburbs by 2070*

A FUTURE WITHOUT ACTION

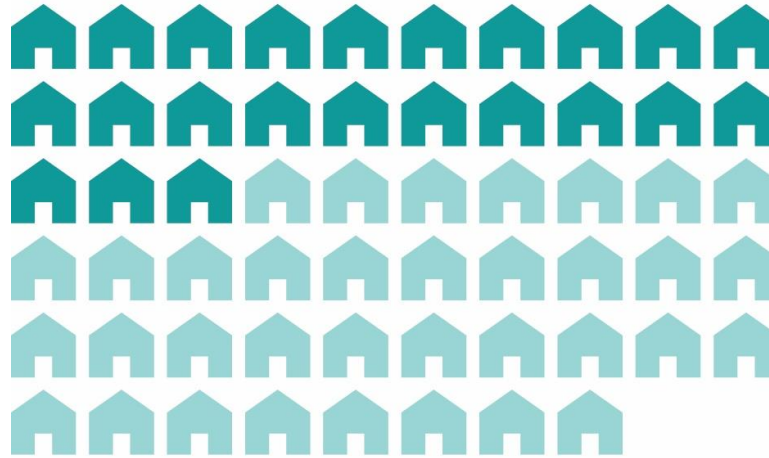
Residents Exposed to Potential Flooding



 = 10,000 people **TODAY**  = 10,000 additional people in 2070

140,000 -> **430,000**

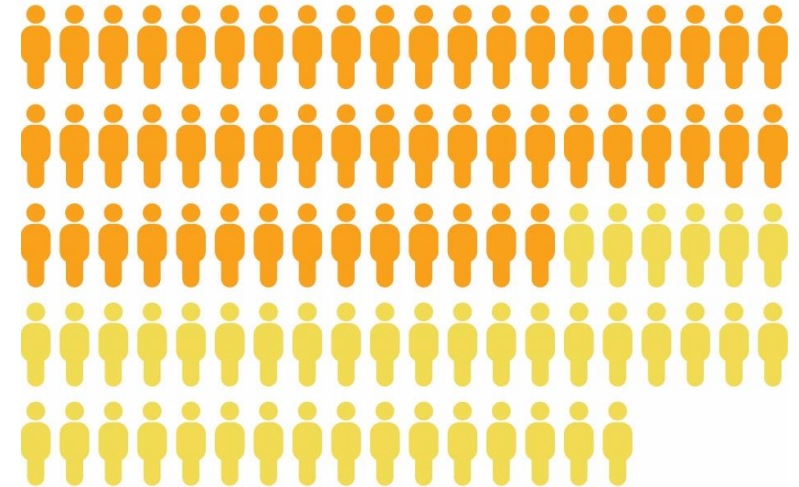
Assets Vulnerable to Potential Flooding



 = 1,000 assets **TODAY**  = 1,000 additional assets in 2070

23,000 -> **58,000**

Residents Vulnerable to Extreme Heat



 = 10,000 people **TODAY**  = 10,000 additional people in 2070

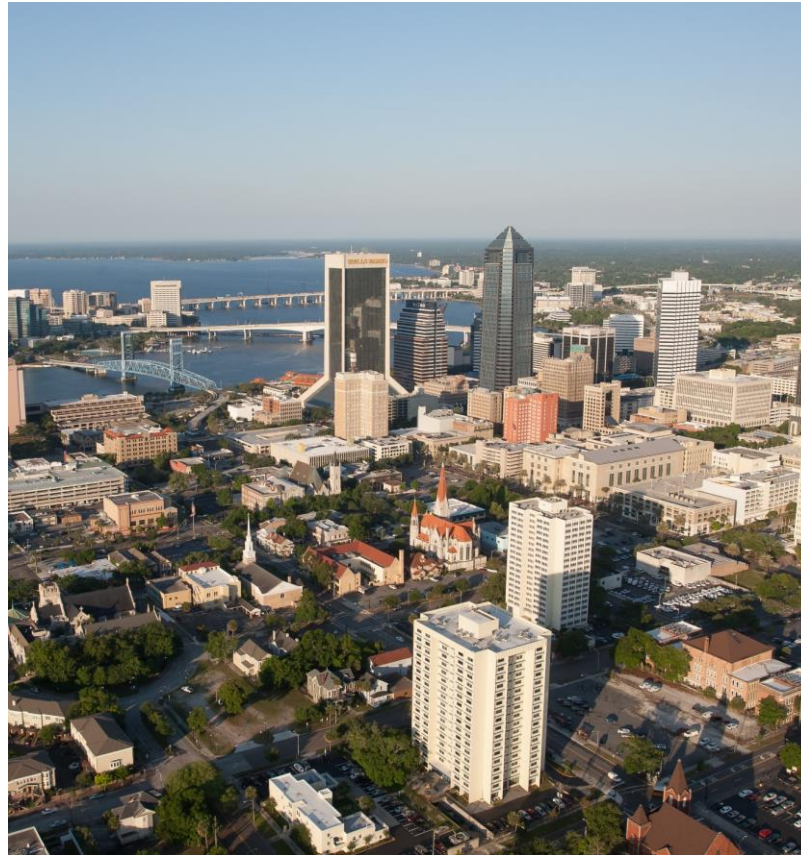
536,000 -> **959,000**

SCENARIOS FOR CITYWIDE ADAPTATION

What if...recent development patterns continue?



What if...growth is focused in the urban core?



What if...growth is focused in existing suburban areas?



PLANNING TEAM



SCAPE



ADG



DOWNLOAD THE STRATEGY

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