

RESILIENT JACKSONVILLE

Public Meetings

February 2023

AGENDA

TIME	SESSION
6:00 - 6:15	<i>Welcome & Sign-in</i>
6:15 - 6:30	<i>Project Overview Presentation</i>
6:30 - 7:30	<i>Informal Stations</i>



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 stresses** (*long-term pressures that weaken the fabric of a community over time*).





ACUTE SHOCKS

Extreme Rainfall Events
Extreme Heat Events
Hurricanes / Tropical Cyclones
Winter Storms / Extreme Cold Events
Infrastructure Failure or Disruption
Energy Insecurity / Blackouts
High Winds
Wildfires
Infectious Diseases
Cyber Attack
Hazardous Materials Incidents



CHRONIC STRESSES

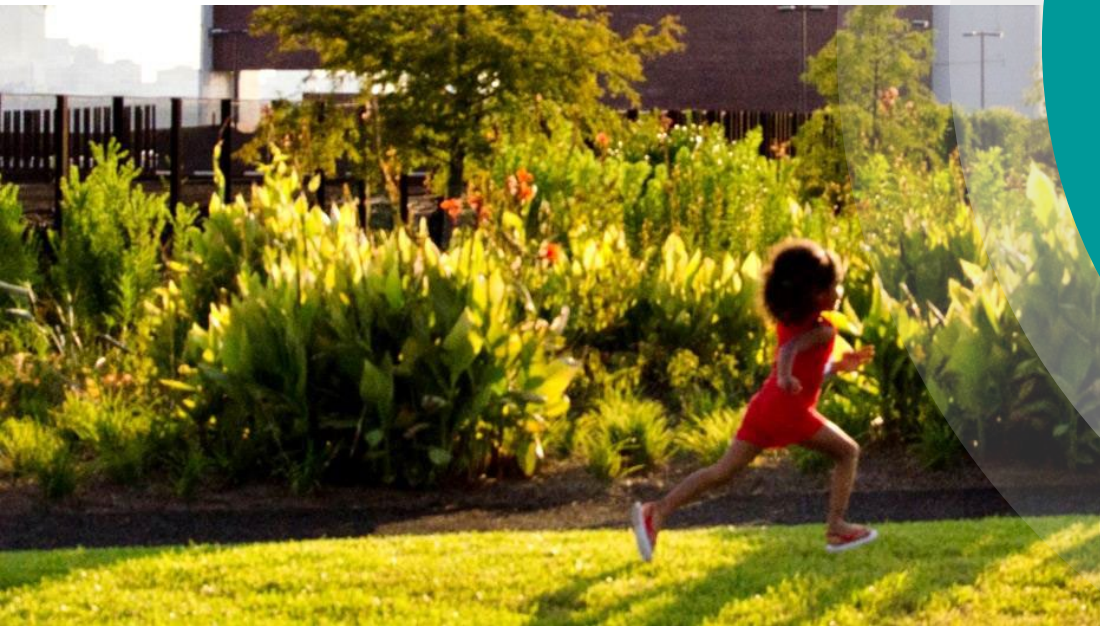
Sea Level Rise
High Tide Flooding
Heavy Rainfall
Coastal Erosion
Saltwater Intrusion
Groundwater Threats
Urban Heat Island Effect
Drought
Aging Infrastructure
Economic Downturns
Poverty
Social Inequality
Lack of Reliable Transportation
Lack of Safe and Affordable Housing
Food Insecurity & Supply Chain Disruptions
Lack of Healthcare Access
Chronic and Infectious Diseases



Reduced risk of flooding & damage



Neighborhood revitalization & economic development



Improved health & quality of life



Environmental education & workforce development

RESILIENCE DIVIDEND

CAPTURING MULTIPLE BENEFITS





WHAT IS A RESILIENCE STRATEGY?

➤ Vision

- **30-50 year future** for a resilient Jacksonville

➤ Objectives

- Capturing the **social, environmental, and economic** aspects of resilience

➤ Risks & Vulnerabilities

- **Science** and **data** on threats facing the city

➤ Actions

- Prioritized built **projects, programs,** and changes to **policies** and **operations**

➤ Implementation

- **Lead** and **partners, timeframe, funding**

A PROCESS GROUNDED IN SOUND SCIENCE



WORK TO DATE



BUILDING ON YEARS OF EFFORTS TO STRENGTHEN JACKSONVILLE'S RESILIENCE:

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
- Adaptation Action Area Workgroup
- Duval County Local Mitigation Strategy
- City Council Special Committee on Resiliency
- 2030 Comprehensive Plan Update
- Tributary Flood Risk Modeling
- CAPA Strategies & UNF Heat Mapping Study
- McCoys Creek Restoration Project
- Emerald Trail Master Plan
- Hogans Creek Restoration Project



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.

Jacksonville will draw from its essential characteristics as a **welcoming city**, a **water city**, and a **growing and spacious city** to build a resilient future for generations to come.





A RESILIENT JACKSONVILLE WILL BE A CITY THAT:

1. PROACTIVELY ADAPTS
2. FOSTERS HEALTHY COMMUNITIES
AND ENVIRONMENTS
3. EXPANDS OPPORTUNITY
4. BUILDS FOR THE FUTURE

These themes are central to Jacksonville's vision for resilience. They set the direction of the **fundamental objectives** for the resilience strategy—the way we will evaluate and prioritize actions for **how** Jacksonville can become more resilient.

1. A CITY THAT PROACTIVELY ADAPTS

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

FUNDAMENTAL OBJECTIVES

- *Minimize damage* to property, infrastructure, and the environment from shocks and stresses
- *Minimize negative effects* of shocks and stresses on human health and well-being
- *Minimize disruptions* to the local economy
- *Minimize disruptions* to essential services



2. A CITY THAT FOSTERS HEALTHY COMMUNITIES AND ENVIRONMENTS

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

FUNDAMENTAL OBJECTIVES

- *Maximize* residents' physical and mental health
- *Reduce* disparities in health and well-being
- *Maximize* ecosystem health and ecosystem services



3. A CITY THAT EXPANDS OPPORTUNITY

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.

FUNDAMENTAL OBJECTIVES

- *Maximize economic growth and prosperity*
- *Minimize barriers to economic mobility*
- *Maximize access to safe housing and essential services*



4. 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.

FUNDAMENTAL OBJECTIVES

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



A Resilient Jacksonville will be a city that...



Proactively Adapts

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

- Minimize damage to property, infrastructure, and the environment from shocks/stresses
- Minimize negative effects of shocks/stresses on human health and well-being
- Minimize disruptions to the local economy
- Minimize disruptions to essential services



Expands Opportunity

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.

- Maximize economic growth and prosperity
- Minimize barriers to economic mobility
- Maximize access to safe housing and essential services



Fosters Healthy Communities & Environments

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

- Maximize residents' physical and mental health
- Reduce disparities in health and well-being
- Maximize ecosystem health and ecosystem services



Builds for the Future

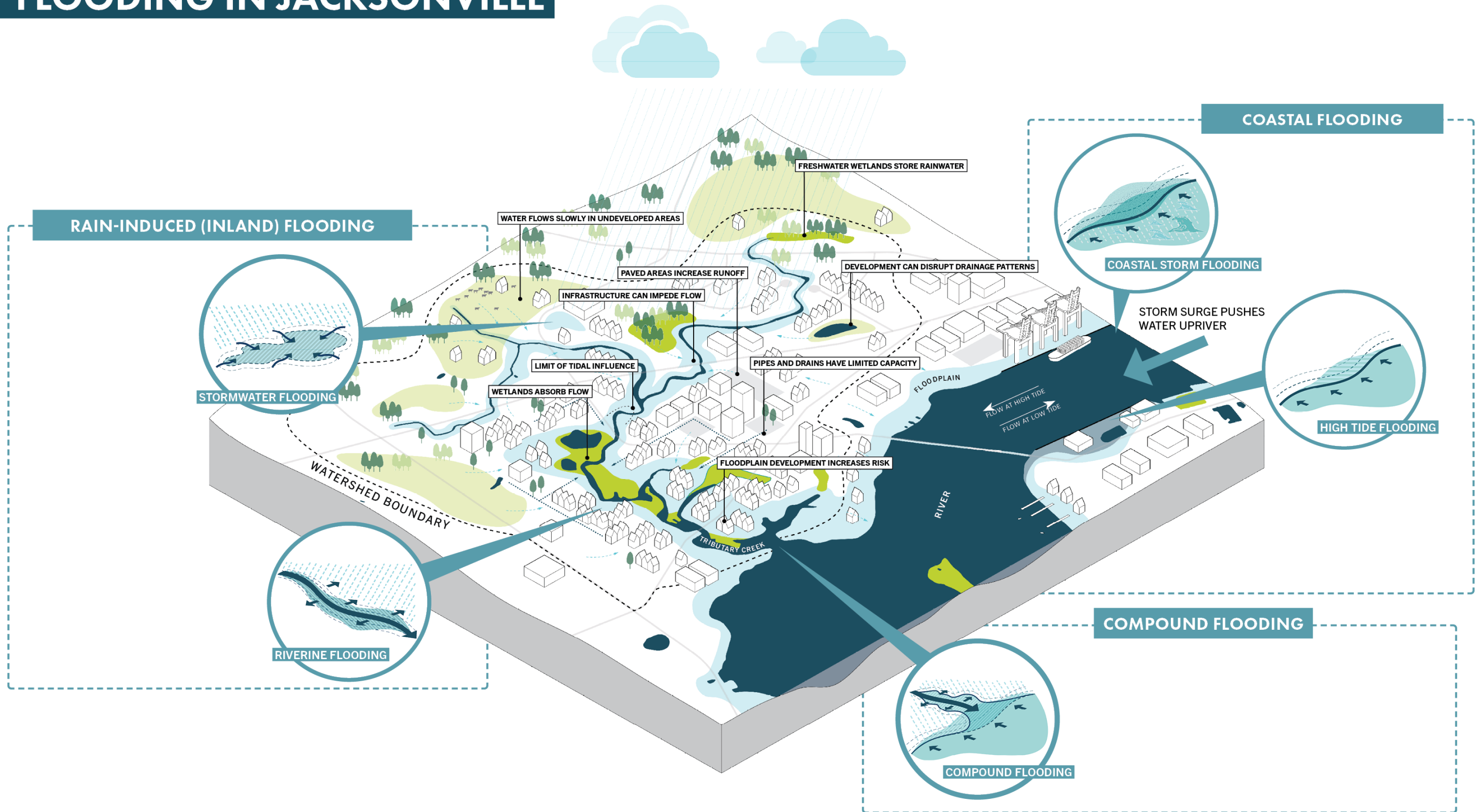
Jacksonville will grow in a way that anticipates the needs and risks of future decades and ensures the city remains a world-class place to live for generations.

- Maximize smart and equitable development in areas that are safest from future hazards
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- Maximize the sustainability and adaptiveness of infrastructure
- Maximize the benefits from public investments in the short- and long-term

WORK TO DATE



FLOODING IN JACKSONVILLE



COASTAL FLOODING

HIGH TIDE FLOODING: *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).*

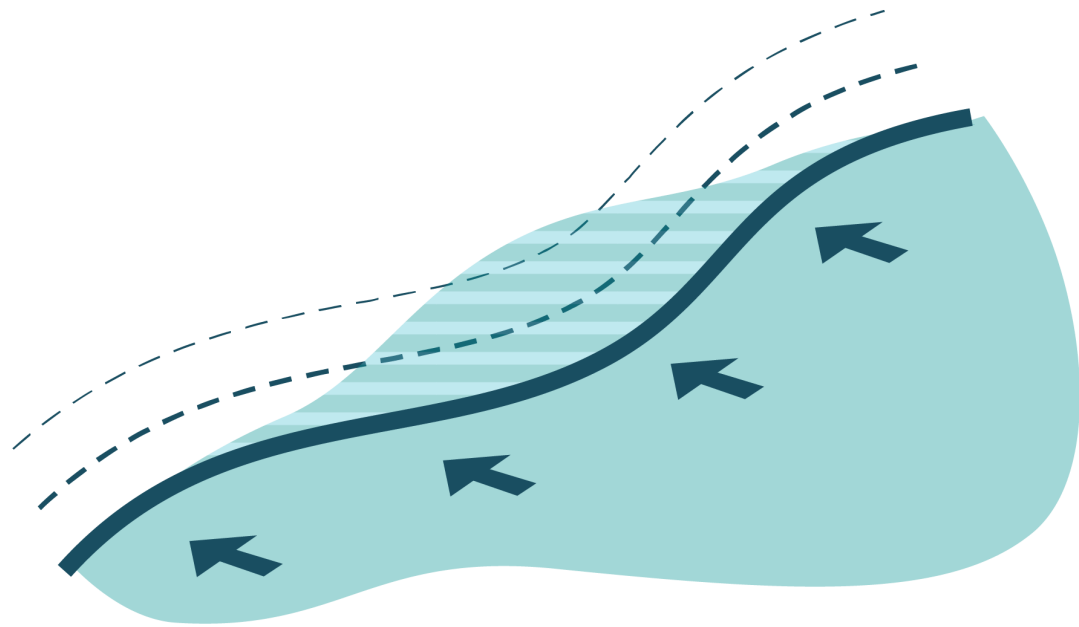
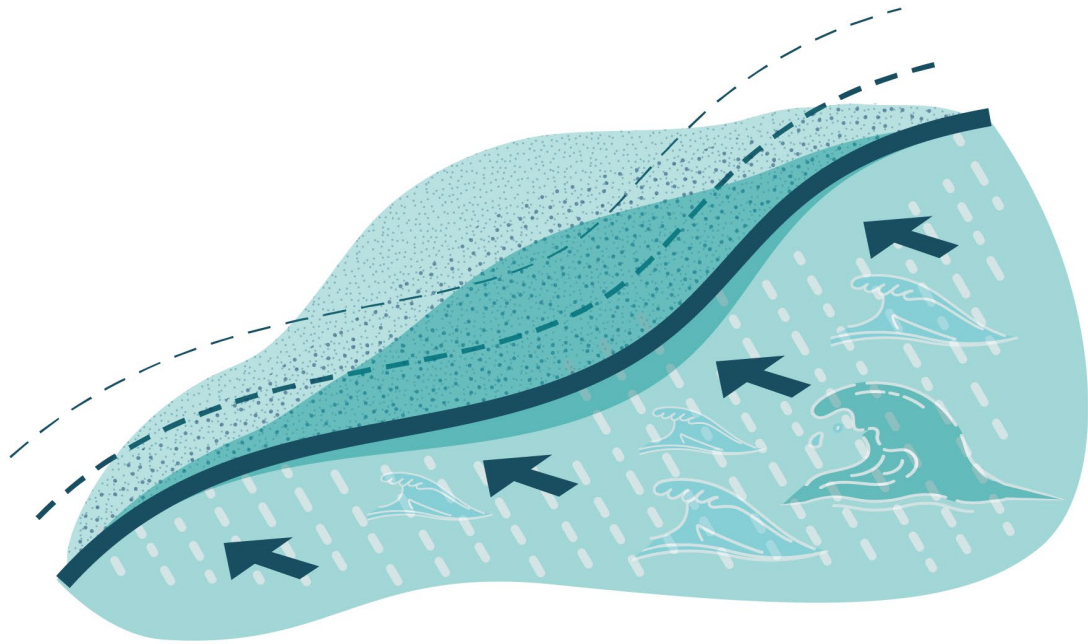


Photo shows high tide flooding in Northeast Florida, News4Jax



COASTAL FLOODING

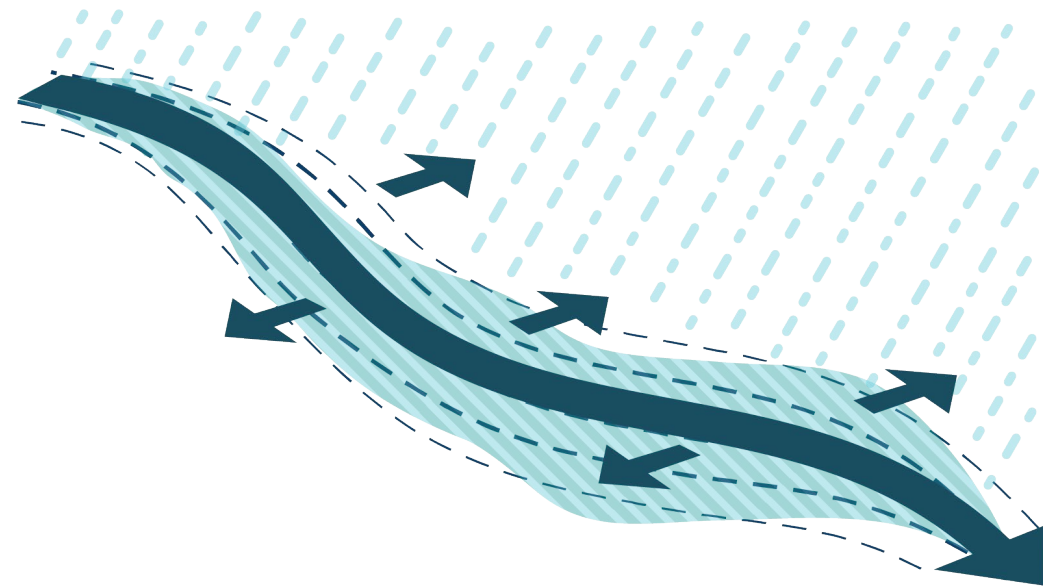
COASTAL STORM FLOODING: *Flooding caused by coastal storms like hurricanes. It includes the effects of storm surge and high waves.*



Coastal flooding caused by storm surge in Jacksonville, ABC News

RIVERINE (FLUVIAL) FLOODING

When water in rivers, creeks, canals, or swales overtop their banks. This can happen due to local heavy rainfall. It can also result from rainfall upstream, even when it hasn't rained where the flooding occurs.

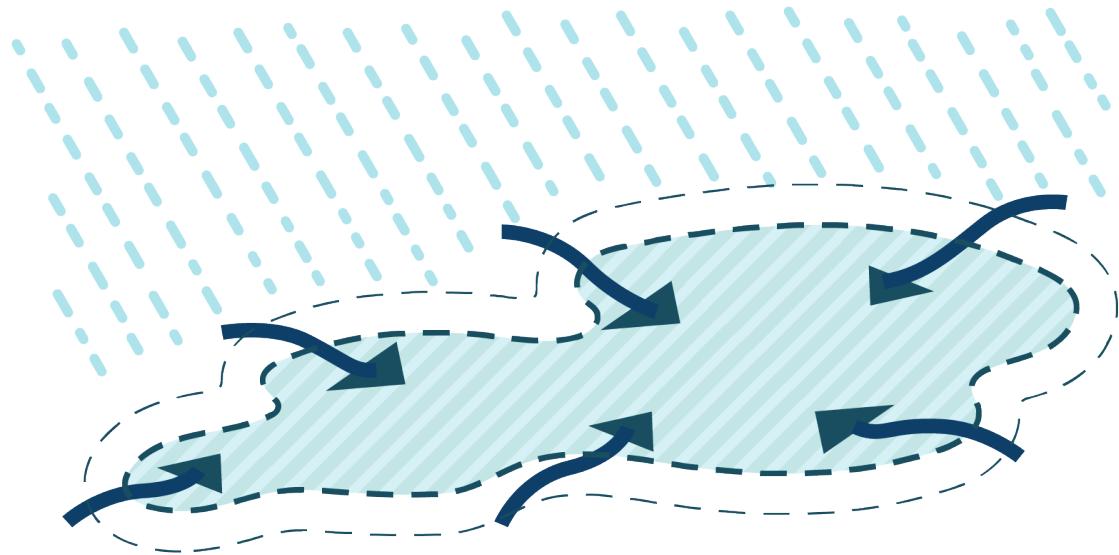


Flooding from St. Johns River during high winds

What data is missing:

STORMWATER (PLUVIAL) FLOODING

Flooding due to rainwater piling up in areas with poor drainage. This often happens during heavy rainfall events, when drains and pipes can't keep up with the rain.



North Edgewood Ave, Jacksonville

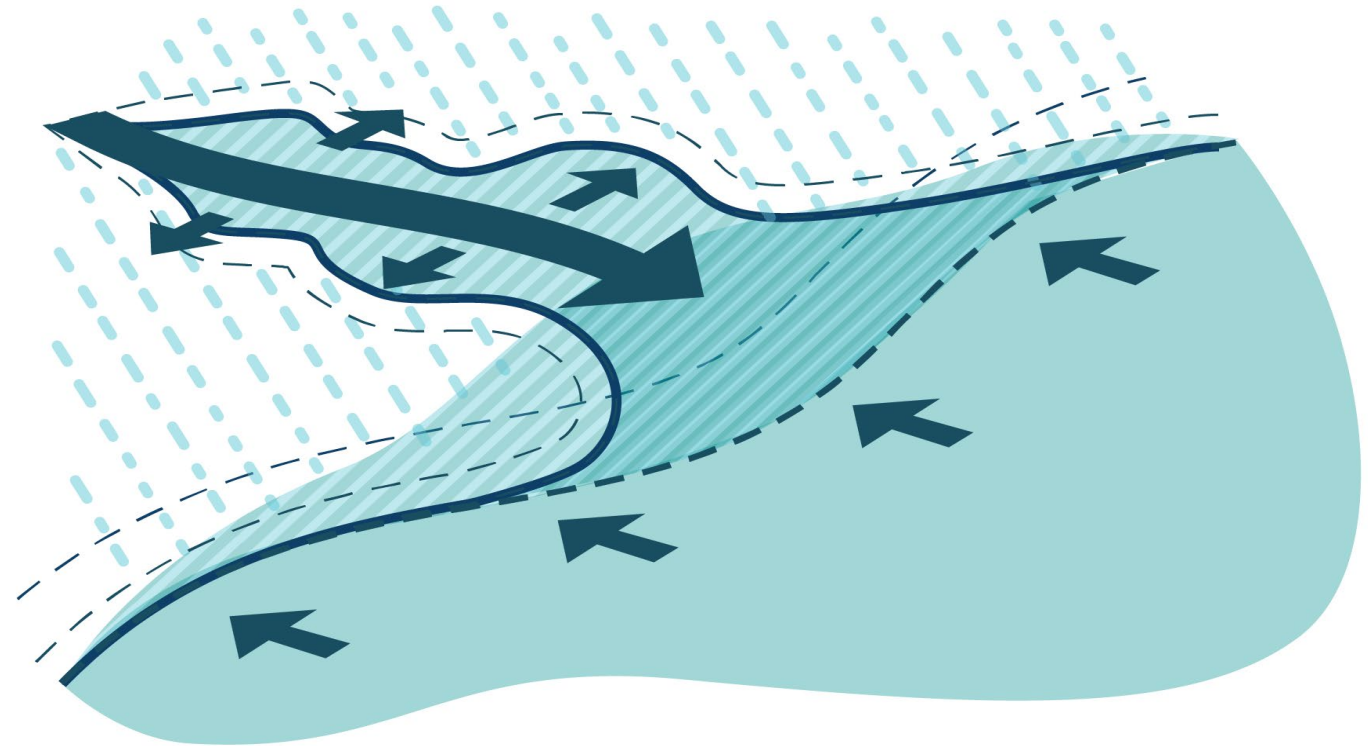




Data with high uncertainty:

COMPOUND FLOODING

When different types of flooding occur at the same time. An example is when heavy rain falls during a coastal storm. Many places along the St. John's River and its tributaries are vulnerable to this kind of flooding, but this type of flooding is the most difficult to predict.

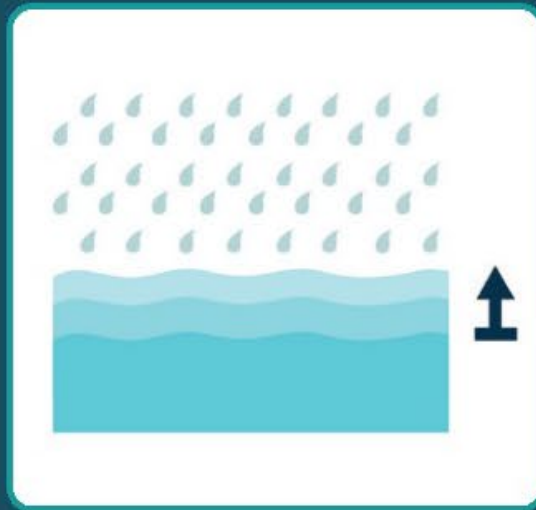


DATA GAPS: *Compound flooding scenarios are currently under-represented in the NFHL data. The COJ data gives one potential compound flooding scenario: riverine flooding during an annual high tide event.*

COMPOUND FLOODING SCENARIOS:
FUTURE (2.23ft SLR + 2.8ft high tide) 1% AEP (COJ)



HOW WILL CLIMATE CHANGE IMPACT FLOODING?



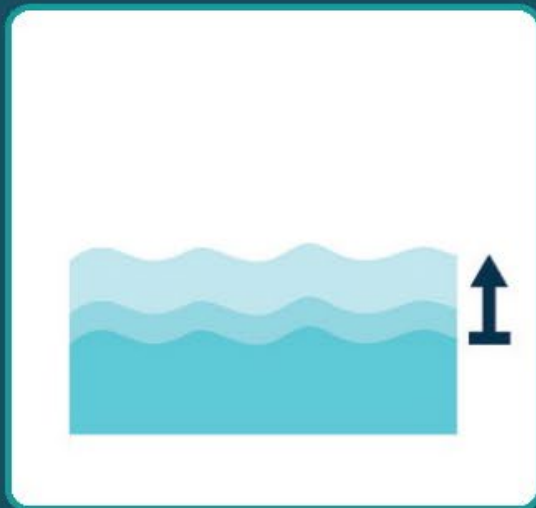
INLAND (RAIN-INDUCED) FLOODING

Jacksonville will experience more inland flooding due to more intense rainfall events (precipitation) and the associated stormwater runoff.

1.5-2x INCREASE IN EXTREME
PRECIPITATION EVENTS BY 2070

COMPARED TO HISTORIC AVERAGE FOR THE SOUTHEAST US

SOURCE: FOURTH NATIONAL CLIMATE ASSESSMENT, 2018



COASTAL FLOODING

Jacksonville will experience more coastal flooding due to sea level rise and from stronger coastal storms.

40-60 ANTICIPATED HIGH TIDE
FLOODING DAYS IN 2050

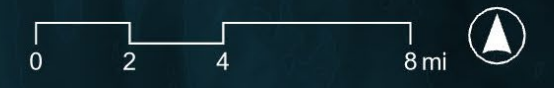
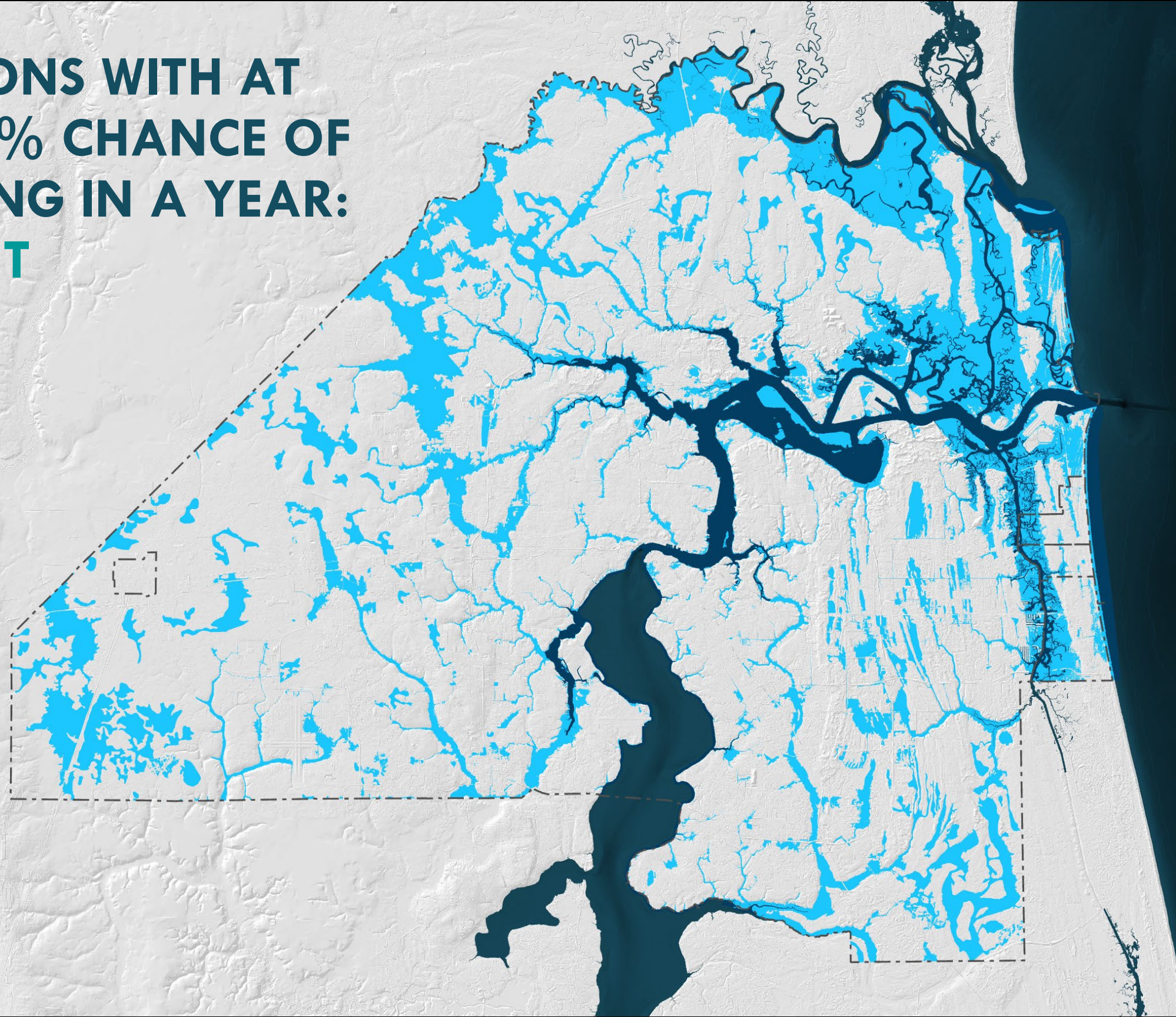
COMPARED TO 4 HIGH TIDE FLOODING DAYS IN 2021

SOURCE: NOAA STATE OF HIGH TIDE FLOODING AND 2022 ANNUAL OUTLOOK FOR MAYPORT, FL

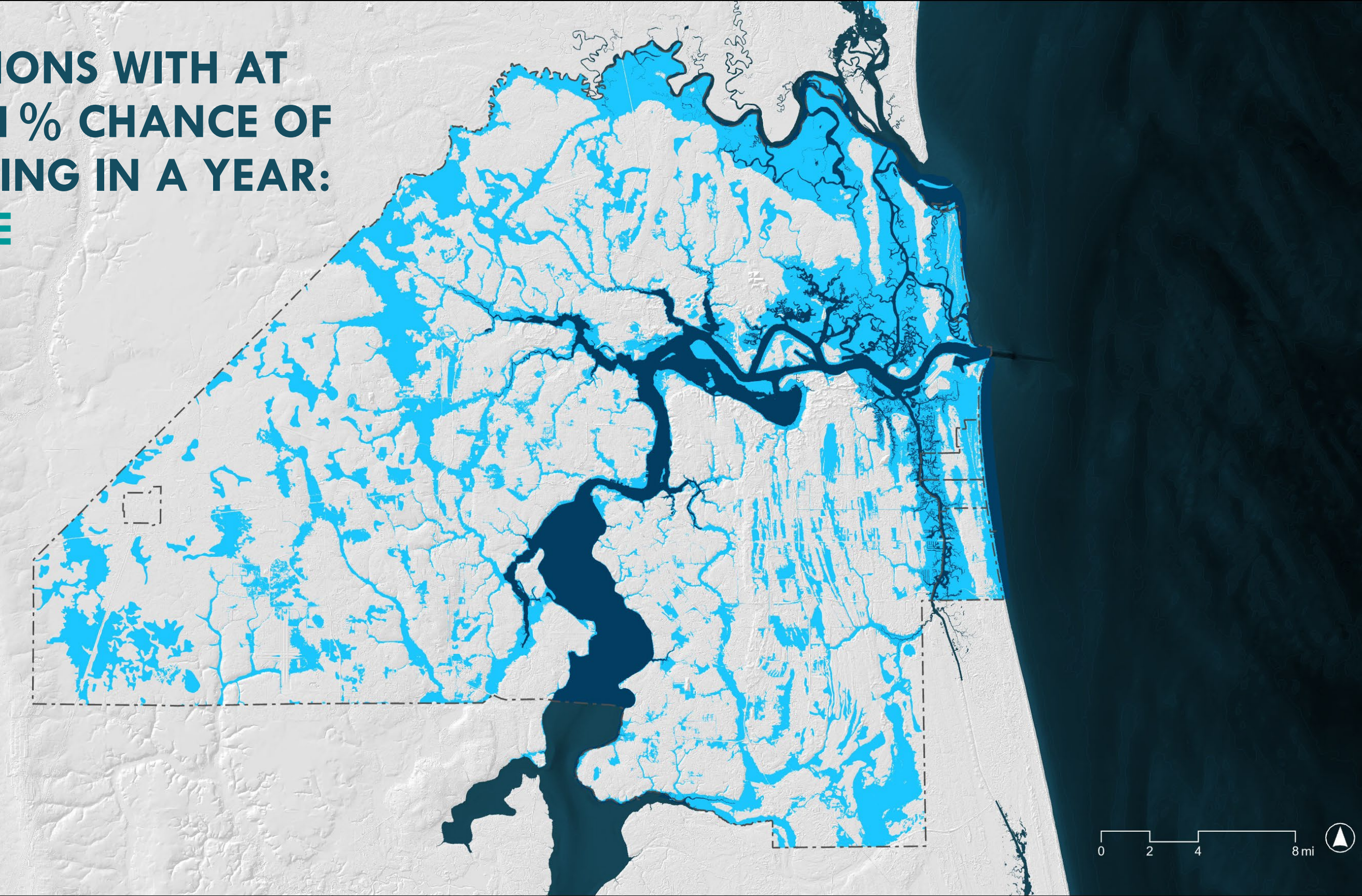




LOCATIONS WITH AT LEAST 1% CHANCE OF FLOODING IN A YEAR: CURRENT



**LOCATIONS WITH AT
LEAST 1% CHANCE OF
FLOODING IN A YEAR:
FUTURE**



2022 Heat Watch Study

Study Date

June 18th, 2022

406 mi²
Study Area

60
Volunteers

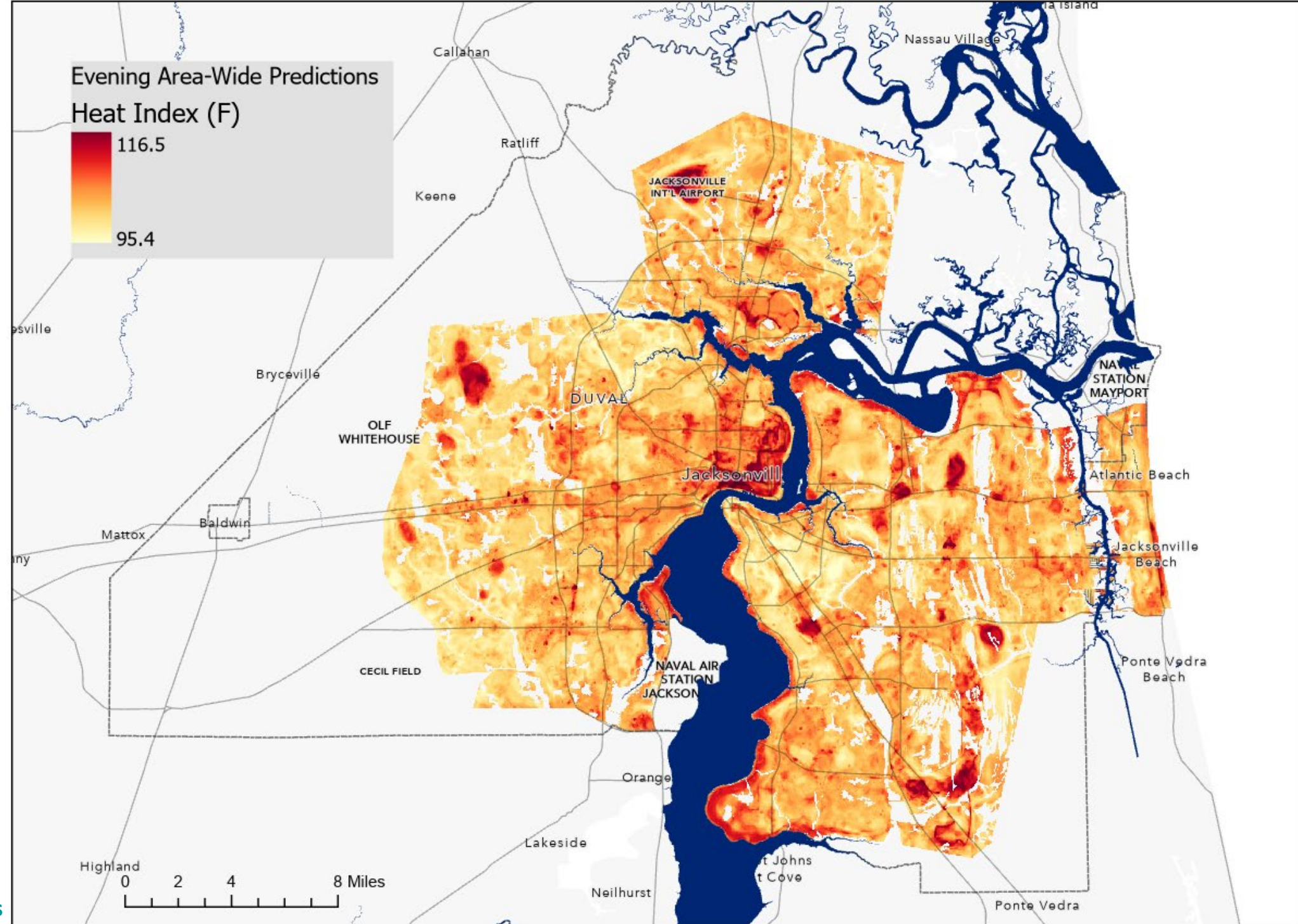
30
Routes

139,337
Measurements

94.7°
Max Temperature

11.8°
Temperature
Differential

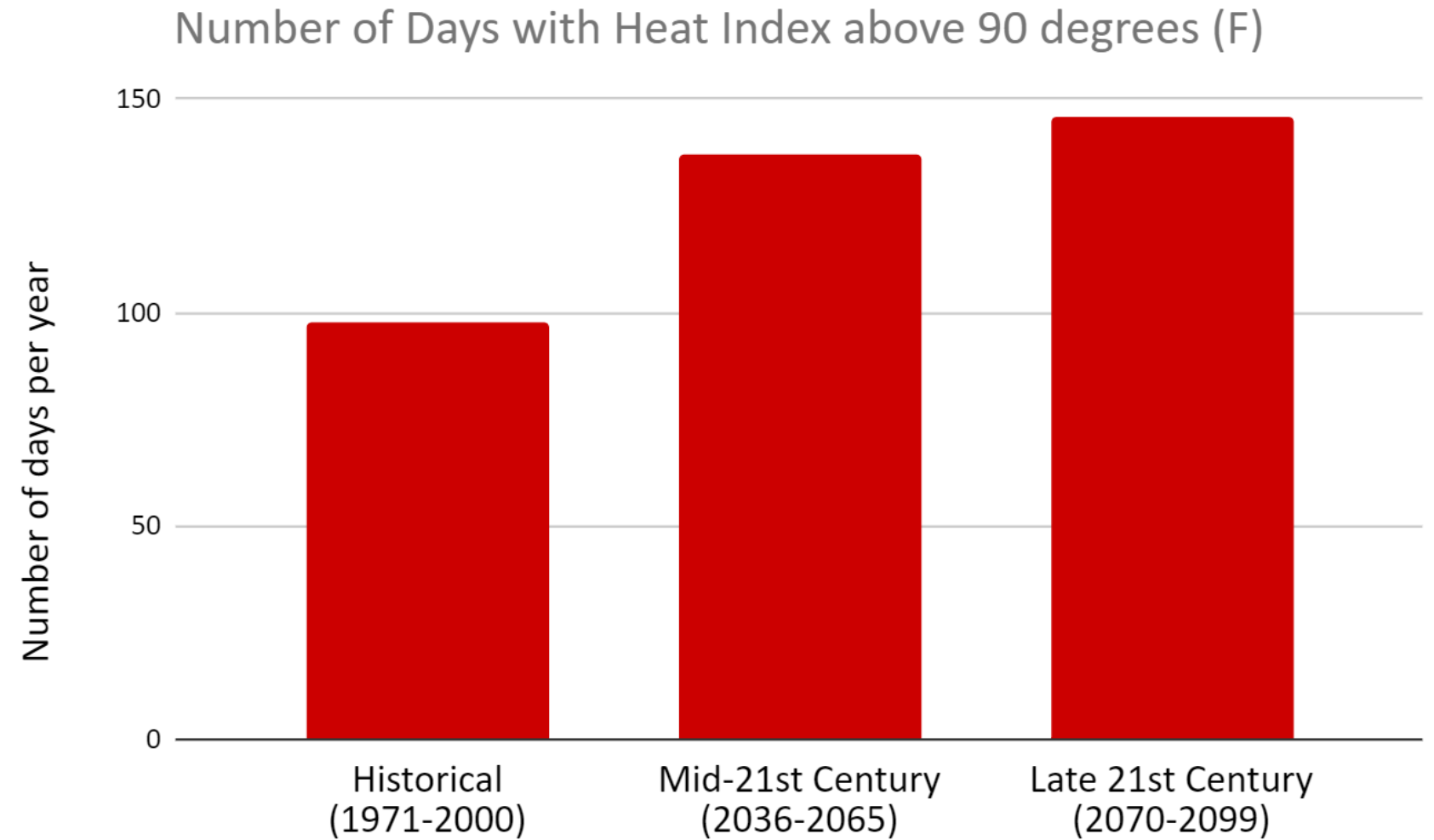
Source: Jacksonville Heat
Watch Report, CAPA Strategies



Extreme heat is a growing risk.

The number of days with extreme heat are expected to increase sharply.

Duval county can see about a **40% increase in number of days with Heat Index above 90 degrees F per year by Mid-21st Century.**



Source: Union of Concerned Scientists Killer Heat in the US Report (2019)



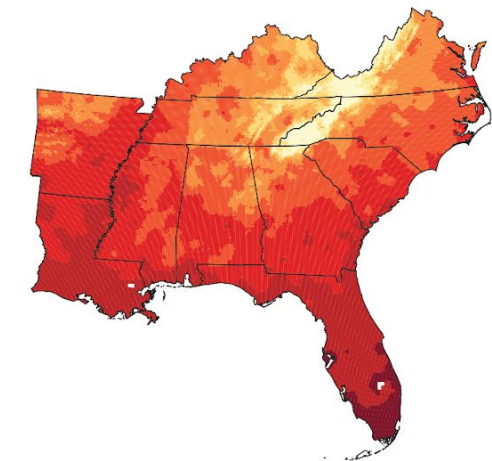
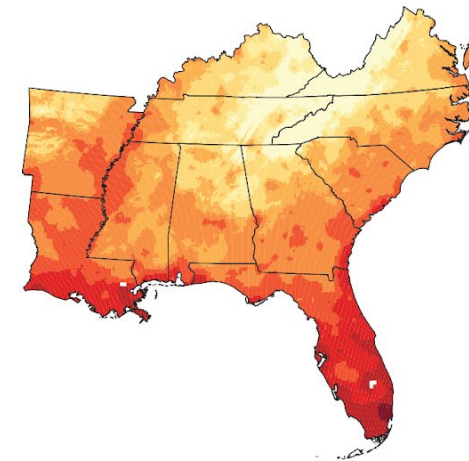
Reduced night-time cooling is a major factor in heat stress and heat-related illnesses.

The region can see **about 50-100 additional 'warm nights' (over 75 °F) per year by mid-century** according to projections from the Fourth National Climate Assessment

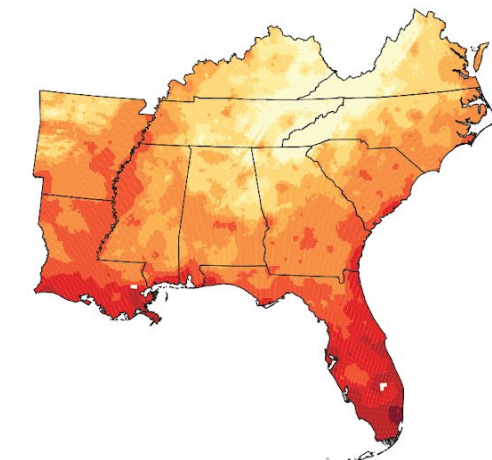
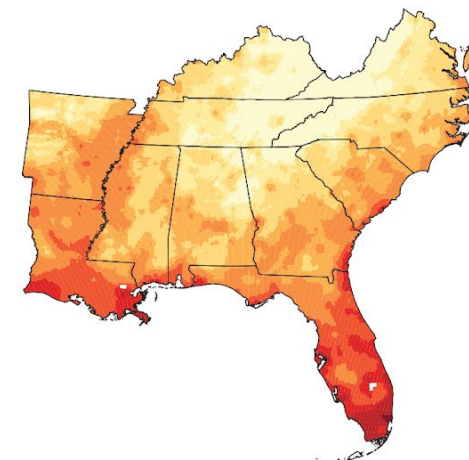
Mid-21st Century

Late 21st Century

Higher Scenario (RCP8.5)



Lower Scenario (RCP4.5)



Number of Nights with a Minimum Temperature Greater than 75°F



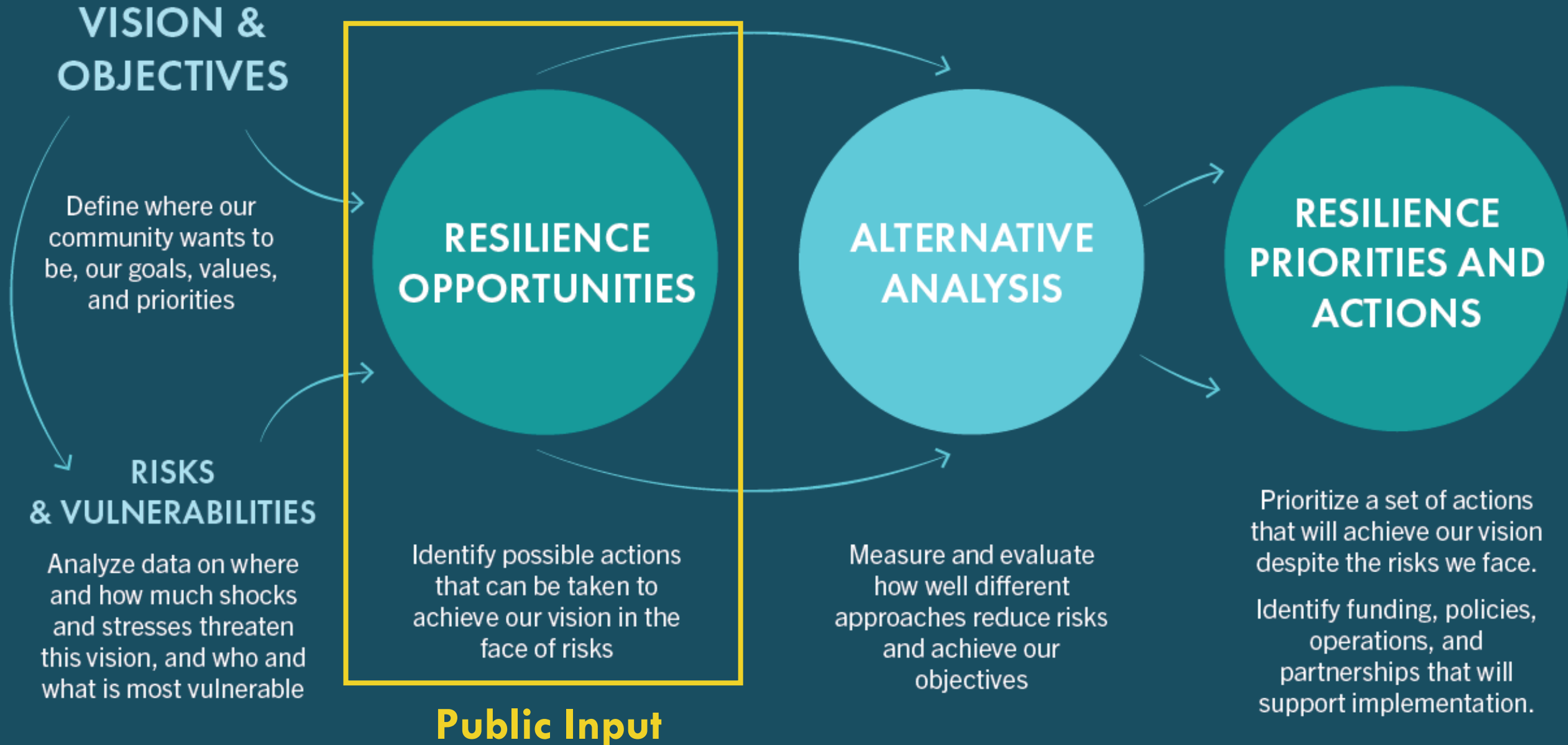
Source: Fourth National Climate Assessment Report



Same exposure - *different vulnerability*



WHERE WE ARE NOW





UNDERSTANDING RESILIENCE OPPORTUNITIES



WHAT IS A RESILIENCE ACTION?

03 SUPPORT SMALL BUSINESSES TO BETTER WITHSTAND ANY DISRUPTION.

Ensure Houston's more than 100,000 small businesses have access to information and resources so they can reduce the impact of disruptions and disasters.

RESILIENCE VALUE: Small businesses are typically more vulnerable when faced with a disruption or disaster. According to FEMA, 40% of small businesses never reopen after a disaster and another 25% that do reopen fail within a year. Working to better understand the existing disaster preparedness and resilience of Houston's small businesses will create opportunities to support businesses and their employees directly, strengthen supply

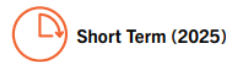
chains and lifelines within communities and the region, and create more disaster resilient communities. The City and its partners will develop and deploy a small business disaster resilience assessment focusing on businesses that support community lifelines, like water, food, and fuel, and operate along targeted commercial corridors. The City will also engage participating small businesses about climate risk awareness and share

existing resources available through the City's Business Solutions Center and other partners. Key findings from the small business resilience assessment will inform targeted recommendations at the business, community, and city levels. Guided by the findings of the assessment, the City will work with partners to develop additional resilience toolkits and trainings for Houston small businesses.

SHOCKS/STRESSES



TIMEFRAME



Short Term (2025)

IMPLEMENTATION THEMES



IMPLEMENTATION PARTNERS

City of Houston (COH) /
Houston Community College /

Houston Chamber of Commerce /
Rice University /
Houston Small Business Association

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS



Specific and implementable policy, program, or project that will help Jacksonville achieve its resilience vision

Identifies:

- Lead implementer and partners
- Timeframe for implementation (short-, medium-, long-term)
- Potential funding sources
- Resilience value: how it will help make Jacksonville better able to withstand multiple shocks and stresses and achieve multiple benefits

STATION 1: SHOCKS & STRESSES



STATION 2: MAPS



STATION 3: NATURAL SYSTEMS



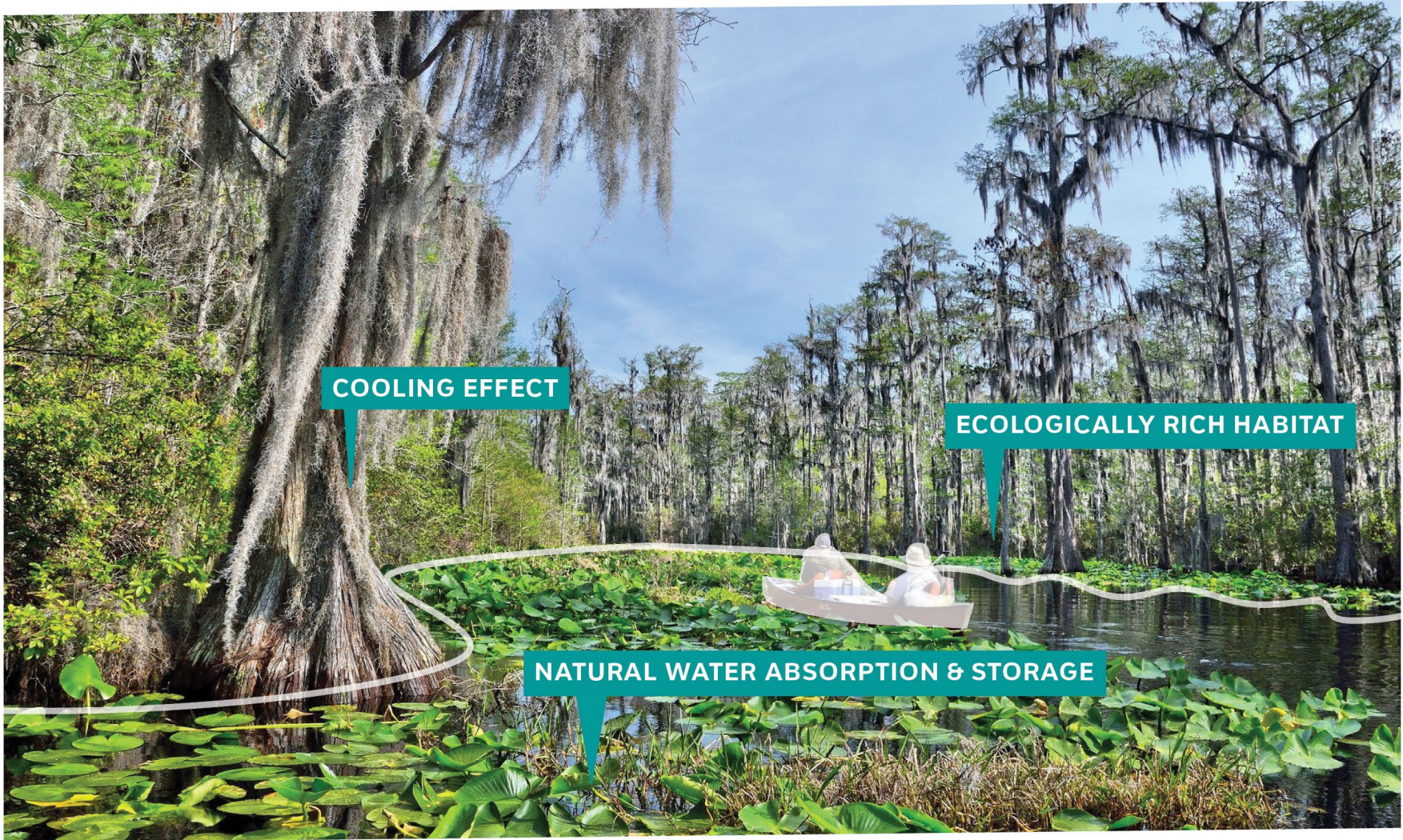
PROTECT EXISTING PARKS, OPEN SPACE + ECOSYSTEMS

WHAT

Preserve and protect existing parks, open spaces and ecosystems that have the ability to absorb and clean water.

WHY

Existing parkland, open space, wetlands, and undeveloped land can reduce flood risks, provide important habitats, and recharge the aquifer. Development pressure threatens some of these areas.



Stresses Addressed

- Heavy Rainfall
- Urban Heat Island Effect

Shocks Addressed

- Extreme Rainfall Events
- Extreme Heat Events



RETROFIT OR ADJUST/ENHANCE EXISTING PUBLIC LANDS

WHAT

Enhance existing parks and public spaces and retrofit city buildings to increase stormwater management capacity while providing other community benefits.

WHY

City-owned assets are distributed throughout the city and many are located on areas suitable for absorbing water and can be retrofitted to contribute to the flood-risk reduction strategy with community co-benefits.



Stresses Addressed

- Heavy Rainfall
- Urban Heat Island Effect

Shocks Addressed

- Extreme Rainfall Events
- Extreme Heat Events



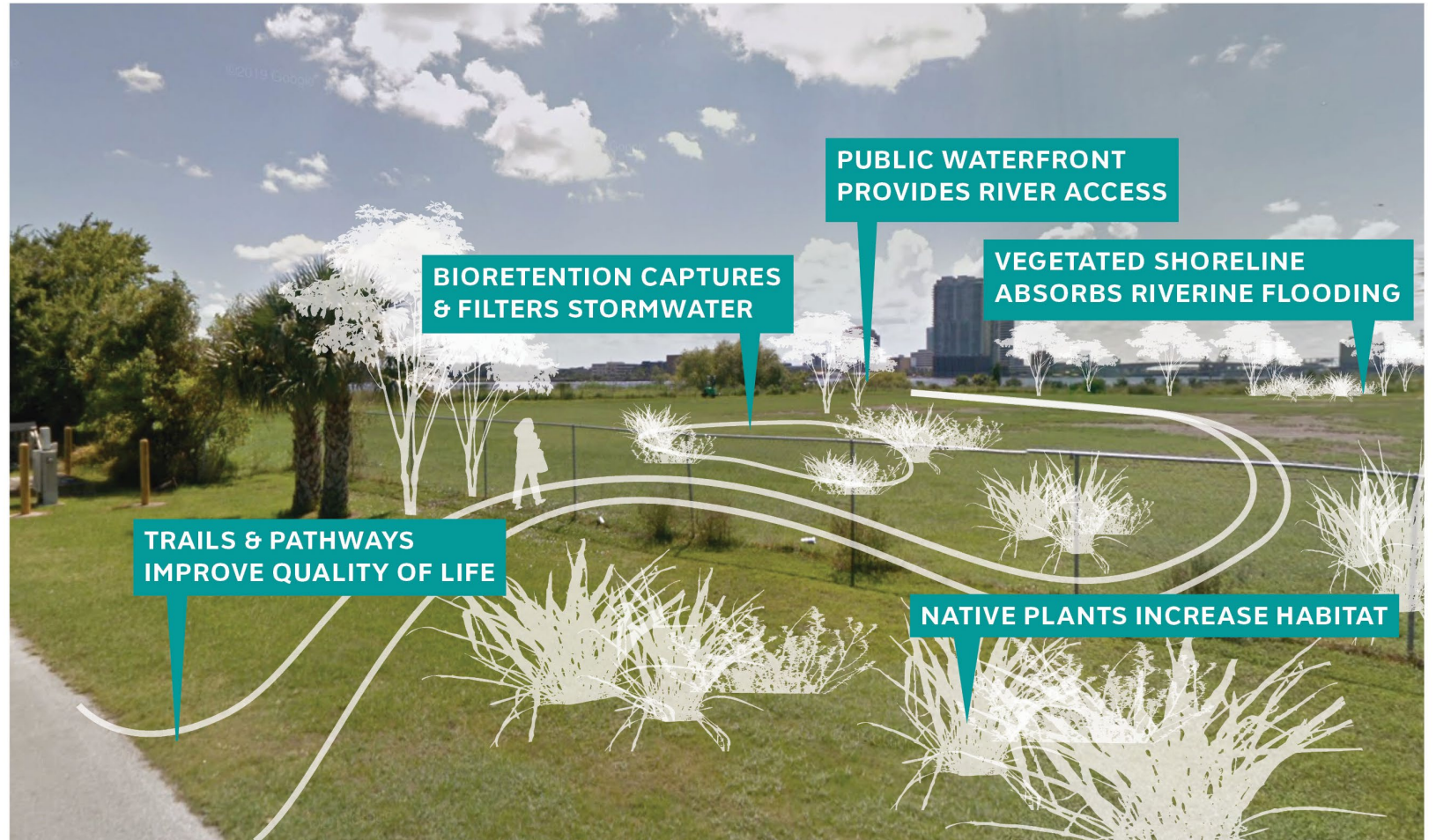
TRANSFORM UNDERUTILIZED OR VACANT SPACES

WHAT

Transform vacant or underutilized and impervious surfaces (surfaces that don't allow water to soak naturally into the earth) or flood-prone spaces into resilience parks and restored ecosystems.

WHY

Many properties experience repetitive property loss due to their proximity to the floodplain or other causes of flooding. Transforming them into water-loving public spaces provide multiple benefits to the community. In other areas that are large under-utilized impervious areas, transforming them to absorb and filter water will assist in reducing flood-risks within the watershed.



Stresses Addressed

- Heavy Rainfall
- Urban Heat Island Effect

Shocks Addressed

- Extreme Rainfall Events
- Extreme Heat Events



INCREASE URBAN TREE CANOPY

WHAT: *Plant trees to improve air quality, reduce energy needed to cool buildings, provide shade, increase property values, and beautify the city*

WHY

- Maximize physical and mental health and reduce disparities in health and well-being
- Minimize the negative effects of shocks/stresses on human health/well-being
- Maximize ecosystem health and services
- Maximize benefits of public investments



The City of Charlotte, NC has undertaken several recent initiatives to increase its urban forests, including the Tree Canopy Action Plan, which outlines policies that preserve, restore, and enhance the canopy.

Source: [City of Charlotte. \(2022\).](#)

Stresses Addressed

- Heavy Rainfall
- Urban Heat Island Effect

Shocks Addressed

- Extreme Rainfall Events
- Extreme Heat Events



STATION 4: BUILT ENVIRONMENT



ENCOURAGE NEW AND INFILL DEVELOPMENT IN AREAS OF LOW FLOOD RISK

WHAT: *Develop community services, jobs, shopping, and affordable housing in low-risk areas with existing infrastructure, transit networks, and underutilized sites. Encourage development on vacant land, or land that was formerly industrial.*

WHY

- Maximize smart and equitable development in areas safest from future hazards
- Maximize benefits of public investments
- Maximize access to safe housing, connected transportation, and essential services
- Minimize barriers to economic mobility



Mixed-use infill development in the Sun Valley neighborhood of Denver, CO
Source: [Denver Infill](#)

Stresses Addressed

- Sea Level Rise
- High Tide Flooding
- Heavy Rainfall
- Lack of Reliable Transportation
- Lack of Safe and Affordable Housing
- Social Inequality

Shocks Addressed

- Extreme Rainfall Events
- Hurricanes/Tropical Cyclones



RETROFIT/ADJUST EXISTING BUILDINGS FOR STORM PROTECTION, WATER STORAGE, EFFICIENCY, AND SHADE

WHAT: *In high-risk areas, retrofit buildings that cannot be relocated to address both adaptation to and mitigation of multiple hazards and climate impacts*

WHY

- Minimize damage to property, infrastructure, and the environment
- Minimize the negative effects of shocks/stresses on human health/well-being
- Minimize disruptions to essential services and the economy
- Maximize the sustainability and adaptiveness of infrastructure



Green roofs and/or facades help cool interior temperatures and temporarily detain stormwater runoff.

Source: ULI. (2022). Resilient Retrofits: Climate Upgrades for Existing Buildings.

Stresses Addressed

- Heavy Rainfall
- Urban Heat Island Effect
- Aging Infrastructure

Shocks Addressed

- Extreme Rainfall Events
- Extreme Heat Events
- Winter Storms/Extreme Cold Events
- Infrastructure Disruption or Failure
- Energy Insecurity/Blackouts



IMPROVE TRANSPORTATION ACCESS THROUGHOUT JAX

WHAT: *Jacksonville is big—but it should still be possible to get around without a car, especially to get to work. Cities around the world are experimenting with improved safety and mobility, and Jacksonville can do the same.*

WHY

- Maximize safe, active, and connected transportation options
- Maximize public physical and mental health
- Reduce disparities in health and wellbeing
- Minimize barriers to economic mobility
- Maximize access to essential services



Narrower intersections with physical protections, like this one in Hoboken NJ, improve safety for all users

Stresses Addressed

- Lack of Reliable Transportation
- Social Inequality
- Poverty



STATION 5: QUALITY OF LIFE



CONNECT AND ENCOURAGE JOB TRAINING AND PLACEMENTS FOR RESILIENCE ACTIONS

WHAT: *For each action or opportunity for action, work with partners to identify, develop, and place Jacksonville residents into relevant training programs and jobs.*

WHY

- Maximize economic growth and prosperity
- Minimize barriers to economic mobility
- Maximize the benefits from public investments



*Image credit: Florida Power & Light Company
The Florida Solar Energy Apprenticeship Program launches Dec. 8.*

Stresses Addressed

- Social Inequality
- Poverty
- Economic Downturns

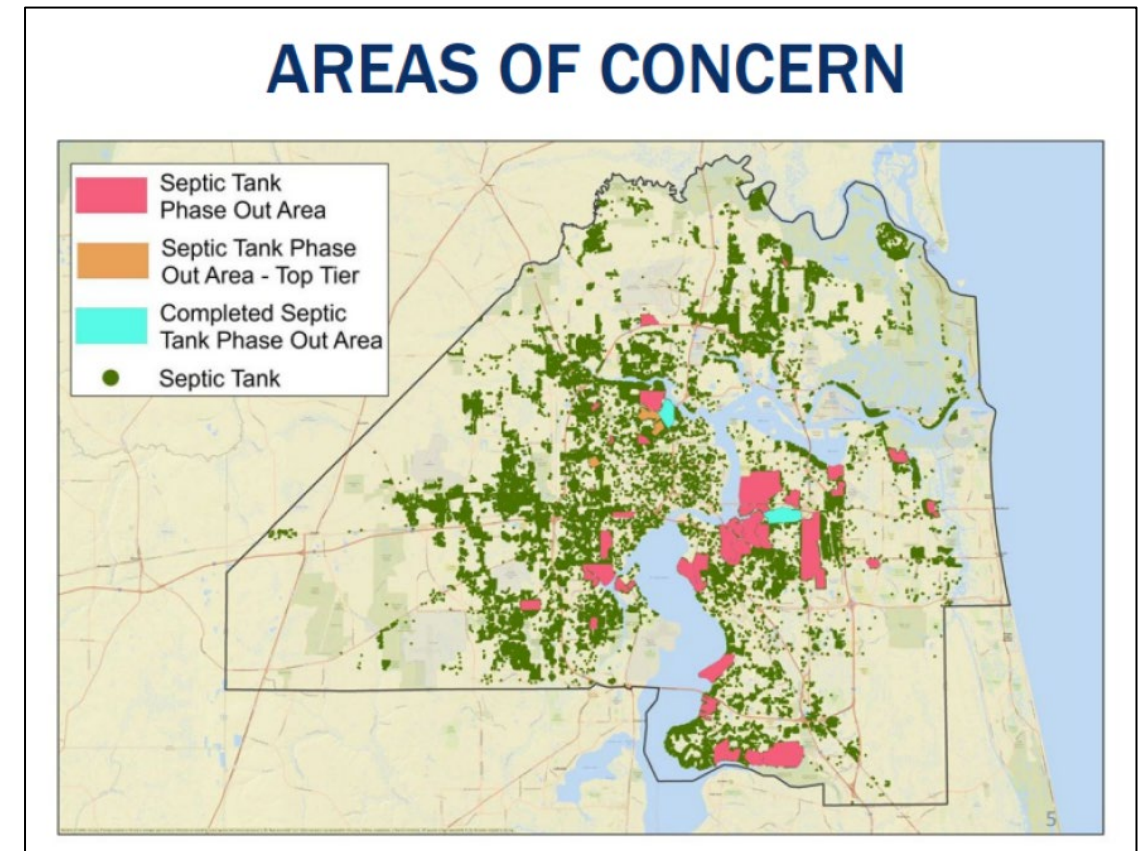


REDUCE POLLUTION FROM SEPTIC OVERFLOWS

WHAT: Point source pollution from septic tanks needs to be addressed at multiple scales. Currently, COJ and JEA are implementing a septic tank phase-out program. The Jacksonville Resilience Strategy should explore additional mechanisms to speed up the process and increase the quantity of phase-outs city-wide.

WHY

- Minimize damage to property, infrastructure, and the environment from shocks and stresses
- Minimize negative effects of shocks and stresses on human health and well-being
- Maximize access to safe housing and essential services
- Reduce disparities in health and well-being
- Maximize the sustainability and adaptiveness of infrastructure



JEA septic tank phase out program's areas of concern.

Stresses Addressed

- Groundwater Threats
- Aging Infrastructure
- Lack of Safe and Affordable Housing

Shocks Addressed

- Infrastructure disruption



USE PLACEMAKING STRATEGIES TO STRENGTHEN COMMUNITIES

WHAT: *Creating great public spaces for the people of Jacksonville is currently centered around Downtown, and other neighborhoods could benefit from similar strategies.*

WHY

- Maximize residents' physical and mental health
- Reduce disparities in health and well-being
- Maximize smart and equitable development in areas safest from future hazards



*James Weldon Johnson Park in Downtown Jacksonville
Photo: Downtown Vision Inc.*

Placemaking: A people-centered approach to the planning, design and management of public spaces

Stresses Addressed

- Lack of Reliable Transportation
- Urban Heat Island Effect
- Social Inequality
- Economic Downturns



STATION 6: EMERGENCY RESPONSE



PROTECT CRITICAL INFRASTRUCTURE TO REDUCE FLOOD DAMAGE AND REMAIN OPERABLE DURING STORMS

WHAT: *Protect existing assets and infrastructure in areas susceptible to current and future flooding that cannot be relocated.*

WHY

- Minimize damage to property, infrastructure, and the environment
- Minimize disruption to essential services
- Maximize the sustainability and adaptiveness of infrastructure



*Temporary flood barriers can be effective at preventing flood damage
Source: [Sustainable Buildings Initiative. Climate Resilience Toolkit.](#)*

Stresses Addressed

- Sea Level Rise
- High Tide Flooding
- Coastal Erosion
- Saltwater Intrusion

Shocks Addressed

- Hurricanes/Tropical Cyclones
- Extreme Rainfall Events (slows runoff)



PARTNER WITH JACKSONVILLE SCHOOLS TO DEVELOP RESILIENCE IN COMMUNITIES

WHAT: Increase community access and ownership of resilience opportunities by partnering with schools as resource points.

WHY

- Minimize negative effects of shocks and stresses on human health and well-being
- Minimize disruptions to essential services
- Maximize residents' physical and mental health
- Maximize access to safe housing and essential services



A Seminole County Public School in Florida prepares for more evacuees due to Hurricane Ian. (Seminole County Government)

Stresses Addressed

- Sea Level Rise
- High Tide Flooding
- Heavy Rainfall
- Urban Heat Island Effect

Shocks Addressed

- Extreme Rainfall Events
- Extreme Heat Events
- Hurricanes/Tropical Cyclones
- Winter Storms/Extreme Cold Events
- Infrastructure Failure or Disruption
- Energy Insecurity/Blackouts
- High Winds



IMPROVE EMERGENCY PREPAREDNESS AND RESPONSE FOR EXTREME HEAT EVENTS

WHAT: *Develop a heat emergency preparedness and response plan to reduce heat-related health risks.*

WHY

- Minimize negative effects of shocks and stresses on human health and well-being
- Maximize residents’ physical and mental health
- Reduce disparities in health and well-being



GOVERNMENT OF THE DISTRICT OF COLUMBIA
DC MURIEL BOWSER, MAYOR

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2022 District of Columbia Heat Emergency Plan

Stresses Addressed

- Urban Heat Island Effect
- Social Inequality

Shocks Addressed

- Extreme Heat Events
- Energy Insecurity/Blackouts



INCREASE PUBLIC OUTREACH AND EDUCATION SURROUNDING EVACUATION PLANS

WHAT: *Improve communication materials, mechanisms, and public outreach surrounding evacuation.*

WHY

- Minimize the negative effects of shocks/stresses on human health/well-being
- Maximize access to safe housing and essential services



New Orleans offers free, city-assisted evacuation and has “Evacuspots,” or pickup locations, throughout the city to transport residents who cannot evacuate on their own.

Source: [NOLA Ready](#).

Stresses Addressed

- Sea Level Rise
- High Tide Flooding
- Heavy Rainfall
- Lack of Reliable Transportation

Shocks Addressed

- Hurricanes/Tropical Cyclones
- Energy Insecurity/Blackouts
- Wildfires
- Hazardous Materials Incidents



STRENGTHEN JACKSONVILLE'S LIFELINES AND SUPPLY CHAINS

WHAT: Evaluate and implement plans to strengthen critical lifelines and supply chains.

WHY

- Maximize access to essential services
- Minimize negative effects of shocks/stresses on health and well-being
- Minimize disruption to essential services and the economy



Image of highway disruption following Hurricane Ian
Source: Geopix/Alamy Stock Photo

Stresses Addressed

- Food Insecurity & Supply Chain Disruption
- High Tide Flooding
- Heavy Rainfall

Shocks Addressed

- Hurricanes/Tropical Cyclones
- Extreme Rainfall Events
- Extreme Heat Events
- Winter Storms/Extreme Cold Events
- Infrastructure Failure or Disruption
- Cyber Attacks

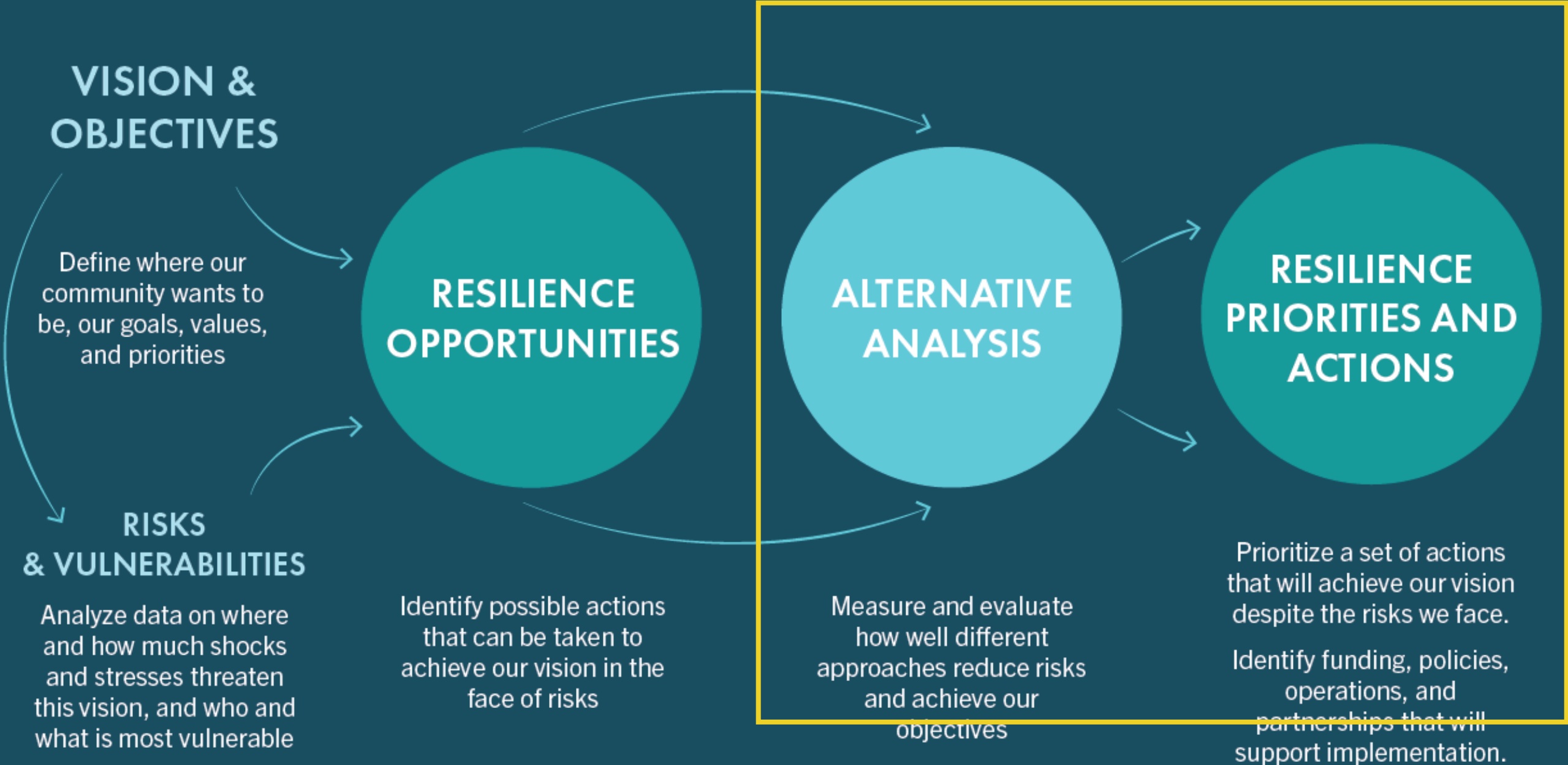




STATION 7: SURVEY & FLOOD RISK COLORING ACTIVITY



FUTURE STEPS





THANK YOU

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