Innovations in Resilience Planning and Policy in Jacksonville, FL

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New Orleans, Louisiana

May 21, 2025

WHO WE ARE

LANDSCAPE ARCHITECTS

\+ ARCHITECTS

\+ URBAN DESIGNERS

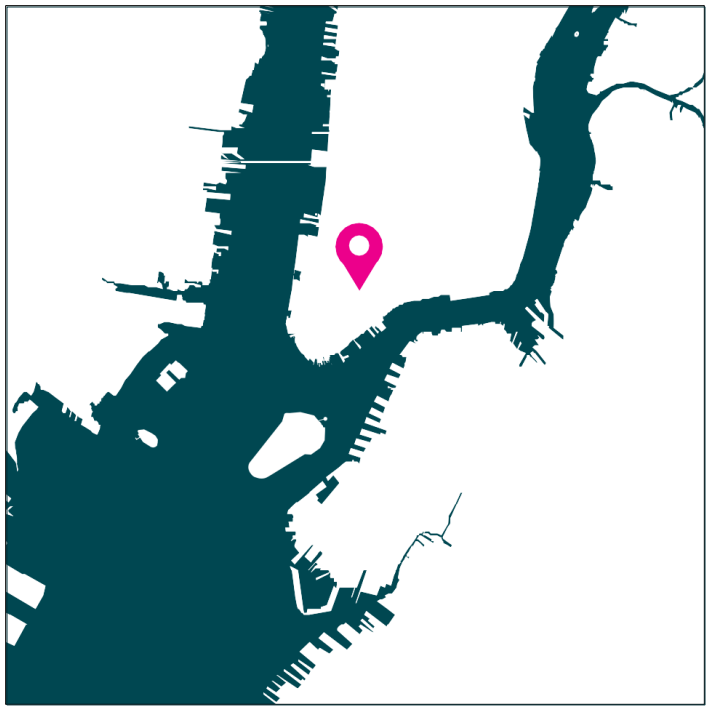
\+ URBAN PLANNERS

\+ HORTICULTURALISTS

= SCAPE

90+ FULL-TIME EMPLOYEES

WHERE WE ARE LOCATED

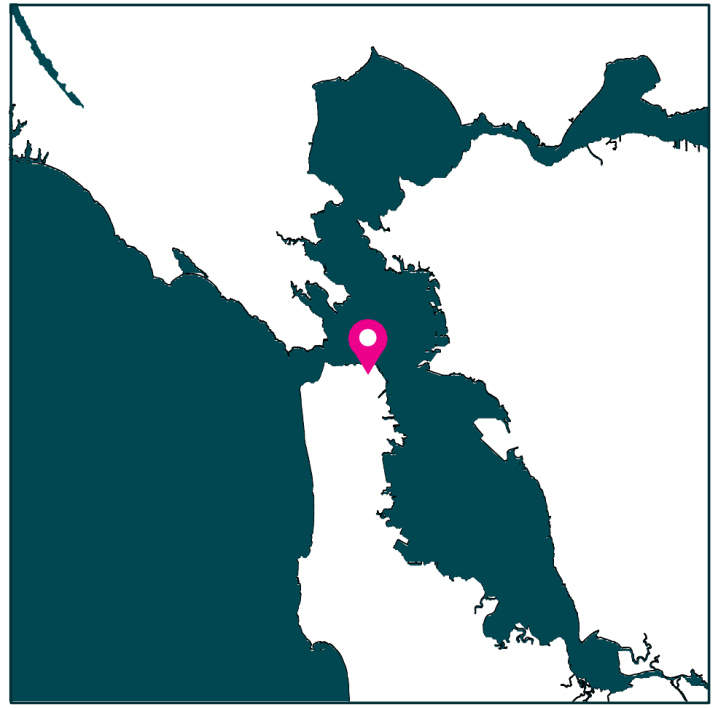


SCAPE HEADQUARTERS NYC

70 FULL-TIME STAFF

SCAPE NOLA

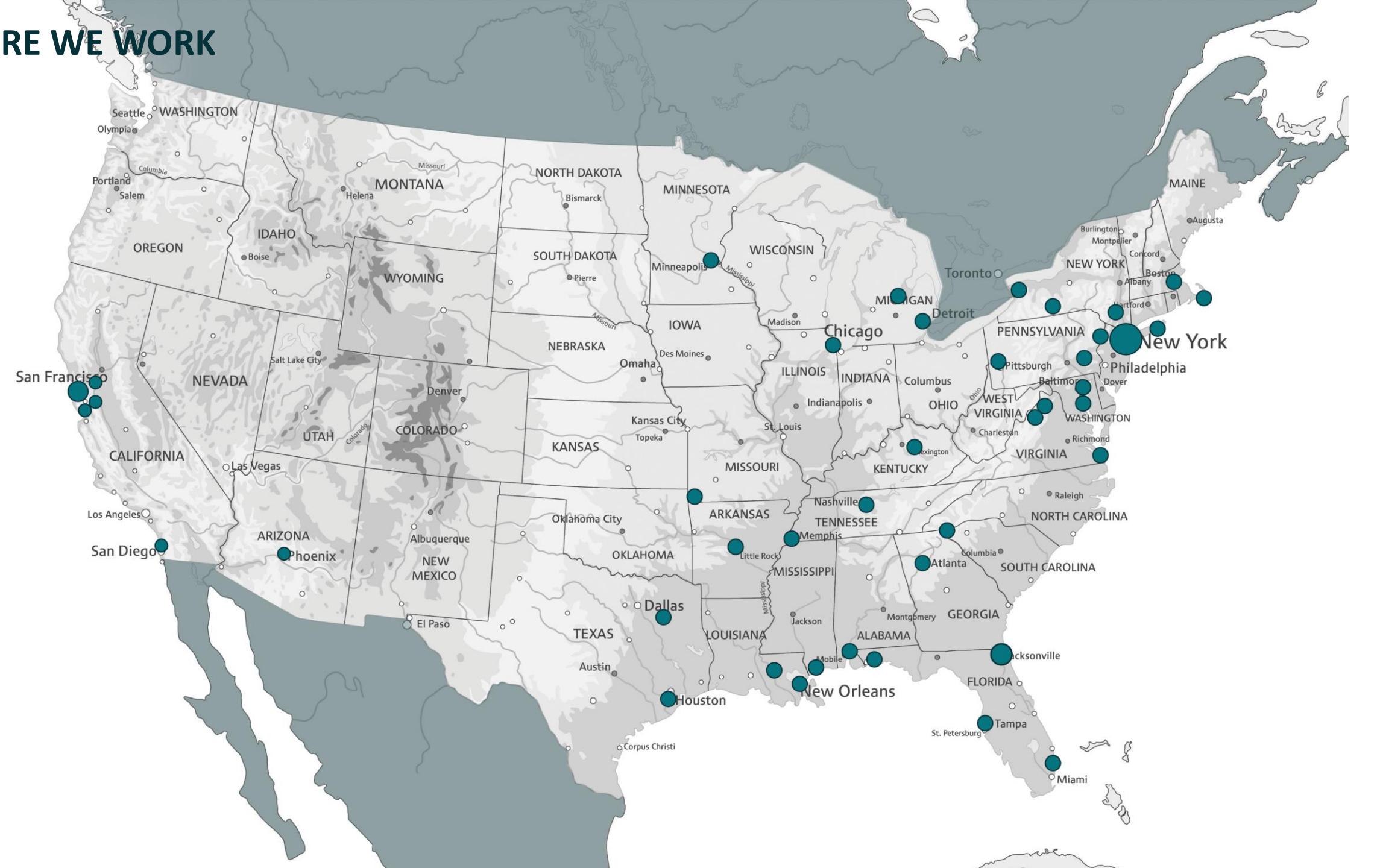
16 FULL-TIME STAFF



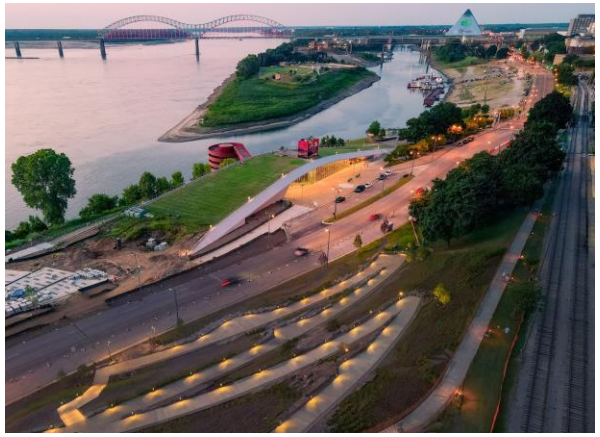
SCAPE SAN FRANCISCO

8 FULL-TIME STAFF

WHERE WE WORK



AN EXPRESSION OF LANDSCAPE THINKING AT MULTIPLE SCALES



PLANNING TEAM

RESILIENT JACKSONVILLE

CITY OF JACKSONVILLE, FLORIDA

THE WATER INSTITUTE

SCAPE

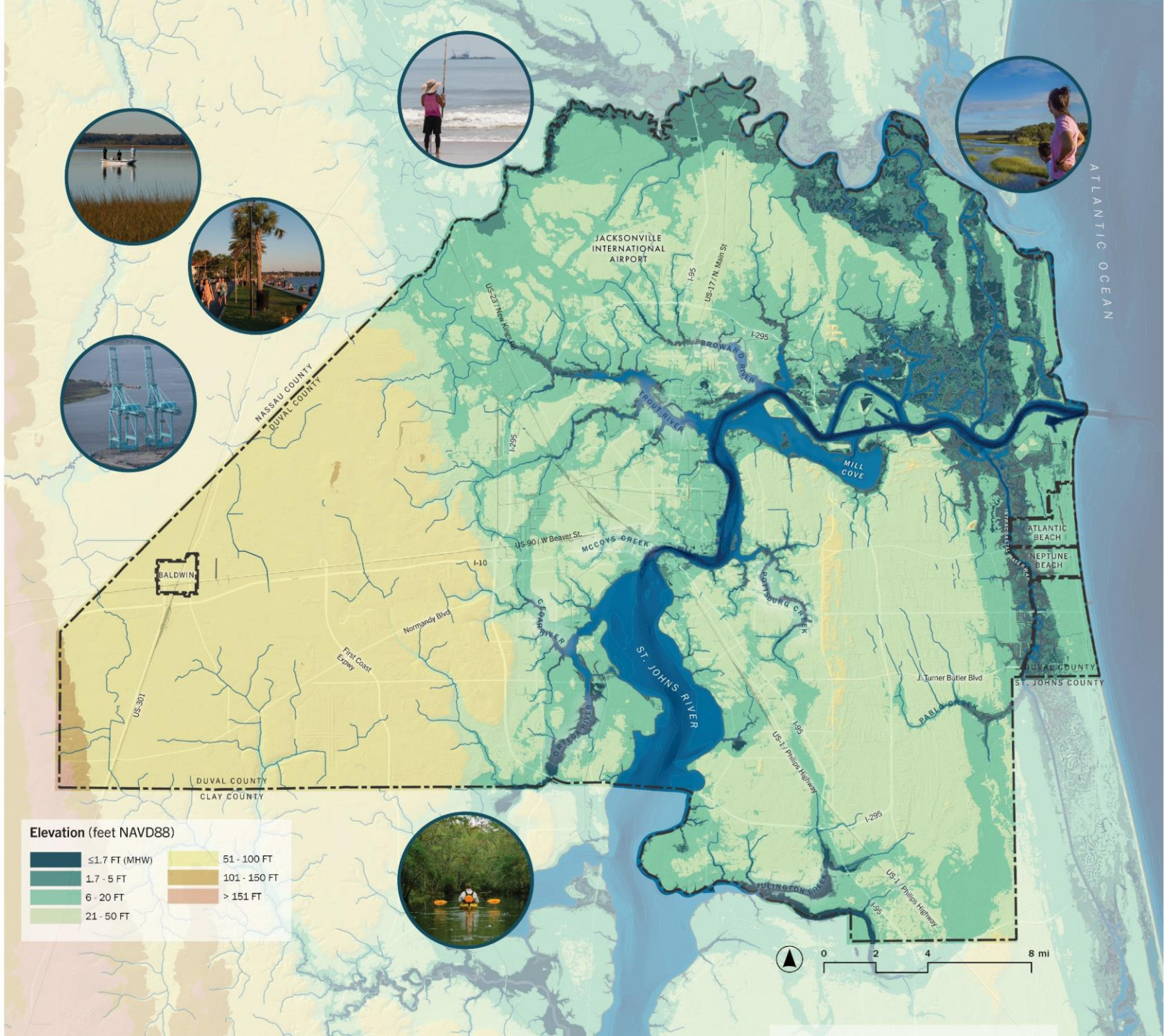
fernleaf

halff SM

ADG

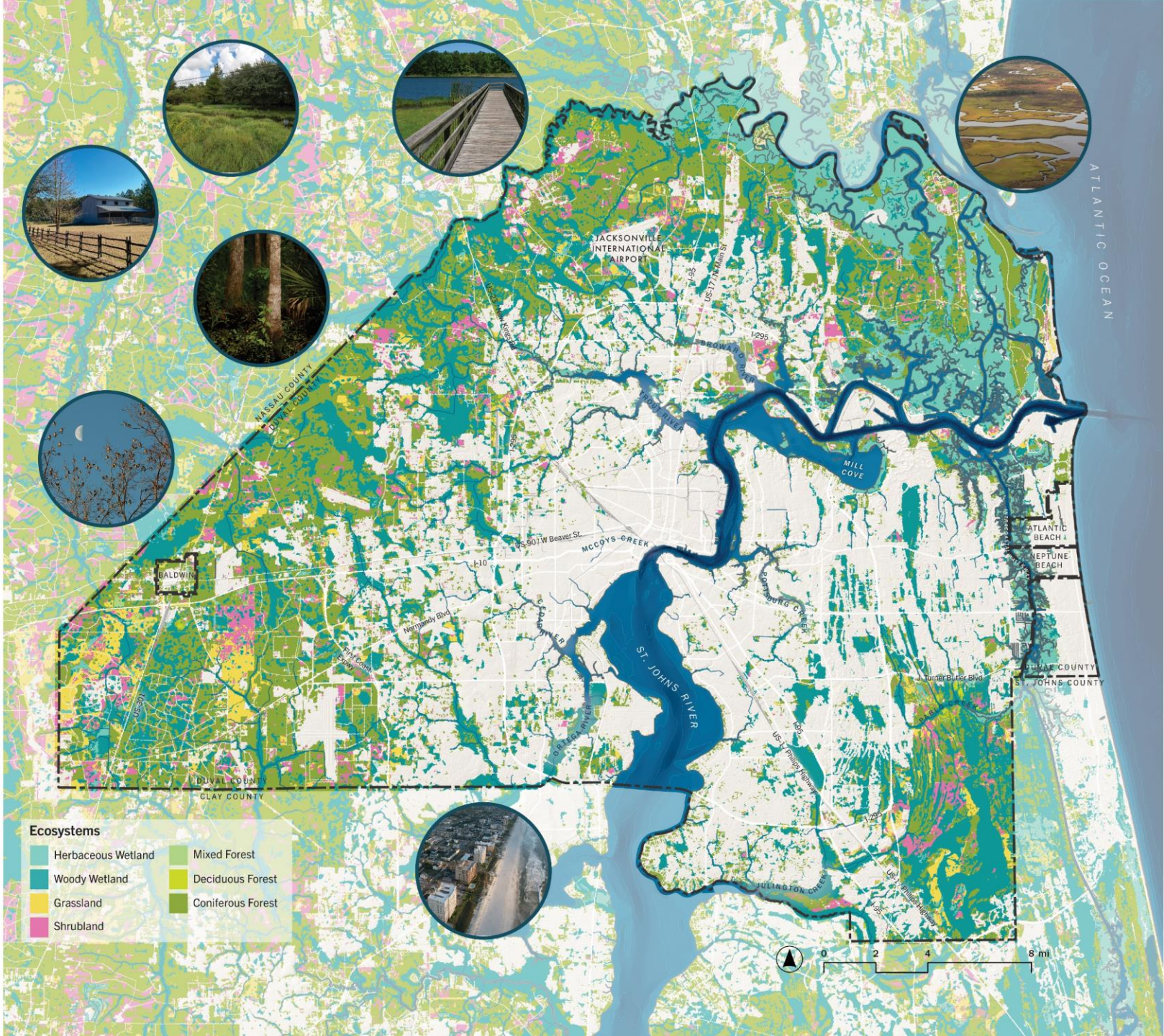
A CITY SHAPED BY WATER

- Atlantic Coast, St. Johns River, 59 Tributaries
- Over 1,500 miles of shoreline



A SPACIOUS CITY

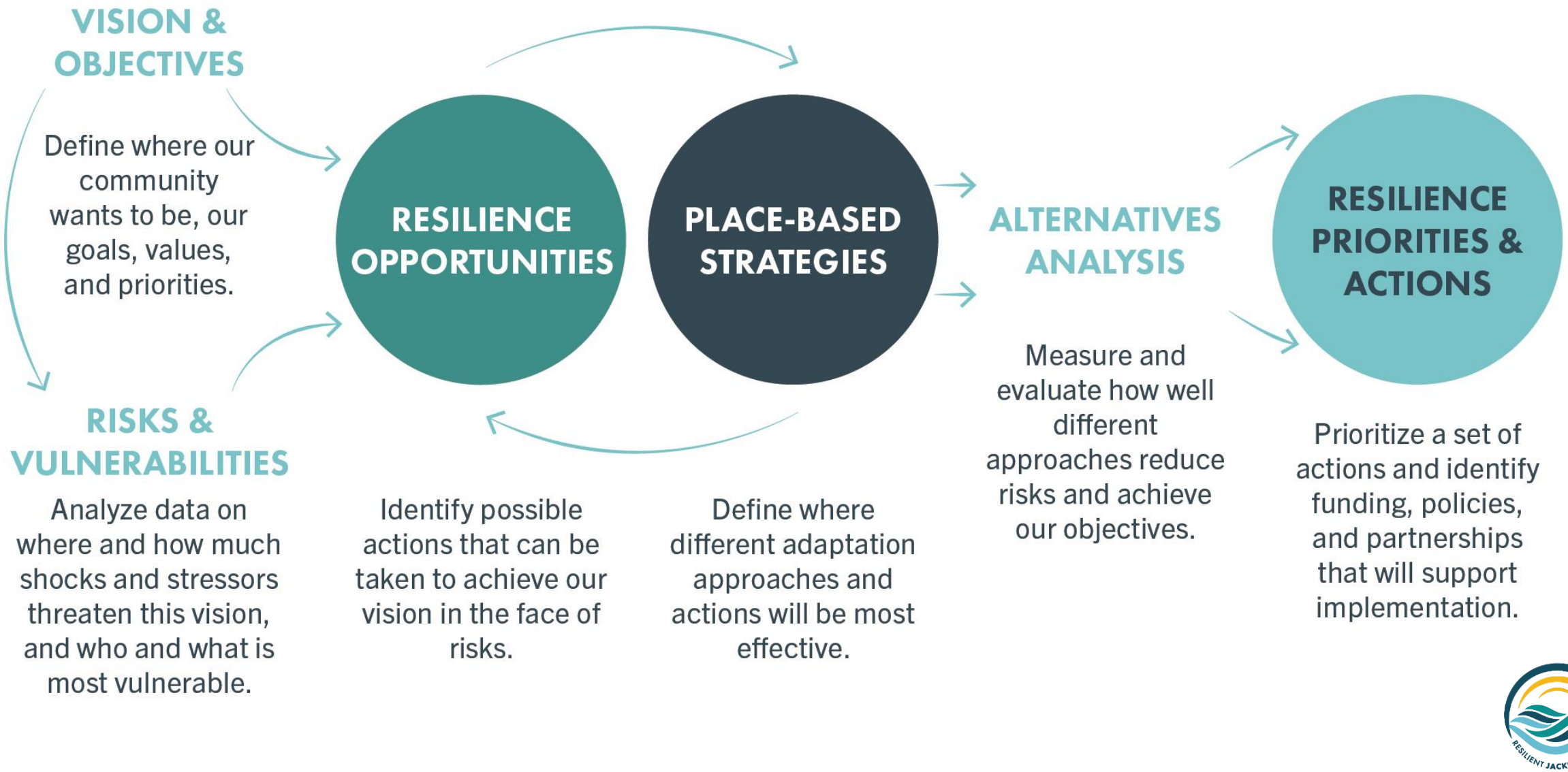
- 747 sq. miles of land – the largest city in the country by land area
- Over half of the land area is undeveloped forests, wetlands, grasslands, agricultural lands, and other open space.



A GROWING CITY

- New development has expanded outward over time to accommodate population growth.

A COLLABORATIVE PROCESS GROUNDED IN SOUND SCIENCE



COLLABORATIVE DEVELOPMENT OF ACTIONS

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

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.

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.

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.

GROW RESILIENTLY

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

SUB-ACTIONS

Resilience and growth can be com
that are at lower risk of flooding a
existing infrastructure necessary
transportation and energy and wa
around where growth and develop
objectives alongside other econor
in a resilient way by using a suite
toward a common vision for the ci
low-risk development, the City ca
and people located in flood-prone
from flood events.

Resilient strategies for growth, like int
development focuses growth on unde
already developed area. It is a model
fabric and supports increased density
development can reduce the distance
modes of transportation, like public t
and recreationally valuable open spac
for more residents; increase the retur
and cost of infrastructure and service

Shocks and Stressors Addressed
Flooding / Sea Level Rise / Chronic Flooding / H
Instability

Implementation Partners
Planning & Development / JEA / JTA / North Fl
Development Community

Potential Funding Mechanisms
CIP / Modified Fee Structure

PRESERVE

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

SUB-ACTIONS

Jacksonville's ecosystem diversity
intertidal, subtidal, estuarine wetl
lakes, coastal beaches, coastal up
ecosystem plays a role in a resilien
protecting existing natural areas,
many benefits for the city. Ecologi
communities and wildlife, providin
quality, and reducing risks associa
they help to purify air and water, l
reduce flood risks and impacts, re
land preservation is critical to imp
as a spacious city with the largest

Shocks and Stressors Addressed
Flooding / Extreme Heat / Wildfires / Air Quality
Water Quality

Implementation Partners
Parks / SJRWMD / North Florida Land Trust

Potential Funding Mechanisms
SJRWMD

PROTECT

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)**

SUB-ACTIONS

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.

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.

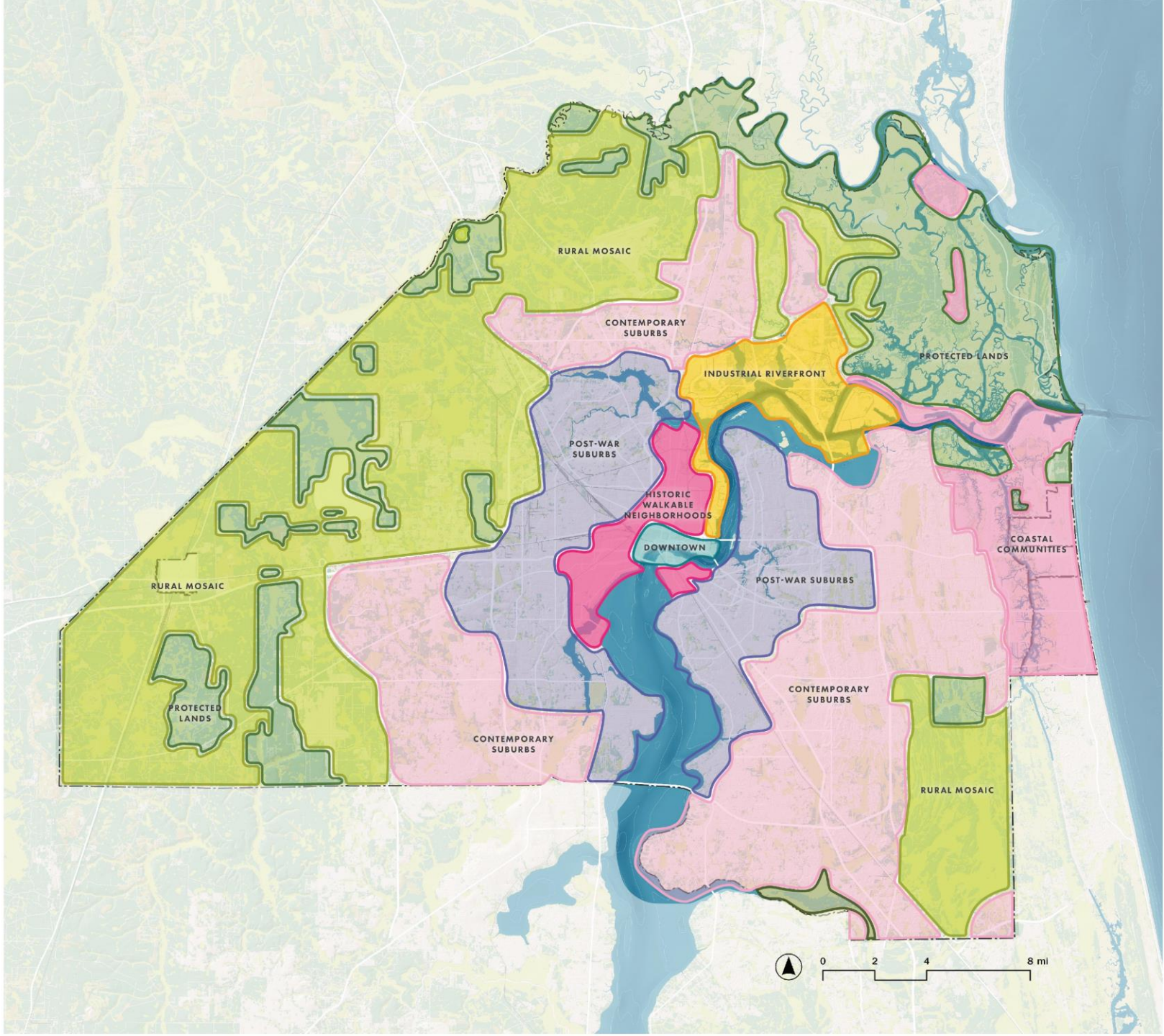
DEFINING DEVELOPMENT TYPES

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

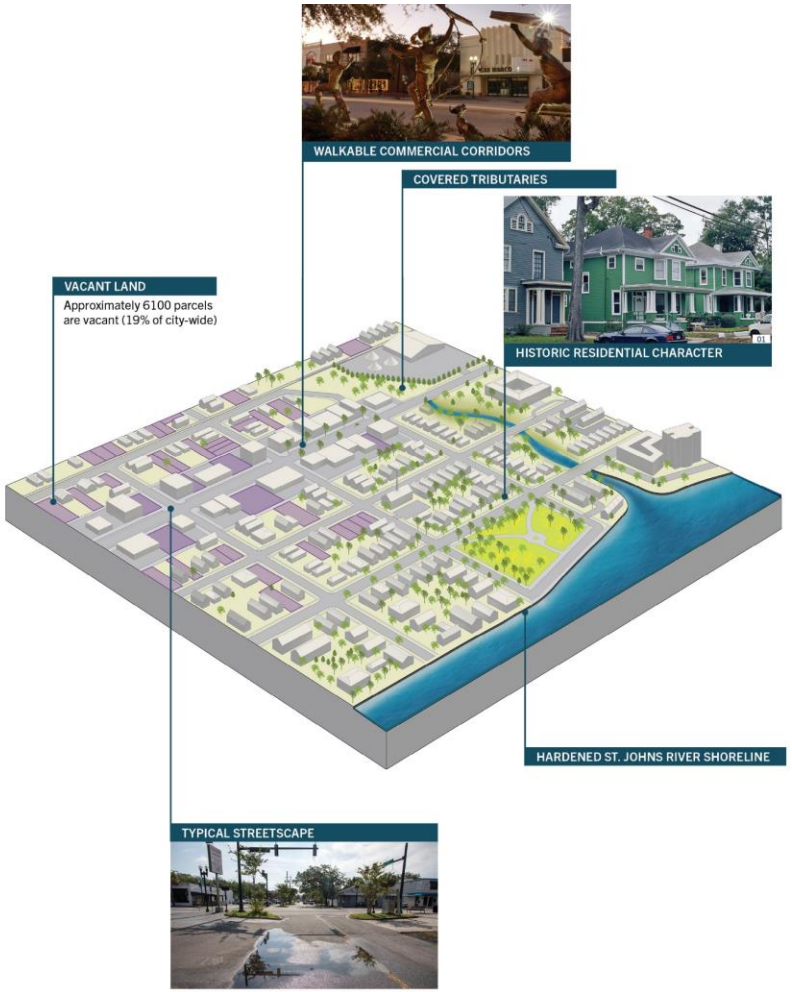
	Age/Era of Development	Density of Development	Street + Roadway Network	Residential + Commercial Urban Form	Stormwater + Wastewater Infrastructure	Use of + Relationship to Waterbodies	Impervious Surface + Vegetated Cover
URBAN	Historic / pre-WWII	High density	Gridded, connected, walkable	Mixed Use	Curbs 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

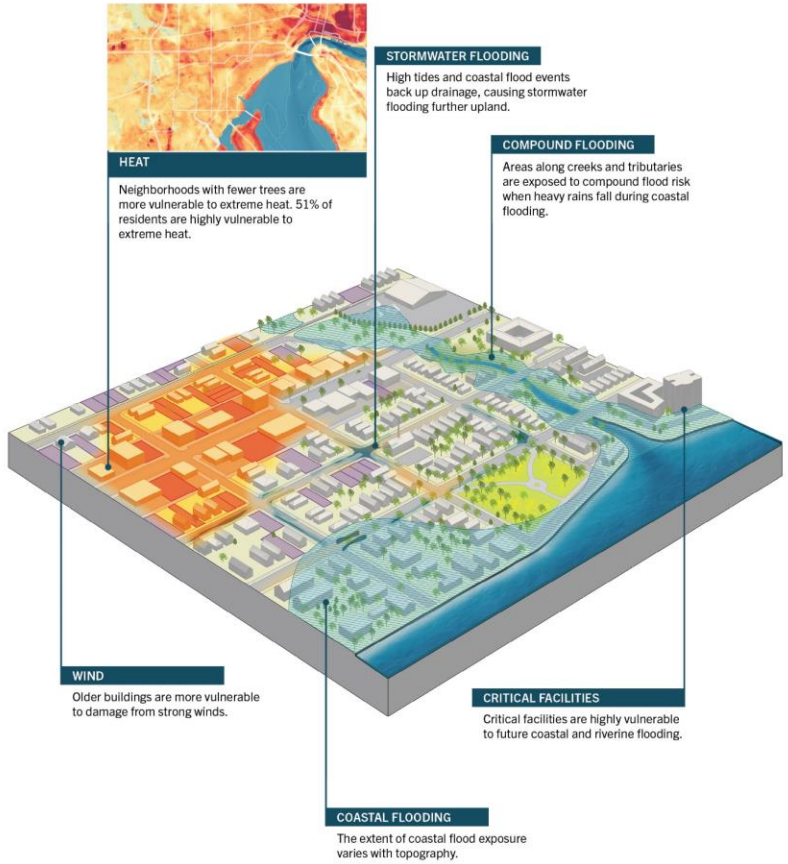
- Downtown
- Historic Walkable Neighborhoods
- Post-War Suburbs
- Contemporary Suburbs
- Industrial Riverfront
- Coastal Communities
- Rural Mosaic
- Protected Lands



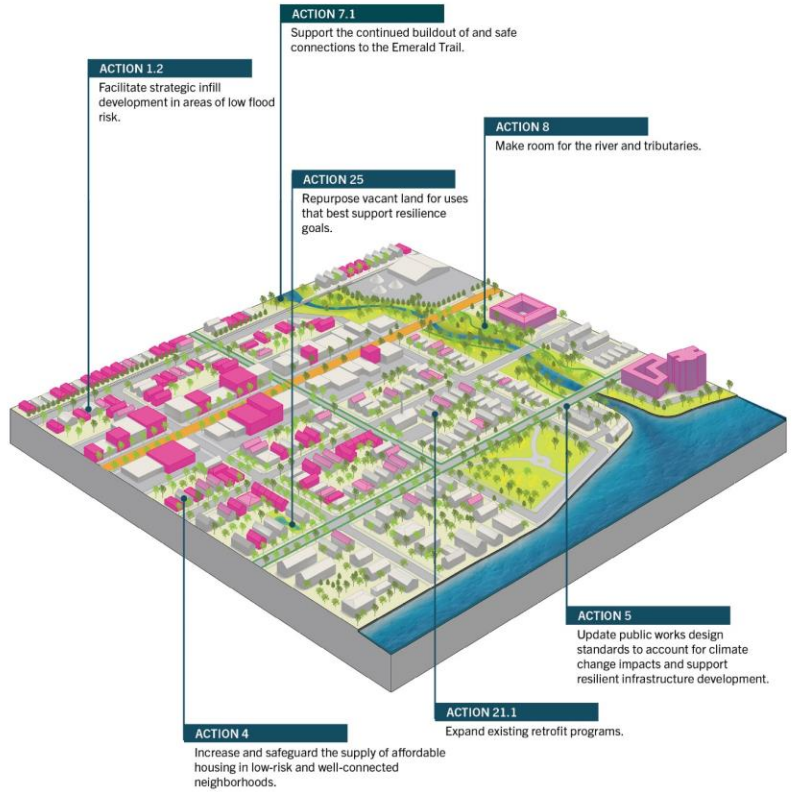
HISTORIC WALKABLE NEIGHBORHOODS



Scale: Tile above represents approximately 0.1 sq miles.



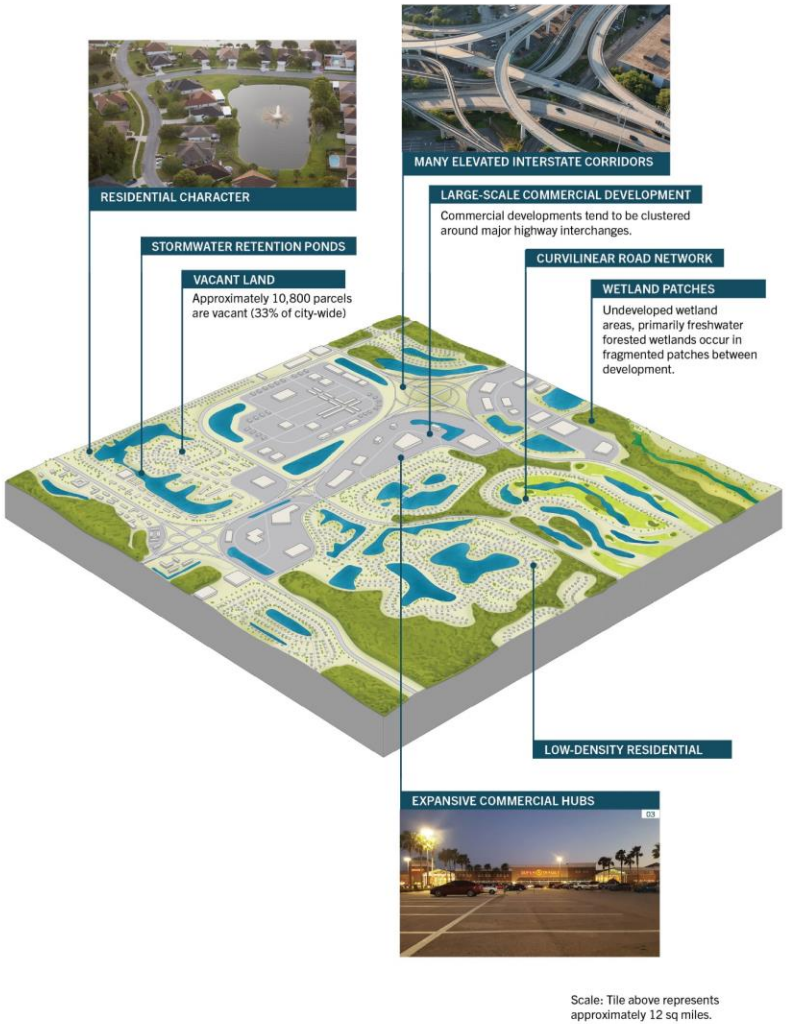
Floodplain
Stormwater Flooding
Urban Heat



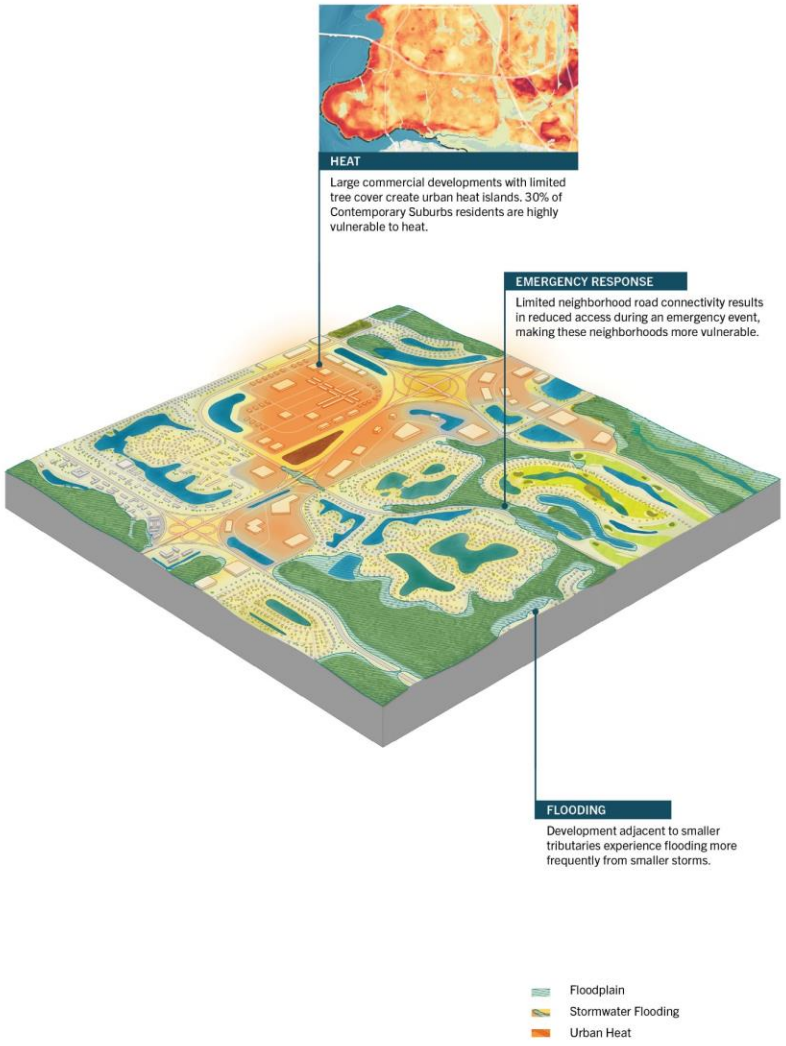
Resilient development
Improved evacuation routes
Resilient streetscape
Building retrofits

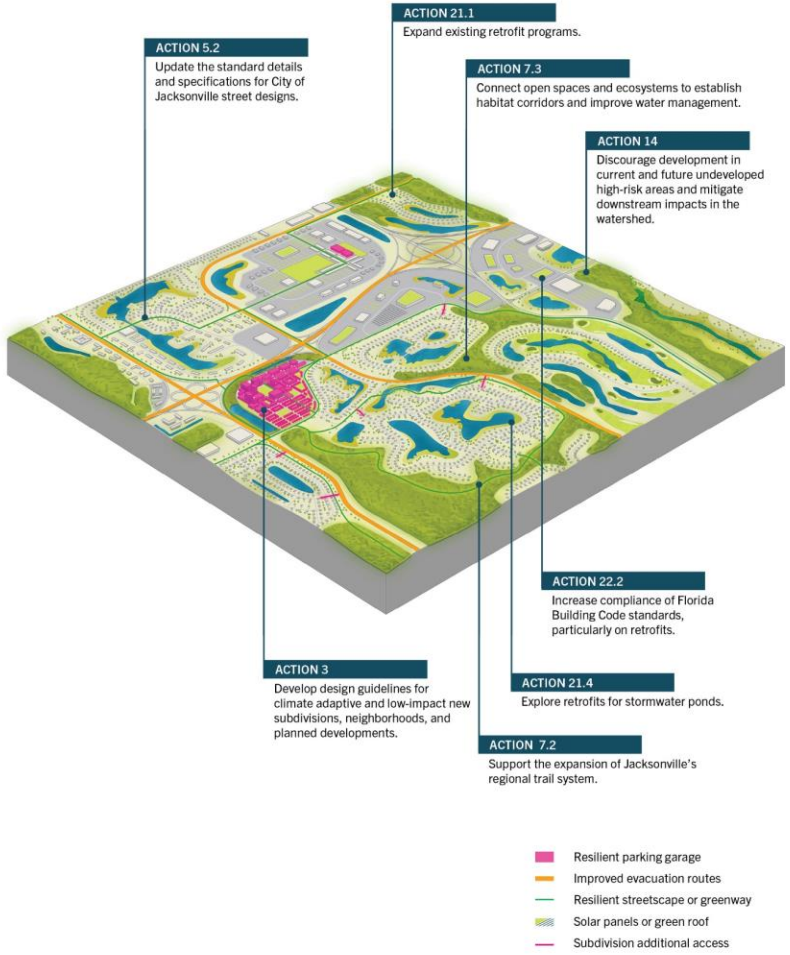
Character | **Risks** | **Opportunities**

CONTEMPORARY SUBURBS



Scale: Tile above represents approximately 12 sq miles.





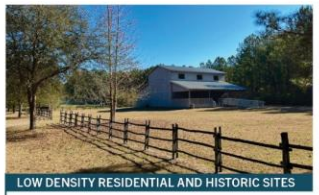
Character

Risks

Opportunities

RURAL MOSAIC

WORKING LANDS



LOW DENSITY RESIDENTIAL AND HISTORIC SITES

LOGISTICS FACILITIES

UPPER WATERSHEDS

VACANT LAND

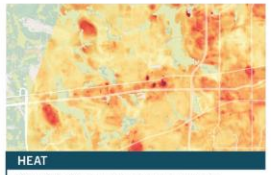
Approximately 4,100 parcels are vacant (13% of city-wide)

TIMBER AND AGICULTURE

UNDEVELOPED FORESTS AND WETLANDS

OUTDOOR RECREATION

Scale: Tile above represents approximately 2 sq miles.



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

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

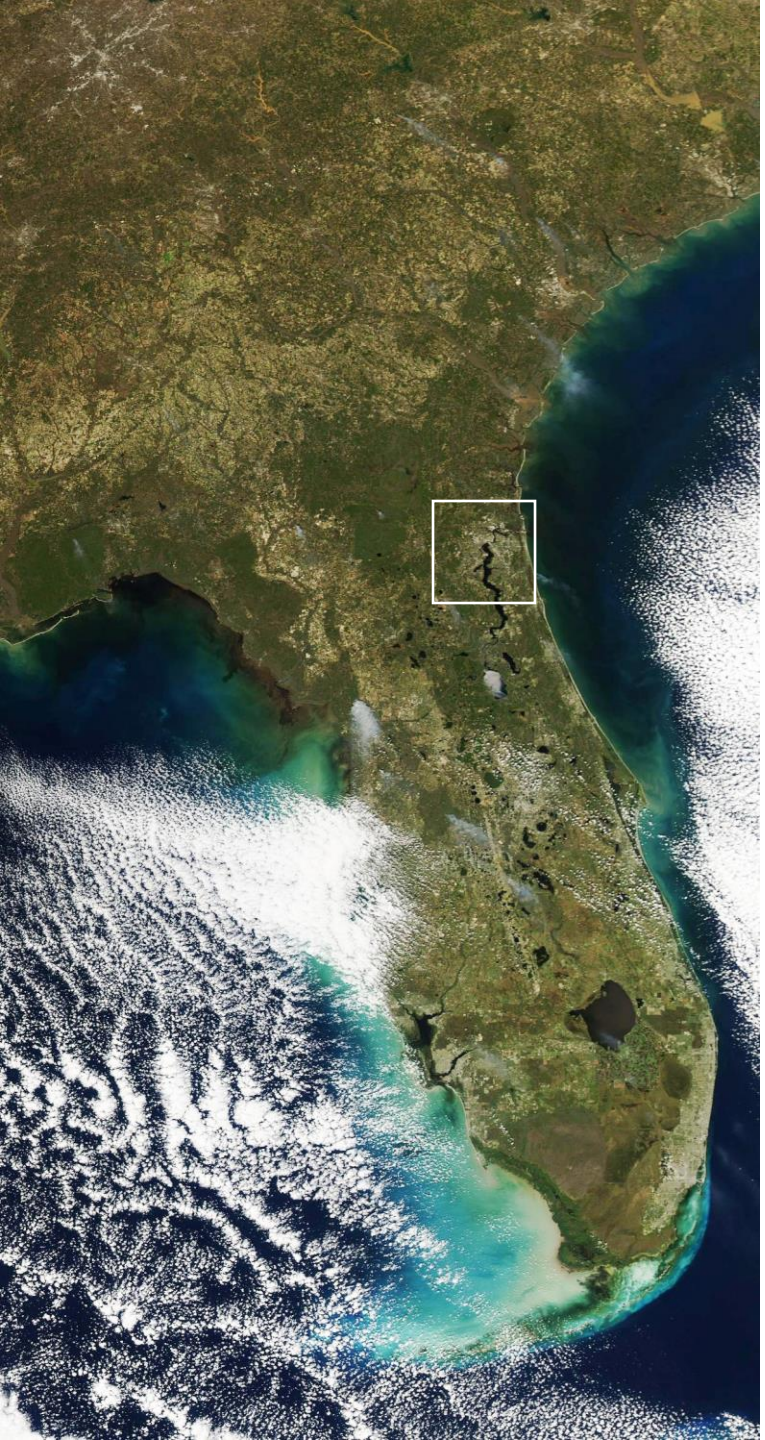
Greenway trail

Solar panels or green roof

Character

Risks

Opportunities



THE WATER INSTITUTE

Science-Grounded Resilience Planning and Implementation in Jacksonville, FL

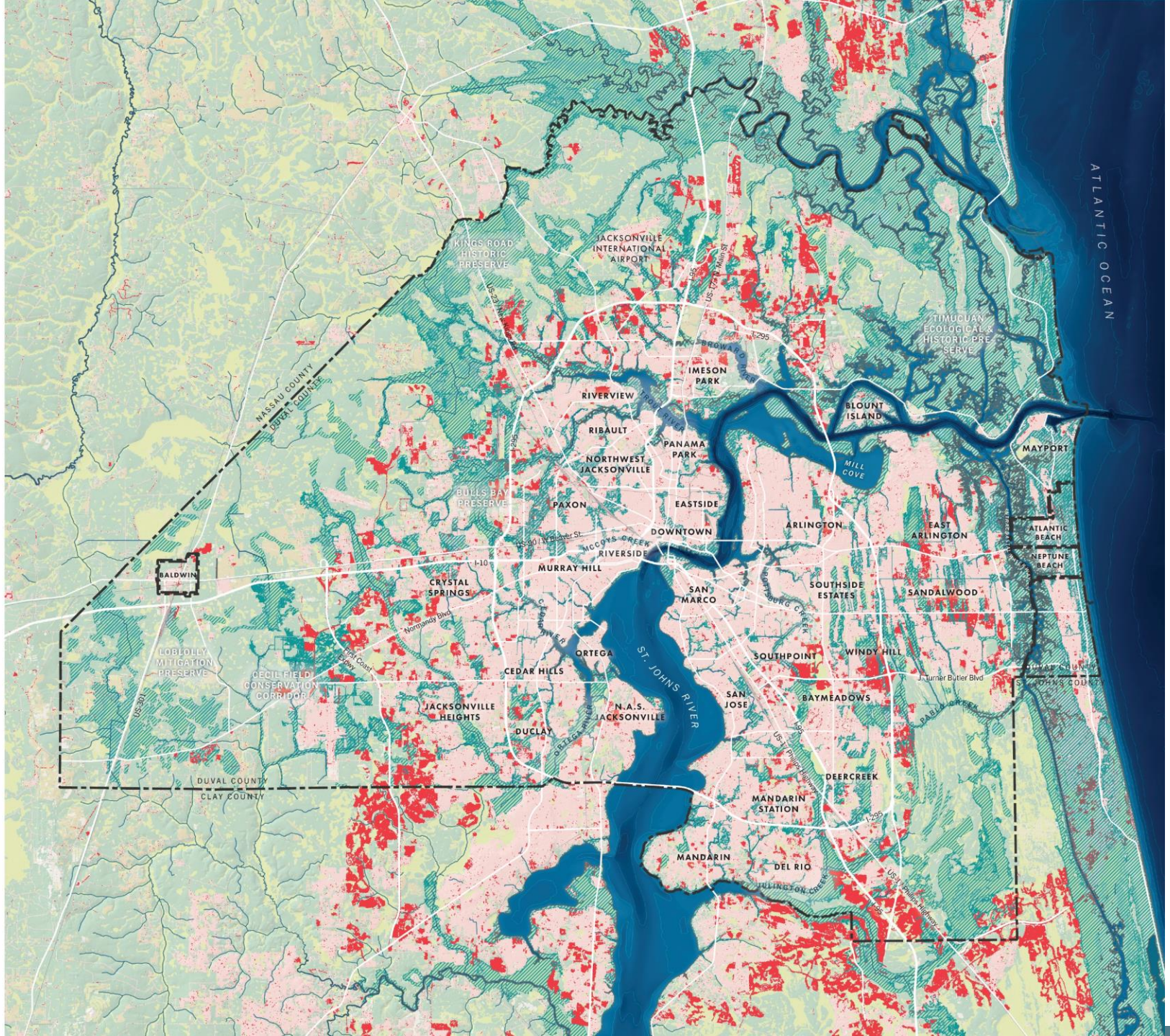
STATE OF THE COAST

Colleen McHugh

May 21, 2025

Jacksonville is the largest city by land area (747 sq mi) in the continental US.

Over half of the land area is undeveloped forests, wetlands, grasslands, agricultural lands, and other open space.



LEGEND

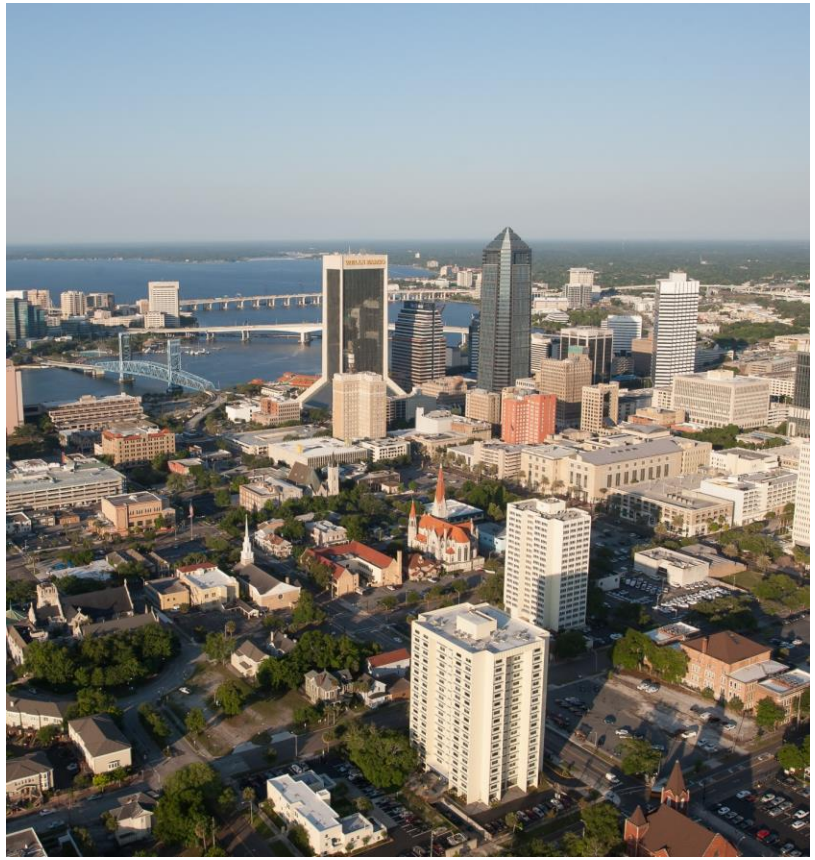
- City Boundaries
- Creeks and Streams
- 2070 1% Annual Exceedance Probability Flood Extent*
- Impervious Surfaces
- Areas Converted to Impervious, 2000-2019
- Forests
- Wetlands

0 2 4 8 mi

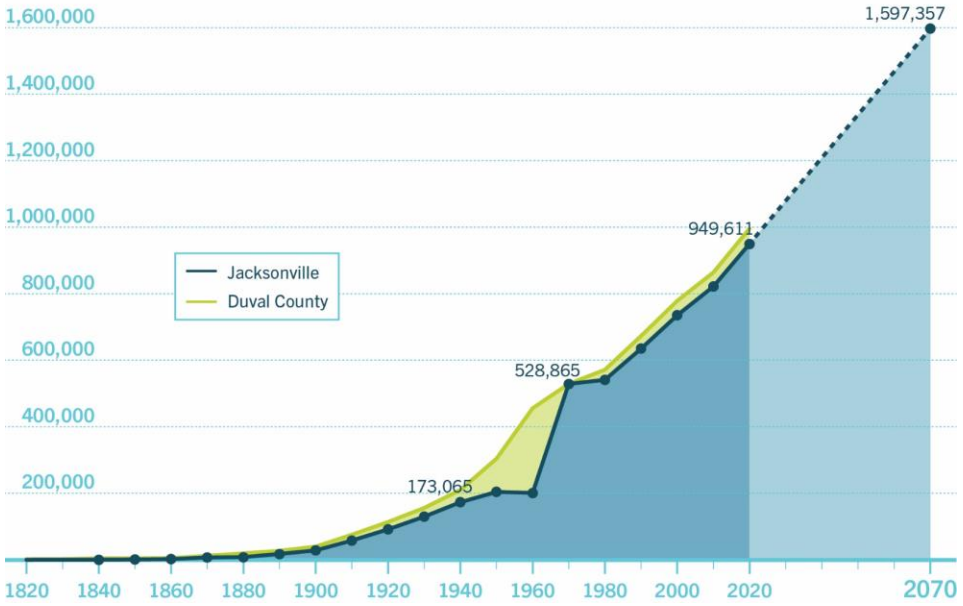
Scenarios for Citywide Adaptation

*What if…*recent development patterns continue?

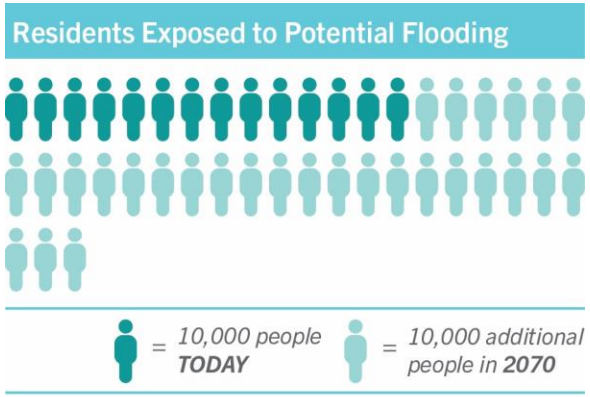
*What if…*growth is focused in the urban core?

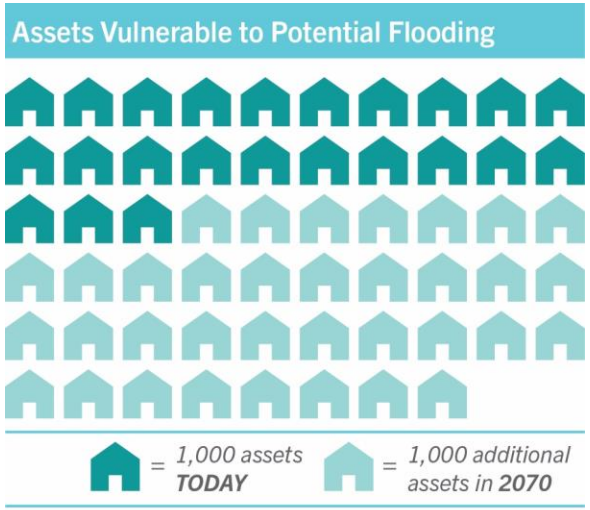


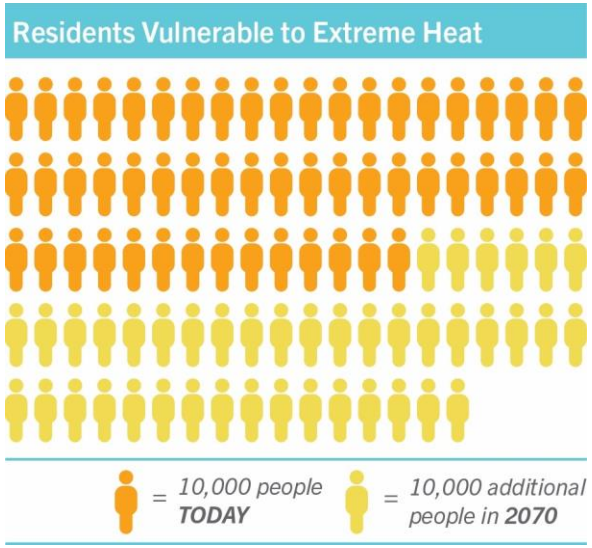
*What if…*growth is focused in existing suburban areas?



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







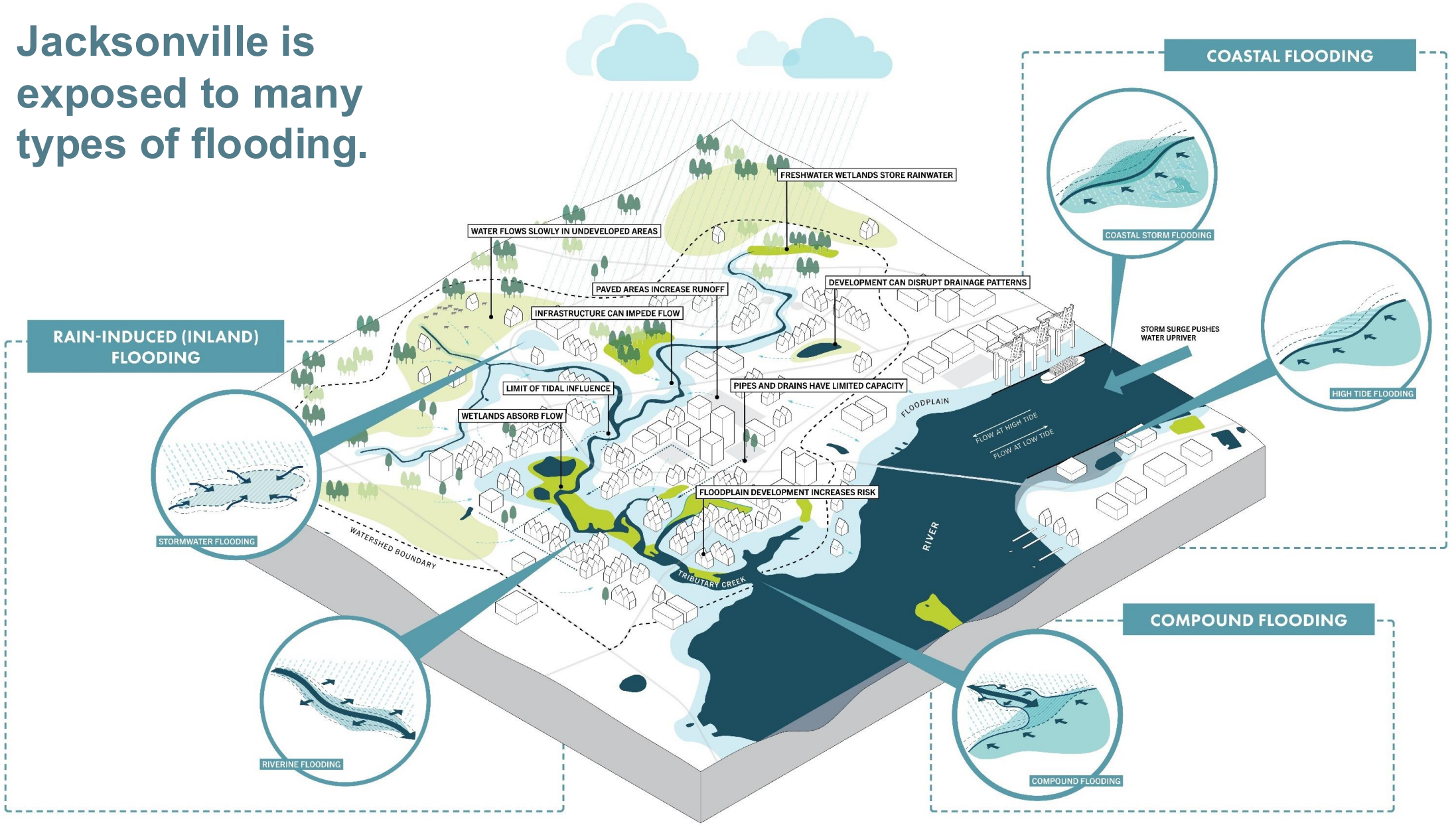
A Future Without Action

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

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

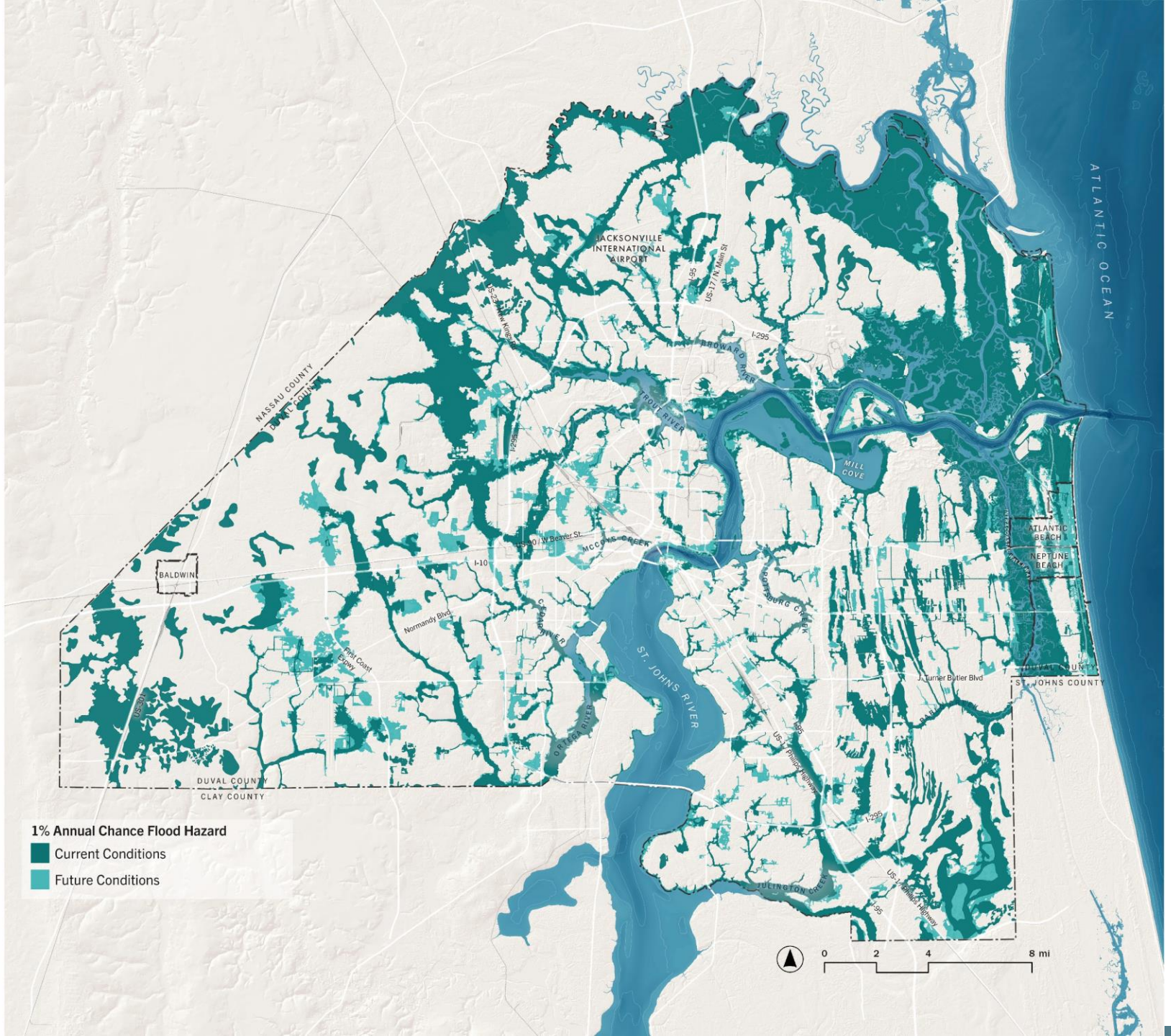
536,000 ***-> 959,000***

Jacksonville is exposed to many types of flooding.

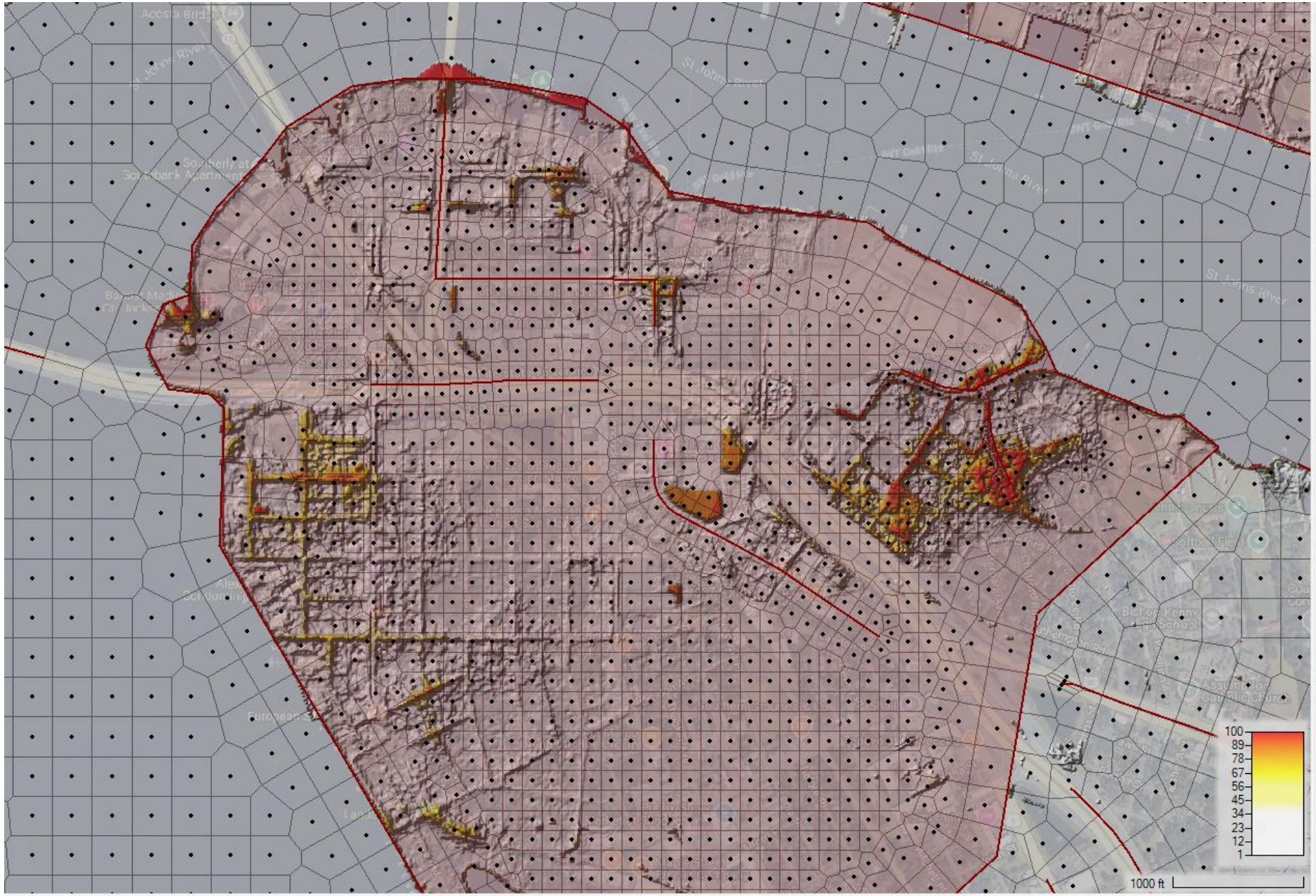


Flood exposure is increasing with climate change.

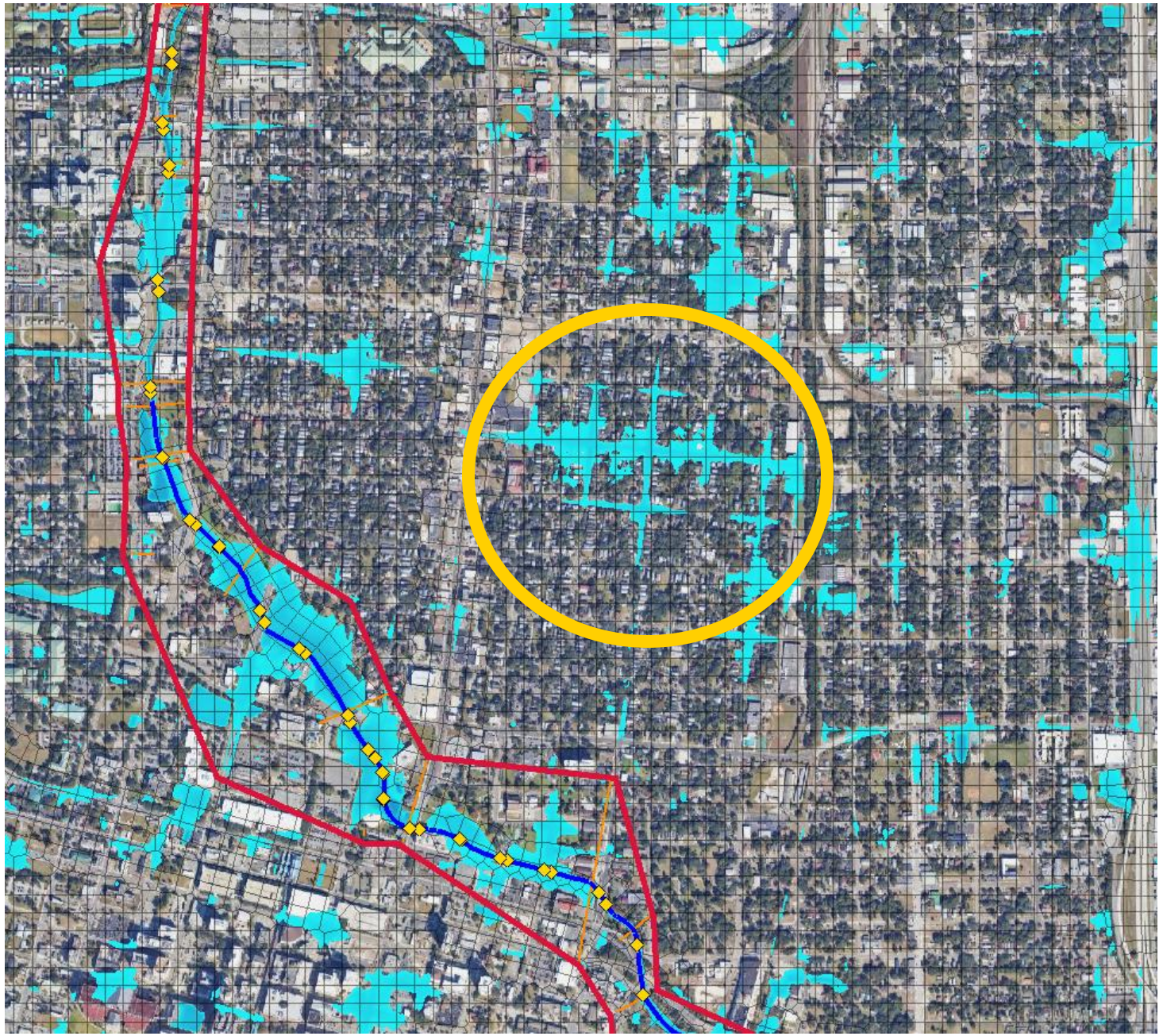
But there remains gaps in flood risk data and understanding, especially for compound and pluvial flooding.



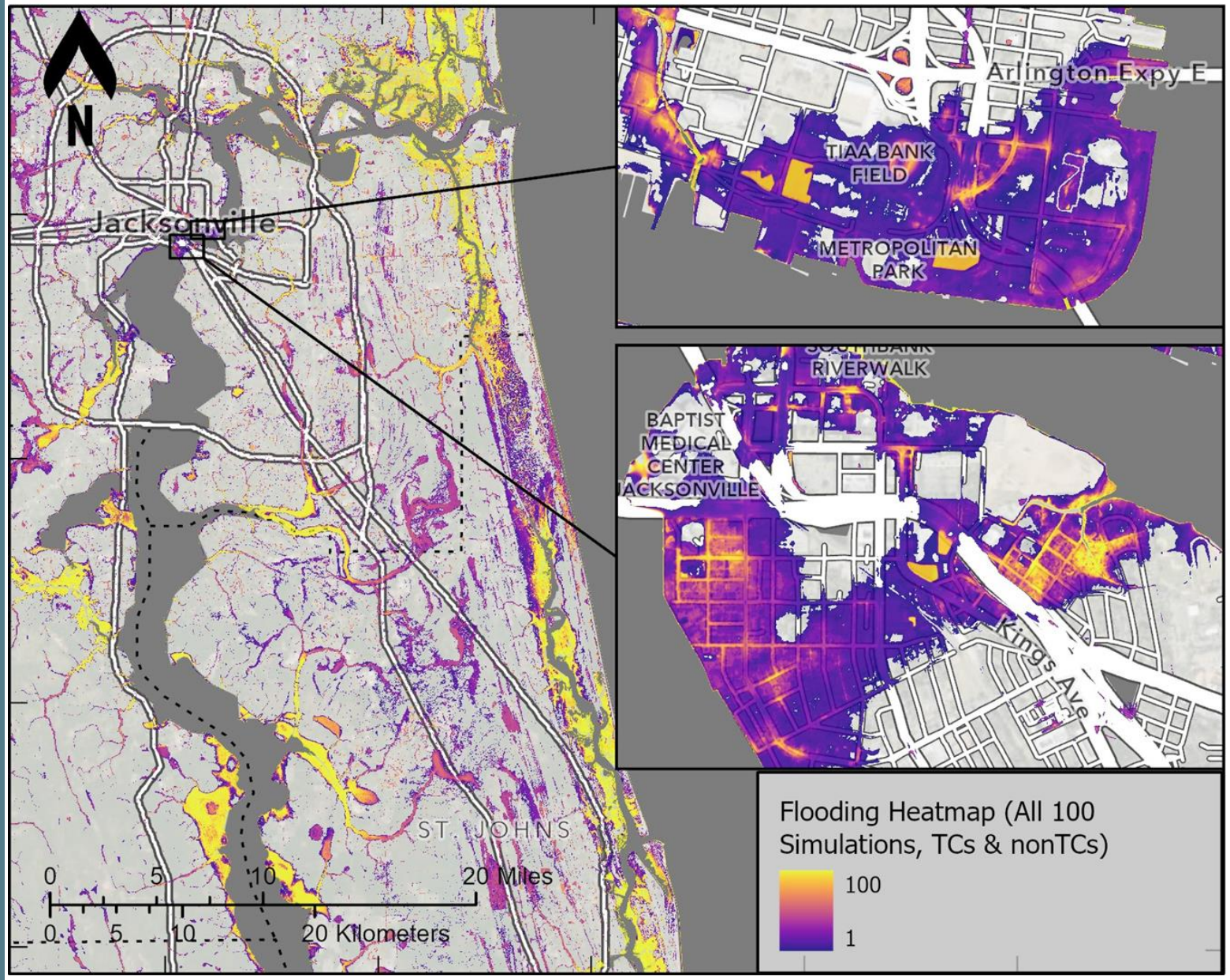
We have developed new detailed models to better capture these complex flood dynamics.



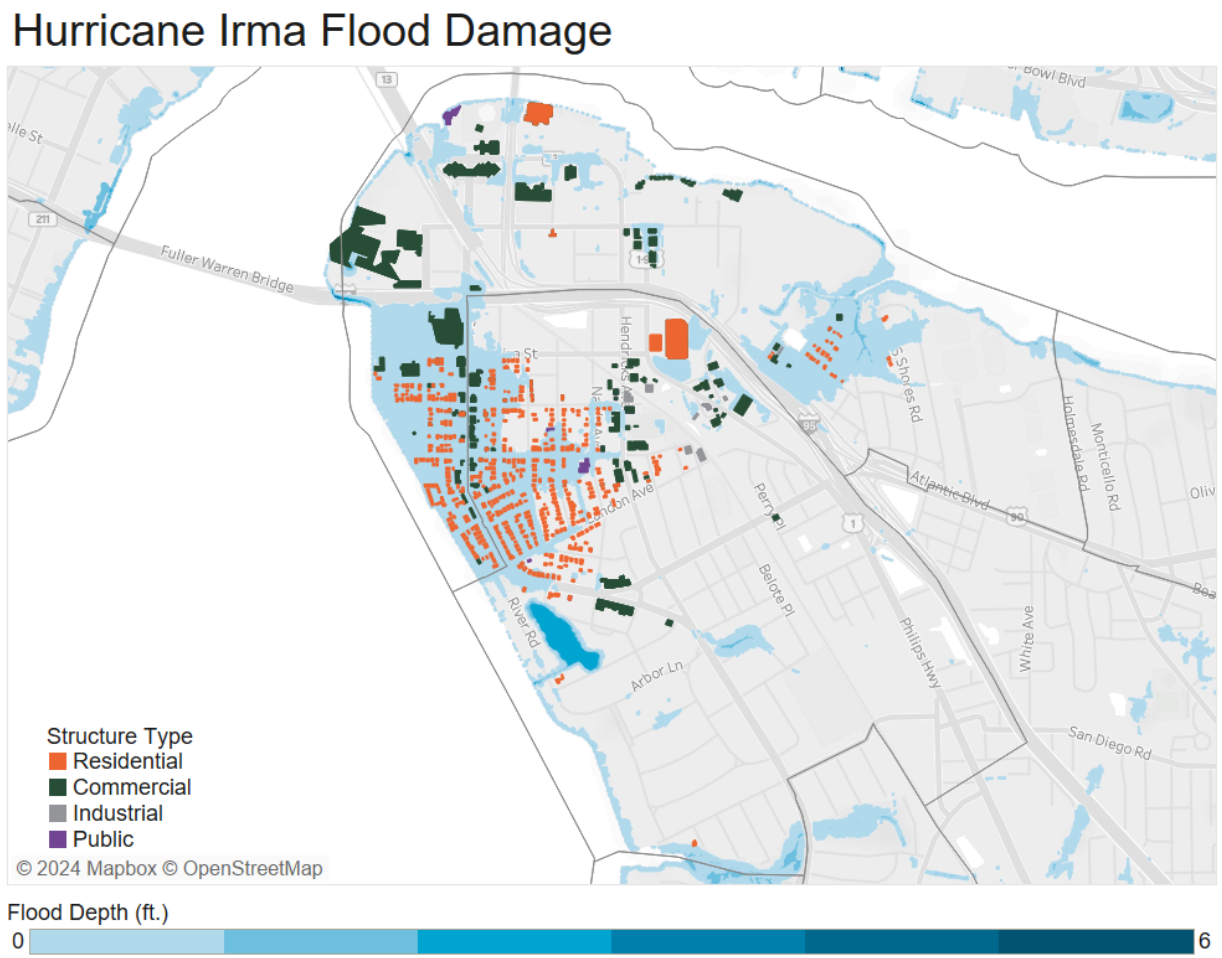
Compound flood model captures localized flooding not included in existing flood data.

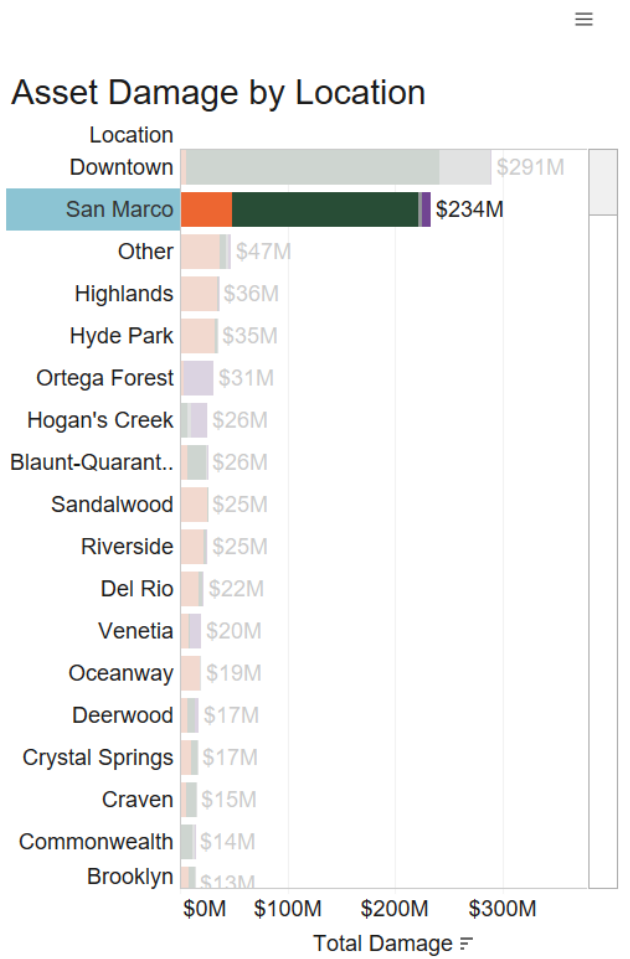


VISUALIZING RESULTS

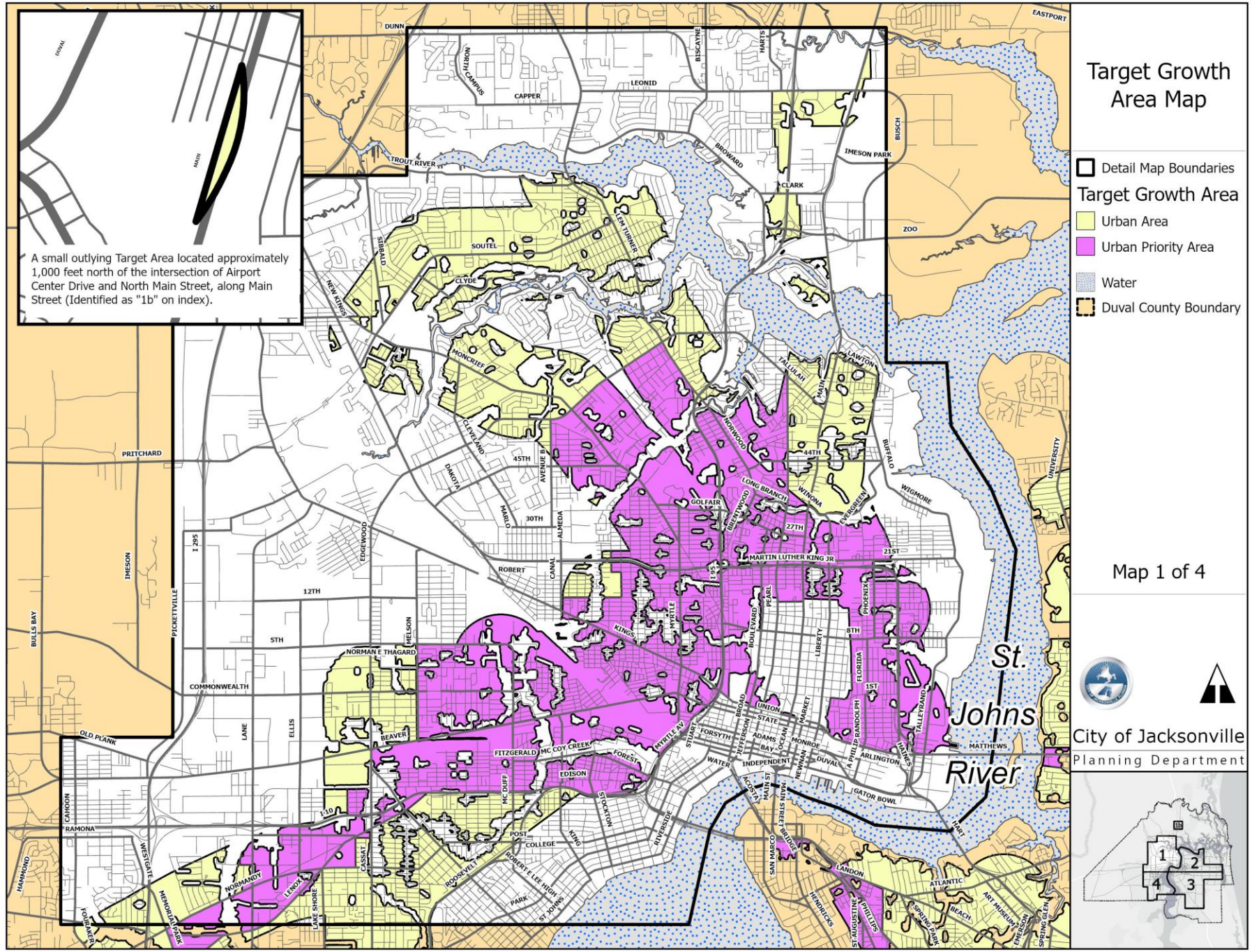


New modeling estimates flood consequences to support resilient infrastructure design and land use planning.

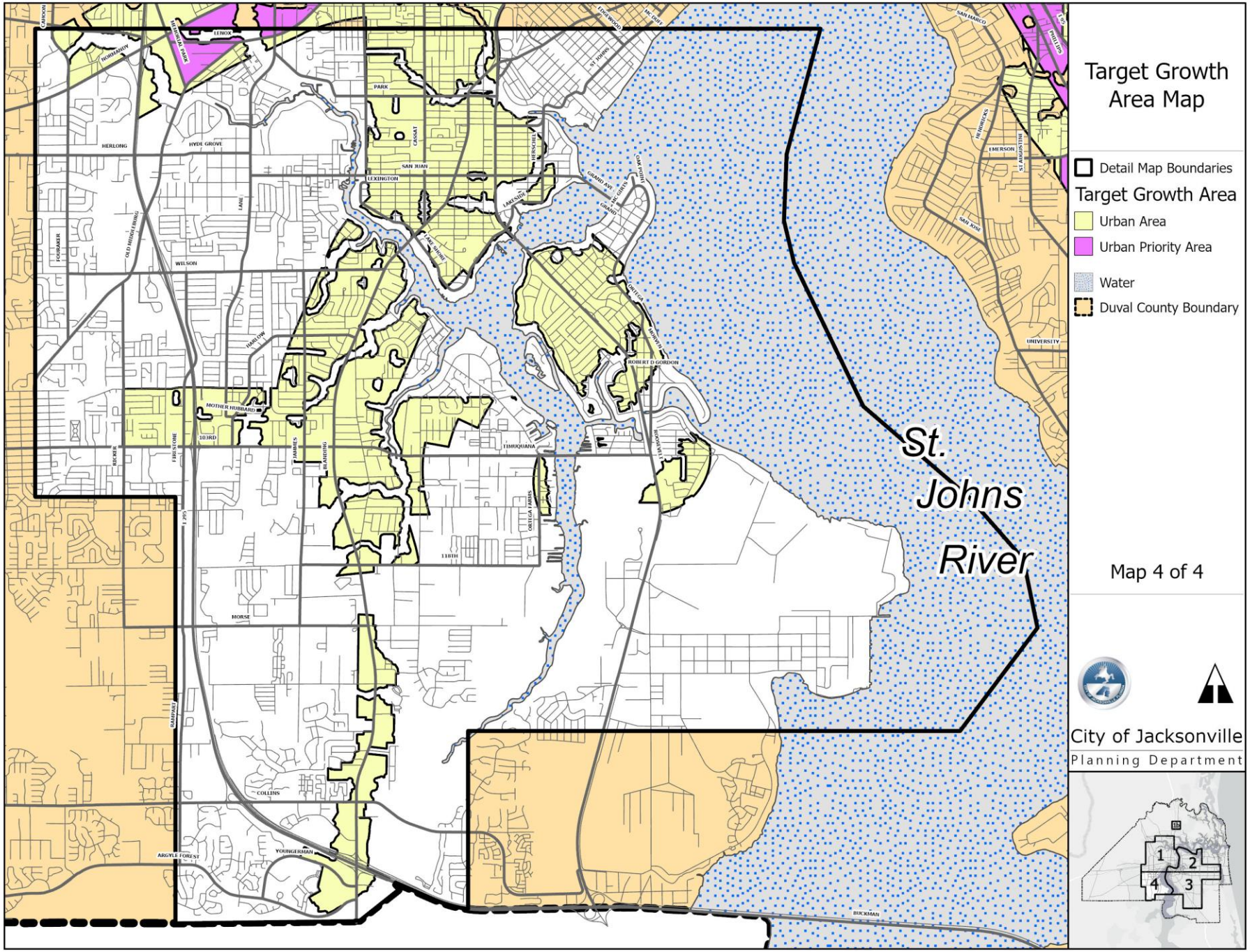


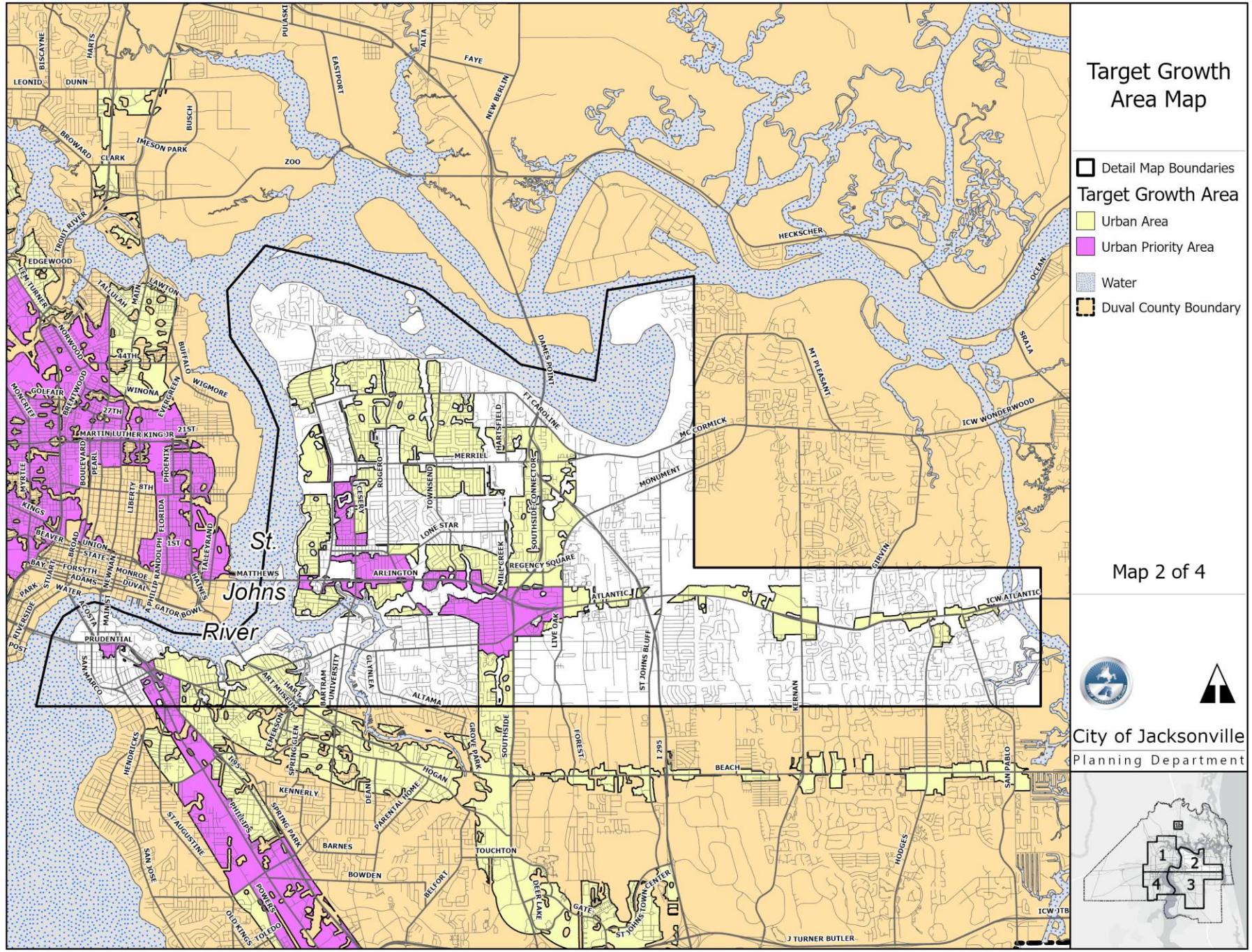


Land Development Regulations Update



RESILIENT JACKSONVILLE


Target Growth Area Map
Detail Map Boundaries
Target Growth Area
Urban Area
Urban Priority Area
Water
Duval County Boundary
St. Johns River
Map 4 of 4
City of Jacksonville
Planning Department
1
2
3
4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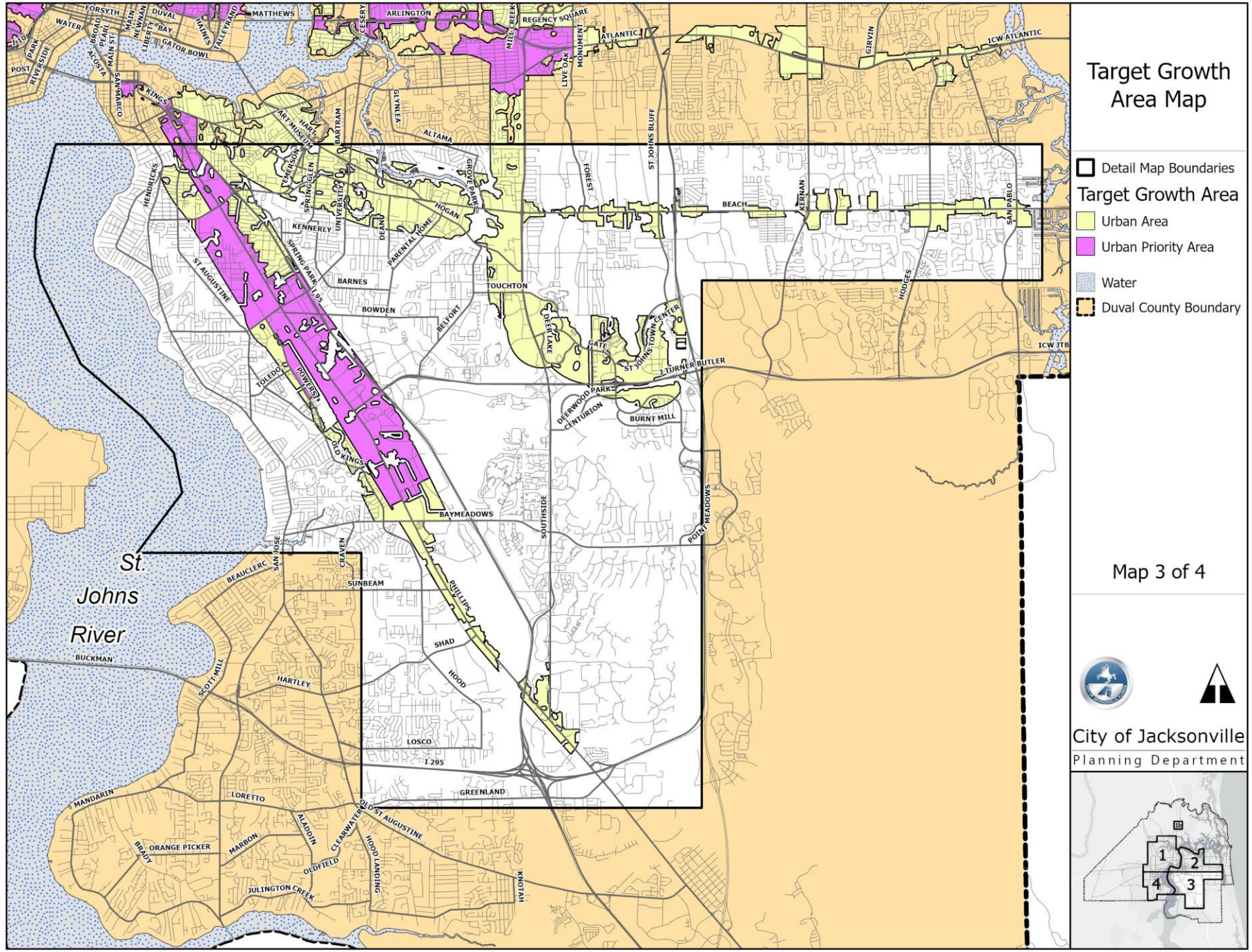
Target Growth Area Map
Detail Map Boundaries
Target Growth Area
Urban Area
Urban Priority Area
Water
Duval County Boundary
Map 3 of 4
City of Jacksonville
Planning Department
St. Johns River
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Bulk and Density, Dimensional and Parking Allowances

Future Land Use Category in Urban and Urban Priority Areas	Bulk and Density Allowances[1]		Dimensional Standards[2]			Parking Standards[4]
	Increased Allowable Density	Max. Height Increase[3]	Min. Lot Area Reduction	Max. Lot Coverage Increase	Min. Yard Requirements	Min. Parking Requirements Reduction
Low Density Residential	Possibly 50%[5]	None	~30%	~30%	Potentially Eliminated	~50%
Medium Density Residential	50%	Up to 90'	~30%	Potentially Waived	Potentially Eliminated	~50%
High Density Residential	50%	Up to 90'	~30%	Potentially Waived	Potentially Eliminated	~50%
Residential-Professional-Institutional	50%	Up to 90'	~30%	Potentially Waived	Potentially Eliminated	~50%
Neighborhood Commercial	50%	Up to 90'	~30%	Potentially Waived	Potentially Eliminated	~50%
Community/General Commercial	50%	Up to 90'	~30%	Potentially Waived	Potentially Eliminated	~50%
Business Park	50%	Up to 90'	~30%	Potentially Waived	Potentially Eliminated	~50%

a. Must be in the UPA or UA of the Target Growth Area Map
b. Must be connected to centralized potable water and wastewater
c. Must provide affordable housing or include resilient design standards
d. Specific allowances in dimensional standards organized by zoning classification
e. Subject to height transition standards in relation to 1–4-unit multifamily structures.
f. Specific allowances in parking standards organized by zoning classification

Development Criteria Required to Access Incentives

Category	Design Factor		Requirement
Resilient Design Factors	3 of 5	Percentage of permeable hardscape	50%
		Percentage of planting areas used for bioretention	75%
		Amount of on-site precipitation retained or detained for the design storm	First 3 inches of any rainfall event
		Percentage of projected energy demand satisfied by on site renewables production	50%
		Percentage of surface parking lots and other hardscape areas shaded[1]	40%
- OR -			
Affordable Housing	1 of 2	20 percent of rental units set aside for affordable housing	Units must serve households earning less than 100% AMI with an affordability term of at least 20 years.
		20 percent of for-sale units set aside for affordable housing at time of sale	Units must serve households earning less than 140% AMI; units must be homesteaded and remain affordable for at least one-year