

JANUARY 2020 - FEBRUARY 2021

CITY OF JACKSONVILLE, FLORIDA

CITY COUNCIL SPECIAL COMMITTEE ON RESILIENCY

THE FINAL REPORT

PREPARED BY:
NORTHEAST FLORIDA REGIONAL COUNCIL (NEFRC)



The cover of this publication displays over a dozen umbrellas floating in the sky. These umbrellas, which are diverse in style, represent the community members of Jacksonville who dedicated their time and energy to the effort of making their local community a more resilient place for current and future generations. United by purpose and a common mission, these community members partnered with elected officials on a policy process that lasted for more than 14 months. This publication would have not been possible if it were not for the tireless work of the Citizens of Jacksonville.

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Beth Payne, Chief Executive Officer.

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EXECUTIVE SUMMARY

In November of 2019, then Jacksonville City Council President Scott Wilson announced plans to form a Special Committee on Resiliency that would launch in January of 2020. The overarching objective of the Special Committee would be to find policy solutions that would increase the resilience of Jacksonville to the impacts of coastal flooding, riverine flooding, sea level rise and high intensity storm events.

In order to increase the resilience of any given community (i.e. ensure that the community can 'bounce back' after a disastrous event), intensive discussions need to be had amongst elected officials, subject matter experts, government staff and members of the public.

In addressing community challenges related to resilience in the City of Jacksonville, there were already several established stakeholder engagement frameworks utilized to better inform both short-term and long-term decision-making processes.

These efforts presented a wealth of knowledge relating to an assessment of City plans, policies and regulations. This includes the Local Hazard Mitigation Plan, the Comprehensive Plan and future land use policies, plans for capital improvements, building codes and zoning codes and plans related to Jacksonville's participation in FEMA's Community Rating System.

In building further capacity at the local level, the purpose of this final report is to summarize the observations made during the 1-year Special Committee process. This report presents new information.

The principal objective is to establish a reference guide for all of the best-practices, strategies and lessons that were identified throughout the overall process.

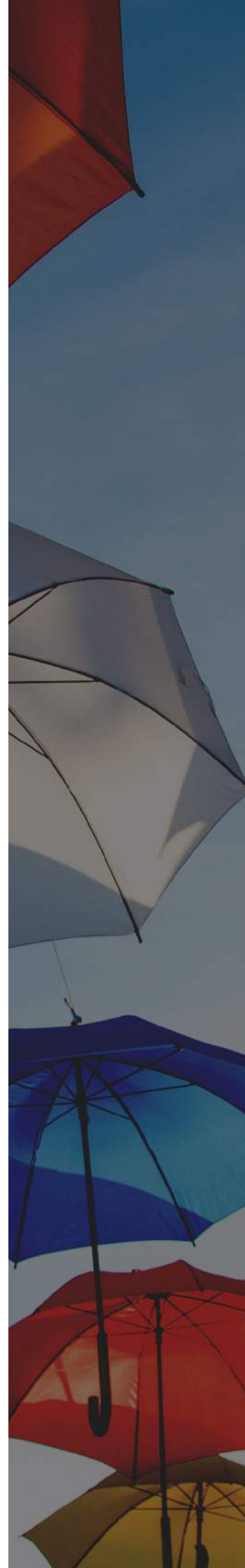


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Message from Chair



Council Member Randy DeFoor, representing District 14, is a 5th generation Jacksonville native and currently a Senior Vice President and National Agency Counsel for Fidelity National Financial, a fortune 500 company. She earned her bachelor's degree from The University of the South and JD degree from Cumberland School of Law.

Following the aftermaths of hurricanes Matthew and Irma in 2016 and 2017, citizen perspectives on flooding, storm surge and sea level rise were heard loud and clear.

Recognizing how many of my own constituents had been impacted by these devastating storms, I made a personal commitment to address these issues when I first became a member of Jacksonville City Council.

In January of 2020, under the leadership of Council President Scott Wilson, City Council established a Special Committee on Resiliency that would be chaired by Council Member Matt Carlucci. The committee was continued by President Hazouri to be chaired by me. Since that time, the City of Jacksonville has made a significant amount of progress in better understanding what steps need to be taken to make our city more resilient to environmental hazards.

Between January and May of 2020, we heard from Federal, state and local government agencies and subject matter experts about lessons that have already been learned. Meetings featured perspectives from the Florida Department of Environmental Protection, U.S. Army Corps of Engineers and City Departments.

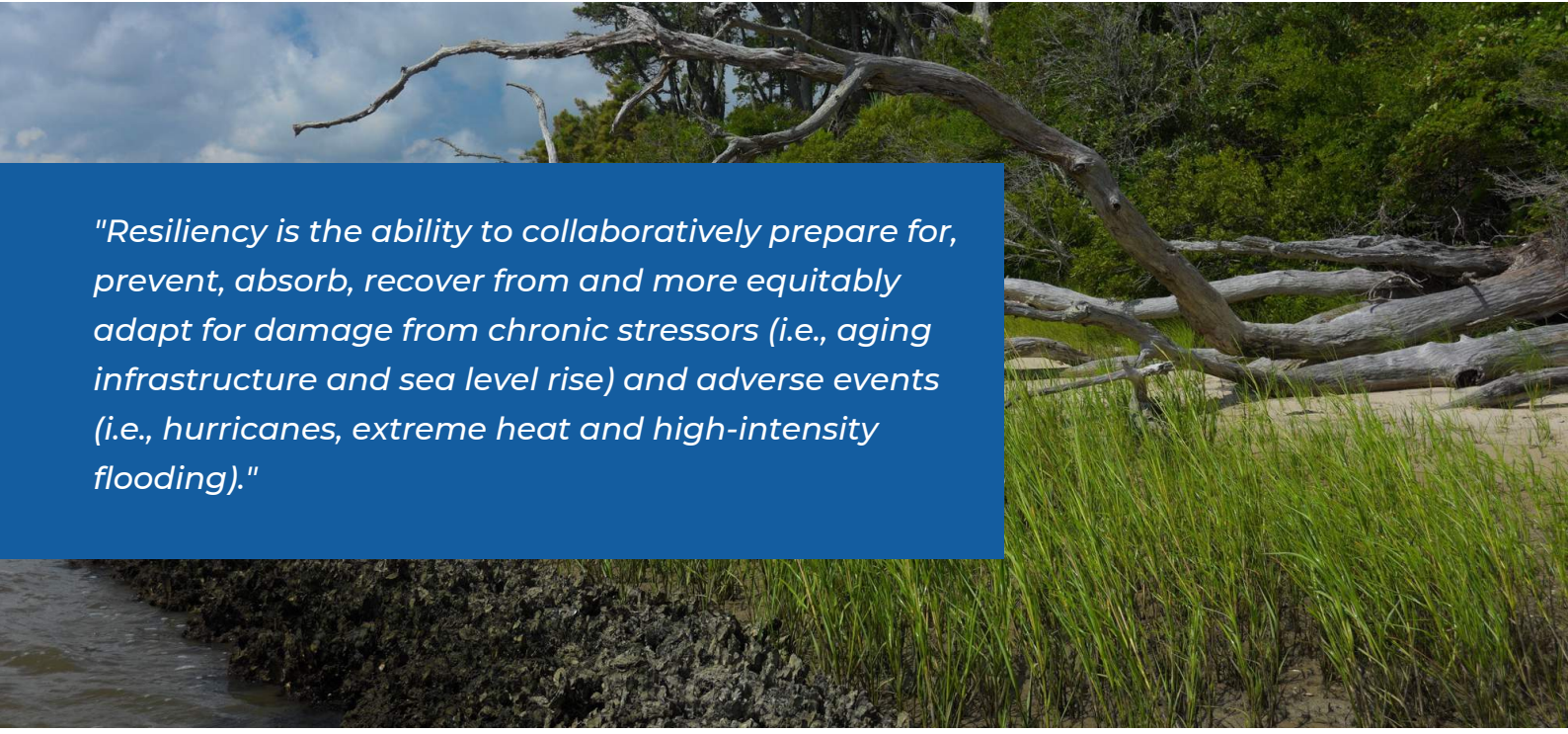
In a short period of time, we established an inventory of what was known so far and drafted steps that needed to be taken immediately moving forward.

In the summer, following the onset of the coronavirus pandemic, leadership announced that three subcommittees would be established with the objective of involving more expert perspectives from the local community. The subcommittees established included the:

- (1) Subcommittee on Infrastructure & Continuity of Operations for Essential Services;
- (2) Subcommittee on Education, Protection of Local Neighborhoods & Community Outreach; and
- (3) Subcommittee on Environmental Planning.

Throughout this entire process, what I have been most impressed with is the dedication and commitment of local community members who have volunteered their personal time to meeting community objectives. This would have not been possible without them.

INTRODUCTION



"Resiliency is the ability to collaboratively prepare for, prevent, absorb, recover from and more equitably adapt for damage from chronic stressors (i.e., aging infrastructure and sea level rise) and adverse events (i.e., hurricanes, extreme heat and high-intensity flooding)."

To establish a clear starting point for this report, it is important to define what exactly is being discussed.

Resiliency is the ability to collaboratively prepare for, prevent, absorb, recover from and more equitably adapt for damage from chronic stressors (i.e., aging infrastructure and sea level rise) and adverse events (i.e., hurricanes, extreme heat and high-intensity flooding).

A more resilient City & community incurs fewer disaster related costs, or losses, when a disaster strikes. These frequently include, among other things, capital losses, deaths and injuries resulting from the disaster, and interruption costs.

This is in addition to the government related costs for response and recovery, which include costs from emergency response teams, emergency shelters, emergency evacuations, supplies like bottled water if the City water supply is interrupted, debris clean up and removal, infrastructure repair and any other services used to return the community to normalcy.

In addition, as the sea level rises, existing infrastructure, both private and public, will be at risk. Cities that have prepared and budgeted will be able to manage this change without drastic impacts on necessary services.



The City of Jacksonville, situated in Northeast Florida, is the largest geographical city in the continental United States and is a rapidly growing metropolitan area with nearly 900 thousand residents and counting. In addition to these specific characteristics, one of Jacksonville's most valued assets is its thousands of miles of shorelines that rest on the Atlantic Ocean, St. Johns River and Intracoastal Waterway. While natural waterways and coastal shorelines are valued by local residents and visitors, these environmental features also make Jacksonville one of the most vulnerable in the U.S. to hurricanes, storm surge, nuisance flooding and the long-range threat of sea level rise.



Following major flooding events in 2016 and 2017 (Hurricanes Matthew and Irma respectively), local community stakeholders expressed an interest in the benefits that can be achieved through long-range resilience planning. In addressing challenges related to coastal flooding, there have been several stakeholder engagement frameworks utilized to better inform both short-term and long-term decision-making processes. City Council announced in November 2019 that a “Special Committee on Resiliency” would be established in 2020 so that legislative action could be taken. The objective of the committee would be focused on finding policy solutions that would increase the resilience of the city to impacts of coastal flooding, riverine flooding, sea level rise, storm events and other hazards.



Downtown Jacksonville Flooding from Hurricane Irma in 2017



Memorial Park, Riverside During and Before Hurricane Irma in 2017

In establishing both short-term and long-range strategies for community resilience, it is valuable to develop an inventory of the various stresses and shocks that have the potential to impact the functionality of a community or region.

STRESSES - Take place over time and weaken the fabric of a community:

- Sea Level Rise
- Ageing Infrastructure
- Nuisance Flooding
- Extreme Heat
- Climate Change
- Social Inequality

SHOCKS - Sudden events that cause immediate loss of community function:

- Hurricanes
- Flood Events
- Tornadoes
- Wildfires



ESTABLISHING CONTEXT



In November of 2019, then City Council President Scott Wilson announced plans to form a Special Committee on Resiliency that would launch in January of 2020. The overarching objective would be to find policy solutions that would increase the resilience of Jacksonville to the impacts of coastal flooding, riverine flooding, sea level rise and high intensity storm events.

It would be comprised of City Council members who would:

- (a) learn from experts;
- (b) work towards finding the most effective policy solutions; and
- (c) further build off the findings of two earlier technical advisory groups:

(1) 2019 COJ Adaptation Action Area (AAA) Working Group

(2) 2019 COJ Storm Resiliency & Infrastructure Development Review Committee

When established, the charge for the Special Committee was written as:

"The committee will comprehensively assess the resilience and health of the beaches coastline and the St. Johns River system, including its tributaries, wetlands and riparian land. As part of this assessment, it will review city environmental, land use and infrastructure policies that affect these valuable and often vulnerable county assets and the health and safety of our citizens. The committee may propose policy recommendations for consideration by the Council and the Mayor and executive branch agencies. I am directing the committee to complement any proposals with definitive, practical action plans. The committee may seek advice from public and private subject matter experts and will encourage maximum public participation in its work. It should consider recent work and recommendations of the planning department and its adaptation action area work group and the valuable work accomplished by the Northeast Florida Regional Council on resiliency and sea level rise. I am pleased and committed to lead this critical initiative and look forward to receiving the committee's work product as they move along."



In addressing community challenges related to coastal resiliency in Jacksonville, before the Special Committee on Resiliency was established, there were several stakeholder engagement frameworks already utilized to better inform both short-term and long-term decision-making processes.

The bulleted list below represents an inventory of resilience-related planning activities that have taken place in Jacksonville:

- 2019 Storm Resiliency & Infrastructure Development Review Committee
- 2019 Adaptation Action Area (AAA) Working Group
- 2020-2021 Public Works Vulnerability Assessment [CDM Smith/FDEP]

These efforts present a wealth of knowledge relating to areas of strengths and weaknesses in City plans, policies and regulations. This includes the Local Hazard Mitigation Plan, the Comprehensive Plan and future land use policies, plans for capital improvements, building codes and zoning codes and plans related to Jacksonville's participation in FEMA's Community Rating System.

Recognizing how much has already been accomplished at the planning level for the City of Jacksonville, the objective moving forward is to leverage these existing plans and recommendations so that the City can start implementing solutions.

Between January and June of 2020, before and after the onset of the COVID-19 pandemic, members of the Special Committee invited subject matter experts to present relevant data and information relating to existing resilience activities at the local, state and Federal levels (Phase 1).

Following economic shutdowns across the country caused by the pandemic, then Special Committee Chair Matt Carlucci announced the formation of three subcommittees that would focus on different components of the big picture. This ultimately evolved into a 6-month process that lasted from July of 2020 all the way to December of 2020. Subcommittees routinely met once every 2-weeks and were comprised of subject matter experts from the local community.

TASK	START DATE	END DATE
PHASE 01 ESTABLISHING CONTEXT	JANUARY 2020	JUNE 2020
PHASE 02 SUBCOMMITTEE MEETINGS	JULY 2020	DECEMBER 2020
PHASE 03 FINAL REPORTING	JANUARY 2021	FEBRUARY 2021

The final phase of the overall process (Phase 3) was comprised of reporting components where each subcommittee developed a list of observations and action steps respective to individual findings. These observations and action steps are detailed exhaustively in later sections of this publication.

Throughout the overall process, there were a number of local, state and national partners who were instrumental in bringing expert insight into the discussion.



NORTHEAST FLORIDA
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Scenic Jacksonville



Georgetown
University

Special thank you to the partner organizations who made this possible!

SETTING THE SCENE



To introduce the Committee's work, the first meeting was held on January 27th, 2020 in Jacksonville City Hall.

Councilman Matt Carlucci called the meeting to order and invited Committee Members to introduce themselves. Following introductions, Councilman Carlucci gave special thanks to Council President Wilson for allowing City Council Members the opportunity to form the Special Committee. In providing members of the public with an overview of what the Committee would seek to accomplish, Councilman Carlucci explained that:

(a) Work will last for about six months [this was later extended to 14 months], up until June of 2020, where the aim will be to have a legislative package created after findings are reached and conclusions are drawn;

(b) The Special Committee will pay homage to the work of earlier Jacksonville efforts that were focused on resiliency, including the 2019 Adaptation Action Area (AAA) Working Group, and 2019 Storm Resiliency & Infrastructure Development Review Committee;

(c) Future meetings will provide a collaborative space for organizations to share their work and for members of the public to make their voices heard.

In his introductory remarks to the public, Councilman Carlucci also made it very clear that part of the Committee's work would be to explore the idea of hiring a Chief Resilience Officer (CRO) for the City of Jacksonville. This individual would oversee operations across all departments and would act as a central liaison for all COJ resiliency efforts. Beyond June, Councilman Carlucci explained that work would continue further, allowing more opportunities for public engagement.

U.S. Army Corps of Engineers (USACE)

Following introductions, the Special Committee welcomed Glenn Landers, a sea level rise expert from the U.S. Army Corps of Engineers, to give a presentation focused on climate science, sea level rise and engineering.

To begin his presentation, Mr. Landers provided Committee Members with an overview of climate related concerns facing the State of Florida. He noted that sea level has changed substantially over thousands of years depending on the presence or absence of glaciers that bind up or release tremendous amounts of water. He explained that Florida faces dangers from hurricanes, fires and less frequent but more intense rainfalls as the world's climate changes.



He then discussed the impacts that were being felt across the state because of sea level rise. Mr. Landers explained that, because sea level rise increases flood frequency and depth in coastal areas, it also causes other negative externalities such as increases in flood insurance costs, market value declines for at-risk properties and an increased likelihood of saltwater intrusion.

Bringing it to the local level, Mr. Landers then discussed what is known about sea level rise by referencing data made available by a NOAA (National Oceanic & Atmospheric Administration) tide gauge located at Mayport. Mr. Landers explained that two factors cause sea level rise concerns: (1) an increase in the water level and (2) subsidence (sinking) of the land. Presented data showed an acceleration in sea level rise from 1928 through 2018.

The highest rate curve predicts a 1.86 to 2.25-meter rise in sea level at Mayport by 2060. Sea level rise impacts include increased flood risk, salinity change in the river and saltwater intrusion into drinking water aquifers.

Delving beyond context alone, Mr. Landers provided Committee Members with information about technology tools that are helping other municipalities better determine risk. One example of this was the mobile LIDAR technology that is being utilized by the City of Ft. Lauderdale, Florida to determine the first-floor elevations of different structures.

He also discussed a wide array of approaches to resilience planning and suggested that different approaches should be used for different projects. When taking future sea level rise projections into account, for instance, the design lifespan of a bridge will be accounted for differently than the design lifespan of a smaller civil engineering project. In providing another illustration, he noted the vulnerability of hospitals in Northeast Florida and pointed to the public safety problems that would arise if local medical facilities were to become inaccessible due to flooding.

One of the overarching takeaways from the presentation came when Mr. Landers painted a clear picture of what was at stake: sea level rise permanently increases coastal flood risks, and by the end of the century, there is projected to be a three-foot increase in sea level rise, with possibly more due to the accelerating melting of land-based ice. Mr. Landers maintained that preparing for sea level rise will require taxpayer dollars to be spent on solutions, and community dialogue will have to take place so that those investment decisions are well-informed and supported by the public.

In charting a path forward, Mr. Landers concluded his presentation with a few closing thoughts: every dollar spent on preparedness will save 4 to 5 dollars in recovery; septic tank systems should be included in discussions related to resiliency; and community dialogue needs to take place before resiliency can be fully addressed.



Florida Department of Environmental Protection (FDEP)

Moving forward, Committee Members welcomed Whitney Gray, Administrator of the FDEP Resilient Coastlines Program, to give a presentation focused on efforts taking place at the state level to address resiliency related planning issues.

Ms. Gray introduced herself and then expressed how happy she was to see Jacksonville taking a proactive approach to resilience planning. She made it clear that FDEP was here to support Jacksonville in its efforts to become more resilient.

The focus of her presentation was on the FDEP Resilient Coastlines Program and the benefits that the program has produced for local communities across the state.

To begin her presentation, Ms. Gray provided examples from other parts of Florida where: **(a)** an octopus was floating in a parking garage; and **(b)** king tides flooded a marina in Hollywood, Florida. She used these examples to show committee members the widespread nature of resiliency related issues. Her message to Committee Members was that Jacksonville is not alone in Florida when it comes to these problems.

In highlighting the work that was being accomplished by the FDEP Resilient Coastlines Program, Ms. Gray explained that FDEP has been providing local governments with grant funding opportunities that help with a broad range of planning activities related to resiliency – ranging from compliance with the “Peril of Flood” statute, to conducting vulnerability assessments and producing adaptation plans.

In providing Committee Members with a framework for approaching resilience planning in the State of Florida, she utilized the FDEP Adaptation Guide Book as a resource for Committee Members to refer to. Utilizing approaches from the Guidebook, she proposed a series of actions steps for resiliency planning:

- 1) Conduct a vulnerability assessment to identify weaknesses and challenges;
- 2) Figure out what can be done to address those vulnerabilities;
- 3) Prioritize and implement strategies.

In addressing the question of what types of solutions could be implemented to make Jacksonville more resilient, Ms. Gray provided Committee Members with a selection of adaptation strategies that could be pursued.

Types of adaptation strategies include:

- 1) **protection** – eliminate the water;
- 2) **accommodation** – build to tolerate some water;
- 3) **managed retreat** – evacuate away from the water;
- 4) **avoidance** – don’t build in wet areas to start with.

The strategies have to be applied to the whole community to achieve the fullest benefit – remediating or protecting one property at a time doesn’t get the job done and can make things worse for adjoining properties.

Following her summary of strategies, Ms. Gray’s presentation specifically highlighted local projects completed in Duval County that were made possible because of grant funding from FDEP, including a vulnerability assessment that was conducted by the City of Atlantic Beach, a vulnerability assessment that is currently being conducted by Jacksonville Beach and a critical facilities assessment that is being conducted by COJ.

BUILDING A FRAMEWORK



Following a January 2020 kickoff meeting, Councilman Matt Carlucci convened committee members again in February to learn about what COJ resiliency efforts have already taken place. The objective of the second committee meeting would be for committee members to hear from technical experts about what findings were discovered in two earlier COJ efforts. In addition to findings, the second meeting would also focus on learning about what recommendations have already been brought forward.

Ms. Emily Pierce, land use attorney for Roger Towers P.A., and Mr. Bill Killingsworth, Director of Planning and Development, were invited to share findings and recommendations from the Adaptation Action Area Working Group. Mr. John Pappas, Director of Public Works, was invited to share findings from the Storm Resiliency & Infrastructure Development Review Committee.

Existing COJ Resiliency Frameworks

Ms. Pierce began her presentation by explaining to committee members that there have been two processes utilized by COJ to address resiliency.

The first process, the Storm Resiliency & Infrastructure Development Review Committee, was utilized to identify short-term strategies and immediate solutions. The second process, the Adaptation Action Area Working Group, was utilized to identify long-term planning strategies.

Adaptation Action Area Working Group

Ms. Pierce explained the rationale behind establishing the working group and referenced “Peril of Flood” legislation passed in 2015, as part of Chapter 163, Florida Statutes, that provides local governments with the option of designating an adaptation action area. Section 163.3178(2)(f)1, Florida Statutes, also specifies requirements for the coastal management element of a local government’s comprehensive plan related to coastal flooding and the related impacts of sea level rise.

Ms. Pierce explained that the focus of the working group was to review policies related to the AAA and make recommendations that describe how those policies should be updated assuming a 2 foot increase in sea level rise by 2060.

Following Ms. Pierce's remarks, Mr. Bill Killingsworth was invited to share findings from the Adaptation Action Area (AAA) Working Group.

Mr. Killingsworth explained to committee members that the working group was established by the Planning and Development Department to function as an ad-hoc committee that would inform long-term planning strategies and priorities relating to the Adaptation Action Area (AAA) for the City of Jacksonville.

Before discussing what was engaged by the working group, Mr. Killingsworth provided some context related to how adaptation action areas came to fruition as a planning tool for local governments in Florida. He referenced, *Adaptation Action Areas: A Planning Guidebook for Florida's Local Governments* – a publication he was involved in creating when he served as Director of Community Development for the Florida Department of Economic Opportunity.

According to the guidebook, an "Adaptation Action Area" or "Adaptation Area" means a "designation in the coastal management element of a local government's comprehensive plan which identifies one or more areas that experience coastal flooding due to extreme high tides and storm surge, and that are vulnerable to the related impacts of rising sea levels for the purpose of prioritizing funding for infrastructure needs and adaptation planning."

Relating his presentation back to the City of Jacksonville, Mr. Killingsworth explained that the scope of the COJ working group, when it was established, was to: **(1)** identify the impacts of coastal flooding within Jacksonville's AAA boundary; **(2)** evaluate the City's existing programs and policies; and **(3)** propose recommendations. When established, the mission of the working group was to:

"Evaluate the City's existing programs and policies in relation to the Adaptation Action Area (AAA) to determine the need and timing, if appropriate, for additional and financially feasible responses to the effects of coastal flooding within the Adaptation Action Area. Recommend policy and regulatory changes deemed necessary and appropriate to protect public and private investment within the AAA."

In order to carry out its mission, Mr. Killingsworth explained that the working group utilized an "Adaptation Planning Framework" to help develop recommendations; and frame those recommendations.

The framework addresses 4 separate components:

- (1) context;**
- (2) vulnerability assessment;**
- (3) adaptation strategies; and**
- (4) implementation**



Following informed research, group dialogue, and final consensus amongst members, the working group made recommendations in 5 core areas (education and community outreach, land development regulations and procedures, economic and human resources, inter-agency coordination and infrastructure), with 3 underlying fundamental recommendations: hire a chief resiliency officer, conduct a vulnerability assessment and expand the boundaries of the AAA beyond the defined CHHA.

The first fundamental recommendation, suggesting that the City of Jacksonville hire a Chief Resilience Officer (CRO), or create a similar authority preferably in the Mayor's Office, was addressed by members of the Special Committee when the item was brought to attention by Mr. Killingsworth. Councilman Carlucci made it clear to members of the public that the process for hiring a CRO was about to get underway. He explained that a policy statement and job description for the CRO position had been drafted, shared with government departments and was currently being reviewed by the Mayor's Office. Councilman Carlucci also explained that Mayor Curry is committed to hiring a CRO and had expressed support to City Council in its efforts to promote hiring.

Mr. Killingsworth proceeded to explain the second recommendation brought forward by the working group, which was for COJ to conduct a coastal flooding and sea level rise vulnerability assessment to "include storm surge, tidal fluctuations and extreme rainfall events."

In addition to these identified data layers, the recommendation also called for the vulnerability assessment to identify "populations, habitats, infrastructure and functions most sensitive to coastal flooding and sea level rise." The emphasis made in this recommendation was that the vulnerability assessment should take Jacksonville's riverine system into consideration. Mr. Killingsworth explained that part of the working group's recommendation was for a technical advisory committee (TAC) to be established with the purpose of informing the vulnerability assessment and monitoring its scope while being conducted.

The third fundamental recommendation was to expand the AAA boundary. Mr. Killingsworth explained that Jacksonville, unlike other cities in Florida, faces many different challenges related to its expansive riverine system and expansive floodplains. Because of the reality that these challenges present, the working group determined that the map boundaries would have to be expanded so that the AAA was more accurate of the risks facing Jacksonville. The working group maintained that the existing AAA had a high correlation with the existing coastal high hazard area (CHHA).

According to the Florida Department of Economic Opportunity (FDEO), the coastal high hazard area is “an area particularly vulnerable to the effects of coastal flooding from tropical storm events and is defined by Florida Statutes as the area below the elevation of the category 1 storm surge line as established by a Sea, Lake and Overland Surges from Hurricanes (SLOSH) computerized storm surge model.” Because of the high correlation mentioned above, the working group decided to add SURGE Zones 1 (CHHA), 2, and 3 with the contiguous 500 year flood plain to the recommended map.

Storm Resiliency & Infrastructure Development Review Committee

Moving further into the meeting, Councilman Carlucci invited Mr. Pappas to share findings from the Storm Resiliency & Infrastructure Development Review Committee.

He explained that the committee was commissioned by the Jacksonville Waterways Commission to:

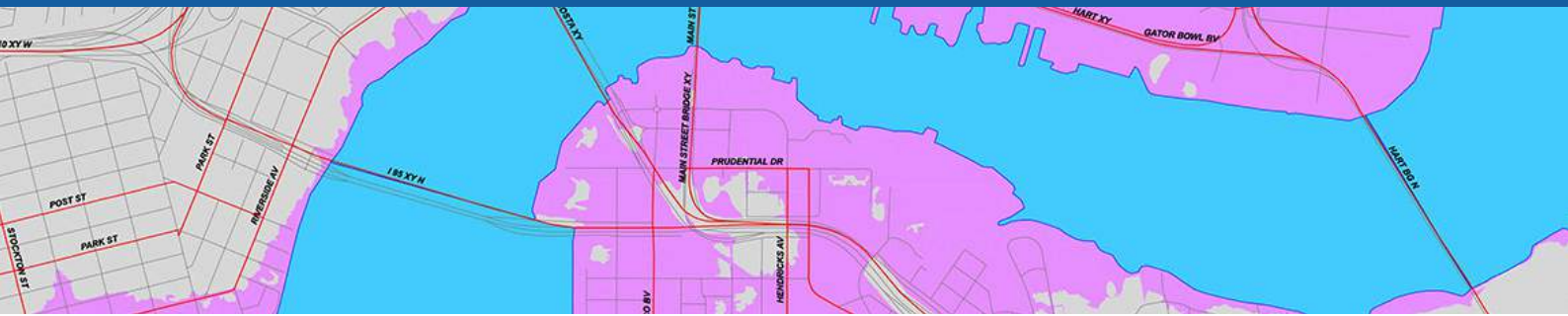
“Evaluate drainage and flood control; tidal impacts and water levels in the St. Johns River; the effects of failing or deficient drainage infrastructure and improvements, the loss of wetlands and natural habitats; and development activities within the floodplain and to offer recommendations as to opportunities for maintenance and preservation of wetlands and floodplains and various drainage and stormwater system improvements, which would contribute to the resiliency of the St. Johns River and Northeast Florida.”

In terms of evaluation, the committee looked at:

- Drainage & flood control;
- Tidal impacts and water levels in the St. Johns River;
- Effects of failing or deficient drainage infrastructure and improvements;
- Impacts from loss of Wetlands and Natural Habitats;
- Impacts from development activities within the Floodplain

In terms of recommendations, the committee looked at:

- Opportunities for maintenance and preservation of Wetlands/Floodplains
- Drainage and stormwater system improvements



Mr. Pappas explained that, before the committee started its work, context first had to be established. The committee invited experts from the U.S. Army Corps of Engineers, Florida Department of Environmental Protection and JEA to present on matters related to resilience and how each agency has been addressing the issue.

Once context was established, Mr. Pappas explained that the focus of the committee shifted to looking at new infrastructure developments carrying a stormwater component.

It was determined that there were adverse impacts from:

- Inadequate development stormwater management systems
- Inadequate “under construction” stormwater management systems
- Flood Plain filling
- Site filling
- Tree Canopy loss on stormwater management
- Incomplete projects
- Un-Natural “man-made” materials for stormwater protection

In recognizing these impacts, members of the Storm Resiliency Committee reached the following conclusions:

- The extent of survey data on adjacent properties is insufficient to evaluate off-site impacts and contributions
- Rear lot swales/pipes may hinder City access and may be exacerbated by the actions of subsequent lot owners
- Revise design standards for impervious surface area vs. lot coverage
- Incomplete implementation of Floodplain Management Code, Chapter 652
- Require specific permeability criteria of fill material (Floodplain & Site)
- Evaluate impacts of eliminating the existing tree canopy and compensate
- Timeframe needed for installation & completion of development’s drainage system
- Develop a timeframe for expiration of a 10-set approval and floodplain permit
- Investigate alternatives to bulkheads – site specific living shorelines

During his presentation, Councilwoman Randy DeFoor asked Mr. Pappas what could be done to address problems relating to existing developments – where water from the St. Johns River, in places like San Marco, has been clogging drainage systems and flooding streets. He responded by pointing out that COJ has made use of Tideflex valves and explained that this technology has already been implemented by COJ in areas like San Marco. Tideflex valves prevent water from backing up into drainage systems.

Mr. Pappas proceeded to describe a number of changes to the City's development ordinances and regulations as a result of the Storm Resiliency Committee's work, including requirements for higher finished floor elevations, required setbacks from floodplains, new infill soil permeability standards and changes in the required impervious surface and lot coverage ratios. Ordinance 2019-331-E amends Chapter 652, Floodplain Management Ordinance.

While explaining the concept of "floodplain setbacks," Mr. Pappas emphasized that a floodway is different than a floodplain in that "a floodway is a corridor within a floodplain." He explained that setback requirements are important because water will be able to inundate local floodplains during a storm event and then recede once the storm has passed.

Recognizing that floodways allow water to flow in and out of a floodplain, if protected from development, Mr. Pappas pointed out that the ordinance included a definition for a "floodway setback" which now requires new development in Jacksonville to be built a minimum of 25 feet away from any floodway.

Mr. Pappas also discussed Ordinance 2019-375-E, which amends Chapter 656, Zoning Code, and Chapter 654, Code of Subdivision Regulations. He explained that the ordinance: (a) Requires that all subdivisions be designed using Impervious Surface Ratios (ISR); and (b) Requires ISRs in addition to maximum lot coverage within Chapter 656, per each Zoning District.

In terms of existing infrastructure systems, Mr. Pappas explained that the Storm Resiliency Committee examined the following:

- Siltation and maintenance issues for existing stormwater facilities – older systems may not have permits (or cannot be located) and access may be restricted
- Outfall elevations and designs impacted by higher tide levels in River
- Bulkhead heights inadequate for storm surge and higher tidal impacts
- Long-term strategy for infrastructure resiliency and hardening



He emphasized the last point and stated that one of the recommendations from the committee was for COJ to put together a study that identifies several different critical infrastructure components in relation to the City's Master Stormwater Management Plan (MSMP). The committee recommended that the study address critical infrastructure assets in the following categories: stormwater; roadways; seawalls and bulkheads; and City emergency facilities.

Once a baseline understanding of exposure is established, the next step will be to determine critical infrastructure improvements and prioritize those improvements. This will be followed by a capital improvements schedule that outlines plans for different time horizons.

In his closing remarks, Mr. Pappas stated that interagency coordination will be an important component of the process moving forward. He explained that relationships will continue to be developed with different agencies so that research efforts are coordinated and stakeholders are informed about implementation developments.



Additional Guest Speaker Presentations

In addition to presentations given in the first two meetings, there were a wide array of other guest speaker presentations given before the Special Committee as a whole. These are inventoried on the following page; and are also summarized in the final pages of this section. Summaries were written by Mr. Jeff Clements, Chief of Research for the Office of City Council.

Guest speaker presentations offered valuable insight into how other cities and regions across the U.S. are dealing with similar challenges. Technical presentations covered topics related to nature-based solutions, building codes and roofing standards, property elevation and the business case for resilience. Additionally, the topic of environmental justice was addressed from many different lenses.

FULL-COMMITTEE SPEAKER INVENTORY



Mr. Glenn Landers, Planning & Policy Division, USACE

USACE Considerations for Climate Preparedness and Resilience

Ms. Whitney Gray, Administrator, FDEP Resilient Coastlines Program

FDEP Office of Resilience and Coastal Protection Overview

Mr. Jim Murley, Chief Resilience Officer, Miami-Dade County

Presentation on Miami-Dade Resiliency Efforts

Mr. Sean Lahav, Resiliency Coordinator, NEFRC

Nature-Based Solutions: Setting the Stage

Mr. Rod Braun, Climate Program Manager, The Nature Conservancy

The Economic Value & Benefits of Nature-Based Solutions

Ms. Janan Reilly, Mitigation Specialist, FEMA

Nature-Based Solutions Funding & Finance Opportunities

Ms. Julie Shiyou-Woodard, CEO, Smart Home America

Building Stronger in Jacksonville: Best-Practices for Residential & Commercial Construction

Mr. Roderick Scott, Board Chair, Flood Mitigation Industry Association

Property Elevation 101: Lessons from the Flood Mitigation Industry Parts 1 & 2

Mr. Bill Killingsworth, Director, COJ Planning & Development Department

Comprehensive Plan Policies Overview

Dr. Alec Bogdanoff, Florida Lead, American Flood Coalition

Overview of the American Flood Coalition

Dr. Joshua Gellers, Associate Professor, University of North Florida

Environmental Justice & Climate Resiliency

Ms. L'Tonya Spencer, U. S. Environmental Protection Agency

Environmental Justice

EXTERNAL GUEST SPEAKERS



Glenn Landers, USACE
Whitney Gray, FDEP



Jim Murley, Miami-Dade County
Alec Bogdanoff, American Flood Coalition



Janan Reilly, FEMA
Rod Braun, The Nature Conservancy



Beth Payne, NEFRC
Sean Lahav, NEFRC



Julie Shiyou-Woodard, Smart Home America
Roderick Scott, FMIA



Josh Gellers, University of North Florida
L'Tonya Spencer, EPA

MIAMI-DADE RESILIENCE



Jim Murley, Chief Resilience Officer for Miami-Dade County, made a presentation on the county's resilience plan which started back in 1991 with work on sustainability and CO2 reduction efforts. Miami-Dade County is part of the Global Resilient Cities Network with cities and counties around the world, an effort supported by the Rockefeller Foundation to promote resilience worldwide, and Mr. Murley recommended that Jacksonville consider joining. He also recommended membership in Resilience Florida which lobbies the legislative and executive branches in Tallahassee on resilience issues.

He underscored the importance of cooperative efforts with the St. Johns River Water Management District which has jurisdiction over many water issues. He noted that four counties in southeast Florida have formed the Southeast Florida Regional Compact on Climate Change to collect data and best practices on a regional level and to lobby for the region's needs at the state government level.

Mr. Murley said that the Regional Compact produced sea level rise projections through 2120.

Projections are updated every 5 years with a multi-faceted working group that reviews all published data and studies and focuses on the data relevant to the four-county region.

These projections are the only sea level rise projections used in the four-county region because it has proven to be the best model and has tremendous buy-in from around the community, and is constantly improved. He strongly encouraged the development of a research network via a memorandum of agreement with the local colleges and universities that have great resources in faculty and students to contribute to the resilience effort via their research.

Miami-Dade views sea level rise as a long-term stress, not a short-term shock, because its impacts will show themselves over the long term and require long-term solutions. The county is evaluating five different approaches to sea level rise, ranging from raising land via fill to building elevated buildings on stilts to concentrating building density and transit on the highest ground to developing blueways and greenways through neighborhoods to absorb flooding without impacting structures.

GREEN INFRASTRUCTURE



Sean Lahav, Resiliency Coordinator for the Northeast Florida Regional Council, gave an introduction for an agenda focused around the adaptation frameworks of green infrastructure and nature-based solutions.

Green infrastructure is typically an implementation strategy after a community planning process has taken place, and community buy-in and identification of funding strategies are vital for successful implementation. Municipal actions can either encourage or discourage green infrastructure initiatives and maintenance of built projects is crucial. An audit of local codes and policies is helpful in identifying barriers to implementation of nature-based solutions.

The Northeast Florida Regional Council is in the process of identifying opportunities for short-term immediate successes to begin building momentum. The benefits and co-benefits expected from green infrastructure will help drive the City's funding and financing process, and fee discounts, tax credits, permitting assistance and the like can help incentivize private developers and property owners to utilize nature-based solutions.

Rod Braun, Climate Program Manager for The Nature Conservancy, said that Florida is uniquely vulnerable to climate changes, sea level rise and storm conditions because of its long shoreline and low-lying topography. He drew distinctions between natural infrastructure and “grey” infrastructure (seawalls, levies, groins, etc.).

The state is suffering from substantial losses of coral reefs, oyster reefs, mangroves and saltwater marsh and that leads to expensive flood-related losses. There is a strong business case to be made for green infrastructure producing tremendous cost savings from storm damage. Several studies have shown that nature-based solutions and coastal adaptation are very effective, better than hard structures in many cases.

Nature-based solutions are not a “silver bullet”, but have a big role to play in a layered protection plan. The Nature Conservancy is working with Chubb Insurance (one of the world's largest property and liability insurers) on optimizing shoreline restoration projects for the best resiliency outcomes and the largest cost/benefit ratios.

FEMA FUNDING OPTIONS



Janan Reilly, Mitigation Specialist for the Community Infrastructure Resilience Branch at FEMA, said that FEMA is getting more involved in nature-based solutions as their effectiveness is demonstrated and they become more popular. Examples include: restoration of grasslands, rivers, floodplains, wetlands, dune and reefs; living shorelines; soil stabilization; and bio-retention systems. Resilience features can be built at different scales and in different locations depending on what's needed and what space is available.

FEMA has 4 different hazard risk reduction programs:

- 1) Public Assistance (406) Mitigation;
- 2) Hazard Mitigation (404) Grant;
- 3) Flood Mitigation Assistance; and
- 4) Building Resilient Infrastructure Communities (BRIC).

The 404 and 406 grants are made post-disaster, while the Flood Mitigation and BRIC programs are hazard pre-mitigation and prevention programs.

FEMA's Hazard Mitigation Action Portfolio is a collection of successful projects from around the country that provides ideas for what might work in various areas.

Ms. Reilly said that FEMA is the largest mitigation and recovery funding agency in the country. She briefly reviewed the program requirements – eligibility, technical feasibility, cost effectiveness and compliance with laws and regulations. The cost/benefit calculation includes FEMA-determined values for various types of land uses for “ecosystem services”. Several types of nature-based systems have been evaluated by FEMA and are approved for federal funding in appropriate locations.

A nature-based solutions guide was just published by FEMA in 2020 and has a wide variety of ideas and suggestions.

Ms. Reilly mentioned several funding options outside of FEMA, including business improvement districts, voter-approved flood control bonds, state departments of transportation and public/private partnerships.

FLOOD MITIGATION PART 1



Roderick Scott, Board Chair at the Flood Mitigation Industry Association, said flood risk is increasing and flood insurance rates are increasing as well.

The 50 year old federal flood insurance is running a substantial deficit that will be paid off for decades to come. Every building built in Jacksonville before 1989 will face huge increases in flood insurance rates in the next 5-10 years as the full-cost premiums phase into effect. Structural flood protection (dikes, levees, seawalls, etc.) are very expensive; building elevation and dry flood proofing techniques are less expensive ways of reducing insurance premium costs.

Flood mitigation helps preserve property values and local tax revenues. No one has a comprehensive inventory of how many properties are at risk of flooding and the potential effect on their values and property tax generation.

Elevation information is not included on building permits so that needs to be added to permit applications to help collect that data. Variance procedures need to be streamlined to accommodate elevation practices and their potential effect on neighboring properties.

Mr. Scott said that using grant writing and project administration companies that specialize in this field is very helpful in locating funding resources and making the process work efficiently.

Design guidelines to reflect community standards and historical patterns are important. Education for design professionals and contractors is important so there's trained capacity to meet the growing demands as elevation becomes a more popular technique. Historic building surveys need to be updated regularly so that those resources can be easily identified and dealt with appropriately in the event of flooding disasters.

Mr. Scott discussed his "Elevate Before It's Too Late" public education program. Having elevation certificates is extremely important, and some communities provide a cash bounty to encourage property owners to get their certificates which helps a community score better on its Community Risk Survey.

He said that communities have less time than they think to get ready for the inevitable. Adaptation is essential for everyone.

FLOOD MITIGATION PART 2



Roderick Scott of the Flood Mitigation Industry Association, also gave a presentation on financing flood mitigation strategies.

He listed a number of funding sources for flood mitigation activities:

- 1) FEMA pre-disaster grants for repetitive loss properties; they are few and far between and lots of paperwork involved;
- 2) BRIC (Building Resilient Infrastructure and Communities) program – all infrastructure-related;
- 3) FEMA HMGP (Hazard Mitigation Grant Program) post-disaster grants – assistance for individuals (assistance capped at \$35,000 but usually much smaller), local government assistance, and non-profits (including houses of worship); can be spent on infrastructure;
- 4) HUD CDBG/DR (Community Development Block Grant/Disaster Recovery) funds; Mr. Scott said it seems that HUD has stopped funding building elevations since Super Storm Sandy without explanation;
- 5) National Flood Insurance Program;
- 6) Homeowner equity – not practical for building elevation if the property is mortgaged because it's difficult to meet standard loan-to-value ratios; the owner needs to be debt free for it to work in practice;
- 7) Federal Housing Administration 203K program – construction loan converted into a 30 year mortgage; rates are very good now;
- 8) Proposed federally-authorized state revolving loan program – would work like a special assessment to property owners with payment via their local property tax bill; Florida Rep. Charlie Crist was the sponsor in the US House of Representatives; the banks are in favor and will loan billions of dollars for elevations because they hold the mortgages on these properties and are on the hook for flooding losses; the loan could continue on to a new owner after a sale and wouldn't need to be paid off at closing; and finally
- 9) Simple cash if you're wealthy enough.

AMERICAN FLOOD COALITION



Alec Bogdanoff, Florida Lead for the American Flood Coalition and principal of Brizaga Inc., said flood adaption is required from both governments and individuals and the longer we wait the more it will cost. The AFC concentrates on 4 pillars for coastal and inland flooding solutions:

- 1) the economy – investing infrastructure that boosts the economy and protects property values;
- 2) communities – using smart planning to keep communities safe and save taxpayer dollars;
- 3) rebuilding – build back stronger to protect communities from future flooding; and
- 4) military readiness – ensure our military installations are ready to deploy 365 days a year.

The organization provides educational guides, tools for effective communication with stakeholders, networking of leaders to share issues and solutions, competitive local resilience pilot projects, and a platform for education and advocacy on the issue of flooding.

Two recent new products are a Dual Disaster Handbook, produced in conjunction with the American Public Health Association, with case studies, best practices and recommendations for proactive planning, and a Flood Funding Finder which identifies federal funding opportunities to address flooding and sea level rise, particularly for small communities of under 50,000 people.

Membership in the Coalition is free and welcomes governments and individuals.

ENVIRONMENTAL JUSTICE



Dr. Josh Gellers, Associate Professor in the Political Science Department at UNF, gave a presentation on the relationship between environmental justice and resiliency. He explained the difference between the terms equality, equity and justice and gave examples of each.

The modern environmental movement started in the United States in 1982 as a result of a protest over disposal of toxic waste in a predominantly Black community in North Carolina. A subsequent report on that event coined the term “environmental racism”.

A document called The Principles of Environmental Justice was adopted at the First National People of Color Environmental Leadership Summit held in Washington, DC. Environmental justice started as a racism issue, then broadened to an equity issue and then ultimately to cover equality.

Three key capability factors in evaluating environmental justice are distribution, participation and recognition. There are many data and mapping capabilities available at the local level to help inform the debate, including the US EPA’s EJScreen Environmental Justice Screening and Mapping tool.

L’Tonya Spencer, Community Involvement Coordinator for the U.S. Environmental Protection Agency, discussed the EPA’s Jacksonville Integrated Planning Project which was a joint effort in 2010 of many organizations looking at conditions in Jacksonville’s Health Zone 1 (predominantly downtown and the urban core).

Major lessons learned from the process and its subsequent aftermath include:

- 1) community leadership is vital but sometimes it’s effective and sometimes not; it can be hard to take people where they don’t want to or are afraid to go;
- 2) community organizations need to be committed to the long haul, and it will be difficult and discouraging at times, so sometimes they drop out;
- 3) missions, goals, objectives and strategies need to be developed and community buy-in is needed, even when citizens don’t trust the government and don’t understand why they can’t get what they want right now;
- 4) funding is necessary, but communities need to know how to get it, use it properly and account for it to funding agencies.

A blue-tinted photograph of a group of people, likely a team, with their hands stacked in a huddle. The image is used as a background for the title. The title text is white and bold, positioned in the upper left quadrant of the image.

FINAL SUBCOMMITTEE OBSERVATIONS & ACTION STEPS

HIGHLIGHTS

SUBCOMMITTEES

3

Following the onset of the coronavirus pandemic, Special Committee Leadership took bold action in establishing three subcommittees that would include subject matter experts from the local community. Between July and December of 2020, these subcommittees met virtually via Zoom video conferencing technology and completed the majority of accomplished objectives in a virtual environment.

SUBJECT MATTER EXPERTS

40+

Throughout the entire process, more than 40 subject matter experts from the local community participated in a dedicated manner.

PUBLIC MEETINGS

50+

More than 50 public meetings were facilitated over a period of 14 months; including full Special Committee meetings, subcommittee meetings and guest speaker presentations. What is not included here are the hundreds of hours that community members committed to individual research.



SUBCOMMITTEE LEADERSHIP



GARRETT DENNIS

INFRASTRUCTURE
SUBCOMMITTEE CHAIR



JOYCE MORGAN

COMMUNITY OUTREACH
SUBCOMMITTEE CHAIR



MATT CARLUCCI

ENVIRONMENTAL PLANNING
SUBCOMMITTEE CHAIR



RANDY DEFOOR

INFRASTRUCTURE
SUBCOMMITTEE VICE-CHAIR



MICHAEL BOYLAN

COMMUNITY OUTREACH
SUBCOMMITTEE VICE-CHAIR



BROOKS ANDREWS

ENVIRONMENTAL PLANNING
SUBCOMMITTEE VICE-CHAIR

HIGHLIGHTS

GUEST SPEAKER PRESENTATIONS

30+

PARTNER ORGANIZATIONS

20+

OBSERVATIONS

50+

One of the other major highlights from the overall Special Committee process was the amount of guest speaker presentations given.

The Special Committee was able to learn from more than 30 guest speaker presentations that addressed a wide array of topics; ranging from climate change and civil engineering solutions, to lessons on environmental justice and community engagement in local neighborhoods.


More than 20 partner organizations at the local, state and Federal levels were able to formally participate in the overall process. Beyond guest speaker presentations, these partner organizations and outside experts will serve a valuable role in Jacksonville's resiliency strategy moving forward.

Finally, the focus of the remainder of this report, are the observations and action steps that were inventoried along the way. More than 50 observations were recorded during the process.



SUBCOMMITTEE ON INFRASTRUCTURE & CONTINUITY OF OPERATIONS FOR ESSENTIAL SERVICES

SUBCOMMITTEE ON INFRASTRUCTURE



"This group would focus its attention on critical infrastructure within the City of Jacksonville, such as bridges, hospitals, grocery stores, roadways and drainage systems. The focus of this discussion would also be on maintaining continuity of operations before, during and after a disaster. Such a subcommittee will more likely attract a technical crowd of audience members who can speak to the specifics."

The Subcommittee on Infrastructure and Continuity of Operations for Essential Services focused its attention on critical infrastructure within the City of Jacksonville, such as bridges, hospitals, grocery stores, roadways and drainage systems. The focus of this discussion was also on maintaining continuity of operations before, during and after a disaster.

As part of its work, the subcommittee also reviewed the Adaptation Action Area (AAA) Working Group's report. In some instances, the subcommittee proposed modifications to the working group's recommendations before forwarding the recommendations to the Special Committee for approval.

Final subcommittee observations and action steps were informed by the perspectives of 10 subject matter experts who represent a wide array of community interests. These subject matter experts brought a wealth of knowledge to the table related to specific infrastructure. topic areas.

The following observations and suggested action steps are derived from Subcommittee topics and discussion points made by citizen subject matter experts and City Council members from July through December 2020. These observations and suggested action steps merit additional research and consideration by the City of Jacksonville and community partners.

Message from Subcommittee Chair



Council Member Garrett Dennis, representing District 9, is a native of Jacksonville, Florida. He is a graduate of Jean Ribault High School, Class of 1992. Garrett attended Florida A&M University, where he earned his Bachelor of Science Degree. He later earned his Masters of Educational Leadership from the University of North Florida. In addition to his role as a city council member, Garrett manages a local construction company.

Over the last year, through virtual meetings and in person forums, we have compiled a wealth of information. This report will be both the encyclopedia and the pathway for the City of Jacksonville to become a stronger and safer City for families, businesses, and community to grow in security in the years to come.

The Subcommittee on Infrastructure, and Continuity of Operations for Essential Services affirms that community-wide resiliency will need a combination of soft and hard engineering investments at the open coast, intracoastal and inland areas, investment in public infrastructure using both municipal Capital Improvement Projects and Federally supported initiatives, and changes at the building-level to make structural improvements to protect individual properties.

I respectfully acknowledge the work done by the 2019 Adaptation Action Area (AAA) Working Group, and 2019 Storm Resiliency & Infrastructure Development Review Committee, from which our subcommittee drew recommendations and expertise.

I would like to offer my thanks to all of the specialists who presented to my Subcommittee and the subject matter experts who gave their considerable time and talent.

Collaboration between the Office of the Chief Resiliency Officer, City Council, the Administration, the Department of Public Works, Planning And Development, Jacksonville Electric Authority and all of the cogs in the public and building sectors will be critical for the development, adoption and implementation of these recommendations as we move forward.

I am confident that this subcommittee and the greater Special Committee on Resiliency has laid the groundwork for significant investment in Jacksonville's ability to recover from and more successfully mitigate the threats of climate change, sea level rise and other adverse events.

We are not the City that Hurricane Irma devastated in 2017, next time we will be better prepared.

SUBCOMMITTEE SUBJECT MATTER EXPERTS



Angela DeMonbreun
Bruce Fouraker



Sandra Fradd
Jim Robinson



Lisa King
Joeseph Loretta



Amanda Polematidis
Jim Seaton



Nikole Ward

SUBCOMMITTEE OBSERVATIONS

This list of observations and suggested action steps is derived from Subcommittee topics and discussion points made by citizen subject matter experts and City Council members from July through December 2020. This list is worthy of reporting and additional research and consideration by City and community partners.

1. QUANTIFY THE MAGNITUDE OF JACKSONVILLE'S RESILIENCE REQUIREMENTS

- The foremost requirement is to identify the totality of the city's resilience needs associated with sea-level rise, rainfall runoff, local flooding and storm surge. This need ranges from the local neighborhood level, to critical public and private infrastructure, to the interconnectedness of key industry sectors that drive Northeast Florida's economy. While this is primarily a government function, its success requires a "whole of community" effort to capture the current and future needs of our city and to identify solutions and paths forward.
- Decision-makers need to consider what is a big hurricane problem, as opposed to a summer thunderstorm problem or a weekly high tide problem (e.g., recognize that some problems are more of an irritant or inconvenience than threats to life or livelihood).
- The City and JEA are currently conducting vulnerability assessments that will drive future resilience decisions. While these are major steps forward, this is not the end to assessing Jacksonville's vulnerability to sea level rise and storm surge. Resilience-related vulnerability issues across individual City departments, City agencies, independent authorities, neighborhoods, etc., need to be identified and examined to provide a comprehensive picture of the City's current and future vulnerability.
- Every proposed Capital Improvement Project (CIP) should be examined using a resilience lens.
- The City needs to better understand how St. Johns River dredging potentially compounds the effects of storm surge, rainfall runoff and sea level rise. The Army Corps of Engineers (USACE) did not include rainfall runoff input in their storm surge model for the river dredging project; however, their report stated that rainfall runoff "can increase the peak water level by 10 or 20 percent."

- In their report, the USACE also estimated that the dredging project “could increase the maximum water levels associated with high frequency events by 12 percent.” The USACE’s estimated increase in storm surge and water levels must be included in vulnerability assessments of those areas of the City that are potentially affected by St. Johns River flooding.
- Resilience planning also includes considerations of what it takes to help a community bounce back after a significant event. Certain industries make a disproportionately large contribution to the region’s economy, so assessments should also examine the degree of vulnerability of critical industry sectors and business enterprises that are most central to the City’s economy and functionality. This speaks to Jacksonville’s economic resilience following a severe water event/hurricane by assessing the ability of key industries and activities, especially those within the projected limits of the Category 3 storm surge zone and the contiguous areas of the 500-year flood zone, to withstand and recover from storm surge. These industries/businesses will be central to Jacksonville’s recovery following a disaster.
- The future Chief Resilience Officer will need to lead a comprehensive effort to craft Jacksonville’s Resilience Strategy. This strategy will combine current and future capital improvement planning, vulnerability assessments, adaptation strategies, etc., – and include a broad range of stakeholders – to craft a comprehensive resilience path for the City.

2. ADOPT ONE SEA LEVEL RISE FIGURE TO GUIDE INFRASTRUCTURE PROJECT PLANNING AND CONSTRUCTION ACROSS THE CITY

- Evaluate ranges of future possibilities for resiliency impacts (hurricanes, sea-level rise, storm surge, etc.).
- Identify what figure FDOT/State of Florida uses for resilience planning purposes.
- Northeast Florida Regional Council uses the National Oceanic and Atmospheric Administration data forecasting 2-3 feet of sea level rise over the next 50 years.
- The AAA working group used an estimate of 2 feet over the next 40 years.
- The USACE assumed a sea level rise of just 0.39 feet over the next 50 years.
- Perform storm surge modeling for areas vulnerable to St. Johns River flooding.

3. UPDATE BUILDING CODE

- Review building codes of other Florida cities and counties for resilience-related elements to see if Jacksonville's building code should reflect similar elements.
- The subcommittee reviewed practices to reinforce building roofs against the effects of hurricane winds and discussed the likely need for our City to update the building code for roofs.

4. INCORPORATE NEIGHBORHOOD-SPECIFIC CRITERIA WHILE PRIORITIZING RESILIENCE DECISIONS

- Adaptation strategies will differ throughout the city and will require balancing today's flooding issues with tomorrow's increasing needs.
- For current issues, decision-making criteria should include examining how long people have been affected by the current situation. Similarly, it is useful to "map the impact" of an individual project as part of prioritizing projects (e.g., "if we do this, how many residents will be positively affected, how will it positively affect property values, etc.).

5. PROMOTE DEVELOPER/PROPERTY OWNER RESILIENCE ROLES

- Craft policies that do not disincentivize property owners from making repairs and renovations for resiliency purposes because it would trigger a requirement for full compliance with all current codes.
- Encourage better private development practices with a broader, long-term resilience vision in mind.
- Address the lack of space for retention ponds in densely developed areas, which poses a problem for expansion or redevelopment.
- Reinforce the value of trees for absorbing stormwater runoff and encourage modeling that incorporates tree canopy effects into development permitting.
- Create a mechanism to help provide City resources to incentivize private owners of seawalls, bulkheads and related facilities to upgrade them (e.g., repair and replace) for the community's benefit.

6. PROMOTE THE PRIVATE SECTOR BUSINESS CASE FOR RESILIENCE

- The city, along with partner organizations such as the Chamber of Commerce and business leaders, can play a key role in educating the business community on the business case for private-sector resiliency efforts.
- A Southeast Florida Regional Climate Change Compact model for 2040 predicts \$4.2 billion in property exposed to daily tidal inundation, 720 jobs impacted and \$28 million in fiscal losses from daily tidal inundation in South Florida. By 2070, impacts grow to a predicted \$53.6 billion in property exposed to daily tidal inundation, 17,800 jobs impacted and \$384 million in fiscal losses from daily tidal inundation.
 - The focus is on higher frequency flooding events (rain and tide-influenced) rather than on hurricanes because that's a more constant problem and the costs are less well understood.
 - Community-wide adaptation uses a combination of soft and hard engineering investments at the open coast, Intracoastal and inland areas which provide regional benefits.
 - Community-wide adaptation strategies will produce \$37.9 billion in benefits at a cost of \$18.2 billion for a benefit-cost ratio of 2.08:1 and would support 85,000 job-years (1 job times 10 years).
 - Building-level adaptation makes structural improvements to protect individual properties.
 - Building-level adaptation will produce \$17.6 billion in benefits at a cost of \$4.4 billion (benefit-cost ratio of 3.97:1) and would support 56,000 job years.
 - Recommendations range from developing actionable funding and financing plans to pay for resilience and investing in key vulnerable and emerging industries to making social vulnerability a priority during adaptation decision-making and conducting further in-depth analysis at the county and project level to optimize benefits and costs.

7. EXAMINE HOW THE NORTH FLORIDA LAND TRUST COULD POTENTIALLY ACQUIRE LAND TO PROVIDE FLOOD STORAGE CAPACITY

8. EXPLORE WAYS TO DISCLOSE FLOOD ZONE AND PRIOR FLOODING INFORMATION ON REAL ESTATE TRANSACTIONS AND LEASE AGREEMENTS

- Require a seller or landlord to disclose in writing the fact that a property has previously flooded.
- Model this disclosure in the same way as a radon gas disclosure, which is required as a standard part of a real estate transaction.
- Disclosure of flood potential/flood history to renters can be a significant equity issue for low-income renters whose landlord may not have insurance
- Plan for the inevitability of flooding displacing some city residents from their homes.
- Many households and people are in the new AAA boundaries in low, medium and high hazard scenarios; sea level rise may force some numbers of them to displace from their current homes.
- Affordable housing is an issue in Jacksonville and some of the city's most vulnerable residents will be adversely affected by future flooding. Planning should begin now to determine where they go when displaced.

9. IDENTIFY FLOOD-PRONE AREAS WHERE PEOPLE AND HOMES ARE THE MOST VULNERABLE AND RECOMMEND SOLUTIONS TO PROTECT THOSE NEIGHBORHOODS

- The “Riverfront Parks Now” initiative offers a once in several generations opportunity to plan for stormwater storage as the downtown waterfront is redeveloped.
- The City's Emergency Preparedness Division tracks damage caused by disasters and can provide related information, along with storm-related citizen input data from the 630-CITY complaint line (flooding complaints, downed trees, etc.).
- Review Building Resilient Infrastructure and Communities grant opportunities. The CDBG Mitigation program managed by Rebuild Florida is another potential funding source.

- Jacksonville is eligible for multi-year funding because of its previous storm damage history.
- Explore the utility of the Ken Knight Drive CDBG-DR (Community Development Block Grant-Disaster Recovery program) grant through the Florida Department of Economic Opportunity.
 - Properties must become public green space after the demolition of the buildings.
 - More assistance can be provided to homeowners (closing costs and relocation expenses) than renters.
 - Funding is a one-time allocation from Congress for Hurricane Irma relief and is not a continuing funding source.

10. PUBLICIZE THE DRAINAGE SYSTEM'S 92 OUTFALL SPOT CLEANINGS LOCATIONS IN A WAY THAT THE GENERAL PUBLIC IS AWARE OF WHERE THE WORK IS TAKING PLACE TO PREPARE FOR POTENTIAL HEAVY RAINS

- Regular annual cleaning of the major drainage outfalls is important for the overall functioning of the system and is a good first step to improving system operation.
- Identify additional funding to maintain the minor outfalls further upstream in the drainage system, which would substantially help prevent flooding.
- Groundwater levels are rising so road underdrain projects are necessary and rainfall intensity seems to be increasing (heavier rains more often) so increased drainage system capacity is needed to alleviate flooding.
- While outside its direct purview, the City should better understand the Florida Department of Transportation's (FDOT) resilience planning and storm preparations, as they directly affect large portions of the City.

11. ASSESS PRIVATE SECTOR ASSETS SUCH AS GROCERY STORES, GAS STATIONS, HOSPITALS, ETC. TO SEE HOW VULNERABLE THEY ARE AND THEIR IMPACT ON THE COMMUNITY IF DAMAGED

12. SUBMIT PROJECTS FOR INCLUSION IN THE 2022 WATER PROJECTS BILL

- The City must begin now to aggressively seek resilience funding through the next federal water projects authorization bill.
- One consideration is to be the local sponsor for a dredging mitigation study. The City would pay a portion of the cost of a dredging mitigation study and the ACOE will pay the remainder if Congress authorizes it in the water bill.
- Once a federally supported study is completed, there is an opportunity to get federal funding for the remediation that the study recommends.
- For particularly urgent needs, the City should seek legislative support ahead of and independent of the biennial Water Bill.

13. REVIEW THE MASTER STORMWATER MANAGEMENT PLAN (MSMP) UPDATE

- Determine the percentage of the City that has been mapped for flood impacts, how often the maps are updated, how areas not yet mapped are prioritized for mapping, etc.
- MSMP needs greater specificity regarding the balance between the need to map previously unmapped areas versus re-studying previously mapped areas that have undergone substantial development and changed conditions.

14. CONSIDER RESILIENCE WHEN APPOINTING JEA BOARD MEMBERS

- Of the four appointments the City Council makes, the Council should seek to have at least one electric and one water/sewer engineering expert among its membership.
- The City Council should appoint JEA board members who are committed to making Jacksonville and the JEA service area more resilient.
- JEA should “double down” on solar and battery technology and should adopt distributed energy resources decentralized throughout our community.

15. PURSUE CREATIVE FUNDING MEASURES TO ADDRESS THE CITY'S RESILIENCE NEEDS

- Various mechanisms can be explored to help fund resilience, including:
 - **Citizen referendum:**
 - The largest revenue stream available to back a large drainage infrastructure bond is a half-cent sales tax for the infrastructure still available to the City.
 - At current collections, it would produce \$93 million per year, which could be bonded for 30 years to produce \$1.1 billion.
 - The next opportunity for a sales tax referendum would be in November 2022 and it could be used to fund facility maintenance as well as new construction projects.
 - **General obligation bond:**
 - Would require an additional property tax dedicated to a project. A 1 mill levy would produce \$65-69 million currently (which varies as property values change over time), producing \$850 million in bonding capacity over 30 years.
 - The City's annual debt affordability study looks at how much is prudent to borrow using 6 debt ratios. The City is currently at or better than each of those parameters.
 - Issuing big bonds would push the City to the limit on one of those parameters, which might impact the debt rating agencies and how they see the City's financial stability.
 - **Federal funding** as a supplement to funding innovative resilience efforts:
 - The City must first commit to most of the funding for its needs from its local sources.
 - A champion is needed to lead the charge for resilience projects funding.
- The congressionally-funded South Atlantic Coast Study (SACS) is a 3-year study to assess coastal vulnerabilities across the Southeastern US to help guide local governments and community stakeholders in addressing long-term resilience challenges. Northeast Florida was selected as a "Focus Area" in the study where special attention will be given in examining certain tributaries in Duval County as well as parts of the St. Johns River to afford the region a better vulnerability picture. SACS will identify projects that can be substantially funded by the ACOE.

Subcommittee on Infrastructure Reflection




Jim Seaton is a retired U.S. Marine Corps Colonel who served on the *Subcommittee On Infrastructure & Continuity Of Operations For Essential Services*. His Marine Corps service included serving in a policy role at the White House; commanding Camp Pendleton, the Marine Corps' major west coast base while overseeing a \$3+ billion infrastructure upgrade; advising some of America's most senior leaders on a range of issues; and teaching at the U.S. Naval Academy.

Sea level rise and severe rainfall events are Jacksonville's future. So are hurricanes. NOAA projects 2-3 feet of sea level rise over the next 50 years. Coastal flooding will increase as will tidal flooding in the St. Johns River and its tributaries. This will affect our homes, neighborhoods, schools and businesses. It will also affect much of the infrastructure that supports our economy and our way of life.

Fortunately, the city is taking action to build a more resilient community. Resilient communities can better withstand and recover from hurricanes, flooding and other stressors. They adapt to changing conditions and seek to minimize future losses that can affect a community and its economy. They plan for managing sea level rise, environmental factors, aging infrastructure and other community vulnerabilities. What does it take to become more resilient?

It takes a collaborative "Resilient Jacksonville" mindset from government, business, university, nonprofit and private citizen stakeholders. It takes a "Whole of Community" effort to mitigate the effects of rising seas and flooding. It takes action to ensure that climate-related stressors will not disproportionately affect our most disadvantaged neighbors. It takes vision, will, money, drive and a laser focus on tomorrow.

The Subcommittee on Infrastructure and Continuity of Operations for Essential Services focuses on systems, facilities and services that help our city function. This includes hard infrastructure such as roads, power, drainage and bridges, as well as services that keep our city running, such as hospitals, emergency services and grocery stores. It also includes green infrastructure that buffers storm surge and absorbs excess rain.



"I've seen what our future will be without taking steps to address rising seas and flooding. My home flooded during Irma."

We examined a broad issue set. Our city already experiences chronic flooding and this won't improve without mitigation. We're reviewing the capital improvement program. We've looked at external funding for resilience programs. Norfolk, a Virginia port and military city, is particularly vulnerable to sea level rise and coastal flooding. It has received more than \$100 million in resilience funding. Jacksonville must tap into similar funds.

We reviewed last year's Adaptation Action Area Working Group recommendations. If the City Council approves them, they will establish new resilience planning requirements for Duval County. We'll look at the business case for resiliency. There is a high return on investment in building for resilience. We don't yet have policy proposals on the equity issues we discussed. But affordable housing and landlords who lack flood insurance are also community resilience issues. Ultimately, we may recommend legislation to address issues we identify.

I've seen what our future will look like without taking steps to address rising seas and flooding. My home flooded during Irma. I've also joined other military veterans to help communities in three states and Puerto Rico recover from devastating hurricanes. But I've also seen what a resilient community looks like. When I commanded Marine Corps Base Camp Pendleton in southern California, our community dealt with major wildfires on base. We also carried out a more than \$3 billion infrastructure upgrade and we embedded community resilience and continuity of operations into our master planning efforts. Community resilience is a choice.

I came here to attend Jacksonville University in 1978 – 42 years ago. At times it seems like yesterday. Now, recall NOAA's 2-3 feet of sea level rise projections over the next 50 years. In a way that's tomorrow. We need a Whole of Community effort to prepare for that tomorrow.

INFRASTRUCTURE SPEAKER INVENTORY



Mr. Bill Killingsworth, Director, COJ Planning & Development Department
Adaptation Action Area Working Group Report

Ms. Heather Reber, Council Auditor's Office
FY20-21 Capital Improvements Project List

Mr. Hai Vu, JEA Water/Wastewater Systems
JEA Resilience Plan Draft Report

Mr. Phillip Peterson, Council Auditor's Office
Bond Issue for Infrastructure Development

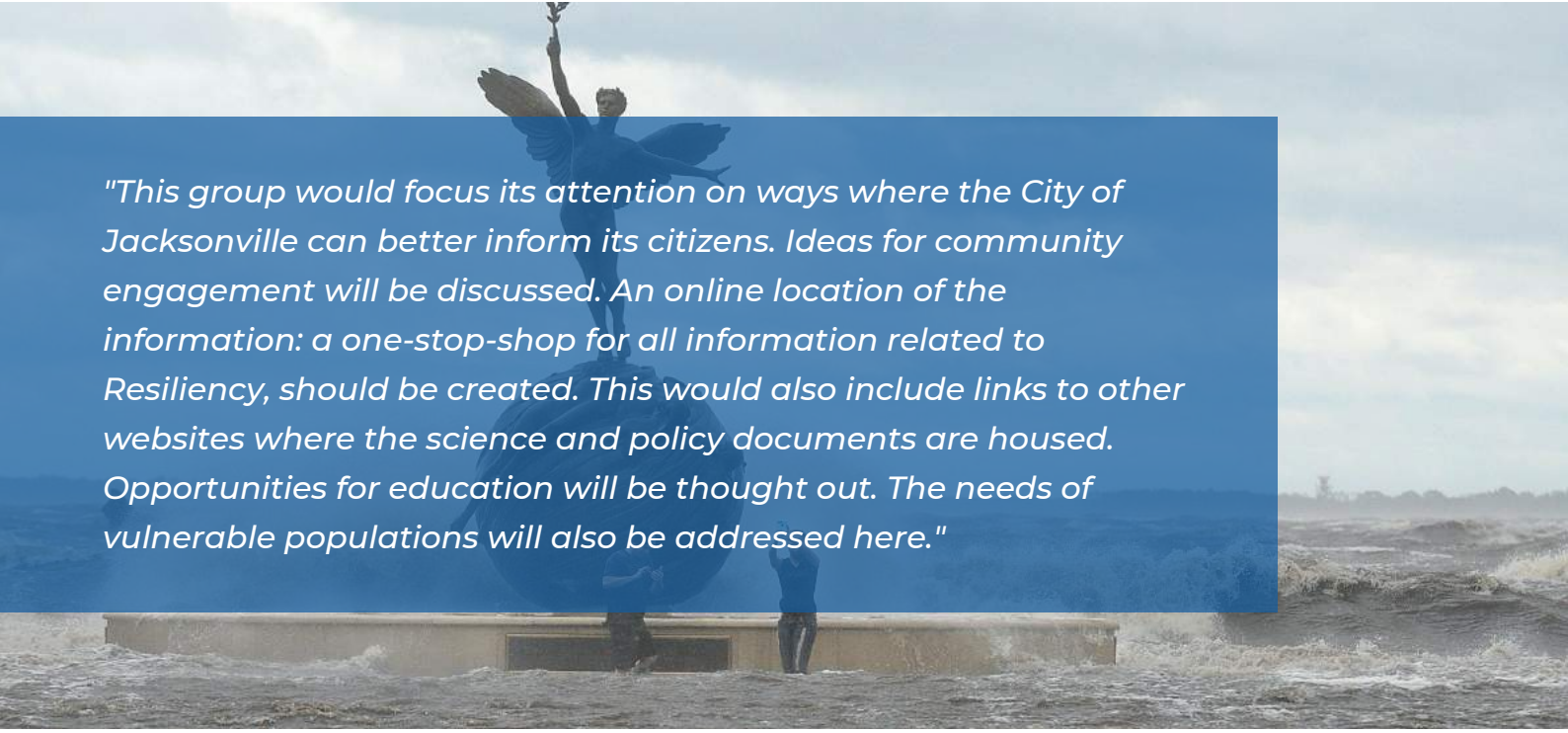
Mr. John Pappas, Director, COJ Public Works Department
CIP Resilience Priorities

Dr. Alec Bogdanoff, Brizaga Inc.
The Business Case for Resilience in Southeast Florida: Regional Economic Benefits of Climate Adaptation

Ms. Kristen Reed, Chief, COJ Community Planning Division
Adaptation Action Area Comprehensive Plan Amendments Final Review

SUBCOMMITTEE ON EDUCATION, PROTECTION OF LOCAL NEIGHBORHOODS & COMMUNITY OUTREACH

SUBCOMMITTEE ON COMMUNITY OUTREACH



"This group would focus its attention on ways where the City of Jacksonville can better inform its citizens. Ideas for community engagement will be discussed. An online location of the information: a one-stop-shop for all information related to Resiliency, should be created. This would also include links to other websites where the science and policy documents are housed. Opportunities for education will be thought out. The needs of vulnerable populations will also be addressed here."

The Subcommittee on Education, Protection of Local Neighborhoods and Community Outreach was tasked with focusing its attention on ways where the City of Jacksonville could better inform its citizens on issues related to sea level rise, coastal flooding and community resilience.

The mission of the subcommittee was to recommend clear action steps to engage the community in a comprehensive strategy of education and outreach on the very complex issue of resiliency.

In short, resiliency efforts are finally taking a front row seat in Jacksonville. It's a seat that has been reserved for so many other important initiatives, always edging out the very obvious elephant in the room.

Now with the Jacksonville City Council and the Mayor's office both focused on resiliency, there is a serious move to change the mindset on how we as a community tackle this tough issue from a working definition to legislation, community education and engagement.

Message from Subcommittee Chair



Council Member Joyce Morgan, representing District 1, works to break down barriers through transparency in government. Arriving in Jacksonville back in 1988, Morgan was a television personality in both Atlanta and Macon, Georgia, and was a news anchor here in Jacksonville at Channel 17 (WJKS). She left for a position in Dallas but returned to Channel 4 (WJXT) in 1993. Her three decades in communications and journalism have sharpened her understanding of the elements needed to build a strong community and city.

In my opinion success for the Special Committee on Resiliency is achieved when citizens in Jacksonville don't ask what it is, but instead talk about resiliency as easily as we talk about the weather.

Working closely with my Vice-Chair, Council Member Michael Boylan, we led a group of highly skilled and highly motivated subject matter experts through the process to flush out how we reach the community and carry this critical message to every neighborhood in Jacksonville especially those experiencing chronic stressors like aging infrastructure, flooding, and sea level rise.

Our subject matter experts all reached out and even stepped up to lead. In particular John Burr, John Sapora, Ashantae Green, Shannon Blankinship and Sean Lahav carefully helped to craft the proposed action steps our subcommittee presented to the special committee on Resiliency. Sean Lahav of the Northeast Florida Regional Council provided special communication through a resiliency newsletter and we've explored many tools that citizens can use to assess their risk of exposure.

As we await the selection of Jacksonville's first Chief Resiliency Officer, this group of volunteers illustrated the kind of engagement process that must be a priority if citizens are to fully understand the long term adverse effects that our city and neighborhoods will face if we do not give Resiliency the proper attention it demands.

The many months of work conducted with this outstanding group can certainly be used by the new CRO to provide a solid outline to the foundational work already in place to ensure a successful beginning.

I believe one of the most important components of this group was their willingness to build upon the work and recommendations of the Adaptation Action Area Working Group who came before us. Building upon work, rather than re-inventing it, saves time, energy, resources, and money. The work is far from over, but Jacksonville is on the right track and shows tremendous promise as we use community engagement to forge partnerships. Welcome to a more resilient Jacksonville.

SUBCOMMITTEE SUBJECT MATTER EXPERTS



John Burr
Josh Gellers, Ph.D.



Ashantae Green
Jason Harrah



Bill Hoff
Kelly Rich



Barbara Gubbin
John Sapora



Joey McKinnon
Mike Bonts

SUBCOMMITTEE OBSERVATIONS

This list of observations and suggested action steps is derived from Subcommittee topics and discussion points made by citizen subject matter experts and City Council members from July through December 2020. This list is worthy of reporting and additional research and consideration by City and community partners.

1. ADOPT THIS WORKING DEFINITION OF RESILIENCY

- **Resiliency** is the ability to collaboratively prepare for, prevent, absorb, recover from and equitably adapt to damage from chronic stressors (i.e., aging infrastructure and sea level rise) and adverse events (i.e., hurricanes, extreme heat and high-intensity flooding).

2. EXPAND THE RESILIENCY DEFINITION OVER TIME TO INCLUDE MORE THAN FLOODING AND SEA LEVEL RISE WITHIN DUVAL COUNTY

- The greatest danger that Jacksonville faces is flooding, from the immediate threat posed by intense tropical storms to the steady increase in sea levels that will come over the next years and decades as the climate warms. For Jacksonville, with our thousand miles of riverfront and oceanfront, resiliency begins with keeping water out of our neighborhoods. It's a multi-billion dollar fight that will be waged over decades to protect the city from changing climate.
- Most metro areas active in resiliency strategies define resiliency more broadly to include: chronic stressors such as income inequality, underinvested neighborhoods, the shortage of affordable housing, lack of healthcare, access to transportation, employment and food insecurity. Using a broader approach to define resiliency fosters more resilient individuals, families, neighborhoods, businesses and communities.
- Resilient305 in Miami, Orlando/Orange County, Tampa Bay, Resilient Houston, Boston, San Francisco and Long Beach, Calif. are examples of this broader approach.
- Consider a Northeast Florida regional approach to resiliency planning over time. Other metro areas – including Southeast Florida, East Central Florida and Tampa Bay – are multi-jurisdictional in their resiliency efforts.

3. ESTABLISH A COMMUNITY ENGAGEMENT STRUCTURE FOR THE OFFICE OF THE CHIEF RESILIENCY OFFICER

- Continue meaningful citizens' engagement work beyond the Special Resiliency Committee to promote creative and lasting solutions that are equitable and inclusive, and enjoy broad community support.
- The City should establish a community-based group or council that includes representation from diverse stakeholders that serve as liaisons for neighborhoods and communities throughout Duval County as well as organizations and associations working in resiliency.
- Establish an annual Resilient Jacksonville event to educate people about sea level rise and climate change, and bring together people who want to help the city become a model of resiliency. This event should make a special effort to include the public schools, and local colleges, employing the energy and passion of students.
- The Chief Resilience Officer should conduct and make public an extensive community survey to find out what the community knows about resiliency and its concerns. This information could also be gathered from a series of resiliency workshops, town halls and mail campaigns.
- The Chief Resilience Officer should keep track how many calls the City receives about flooding and drainage issues each month, and create a contact list and calendar of events for how citizens can get help with their problems. This record should be published monthly by the CRO.
- The Chief Resilience Officer should coordinate with the Duval Community Organizations Active in Disaster coalition of government emergency management, nonprofits and businesses to better align disaster services with resiliency strategies.
- The Chief Officer should support comprehensive resiliency research and cross-sector learning by fostering an academic-government collaboration with local academic institutions, government and the nonprofit sector.
- The Chief Resilience Officer should leverage the power of partnerships and educational opportunities with diverse organizations, including the school district, private philanthropy and businesses to encourage community participation in resiliency and climate change initiatives.

4. CREATE A COMMUNITY ENGAGEMENT PROCESS THAT HELPS CITY OFFICIALS PRIORITIZE NEIGHBORHOOD RESOURCE ALLOCATION AND SUPPORT COMMUNITY REVITALIZATION PLANS

- Community engagement is more than informing and educating the public about City plans and processes, which is mainly one-way communication.
- Meaningful community engagement is about listening processes among diverse community stakeholders. Neighborhood and business leaders are worthy experts about their lived experience of resiliency challenges and are helpful, critical thinking partners to find solutions.
- Using infrastructure priorities as an example, Public Works should continue to produce a list of capital improvement projects planned for a particular neighborhood and explain them to neighborhood leaders. Neighborhood leaders then evaluate the list based on their lived experience of what is already included and what could be added to the list. Neighborhood leaders then recommend priorities for funding based on various factors such as (a) does it affect an area where people live and work, (b) whether the area has a history of underinvestment and vulnerable populations, (c) how many residents are affected, (d) how long have they been suffering from this condition and (e) how the infrastructure might support a community revitalization project.
- All city departments should include the community in the adoption of a resilience scorecard matrix to assist government officials in prioritizing resiliency capital.

5. ESTABLISH EDUCATION AND PUBLIC ENGAGEMENT TOOLS SUCH AS USER-FRIENDLY WEBSITES, NEWSLETTERS, SOCIAL MEDIA PLATFORMS AND RESOURCE GUIDES TO REACH DIVERSE AUDIENCES

- Create an infrastructure and process for disseminating information that is readily accessible and easily understandable by the general public.
- Use communication methods and recruit trusted community messengers who relate to various racial and ethnic groups, ages, income levels and neighborhoods. Include arts, cultural and media groups to shape messages.
- Create common talking points to make sure consistent messages and information is sent into the community.

6. USE A SOCIAL JUSTICE AND EQUITY LENS THAT WILL HELP CHANGE PUBLIC DISCOURSE AND RESOURCE ALLOCATIONS TO BE MORE INCLUSIVE OF VARIOUS POPULATIONS AND ADDRESS UNFAIR OR EXCLUSIONARY PRACTICES BY GOVERNMENT AND BUSINESS

- Employ social vulnerability index to insure intentional inclusion of leaders in underinvested neighborhoods to address improvement opportunities as part of resiliency – disparities in health and well-being, employment, safety, wealth and financial security– that have historically reduced everyone’s quality of life in Jacksonville.
- Allocate public resources more equitably to ensure that all neighborhoods are healthy, safe and more climate ready.

7. PARTICIPATE IN RESILIENCY LEARNING, ADVOCACY AND FUNDING NETWORKS

- Become a member of the Resilient Cities Network (formerly 100 Resilient Cities).
- Join the Adrienne Arsht-Rockefeller Foundation Resilience Center.
- Join in statewide and regional resiliency networks.
- Create a Regional Climate Compact with other Northeast Florida government jurisdictions.

8. IMPLEMENT THESE ADAPTATION ACTION AREA (AAA) WORKING GROUP RECOMMENDATIONS ON EDUCATION AND COMMUNITY OUTREACH AND ALIGN WITH OTHER RECOMMENDATIONS

- The City shall educate, inform and disclose flood hazards to the public through various mechanisms such as real estate disclosures, public mapping resources, community or citywide public information campaigns.
- The City – through educational campaigns, promotional materials and partnerships with non-profit and for-profit entities – should promote and participate in green infrastructure solutions to mitigate flooding.

SAMPLE LIST OF IDENTIFIED COMMUNITY ASSETS

- Jacksonville Environmental Protection Board
- Jacksonville Waterways Commission
- JEA, JTA, Jaxport
- Duval County Public Schools
- Jacksonville Public Library
- Soil and Water Conservation District
- St. Johns River Water Management District
- Florida Department of Environmental Protection
- US Army Corps of Engineers, Jacksonville District
- Northeast Florida Regional Council
- Resilient Jax (originally Resiliency and Climate Change Coalition)
- Garden Club of Jacksonville
- St. Johns Riverkeeper
- Groundwork Jacksonville
- Northeast Florida Sierra Club
- Duval Audubon Society
- Scenic Jacksonville
- Riverfront Parks Now
- Timucuan Parks Foundation
- North Florida Land Trust
- Urban Land Institute, North Florida
- Jacksonville Chapter of the Citizens Climate Lobby
- Northeast Florida LTRO (Long Term Recovery Organization)
- Duval COAD (Community Organizations Active in Disaster)
- LISC Jacksonville
- Riverside Avondale Preservation, Inc.
- Springfield Preservation and Revitalization Council, Inc.
- Other Neighborhood-based Organizations
- Florida Housing Coalition
- The CLEO Institute
- Green Infrastructure Center
- Resilient Cities Network
- University of North Florida, Jacksonville University
- Edward Waters College, Florida State College at Jacksonville
- University of Florida, Florida State University
- Northeast Florida Builders Association
- JAX Chamber and JAXUSA Partnership
- Resiliency professionals and consultants
- WJCT Public Media – adaptflorida.org
- Florida Times Union
- Jacksonville Business Journal
- The Free Press of Jacksonville
- The Florida Star
- The Jaxson
- TV and Radio Stations
- African American Economic Recovery Think Tank
- Jacksonville Urban League
- Jacksonville Chapter of the NAACP

Subcommittee on Outreach Reflection



John Burr is a veteran journalist who has been directing news coverage and reporting in Jacksonville since 1983. He served on the Subcommittee on Education, Protection of Local Neighborhoods and Community Outreach. He is currently also a news analyst for WJCT, where he can be heard regularly on the "First Coast Connect" media roundtable.

There are times – more than a few – that I've thought there are not enough people in Jacksonville who care about climate change to actually do anything.

But that's not true. There are tens of thousands of people here who want to pitch in and help their city. Most of them have no idea how to do so as they go about their lives in our climate change indifferent yet flood prone city on the river by the sea.


Jacksonville needs to get moving. We are at the top of the list of cities in this country that are susceptible to sea level rise and flooding, thanks to our 1,000 miles of river and ocean shoreline. And we're in Florida, looking right down the gun barrel at the ever-stronger hurricanes the 21st Century will breed. And yes, Florida is hot and getting hotter.

All this, yet as a city, we are just awakening from our ambivalence, while the other major Florida cities are years ahead of us in their responses to climate change. So let's wake up, Jacksonville.

Here's what you can do:

- The Jacksonville City Council has established a Special Committee on Resiliency, which is busy researching and recommending ways for the city to respond to rising waters, extreme heat and the threat of increased wildfires. We need your ideas and your energy.
- The Northeast Florida Regional Council is an excellent place to find information on ways to protect our region from climate change.
- Catch up on what local governments and businesses are doing in other parts of Florida, especially South Florida, which has had an active resiliency movement for a decade or longer.
- Resilient Jax is a new coalition of local civic and environmental groups that is engaged in the local climate change fight.

Get involved.



"We can build a city that's up to the challenges that a warming climate will throw our way. We can do this. We need your involvement."

As I said before, I've had my doubts about Jacksonville's desire to respond to climate change. After all, we have not been a hotbed of environmental consciousness or urban planning excellence. We're Jacksonville.

And Jacksonville is us. We can build a city that's up to the challenges that a warming climate will throw our way. We can do this. We need your involvement. Let's catch up with our other Florida cities. Better yet, let's lead them.

That's why I've joined the City Council Special Committee as a resident expert, and the Steering Committee of Resilient Jax. I've found well intentioned people committed to finding ways to protect our neighborhoods from the present dangers and the greater dangers to come from our changing climate.

You can worry about climate change, but it's better to join with others to find answers. You will find that there are many others who share your concerns, and willing to bring their time and energy to a mutual effort that serves the common good.

Battling climate change is the ultimate long haul. Science tells us that Jacksonville and the world will be forced to confront the warming climate and sea level rise for the rest of the 21st-century, and well into the next.

Welcome to the good fight, we need you. And your children, too.

Check out the links below for more information:

coj.net/city-council/standing-committees/resiliency-special-committee

nefrc.org/resiliency

resilientjax.org

OUTREACH SPEAKER INVENTORY



Mr. Sean Lahav, Resiliency Coordinator, NEFRC
Northeast Florida Regional Survey on Resiliency Results

Ms. Carla Miller, Ethics Officer, City of Jacksonville
Sunshine Law Impact on Committee's Work

Ms. Elizabeth Payne, CEO / Mr. Sean Lahav, Resiliency Coordinator, NEFRC
Northeast Florida Regional Council Resiliency Resources

Mr. Scott Ennis, Stormwater & Roadway Engineer
RAP Storm Surge/Flood Zone Interactive Map Overview

Ms. Kristen Reed, Chief, COJ Community Planning Division
2020-526 Grant for Public Engagement Overview

Ms. Ashantae Green, Duval Soil & Water Conservation District, Group 4
What Other Cities Are Doing to Address Resiliency

Ms. Shannon Blankenship, Advocacy Director, St. Johns Riverkeeper
Adaptation Action Area Working Group Community Outreach Recommendations

Ms. Shannon Blankenship, Advocacy Director, St. Johns Riverkeeper
Resiliency Jax Overview

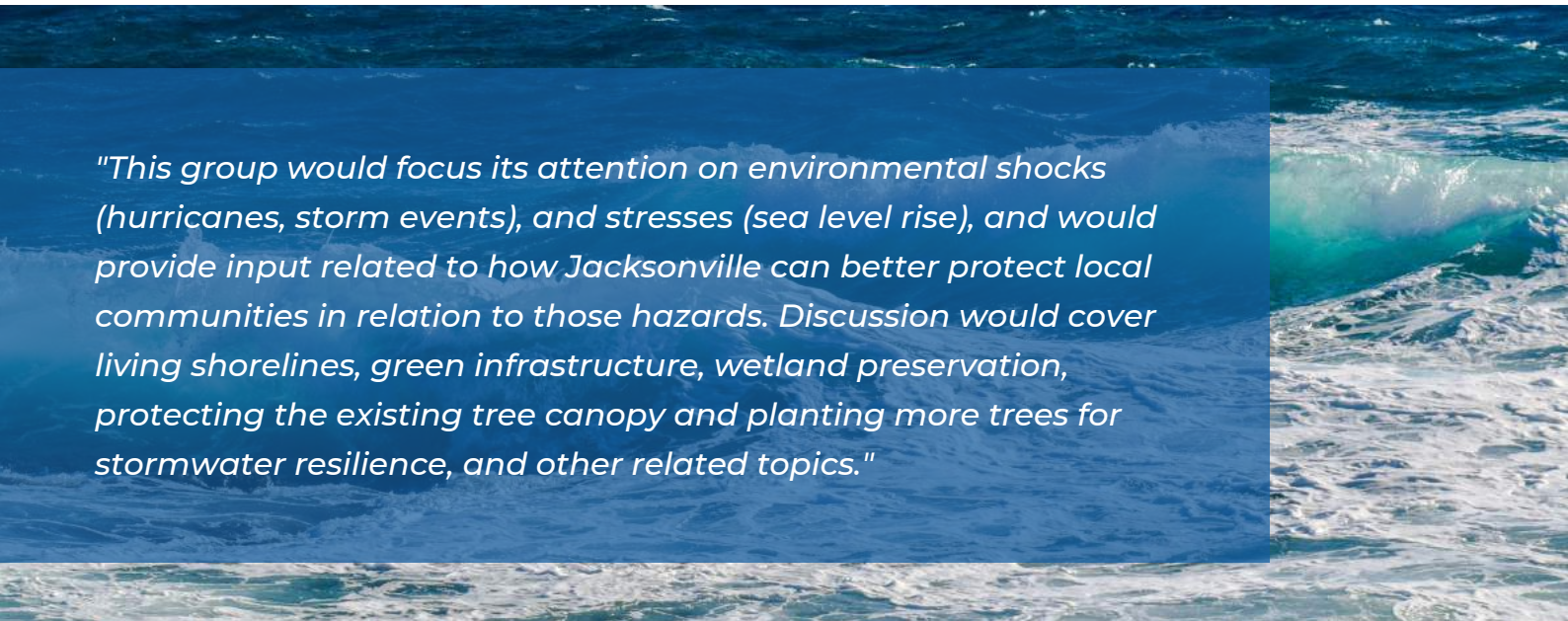
Ms. Kristen Reed, Chief, COJ Community Planning Division
2020-526 RFP Update

Mr. Steve Woodard, Director, COJ Emergency Preparedness Division
Local Mitigation Strategy 2020-701

A coastal landscape featuring large, weathered driftwood logs scattered across a field of tall, green grass. In the background, there are dense green trees and a clear blue sky. The entire image has a blue color overlay.

SUBCOMMITTEE ON ENVIRONMENTAL PLANNING

SUBCOMMITTEE ON ENVIRONMENTAL PLANNING



"This group would focus its attention on environmental shocks (hurricanes, storm events), and stresses (sea level rise), and would provide input related to how Jacksonville can better protect local communities in relation to those hazards. Discussion would cover living shorelines, green infrastructure, wetland preservation, protecting the existing tree canopy and planting more trees for stormwater resilience, and other related topics."

The Environmental Planning Subcommittee was tasked with focusing its attention on environmental shocks (hurricanes, storm events), and stresses (sea level rise, extreme precipitation, and heat waves).

The subcommittee included nearly 30 community subject matter experts and passionate citizens who represent certain public agencies, marine scientists, university professors, civil, sustainability and floodplain engineers, attorneys, a physician, St. Johns Riverkeeper, architects, Scenic Jacksonville and Timucuan Parks Foundation, to name a few.

The subcommittee has prepared input related to how Jacksonville can better anticipate and protect local communities from those hazards.

Discussion, study, review of resources and presentations on various topics has afforded the subcommittee to explore living shorelines, green infrastructure, wetland preservation, protection for the existing tree canopy and planting more trees for stormwater and heat resilience, and other related topics.

Various presentations were made to this subcommittee by various experts to include the Adaptation Action Area (AAA) Report recommendations, the Green Infrastructure Center's Casebook for Trees to Offset Stormwater prepared for Duval County and FDEP Living Shorelines progress for Tampa Bay. Representatives from the JEA and JTA spoke to our subcommittee regarding their plans for resiliency and future energy efficiencies.

Message from Subcommittee Chair



Matthew "Matt" Carlucci, representing At-Large - Group 4, is the founder and owner of Matthew F. Carlucci Insurance Agency, Inc. He is a 38 year State Farm veteran and a former board member of the Jacksonville Association of Insurance and Financial Advisors, which awarded him the 2001 Community Service Award. Mr. Carlucci holds a Bachelor of Arts in Education from the University of North Florida and was awarded alumnus of the year in 1987.

The Environmental Planning Subcommittee and subsequent observations were organized around the three hazards 1) Sea Level Rise, 2) Extreme Precipitation Events and 3) Mean Heat Increase.

All three hazards were examined through the lens of land development and environmental justice. Nearly 50 different studies, presentations and papers were shared with the subcommittee on various topics to include, but not limited to best practices from other communities, funding opportunities, insurance risk, impact on property values, heat islands and elevating vulnerable structures.

For example, it is reported that Hurricane Irma cost the state some \$50 billion and locally, just the clean up costs in Duval County were reported to be \$85 million.

The Yale School of the Environment reported 8-5-19 that it would require an investment of \$3,990/capita to protect Duval County from rising waters. In 2020, the US suffered \$95 billion in damages from natural disasters, double the 41 year average.

This is why resiliency matters.

Throughout the sub-committee process, I have been amazed at the wealth of knowledge that exists in our community. The Subject Matter Experts provided critical value to our city with their willingness to share expertise and ideas. The breadth and scope of the supporting presentations cannot be overstated. I strongly feel that these three sub-committees have helped to establish the groundwork for our incoming Chief Resiliency Officer and am deeply appreciative to all who participated.

Land Use Planning

Environmental Justice

Hazard 1
Sea/River Level Rise
Coastal Surge
Extreme Tides

Hazard 2
Climate Change
Extreme Precipitation
Events and Rain Pattern

Hazard 3
Climate Change
Mean Temperature
Increase and Heat Waves

Coastal, River and Tributary Shoreline
Impact

Shoreline Impact

Contribution to Ocean and River's Surface
Temperature Rise

Economic, Health, Social and Safety Impact
of Flooding

Functionality of Stormwater Management
Systems and Wetlands

Impact on Health and Well-Being of
Residents

Saltwater Intrusion

Economic, Health, Social and Safety Impact
of Flooded Streets, Homes and Businesses

Contribution to Droughts and Wildfires

Riverine (St. Johns River, Tributaries and
Wetlands) Health, Depth, and Resilience

Run Off Contribution to Poor Water
Quality in River and its Tributaries

Impact on Vegetation and Agriculture

Land Use Planning

Bill Bishop, Mark Middlebrook, Joshua Rosenberg & Kevin O'Halloran

Environmental Justice

Ashantae Green, Todd Sack & Patrick Krechowski

Hazard 1
Sea/River Level Rise
Coastal Surge
Extreme Tides

Hazard 2
Climate Change
Extreme Precipitation
Events and Rain Pattern

Hazard 3
Climate Change
Mean Temperature
Increase and Heat Waves

Steve Swann

Adam Hoyles

Dr. Adam Rosenblatt

Dr. Quinton White

Bruce Fouraker

Ashantae Green

Joshua Rosenberg

Patrick Krechowski

J. Logan Cross

Shannon Blankinship

James Richardson

Sarah Boren

Mark Middlebrook

Kevin O'Halloran

Bill Bishop

Dr. Todd Sack

Guillermo Simon

Jim Schwarz

Ken Godwin

Nancy Powell

SUBCOMMITTEE SUBJECT MATTER EXPERTS



Adam Hoyles
Bill Bishop



Sarah Boren
J. Logan Cross



Patrick Krechowski
Quinton White, Ph.D.



Kevin O'Halloran
Joshua Rosenberg



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Todd Sack, M.D.



Ashantae Green
Bruce Fouraker

SUBCOMMITTEE OBSERVATIONS

This list of observations and suggested action steps is derived from Subcommittee topics and discussion points made by citizen subject matter experts and City Council members from July through December 2020. This list is worthy of reporting and additional research and consideration by City and community partners.

OBSERVATIONS AND ACTION STEPS FOR HAZARD 1 SEA & RIVER LEVEL RISE, COASTAL SURGE AND EXTREME TIDES

The focus of the Hazard 1 working group was to consider the impacts of Sea/River Level Rise, Coastal Surge and Extreme Tides on the shorelines of our coast, rivers and tributaries. The group spent a considerable amount of time understanding how rising water and surge will disturb, flood, erode, inundate our shorelines and how we might mitigate or prevent that disruption through proactive policies and projects. The recommendations and action steps below are the outcome of the process, beginning with the priorities that will have the strongest and most immediate impact.

H1.1 CREATE A GREEN INFRASTRUCTURE ACTION PLAN

- As sea and river levels rise and our current gravity-based infrastructure drainage systems lose function, retaining stormwater on land will become increasingly important. Many of the recommendations made by the Hazard 1 Working Group will be included during the creation of a Green Infrastructure Action Plan. In the urban core and downtown, heat island issues should also be considered.

H1.2 NEW SEPTIC TANKS NEED MORE SCRUTINY

- In anticipation of sea level rise, new septic tanks must require additional protections. Within the AAA and Special Flood Hazard Areas (SFHA), new septic tanks should only be permitted if lots are larger than 1-acre, tanks are required to have advanced treatment for nutrients, and considerations for advanced drainfield landscape design should be made. The City and JEA should continue to decide where it makes sense to extend sewer lines and where alternatives to traditional septic tanks should be expanded.

H1.3 TRIBUTARIES SHOULD BECOME NATURAL AGAIN

- Most tributaries in Duval County have been straightened and channelized and are no longer connected to their natural floodplain. Sediment transport has been impacted and many waterways now have reduced hydraulic capacity. The result is flooding. In order for waterways to protect adjacent property rather than become a nuisance, we should aspire to natural channel design in any waterfront project. The City should create a list of impacted tributaries for restoration and seek partners and funding sources to begin the work. In other cities, this is an opportunity to create local jobs through unique training that will benefit our community.

H1.4 KEEP SHORELINES NATURAL

- Activity like mowing, fertilizer, pesticide and herbicide application erode shorelines and diminish their capacity to absorb water during weather events. A 6-foot low maintenance buffer (no mowing, fertilizer, pesticide, herbicide application) is already required in Jacksonville, but should be enforced, especially in areas where there is no community opposition. It should be encouraged along waterways on private property through public education and outreach.

H1.5 ABSOLUTELY PROTECT EXISTING WETLANDS

- Wetlands provide the best protection from sea level rise and reduce flooding when connected to upland drainage areas. Building alongside wetlands may not directly impact the soil, but diminished the drainage and storage function the wetland previously served. Encroachment of wetlands can degrade wetland function nearby and downstream long-term. The City should require the St. Johns River Water Management District (SJRWMD) to protect a minimum 25' average buffer from wetlands & surface waters, 50' buffer along Category I wetlands and 25' in Category II wetlands.

ADDITIONAL HAZARD 1 OBSERVATIONS AND ACTION STEPS

H1.6 COASTAL MARSHES

- **Observation:** Dredged material is typically placed in upland Dredged Material Management Areas (DMMAs) or discharged offshore. Dredged material can be beneficially reused to provide protection from storm surge and maintain marsh quality.
 - **Action:** Partner with JAXPORT & USACE to develop a program for the beneficial reuse of dredged material through Thin Layer Placement (TLP), or other methods of strategic placement. This may be especially important to coastal areas with vast marsh systems. TLP may help to build the marsh up ahead of sea level rise and prevent marsh areas from converting to open waters and would reduce wave energy from reaching the shoreline.

H1.7 COMMUNITY EDUCATION

- **Observation:** Street sweeping and stormwater inlet cleaning help reduce localized flooding.
 - **Action:** Public notices should be a part of any street sweeping or stormwater inlet cleaning schedule. The public notices should be coupled with information detailing how residents can help. For example, information about how to prevent grass clippings from reaching storm drains, retain mulch and debris onsite and explain how these actions combined will reduce localized flooding. Residents or others should not use street parking on street cleaning days.
- **Observation:** Existing property owners in the AAA may be unaware of their risk from sea level rise, storm surge & extreme tides. They may also not be aware of structural & non-structural practices that can be employed to help protect their property and enhance the surrounding area.
 - **Action:** Establish an outreach program to provide voluntary property vulnerability assessments in AAA and other Special Flood Hazard Areas (SFHA). Provide property owners suggested adaptation actions they may wish to undertake to increase resiliency to sea level rise, storm surge & extreme tides while simultaneously providing habitat and water quality benefits.

- **Observation:** Potential property owners in the AAA may be unaware of the risk potential for damage from SLR, storm surge and extreme tides.
 - **Action:** Require Real Estate Disclosure for property sales in the AAA that outline the risk of sea level rise, storm surge & extreme tides; include risk maps and statement of value of riparian lands with respect to water quality and habitat protection.
- **Observation:** After the Special Committee on Resiliency concludes, a need remains for a dedicated group of individuals that will work with the City, or the Chief Resilience Officer, in an advisory capacity and as a stakeholder to the community they represent.
 - **Action:** A community resiliency board or other technical advisory group should be created to continue to serve as a liaison between City of Jacksonville staff working in resilience and the neighborhoods and communities impacted. This group should be created with an eye towards transparency and inclusion representative of the diversity within Jacksonville. Permit Applications for development projects (other than single family) within the AAA should be reviewed by the Chief Resiliency Officer or Community Resiliency Board to assure that resiliency policies and requirements are addressed.
- **Observation:** To reduce flooding exacerbated by stormwater, programs to educate and assist private property should be created.
 - **Action:** Mini grants, cost-share, technical assistance, or community incentives should be established to educate communities regarding on-site water storage solutions and also help fund these solutions. For example, rain gardens, garden planters and strategically planted grasses can be installed in yards with problematic water pooling. Rain barrels can capture 50+ gallons of water from roofs. Swales, trees and other water capture and storage features on residential property should be encouraged. Lawn alternatives like perennial peanut and sunshine mimosa coupled with trees retain more water than lawn. Stormwater ponds that no longer function in their flood control capacity can be made "resilient"**. Residents wanting help in understanding their viability for natural or living shorelines can seek assistance.

H1.8 FLOODPLAIN/Shoreline/AAA

- **Observation:** Natural shorelines give flood water room to expand and slowly recede during weather events. They require reduced repair after a storm and can dissipate storm energy. Hardened shorelines can result in erosion or damage to adjacent properties and natural habitats from wave reflection. They are more expensive to repair and result in increased erosion after major storms.
 - **Action:** Utilize USACE maps of shoreline types in Duval County to understand shoreline exposure and develop recommended or allowable shoreline treatments for erosion protection. City of Jacksonville in tandem with the Florida Department of Environmental Protection (FDEP) should ensure that natural and living shorelines are understood as an alternative to traditional bulkheads before and during the permitting process. In places where bulkheads are largely absent, policies to retain natural shorelines should be encouraged through permitting incentives. Living Shorelines should be built in areas designated as ideal to protect upland neighborhoods.
- **Observation:** Selectively purchase and protect existing high-risk lands to curb future flood claims. Open space and protected land will improve Jacksonville's CRS score which reduces the cost of flood insurance.
 - **Action:** Implement a City-led land acquisition, preservation, or conservation easement program that prioritizes the protection of tributary headwaters, wetlands, waterways and land within the AAA designated boundary or other Special Flood Hazard Areas. These lands are most vulnerable to future flooding, but also, can best protect pre existing development from future flood impacts as well as water quality improvement.
- **Observation:** Invasive plants can result in displacement of more desirable native plants that provide protection from storm surge, erosion and wave action.
 - **Action:** Map riparian areas subjected to invasive species (e.g. Brazilian Pepper) and develop a program to eradicate species on public property and provide guidance to owners of infested private properties.

- **Observation:** Land that is contaminated or contains toxic materials will be submerged or partially inundated soon.
 - **Action:** A risk assessment should be made of land within the AAA that would be dangerous to public health when submerged and a plan to reduce risk should be completed. This would include contaminated lands and former industrial sites, stormwater ponds that retain dangerous contaminants, and currently operational facilities with known hazards.
- **Observation:** Impervious surface ratios (ISR) should be significantly reduced in the Adaptation Action Area because floodwaters connected to sea level rise will expand in these zones.
 - **Action:** A separate ISR for the AAA should be established.
- **Observation:** The Duval County Shore Protection Project (SPP), funded by USACE, FDEP and COJ is critical to maintenance and restoration of the beach and dune system, providing protection to all the Atlantic Ocean coastline in Duval County. This program must be periodically reauthorized by the USACE.
 - **Action:** Assure that the Duval County SPP remains funded and provides for continuous beach and dune restoration on an as-needed basis.
- **Observation:** Exposed coastal properties can be damaged by wave action during extreme storm events. The potential for damage is expected to increase with sea level rise.
 - **Action:** The established FEMA Limit of Moderate Wave Action (LiMWA) line adjacent to Coastal A Zones requires V-Zone construction standards. The City of Jacksonville Floodplain Manager should assure that V-Zone construction standards are adhered to in areas waterward of the LiMWA.

H1.9 GREEN INFRASTRUCTURE

- **Observation:** Traditional roadway and transportation projects are designed to divert water to storm drains that lead to waterways. Those waterways often become the source of flooding which could be reduced by capturing water via green infrastructure such as vegetation in roadway medians, sidewalk infiltration areas and recessed areas with trees and plants.
 - **Action:** The JTA Complete Streets program should incorporate EPA Green Streets concepts, such as green infrastructure and drainage into its medians, sidewalks and landscaped areas during the planning and design process of roadway transportation projects.

- **Observation:** City departments, where applicable, should have someone designated with expertise in Green Infrastructure or resiliency that works directly with the Chief Resiliency Officer. These individuals and any supporting staff should have attended regular professional development courses or seminars to stay current with new approaches.
 - **Action:** City employees in Planning, Public Works, Neighborhoods, JAXPARKS and other relevant departments should provide access to professional training in green infrastructure, Low Impact Development, sustainability, resiliency or other related programs. Each department should have staff dedicated to meeting the Green Infrastructure or resiliency goals in tandem with the CRO.
- **Observation:** Capital Improvement Plan (CIP) projects are not required to undergo evaluation of sea level rise or surge impacts, nor is green infrastructure required as a mandatory analysis.
 - **Action:** A Resiliency Matrix should be developed and utilized by the planning department for review of new development's resiliency initiatives. A similar matrix could be used to review CIP projects by Public Works prior to final scope of work approval. A higher score or ranking would be needed in the AAA. Analysis of green infrastructure/LID components when economically and practically feasible should be required.* Eco-mapping of existing natural capital including tree canopy, waterways, wetlands, coastal marshes, wildlife corridors, etc. could be used to develop metrics for preserving and enhancing natural assets within the Resiliency Matrix.

H1.10 SEPTIC TANKS

- **Observation:** Existing installed septic tanks are increasingly expected to fail due to sea level rise and increases in salinity. Failing septic tanks allow human waste and bacteria to contact humans and waterways and pose a threat to public health.
 - **Action:** The City should seek state and federal assistance, when available, to help fund the removal of failing septic tanks and determine a realistic budget for a 10-year phase out of the 22,000 existing prioritized failing septic tanks with JEA.

H1.11 WATERWAYS

- **Observation:** Drainage and roadway projects along waterways occur without an analysis of natural channel design or incorporation of future flood projections to protect neighborhoods and waterways.
 - **Action:** Any public project that occurs along a waterway should involve the CRO, JaxParks, the Neighborhood Department, Public Works and other key stakeholders to assess flooding projections and determine if multiple benefits are possible with individual projects.

H1.12 WETLANDS

- **Observation:** Mitigation for wetland impacts often occurs in mitigation banks remote from the actual area of impact. This practice can result in increased localized flooding and degradation of local water quality and habitat.
 - **Action:** Require no net loss of wetlands within the same named tributary. Mitigation from activities impacting wetlands must be completed within the same watershed where the impact occurred.

OBSERVATIONS AND ACTION STEPS FOR HAZARD 2 CLIMATE CHANGE: EXTREME PRECIPITATION EVENTS AND RAIN PATTERN

Hazard 2 - Climate change associated with extreme precipitation events and rain patterns. This working group studied and developed observations associated with impact on shoreline functionality of stormwater management and wetlands, the economic, health, social impact of street flooding on homes and businesses and runoff contribution to poor water quality in the river and its tributaries.

H2.1 TREE PLANTING

- **Background:** This subgroup committed to address the potential for trees to make a large impact in the resiliency efforts, using the Tree Mitigation Fund, along with other funding sources. It started with the GIC presentation but was expanded upon with the experience of the working group.

- **Reference:** Green Infrastructure Center (GIC) - Jacksonville Trees to Offset Stormwater (Recommendations p. 26-27; May 2019)
- Set ambitious goals and implement a major plan for tree planting to effect stormwater, heat index and beautification. Prioritize areas using data mapping technology for the following:
 - a. Existing tree canopy per Planet GEO GIS Mapping (currently in use by the Urban foresters/Tree Commission.
 - b. Heat index (source: US Urban Heat Map)
 - c. Flood hazards (source: FEMA flood maps, zip code level FloodFactor data)
 - d. Poverty/Redline/economically distressed areas (source: ESRI Census Demographic Info, Jacksonville Redline Maps). Combined Maps*
- This is an adaptation from Green Infrastructure Center (GIC) Recommendation #10 and #12 with measurement #6 and includes:
 - Tree Commission subcommittee to be formed for overall goal setting; and
 - Resiliency Program Goals with legislation through Tree Commission
- Level 2 (\$2 million) funding and resources will be set against that goal — over next 1, 3 and 5 years.
- Goal is to make an impact with a large overall effort using up to 50% of the Tree Mitigation Fund over 5 years. (Exact goals TBD)
 - Establish goals to provide a minimum tree coverage that will be specific for the following areas, and will vary by starting point and potential.
 - Urban core
 - Inner neighborhoods
 - Suburban neighborhoods
 - Rural periphery
 - Beaches communities
- Measure results

NOTE: This will need support from #4, a Community wide education effort on the project and benefit to the residents and businesses.

A. Strengthen Ordinance Codes to support a healthy and growing tree canopy.
Expands on GIC Recommendation #7 and #15:

- Review and revise the streetscape, tree, landscape, parking lot codes to ensure that more canopy trees are required and able to grow and thrive.
- Soil type, volume, depth, quality
- NOTE: There is already an existing subcommittee for the Tree Commission. A resiliency expert should be added to the subcommittee.

B. Plant trees around stormwater ponds.

- GIC Recommendation #13.
- Set a specific goal for this using the data from the mapping tools and the stormwater calculators. Prioritize areas of town that have higher flood risks.

C. Plan and implement major education efforts to private property owners on the benefits of caring for trees, retaining mature trees and planting new trees.

D. Tree Maintenance Operations and Funding

- Consideration of larger match for mature tree maintenance (currently 25%).
- Coordination between DOT and City for state road maintenance.
- Parks Department Tree Maintenance – arborist & funding.
- Arborist for helping consult with Private Property owners.

E. FDOT Tree Planting, Landscape & Maintenance of Mature Trees

- FDOT funding – separate from City Existing roads
- Stormwater ponds

F. Code Enforcement

- Commercial areas & parking lots
- Protected trees

Current Funding Sources

- Tree Mitigation Funds
- FDOT

Future Funding Sources

- Ordinance change – increase stormwater fees & use for resiliency tree planting/maintenance
- Ordinance change – allow Tree Mitigation Fund to fund additional areas
- Grants – State, Federal

H2.2 PRECIPITATION AND STORMWATER MANAGEMENT

- A resilient Stormwater Management Plan (SWMP) plans for and adapts to, a changing environment. The city has a large SWMP in need of updates and improvements to fully understand current and future flood risks and implement best management practices to reduce those risks. These recommendations include understanding future climate patterns, such as extreme precipitation and evapotranspiration; engaging in community outreach and education; providing grants and technical assistance to incentivize property owners to adopt stormwater practices that benefit their neighborhoods; engaging the JTA Complete Streets program to incorporate EPA Green Streets concepts; and, coordinating and collaborating with regulatory and research agencies such as the FDEP, the SJRWMD and the Florida Climate Institute.
 - i. Pluvial flood risk study
 - ii. Update rainfall data for future decision-making
 - iii. Community education regarding street sweeping
 - iv. Community incentives
 - v. JTA Complete Streets
 - vi. Coordination of stormwater pond permitting
 - vii. Update stormwater pond design with best practices
 - viii. Resilient stormwater ponds

H2.3 URBAN DESIGN

- Other resilient stormwater management recommendations focus on the development pattern of the city, including updating the building and tax codes to incentivize low-impact development, and changing land use and zoning requirements to allow for less impervious surface and more space for trees or other green assets.
 - **Incentivize Low-Impact Development (LID)**
 - Adopted from recommendation #14 of the Jacksonville GIC Report to incentivize low-impact development. Low-impact development can include rain gardens, recessed planting beds, bioswales, green roofs, or simply planning for greater pervious surface area in site design. Two ways to encourage the use of LID is to provide faster approval processes or tax incentives when substantial LID methods are employed on-site. An example of an effective incentive program to encourage low-impact development with tax incentives can be seen in NYC's Green Roof Ordinance.

- **Eliminate Off-Street Parking Space Minimums**
 - Adjust city land-use and zoning codes to allow private developers to determine how much parking is needed in a development based on demand signals from the free market. Consider placing maximum parking space standards in urban neighborhoods. Today, off-street parking minimums for residential and commercial developments artificially inflate the number of parking spaces, and thus impervious surface area, that must be developed throughout the county. This greatly contributes to the amount of stormwater run-off generated from developments and increases flooding potential, especially in areas that do not have space to add stormwater ponds. The practice of eliminating minimums has already been adopted in Downtown Jacksonville and is a growing trend across the country, not only for addressing excess stormwater run-off but for encouraging more efficient urban development patterns in general.

OBSERVATIONS AND ACTION STEPS FOR HAZARD 3 CLIMATE CHANGE: MEAN TEMPERATURE INCREASE AND HEAT WAVES

The focus of the Hazard 3 working group was to consider how Jacksonville can build resiliency to mean temperature increase and heat waves. 2020 was the hottest year on record (Source: NASA) and has worsening heat directly negatively impacts Jacksonville residents (Source: Orlando Sentinel article 1/19/21) This working group studied and developed observations and action needed to mitigate the adverse impacts of warming on ocean and river surface temperature rise, health and wellbeing of residents, vegetation and agriculture, as well as the contribution to droughts, wildfires and extreme heat events. The recommendations and action steps below are the outcome of the working group's research and deliberation process. It should also be noted that this group felt strongly that environmental equity and justice should be taken into account for each and every observation and action. We have organized the priorities by urgency as well as by which entity (e.g., City Council, Administration, CRO, Citizen Resiliency entity) should take action and by when.

H3.1 INCREASE AND MAINTAIN COJ TREE CANOPY TO 40% BY 2040

- Trees provide many benefits including reducing the heat island differential between treed and under-treed neighborhoods and reducing stormwater run-off. The following four adjustments to ordinances and internal city processes are observations on how best to achieve these outcomes and important target:
 - Adjust current tree ordinance to have a tree canopy percentage target and maintenance requirement of increase (and then maintain) the City of Jacksonville's tree canopy to 40% by 2040 for the purposes of reducing the heat island differential between treed and under-treed neighborhoods and reducing stormwater run-off. Priority should be given to previous and current under-invested neighborhoods of the city to help address environmental inequity and injustice. (Resources: EPA Heat Island; Relining & Mapping Inequality)
 - Adjust the tree mitigation ordinance to include and allow funds and staff time for outreach and education especially to homeowners. The key to this outreach is to listen, learn and offer researched choices to each specific neighborhood based on its wants and needs and not to implement a tree planting plan without any direct input from the affected neighborhood. (Resources: Detroit example)
 - Adjust the tree mitigation ordinance to allow planting on private property under certain criteria. (Resources: See City of Atlantic Beach's proposed tree ordinance for an example of this allowance)
 - Adjust current tree ordinance to incentivize (e.g., property tax breaks, recognition) retention of mature trees and planting of diverse tree types with emphasis on native and/or Florida-friendly, broad canopy and carbon dioxide sequestration (e.g., not always palm trees). Not all trees are created equal when it comes to shade, filtering pollutants for cleaner air and CO2 sequestration. It is important to have tree diversity for biodiversity, birds and habitat and also for human health and comfort -- shade, clean air, reduction in GHG, energy savings, etc.

H3.2 DEVELOP A HEAT EMERGENCY PREPAREDNESS AND RESPONSE PLAN.

- Climate change is causing an overall warming of our atmosphere which is leading to more frequent and more serious extreme heat events across Florida and the U.S. “Future scenarios indicate that the majority of Florida may be at high heat risk with monthly-mean daily maximum temperatures between 95-100°F. ...There are important public health implications from daily and extreme heat. (Source: Florida Department of Health). It is important for Jacksonville to be prepared and create a Heat Emergency Preparedness and Response Plan similar in scope to the COJ’s hurricane preparedness plan, to prepare for acute events and mitigate a public health crisis. This observation recommends including the following in the plan:
 - a. Include multi-agency, hospital and private sector input
 - b. Gather baseline data (e.g., look at Portland, OR effort)
 - c. Know which neighborhoods are most vulnerable and give priority status
 - d. Include environmental equity and justice in the action plan
 - e. Review annually and update as needed
 - f. Keep running list of resources, best practices, strategies and SMEs
 - g. Include thresholds of when the plan takes effect/gets triggered
 - h. Deploy temperature loggers for granular data
 - i. (Resources: Published research; EPA Excessive Heat Guidebook; City of Philadelphia’s Excessive Heat webpage; Guardian article on failure to protect vulnerable populations)

H3.3 STRENGTHEN AND ENFORCE THE CURRENT COJ SUSTAINABLE BUILDING ORDINANCE (2009-2011)

- According to the U.S. EPA, Americans spend 90% of their time indoors. So much time spent indoors makes it very important for buildings to be healthy, high performing and resilient especially during extreme heat days. Green buildings take into account solar orientation, current trees, reflective roofs, insulation, efficient appliances and HVAC systems as well as holistically building with water, waste, materials, indoor environmental quality in mind. The COJ already has an ordinance on the books that could be strengthened and incentivized to encourage more adoption of healthy, high performing and resilient homes, schools and offices. The observation encourages the following changes to the current ordinance:

- a. any developments that receive COJ money must follow public sector requirements within ordinance
- b. include existing buildings under ordinance for both public and private sector
- c. increase incentives for private sector and/or require certain level of certification and/or certain resiliency attributes (e.g., tax abatements, density bonuses, priority review by all departments)
- d. all city RFPs for city buildings and buildings that receive public dollars must have requisite language that reflects ordinance requirements

H3.4 OBTAIN LEED FOR CITIES CERTIFICATION

- Framework for LEED for Cities certification includes resiliency planning and quality of life metrics as well as annually measures performance and progress which provides reliable data for informed governance decisions. The certification process also encourages all departments to collaborate and measure the same metrics with the same methodology. This observation is listed as a top priority because technical resources and a grant may be available in February/March 2021 and COJ would have a good chance of winning the grant since the City of Atlantic Beach has already achieved LEED Silver certification. To date 24 Florida cities and counties have registered and certified for LEED for Cities. (Resources: USGBC LEED for Cities; Bank of America grant)

H3.5 CREATE AND IMPLEMENT A GREENHOUSE GAS INVENTORY AND REDUCTION PLAN

- Greenhouse gases (GHG) contribute to climate change which in turn cause more heat hazard events. Therefore, it is important to measure and understand the sources of a city's greenhouse gas emissions and make a plan to reduce and mitigate these emissions. What gets measured gets managed and what gets managed gets improved. This observation requests the creation and implementation of a plan that regularly measures GHG emissions and sets an ambitious and measurable reduction target and timeline that is consistent with federal recommendations and targets. It recommends to include the following aspects:

- Promote electric cars, community solar, public transportation and microgrids.
- Require JEA to establish an aggressive, yet achievable, timetable for becoming carbon neutral.
- Require JEA and JTA to work collaboratively on a plan to electrify JTA transportation, including city vehicles, and require TPO/JEA/JTA to ramp up electric charging stations thereby enabling residents and businesses to purchase electric vehicles.
- Focus on actual reduction opportunities that address real problem and sources particularly with the benefits helping underserved and underinvested neighborhoods.

ADDITIONAL HAZARD 3 OBSERVATIONS AND ACTION STEPS

- **Observation:** The City could get ahead of the next acute event as well as address chronic stresses by adding preferred resiliency strategies to all building permits including city buildings (LEAD: City Planning and Zoning & Building Department).
- **Action:** Include the following information when requesting and reviewing building permits:
 - Require new and existing city buildings to pilot resiliency strategies so City can lead and learn by example;
 - Require site plans and green infrastructure for projects over certain size threshold;
 - Request projects could include stormwater infrastructure, including adaptive landscapes, features can include green or cool roofs, tree canopies, etc.; and
 - Decline projects building in 100 year flood zone altogether
- (Resources: Design for Enhanced Resilience; Sustainable Sites: RELi Resilience Rating System, Power system performance and electricity infrastructure

- **Observation:** The City's comprehensive plan goals and methods could be strengthened to reduce heat island effect and environmental heating from the built environment.
 - **Action:** The plan should include incentives for both new construction and retro-fits to existing structures and both horizontal and vertical structures. Environmental heating includes radiation of heat from human-built structures such as rooftops, road surfaces, parking surfaces and buildings, as well as loss of green space (grass, trees, etc.). Reduce heat island effect through the use of best practices such as early warning systems and cooling centers and mitigation including cool reflective pavements, pervious pavements and trees and vegetation.

- **Observation:** Given the dire wildfires this area has experienced in the past (e.g., Palm Coast fire), it is important to maintain a sense of degree of potential fire hazards.
 - **Action:** Restrict wildland urban interface development (WUI) and incentivize fire assessments with large developments (new and existing) that include adjacent lands. Example: Fire risk assessment and plan for large solar farms.

- **Observation:** There seems to be little measurement or knowledge of how effective our current ordinances are working towards their intended outcomes. It was also noted several times during meetings that many ordinances and policies are subjectively interpreted by staff. To ascertain if ordinances and policies are working there needs to be some sort of measurement and/or report. Create accountability through requirement of an annual report from COJ departments on ordinance performance and metrics of effectiveness that shares what was enforced and not enforced (e.g., enforcement actions and resolutions) of existing planning and zoning ordinances, building codes and environmental ordinances. Seek technological solutions to streamline collection of ordinance performance and effectiveness metrics.
 - **Action:** Require all COJ Departments to enforce existing planning and zoning ordinances, building codes and environmental ordinances as written, and to submit an annual report on what was enforced and not enforced and why.

- **Observation:** There is a need for a one stop shop for all resources and information on resiliency at the individual, organizational and city/county level. (LEAD: Chief Resiliency Officer/City in partnership with citizen-based entity such as ResilientJax)
 - **Action:** Develop and maintain a Resilience Resource Center that provides education, technical assistance, demonstration projects, recognition, etc.
- **Observation:** There is a need to update the City's current tools to reflect and emphasize best practices and design standards for resiliency. (LEAD: City)
 - **Action:** Update building codes and zoning ordinances to reflect best practices and resilient design standards which could include density bonuses, etc.
- **Observation:** There is a need to get out ahead of future development to incorporate resilient design standards. (LEAD: Chief Resiliency Officer and COJ Planning and Development).
 - **Action:** Incentivize and implement "smart growth" practices for neighborhoods. Here are some suggestions to consider: a) Mix land uses, such as residential, commercial and recreational uses b) Take advantage of compact building design c) Create a range of housing opportunities and choices d) Create walkable neighborhoods d) Foster distinctive, attractive communities with a strong sense of place e) Preserve open space, farmland, natural beauty and critical environmental areas f) Strengthen and direct development towards existing communities g) Provide a variety of transportation choices h) Make development decisions predictable, fair and cost effective i) Encourage community and stakeholder collaboration in development decisions (Resource: Look at City of Orlando Future Ready initiative that includes its smart cities program).
- **Observation:** There are many ways a building can help deal with and address heat hazards and it is important for the City to share, promote and incentivize these best practices.
 - **Action:** Incentivize and implement resiliency and green building best practices for both private and public sector buildings not addressed by the COJ Sustainable Building Ordinance. Examples of best practices on how to keep buildings cool, energy and water efficient and safe include cool roofs, green-roofs insulation, rain water harvesting, bioswales, orient for solar, reduce solar heat gain and more.

- **Observation:** As our working group went through this process, we realized that the new CRO will be responsible for a lot of these observations and actions and will need support.
 - **Action:** Create, authorize and implement an Energy & Resiliency Commission/Board that includes citizen subject matter experts to support the CRO's work.
- **Observation:** A big part of becoming a resilient community is education of its stakeholders. As a community we will not be prepared for the next adverse event or address chronic stressors if we don't make education a vital part of the process.
 - **Action:** Create a Community Resiliency Outreach coordinator position that works with the CRO.
- **Observation:** Under former Mayor Peyton, the COJ had an interdepartmental sustainability team that fostered collaboration and coordination across city departments and authority. In the first year of that initiative, the Sustainability Officer saved the City 2 million dollars. This need for across City, County and Agency collaboration and coordination is still vital.
 - **Action:** Create and sustain a COJ multi department energy and resiliency team that meets monthly to support the CRO's work and fosters coordination and collaboration.
- **Observation:** The idea of local resiliency hubs came from Puerto Rico after Hurricane Matthew and preparing and empowering local neighborhoods to shelter and recover in place. This may be a prudent step to take in preparation for the next Hurricane Irma like flooding event.
 - **Action:** Install local resiliency hubs in vulnerable, underserved communities.
- **Observation:** We need to educate and prepare our community about the science and risks and solutions of resiliency.
 - **Action:** Embed the science and risks and solutions of resiliency in K-12 school curriculum.

- **Observation:** Preparing for acute events and addressing chronic stressors is an ever evolving process. It is difficult for city employees to keep up with all the changes and market trends such as the financial and real estate markets responding to the risk of inaction on resiliency (physical risk to assets, social risk and transition risk to low carbon economy). Therefore there is a high need to have a process in place that keeps the City progressing forward in achieving its goal to be a resilient community.
 - **Action:** Use respected third party rating systems for resilience and reduce workload and training of city personnel. Resources: RELi (resiliency rating system that provides a whole framework), LEED (does not allow building in flood zones), PEER (for critical facilities that need to be reliable) and SITES (for parks and green spaces); Building a Resilient Future article; Financial Stability Board and its Task Force on Climate-related Financial Disclosure recommendations; UNEP FI TCFD Pilot for Real Estate.
- **Observation:** Communication of progress and what works is key to success.
 - **Action:** Develop an annual communication and education program regarding resiliency progress and best practices for local COJ officials, employees, the media and the general public.

Subcommittee on Environmental Planning Reflection




Joshua Rosenberg is the founder, designer and broker of NativeJax Permaculture Design and Real Estate. He served on the Subcommittee on Environmental Planning. Joshua is a proud Jacksonville native, University of North Florida graduate and permaculture global trotter.

As soon as I heard about the City of Jacksonville's Special Committee on Resilience, I jumped at the opportunity to add my permaculture design and real estate expertise to the pot. As a permaculturist, I am always thinking about how to improve the environment and our community through nature's inspiration. Resilience is always top of mind for me and what I do, so this special committee seemed like an amazing opportunity to help direct our environment and community towards a more sustainable and resilient one.

At first, the council members realized they were in way over their heads and did not fully understand the concept of resilience; not to mention how they were to implement this idea on a large scale. The council members did not hide the fact they were unsure of resilience and how to proceed so they quickly and energetically turned to the community. I believe this was the best thing the committee could have done. Thankfully Jacksonville has a huge community of people dedicated to creating a resilient future.

The community experts, including myself, came out strong and prepared to collaborate on the direction the city should take to apply resilience measures into our community and environment. It is such an amazing thing to see the community support in which we were all participating pro-bono!

Through the next months, the special committee broke up resilience into three main topics: Infrastructure, Community Education and Environmental Planning. I joined the third group which was where I felt most comfortable in adding my input. Within this large topic the sub-committee broke down into three more categories: Hazard 1: Sea/River Level Rise, Coastal Surge, & Extreme Tides, Hazard 2: Extreme Precipitation Events and Rain Pattern and Hazard 3: Mean Temperature Increase and Heat Waves. I joined the Hazard 1 group as a community expert along with a few other powerful local experts who were ready to lend their expertise to the committee.



"The council members did not hide the fact they were unsure of resilience and how to proceed so they quickly and energetically turned to the community."

Being a part of the hazard 1 group, we were responsible for brainstorming ideas on how to improve the Sea/River Level Rise, Coastal Surge and Extreme Tides that Jacksonville faces on a frequent basis. With experts spanning many disciplines, we brainstormed and reviewed reports to come up with options to solve our environmental issues using holistic techniques. Our group exemplified a strong energy from the beginning, as did all the other groups.

In conclusion, I see the city council members involved in this special committee excited and open to ideas on how to improve and create resilience within Jacksonville. With the new position of Chief Resilience Officer approved and budgeted for, I am left excited and confident that our city is now realizing the importance of working with nature and creating a city that is resilient, sustainable and beautiful.

I want to personally thank Council Member Matthew Carlucci for initiating this special committee and creating a jumping off point for our city to grow from and eventually thrive in.

ENVIRONMENTAL SPEAKER INVENTORY



Ms. Emily Pierce, Chair, COJ Adaptation Action Area Working Group
Adaptation Action Area (AAA) Working Group Final Report

Ms. Karen Firehock, Green Infrastructure Center Inc.
Tree Canopy as Green Infrastructure

Mr. Kevin O'Halloran, Graduate Student, Georgetown University
Analysis of Taxable Value & Flood Risk for City of Jacksonville

Ms. Kathleen O'Keefe, Florida Fish & Wildlife Research Institute
Living Shoreline Model Suitability for Tampa Bay

Mr. Kurtis Wilson, Mr. Hai Vu & Mr. Brian Roche, JEA
JEa Review of Environmental Issues & Solutions

Mr. Alexander Traversa & Ms. Greer Gillis, JTA
JTA Sustainability Program

MOVING FORWARD



In February of 2021, the City of Jacksonville officially began searching for a Chief Resiliency Officer (CRO) to oversee all operations in the city having to do with resiliency.

The City of Jacksonville Chief Resiliency Officer (CRO) will be the lead staff person responsible for the development and implementation of Jacksonville's Resilience Strategy across all Departments.

The CRO will primarily be responsible for the coordination, development, refinement, administration, integration and communication of resilience policies and practices for the City of Jacksonville.

The CRO will directly oversee implementation of high-priority resilience projects, including securing funding for and managing resilience initiatives and budgets, formulating work plans, monitoring and reporting progress and supervising staff.

The CRO will be responsible for coordinating resiliency efforts across all government departments and will lead multi-departmental teams to review city infrastructure, land use and environmental policies that affect valuable county assets.

The CRO will also be responsible for coordinating efforts with other government and affiliate entities, including, but not limited to, DIA, JEA, JTA, JAA, JAX Port, JAX Chamber, the North Florida Transportation Planning Organization, the Northeast Florida Regional Council and the Florida Department of Environmental Protection.

The ultimate purpose of this final report is to provide the CRO with a foundation to begin his or her work both in the short- and long-term. Moving forward, because of these efforts, Jacksonville will be a more resilient city.

SPECIAL COMMITTEE ACKNOWLEDGEMENTS

City Council

Hon. Randy DeFoor (Chairwoman)
Hon. Matt Carlucci (Former Chairman, Subcommittee Chair)
Hon. Joyce Morgan (Subcommittee Chair)
Hon. Garrett Dennis (Subcommittee Chair)
Hon. Michael Boylan (Subcommittee Vice-Chair)
Hon. Scott Wilson (Special Committee Founder)

Mayor's Office

Hon. Lenny Curry, Mayor of Jacksonville
Brian Hughes, Chief Administrative Officer
Stephanie Burch, Deputy Chief Administrative Officer

Northeast Florida Regional Council (NEFRC)

Beth Payne, Chief Executive Officer (External Advisor)
Sean Lahav, Resiliency Coordinator (External Advisor)
Nicholas Cole, Regional Planner (Support Staff)

City Legal & Ethics Staff

Susan Grandin, Assistant General Counsel
Carla Miller, Director, Office of Ethics, Compliance & Oversight

City Council Staff

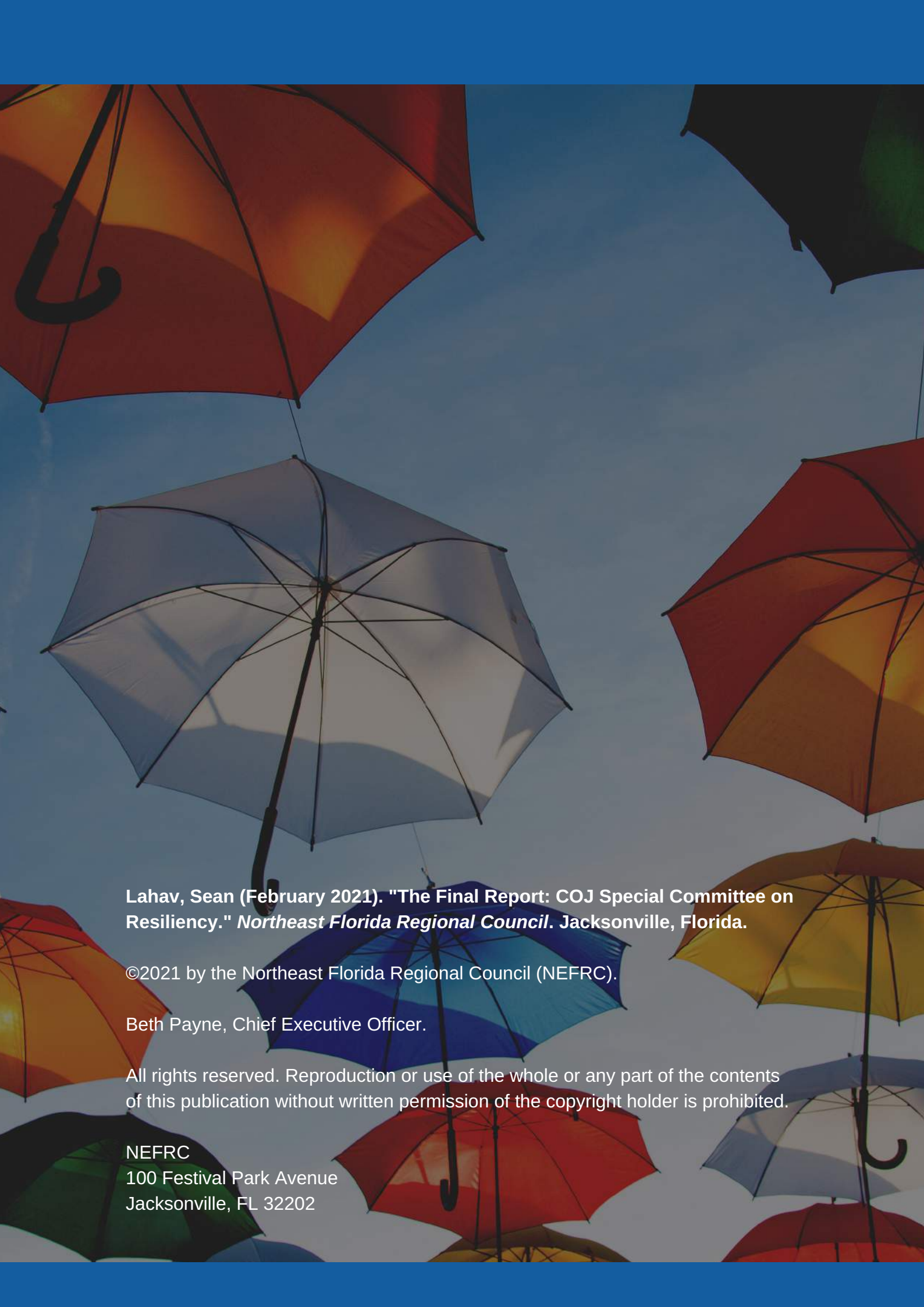
Cheryl Brown, Director/Council Secretary
Jeff Clements, Chief of Research, Office of the City Council
Alyson Lee, Executive Assistant to Matt Carlucci
Brooks Dame, Executive Assistant to Randy DeFoor
Chet Aikens, Executive Assistant to Joyce Morgan
Sonia Johnson, Executive Assistant to Michael Boylan
Dorian Bush, Executive Assistant to Garrett Dennis

City Department Staff

William "Bill" Killingsworth, Director, Planning & Development Department
John Pappas, Director, Public Works Department
Steven Woodard, Director, Emergency Preparedness Division
Kristen Reid, Chief of Community Planning Division
Melissa Long, Chief of Environmental Planning
James Richardson, Administrator, Environmental Protection Board

Community Members Who Assisted with Formal Publication

Brooks Andrews (Subcommittee Vice-Chair)
John Sapora, LISC Jacksonville
Jim Seaton, Ret. USMC Col
John Burr, Veteran Journalist
Shannon Blankinship, St. Johns Riverkeeper
Sarah Boren, USGBC Florida



Lahav, Sean (February 2021). "The Final Report: COJ Special Committee on Resiliency." *Northeast Florida Regional Council*. Jacksonville, Florida.

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Beth Payne, Chief Executive Officer.

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