



RESOLUTION NO. 2020-07

**A RESOLUTION OF THE CITY OF NEPTUNE BEACH  
CITY COUNCIL ACCEPTING AND ADOPTING THE  
UPDATED DUVAL COUNTY LOCAL HAZARD  
MITIGATION STRATEGY DOCUMENT**

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**WHEREAS**, the City of Jacksonville Mayor's Security and Emergency Preparedness Planning Council (SEPPC) serves as the Local Mitigation Strategy Working Group and includes representation from the City of Neptune Beach; and

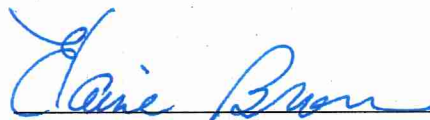
**WHEREAS**, The Duval County Local Mitigation Strategy has been updated by the LMS Strategy Working Group and Duval County Emergency Preparedness to meet federal requirements; and

**WHEREAS**, this Local Mitigation Strategy is intended to provide a strategy to mitigate dangers and costs associated with natural and manmade hazards and to provide a priority for mitigation activities before and after a hazardous event occurring in Duval County; and


**WHEREAS**, The Duval County LMS Working Group has completed an update to the Local Mitigation Strategy which has been reviewed by the Florida Division of Emergency Management and confirmed to comply with the criteria set forth by the Federal Emergency Management Agency.

**NOW, THEREFORE, BE IT RESOLVED** that the City of Neptune Beach City Council accepts and adopts the updated Duval County Local Mitigation Strategy and assigns review and maintenance responsibilities of the LMS to the Local Mitigation Strategy Working Group to be coordinated by the Duval County Emergency Preparedness Division with review and re-adoption by the City Council at least once every five years.

This Resolution adopted by the City Council of Neptune Beach, Florida, at the Regular Council meeting held this 8<sup>th</sup> day of September, 2020.

  
Elaine Brown, Mayor

ATTEST:

  
Catherine Ponson, CMC, City Clerk



# 2020

## LOCAL MITIGATION STRATEGY



## DUVAL COUNTY, FLORIDA

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## Local Mitigation Strategy Glossary

ACC	Adaptation to Climate Change
ACE	Army Corps of Engineers
CDBG	Community Development Block Grant
CHHA	Coastal High Hazard Area
CEMP	Comprehensive Emergency Management Plan
CID	Critical Infrastructure Disruption
COAB	City of Atlantic Beach
CONB	City of Neptune Beach
COJB	City of Jacksonville Beach
COJ	City of Jacksonville
CRS	Community Rating System
F	Flooding (Hazard)
FDEM	Florida Division of Emergency Management
FDOH	Florida Division of Health
FEMA	Federal Emergency Management
FMAP	Flood Mitigation Assistance Program
GIS	Geographic Information System
HCDD	Housing and Community Development Division
HIVA	Hazard Identification and Vulnerability Assessment
HMGP	Hazard Mitigation Grant Program
JEA	Electric, Water, Sewer Utility serving majority of Duval County (Not an acronym)
JPPD	Jacksonville Planning and Development Department
LMS	Local Mitigation Strategy
NWS	National Weather Service
NEFRC	Northeast Florida Regional Council
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
PDRP	Post Disaster Redevelopment Plan
RL	Repetitive Loss Property
SJRWMD	St Johns River Water Management District
SRL	Severe Repetitive Loss Property
SS	Storm Surge (Hazard)
TH	Thunderstorm (Hazard)
T	Tornado
USMC	United States Marine Corps

**Note:** In accordance with Article 1, Section 1.102 of the Charter of the City of Jacksonville, any reference made to the Consolidated City of Jacksonville/Duval County shall include the Cities of Jacksonville Beach, Atlantic Beach, Neptune Beach, and the Town of Baldwin, and collectively called the City of Jacksonville

## **SECTION I: INTRODUCTION**

### **A. Local Mitigation Strategy**

#### Purpose

The Local Mitigation Strategy (LMS) is the primary component of a statewide permanent process of community-based hazard mitigation planning. This process is implemented through a partnership between the Florida Division of Emergency Management (FDEM), the City of Jacksonville and its municipalities, local nonprofit organizations, and private sector organizations. The purpose of the LMS is to identify hazards to which the City of Jacksonville is vulnerable and then identify actions to minimize or avoid the impacts from those hazards. This unified all-hazards strategy has been developed and will be maintained by a Working Group of public and private sector officials supported by a dedicated Advisory Committee. Within the City of Jacksonville, the Security and Emergency Preparedness Planning Council (SEPPC) acts as the LMS Working Group. The Advisory Committee membership includes subject matter experts, liaisons to the municipalities within the City of Jacksonville, members of relevant state and federal agencies, regulatory commissions, military partners, public and private sector organizations, education and healthcare sector partners, and members of the general public.

The LMS Advisory Committee supports the planning process by conducting data collection, hazard analysis, and preparation of recommendations for mitigation project prioritization. The LMS will be reviewed, revised, and updated every year by the LMS Advisory Committee and approved by the LMS Working Group every five years.

The most fundamental element of this LMS is the Hazard Identification and Vulnerability Analysis (HIVA). The HIVA identifies all types of hazards with the potential to impact the City of Jacksonville, defines the vulnerabilities to each hazard, and estimates the risks associated with each hazard. Mitigation initiatives are then developed to minimize or eliminate those vulnerabilities. The LMS is a living document that is updated to integrate and reflect current and projected issues, and to track mitigation measures and actions that have been completed, are in progress, or have been deferred or abandoned.

The HIVA conducted as part of the 2020 LMS revision indicates that the City of Jacksonville is susceptible to the following natural hazards, in order of descending overall vulnerability: 1) Wind from Tropical Cyclones, 2) Severe Weather, 3) Storm Surge, 4) Extreme Heat, 5) Sea Level Rise, 6) Flooding, 7) Infectious Disease, 8) Drought, 9) Coastal Erosion, 10) Saltwater Intrusion, 11) Wildfire, 12) Winter Storms and Extreme Cold. Additionally, the City of Jacksonville is susceptible to the following technological and man-made hazards, in order of descending overall vulnerability: 1) Critical Infrastructure Disruption, 2) Hazardous Materials Accidents, 3) Improvised Explosive Devices, 4) Active Shooter Incidents, 5) Biological Attacks, 6) Cyber Attacks, 7) Terrorism and Targeted Violence, and 8) Chemical Attacks.

The top mitigation initiatives as prioritized by the LMS Working Group include retrofitting water, sewer, and electrical facilities to protect against failure caused by flooding and storm surge, hardening against wind impacts, fully implementing storm water management plans, purchasing emergency generators for municipalities, prioritizing redevelopment options prior to disaster loss, operationalizing a safety review procedure for new development, beach re-nourishment, identifying specific vulnerable facilities which need to be relocated or elevated, increasing education efforts regarding evacuation procedures, funding regional storm water retention impacts, and developing a pre-disaster plan of locating underground utilities for post-disaster installation.



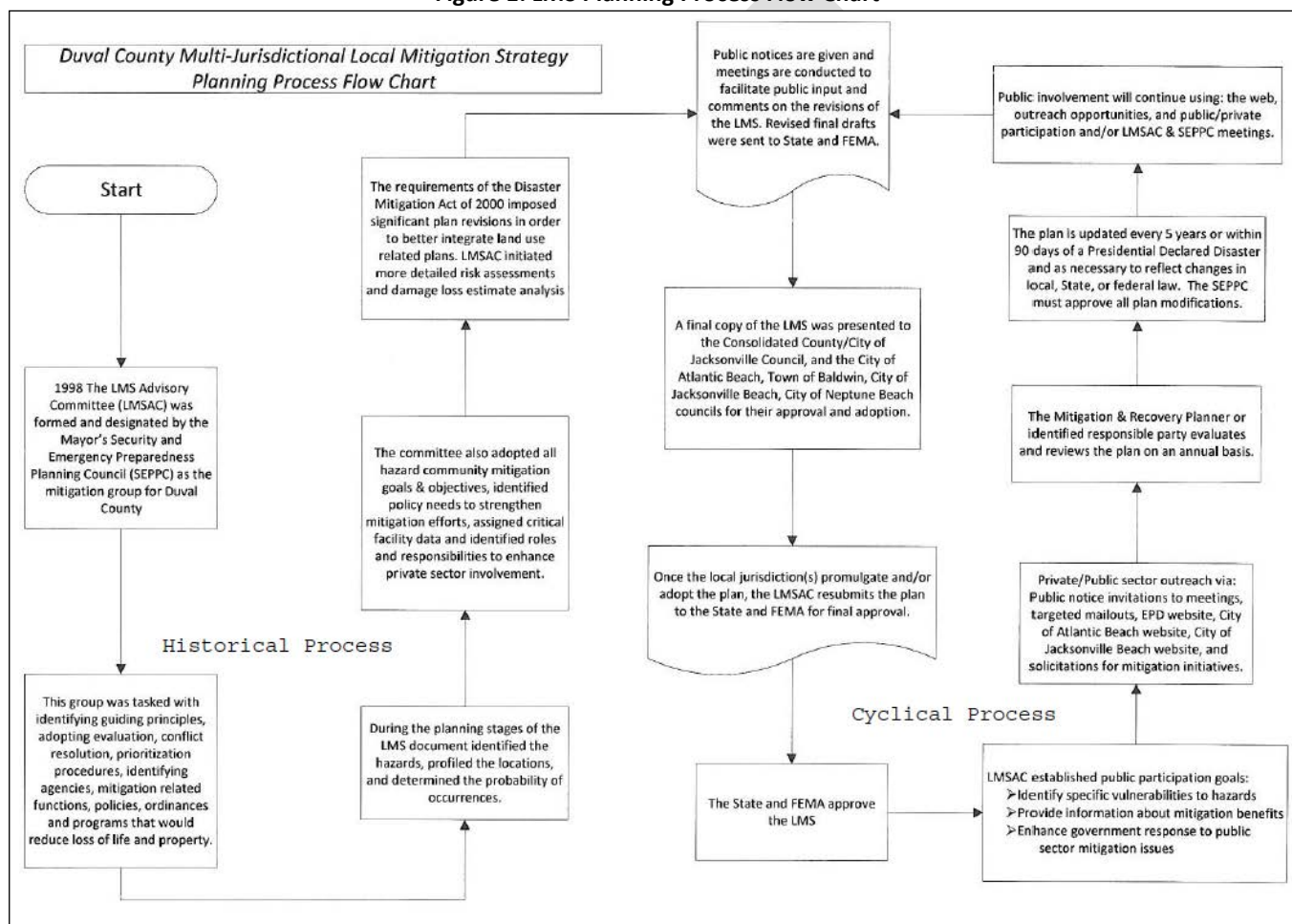
Policy changes recommended within the LMS include seeking alternative sources of funding for beach re-nourishment based on mitigation, re-prioritizing storm water management projects in light of new observations and studies, requiring a public safety review of new development, flood-proofing sewer lift stations and water wells, developing a plan for underground utilities, and adapting to climate change.

## B. Planning Process

### History/Background

The LMS Advisory Committee, otherwise known as Duval Prepares, was established in 1998. The LMS Advisory Committee was designated by the Mayor's SEPPC on September 24, 1998 as the official mitigation advisory group for the City of Jacksonville.

Figure 1: LMS Planning Process Flow Chart



## Organizational Structure

The Duval Prepares Partnership serves as the LMS Advisory Committee. The Partnership is a group of partners and programs that share the vision of making the City of Jacksonville more resilient to disaster. This group includes both public sector and private sector partners, local businesses, organizations and associations, and representatives from the five municipalities in the City of Jacksonville. This group is charged with identifying guiding principles, adopting evaluation, conflict resolution, and prioritization procedures, identifying relevant agencies and mitigation-related functions, reviewing existing mitigation policies, ordinances, and programs, and assessing their effectiveness at reducing loss of life and property. One of the principal objectives and priorities of the Partnership is to maintain the LMS document to reflect current information regarding projects, goals, and objectives for the county.

During the planning stage of the LMS document, the committee adopted all-hazard community mitigation goals and objectives, identified policy needs to strengthen mitigation efforts, assigned data and critical facility needs to committee members and identified potential data sources, and identified roles and responsibilities to strengthen private sector involvement in the LMS process. They also identified methods for disseminating project-related information to citizens.

This group meets, and will continue to meet, on a quarterly basis to discuss hazard mitigation related issues and projects, including the continual maintenance to the LMS document. The Duval Prepares Partnership recommends changes in the LMS to the Working Group, which then approves the changes to the document to make them official. This process of continuous review and update ensures that the document will remain consistent with current information. The Duval Prepares partners are members by representation of their designated agency or municipality, entities with a commitment or interest in mitigation, public and private organizations, including business, healthcare, education, and faith based partners. Members of the public can also join Duval Prepares or participate in the public meetings.

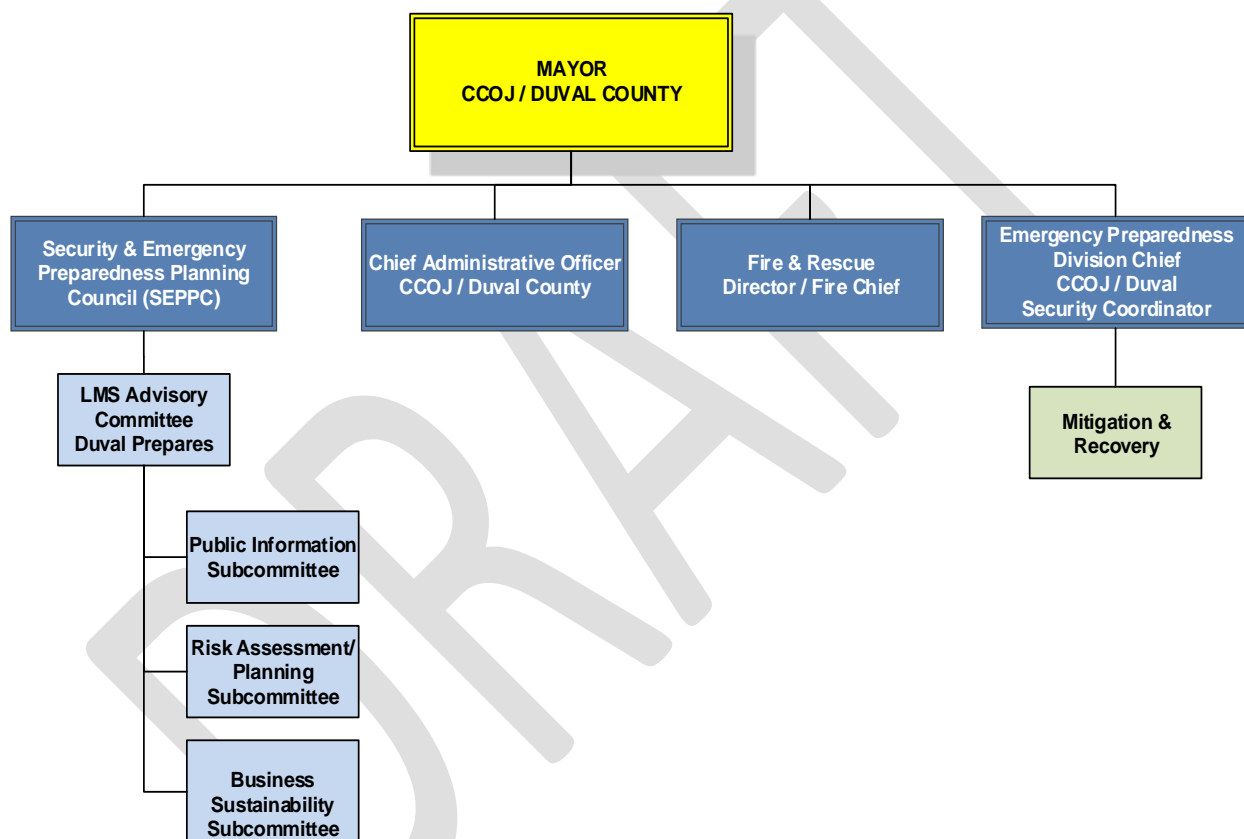
A final copy of the document reviewed and approved by Federal Emergency Management Agency (FEMA) and the State of Florida will be presented to all participating jurisdictions to the City of Jacksonville City Council, City of Atlantic Beach City Commission, Town of Baldwin Town Council, City of Jacksonville Beach City Council, and the Neptune Beach City Council for their approval and adoption. There have been no changes to the jurisdictions participating in this process since inception.

## 2015 Planning Process

The 2015 LMS update process was commissioned by the LMS Working Group, also known as the Mayor's SEPPC. This body charged Duval Prepares, the LMS Advisory Group, to furnish initial review and recommendations. On January 27, 2014, SEPPC was briefed on the update process and further details and updates on progress were given to the group on May 6, 2014. A timeline was established for each of the Duval Prepares Subcommittees, with the lead responsibilities for review and recommendation emanating from the Risk Assessment and Planning Committee, to meet and formally evaluate each section of the LMS, as required by the Local Multi-hazard Mitigation Planning Guidance, July 1, 2008 Requirements 201.6 (b0 and 201.6(c)(1), pp. 26-27).

The Risk Assessment and Planning Subcommittee was the lead review team as the subcommittee membership is comprised of each the City of Jacksonville jurisdiction’s liaisons, private sector engineering and emergency management representatives, City Planning Department planners, and Emergency Preparedness Division staff. This group has the knowledge and expertise to render valuable decisions about hazards and vulnerability analysis for the whole of the City of Jacksonville and the individual jurisdictions. For the timetable and description of meetings where the plan sections were reviewed and adopted to be forwarded to Duval Prepares and SEPPC for approval, which in turn will be sent to the State of Florida and FEMA for approval. Each of the four incorporated municipalities and the City of Jacksonville had representatives attending each of the meetings described above and are considered to be active participants.

**Figure 2: Mitigation Organizational Structure**



*Source: City of Jacksonville CEMP 2012, pg. 157*

### 2020 Planning Process

The most recent update of this document closely followed the procedures outlined during past revisions. From January 2019 to January 2020, the LMS Advisory Committee Duval Prepares and the Risk Assessment/Planning committee, met to review existing documents for hazards and vulnerabilities, provide input on completed, delayed and deferred mitigation projects, and propose new mitigation projects. The Chief of the Emergency Preparedness Division distributed letters and copies of the plan to

the SEPPC membership and key stakeholders in the City of Jacksonville. Partners for Duval Prepares met with the representatives and liaisons for each of the municipalities within the City of Jacksonville. The Emergency Preparedness Division took the information from these meetings and the interim assignments to prepare the 2020 LMS Update, which was posted for public comment twice in January 2020. During the 2020 Planning Update process, the multi-jurisdictional entities within the City of Jacksonville that participated in the planning process include:

- The City of Jacksonville
- City of Jacksonville Beach
- City of Atlantic Beach
- City of Neptune Beach
- Town of Baldwin
- Duval County as a whole, including public and private partners and the general public

#### Coordination with Counties in Northeast Florida for Input on Local Mitigation Strategy

In a highly interconnected world, the ramifications of county planning for a mitigation strategy require input from neighboring counties. Planning would also consider projects of such magnitude for impacts and consequences beyond the immediate county's borders. The City of Jacksonville solicited input via email from adjoining counties in the Florida Region 3 as delineated by the FDEM. Planning issues include, but are not limited to, roadways serving as evacuation routes throughout the region, economic development and stimulus, and developments of regional impact.

**Table 1: Northeast Florida Counties Coordination Table**

County	Date	Recipient of Request	Response
Baker	February 12, 2020	Emergency Manager	No specific comments.
Clay	February 12, 2020	Emergency Manager	No specific comments.
Flagler	February 12, 2020	Emergency Manager	No specific comments.
Nassau	February 12, 2020	Emergency Manager	No specific comments.
Putnam	February 20, 2020	Emergency Manager	Reviewed plan, no specific comments.
St. Johns	February 12, 2020	Emergency Manager	No specific comments.

### **C. Community Participation**

The public participation goal of the LMS Advisory Committee/Duval Prepares is to reach a broad representation of the City of Jacksonville's business and citizen-participant population to identify specific vulnerabilities to hazards, provide targeted information about the benefits of mitigation, and enhance government responsiveness to public sector issues. Because of the City of Jacksonville's unique governmental structure, extensive geographic area, and diverse economic base, a multi-directional effort is necessary to inform county residents about the LMS initiative and include their input and suggestions into the process.

The public's involvement is cultivated through the Duval Prepares Partnership. Business and citizen involvement in the LMS process has been accomplished using various methods. These methods include printed information disseminated through newsletters, targeted mail outs, the publication of the annual City of Jacksonville Emergency preparedness Guide, through social media, and the Emergency Preparedness Division's Web page: JaxReady.com. In addition, brief surveys targeted to specific groups of the population, such as elected officials, builders, homeowners and business owners inform about potential mitigation measures and solicit prospective mitigation initiatives. Public presentations also serve to inform both citizen and business groups in the City of Jacksonville. Citizen interests are represented by participation from the City of Jacksonville Planning and Development, an outreach and response division, which provides staff for Citizen Planning Advisory Committees (CPAC) in the six planning districts of the City, and coordinates neighborhood service issues for approximately 200 neighborhood organizations.

The Duval Prepares Partnership, the group of public and private organizations and agencies which serves as the LMS Advisory Committee, advertises meetings as open to the public. The notices are put on public display and the public is encouraged to attend and participate. This will allow the public and all other interested people to view the document. A public workshop is held prior to completion of the final LMS so that comments are gathered from the general public as well as the Advisory Committee/Duval Prepares, and the Working Group members who are consistently involved. The public is invited and encouraged to attend Duval Prepares meetings that are held regularly, and encouraged to discuss any hazard mitigation issues in addition to the procedural LMS update process. Duval Prepares agendas include place and time for public comment in order to get comments, questions and suggestions from those in attendance. During the 2020 LMS Update process, each Duval Prepares quarterly meeting and subcommittee meetings were posted for public notice to invite community participation into plan review and project recommendations.

The Duval County LMS Risk Assessment Subcommittee devised a public Mitigation Survey to solicit feedback from the public regarding both their prior experience and perceptions regarding mitigation within Duval County. The survey consisted of 22 questions, with 16 substantive questions and 5 demographic questions. Information regarding the survey, including a direct URL and a QR Code were included in the 2019-2020 City of Jacksonville Emergency Preparedness Guide, which was mailed directly to every postal mailing address on file with the United States Postal Service in Duval County. The number of addresses exceeded 418,000. In addition to including the information and link in the Preparedness Guide, flyers were posted at branches of the Jacksonville Public Library system over the summer of 2019. Additionally, staff from the Emergency Preparedness Division attended several meetings of the local CPAC and delivered brief presentations explaining the LMS and advised of the ongoing mitigation survey. The results of this survey aligned very closely with expectations of the Risk Assessment Subcommittee, and were considered during revision of the LMS Goals and Strategies, as well as during project formulation. Several survey respondents requested projects that would fund public education and awareness campaigns; this will provide momentum to accomplish several public education projects, which are included in the project list. A summary of the results is detailed below, and further details can be found in **Appendix A: Mitigation Survey Results**.

According to the Survey, nearly 80% of respondents had directly experienced one of the hazards listed in the LMS within the past five years. Responders were most concerned about Tropical Cyclones, followed closely by Climate Change and Flooding. Respondents were least concerned about Earthquakes, Industrial Accidents, and Tsunamis. These results directly align with the results of the HIVA conducted as part of the LMS. The majority of respondents had received some information regarding natural hazard preparedness and mitigation within the past year. The respondents claimed to trust government agencies the most to provide credible information. Hospitals, Bridges, and Public Safety Infrastructure were found to be the



most important community assets, while City Hall (and other government infrastructure), Museums and Historic Buildings, and Major Employers were found to be the least important community infrastructure with regard to protection from hazards. Respondents most strongly supported the prohibition of new development in hazard-prone areas as a regulatory action to reduce risk to hazards within the community. Respondents prioritized the protection of critical infrastructure (public safety and healthcare facilities), protection of utilities, and protection of private properties as goals for mitigation efforts within the community as mitigation goals for the community. For graphs and tables illustrating the full survey results, please see **Appendix A: Mitigation Survey Results**.

## D. Private Participation

Both business and citizen interests are represented on the LMS Working Group through the Advisory Committee/Duval Prepares. Business representatives include economic development organizations, such as the Jacksonville Chamber of Commerce, and specific key economic interests. In addition, a business representative on the Working Group through the Advisory Committee is the president of the Northeast Florida Chapter of the Association of Contingency Planners and serves as a liaison to the members of that organization who represent some of the larger employers in the area. The extensive list of partners in the Duval Prepares Partnership includes:

### LMS Advisory Group Organizations:

AECOM Engineering	DMS Recovery	Lutheran Social Services
American Red Cross of North Florida	Dostie Homes	Marine Corps Support Facility Blount Island
AT&T	Duval County Health Department	Mayo Hospital Jacksonville Sheriff's Office
Atlantic Beach Police Department	Duval County Public Schools	National Weather Service JAX
Building Inspection Division	Duval County School Police	Naval Air Station - Jacksonville
Memorial Hospital – Jacksonville	Eisman Russo	Naval Station – Mayport
City of Atlantic Beach	Emergency Preparedness Division	Neptune Beach Police Department
City of Jacksonville (COJ)	Feeding Northeast Florida	Northeast Florida Regional Council
City of Jacksonville Beach	Fleet Architects	Prudential
COJ Community Development Department	Florida Blue	St. Johns River Keeper
JAXPORT	Florida Department of Transportation	St. Johns River Water Management District
Jacksonville Transportation Authority	Florida Forestry Services	State Farm Insurance Company
City of Jacksonville - Neighborhoods Department	Gate Petroleum	Town of Baldwin
COJ Department of Parks & Recreation	Heartland Hospice Care	United States Army Corps of Engineers
COJ Department of Public Works	Jacksonville Aviation Authority	USCG - Sector Jacksonville
COJ Department of Risk Management	Jacksonville Beach Fire Department	US Navy - Region Southeast Command
COJ Emergency Preparedness Division	Jacksonville Fire and Rescue Department	United Way of North East Florida
COJ Neighborhoods Department	Jacksonville International Airport	United Way of Northeast Florida
COJ Planning and Development Department	JAX Chamber	University of Florida
City of Neptune Beach	JEA	University of North Florida
Comcast	Langton Consulting	US Army Corps of Engineers
Department of Homeland Security	LISC	Wells Fargo

### LMS Working Group Organizations:

American Red Cross of North Florida	City of Jacksonville Office of the Mayor	Florida State College Jacksonville
Ascension St. Vincent's Riverside / Southside	COJ Medical Examiner's Office	Jacksonville Fire and Rescue Department
Baptist Medical Center Southside	COJ Neighborhoods Department	Jacksonville International Airport
Baptist Medical Center –Beaches	COJ Public Works	Jaxport
Baptist Medical Center Downtown	City of Jacksonville Beach	Marine Corps Support Facility Blount Island
City of Atlantic Beach	City of Neptune Beach	Memorial Hospital – Jacksonville
City of Jacksonville City Council	Department of Homeland Security	Salvation Army
Jaxport	Duval County Public Schools	Town of Baldwin
JEA	Elder Source	UF Health – Jacksonville
Jacksonville Transportation Authority	Florida House of Representatives	University of North Florida

Meetings are held quarterly, and motions are taken at the meetings for the business brought to the group for discussion, review, input and action. At this time, the Duval Prepares partners are not subject to mandatory attendance at the meetings and meeting quorum is established by a simple majority. Decisions at the Advisory Committee level regarding actions and recommendations for project prioritization are advanced to the Mayor's SEPPC for ratification and approval prior to advancing the action/project to the appropriate City Council or Commission body, or the State or Federal agency.

Prior to each meeting, a public notice is posted on the City of Jacksonville Emergency Preparedness Division's website and posted at the City Council chambers, where meetings are generally held. In addition to posting the notice of each meeting in a public location to notify members of and the general public, an email is also sent out to every member of the Advisory Committee prior to the meeting to provide them with an invitation. Efforts are also continuously being made to recruit new members into the Duval Prepares group. As new groups, businesses, organizations, and individuals decide to participate in the meetings, their names will be added to the email list to notify them of upcoming meetings as well.

### **E. Use and Incorporation of Existing Documents**

During the initial planning process the LMS Advisory Committee members were asked to study existing policies, ordinances, plans, and programs of the county, its associated municipalities and related regional, state and federal agencies that support hazard mitigation in the City of Jacksonville. Members were asked to score each issue area based on the ability to support and enhance mitigation activities in the City of Jacksonville. During this process, goals, objectives and policies in existing documents of the county, associated municipalities, and regional, state and federal agencies were reviewed and incorporated in to the LMS to help determine the effectiveness of existing items and identify the gaps. Documents that were reviewed for hazard mitigation related information included: The City of Jacksonville Ordinances, Floodplain Management Plan, Community Rating System (CRS) Plan, Town of Baldwin Comprehensive Plan, Growth Management Task Force Report, Florida Administrative Codes, City of Jacksonville Comprehensive Plan, City of Jacksonville Flood Map Modernization Plan, City of Jacksonville Beach Comprehensive Plan, City of Atlantic Beach Comprehensive Plan, City of Neptune Beach Comprehensive Plan, Storm-water Management Plan, Land Development Regulations, Comprehensive Emergency Management Plan (CEMP), Hurricane Preparedness Plan, Emergency Operations Plan, Florida Statutes, Florida Building Codes, City of Jacksonville Zoning Code, Hurricane Evacuation Traffic Management Plan, FEMA Comprehensive Plan, and the Northeast Florida Regional Council (NEFRC) Hurricane Evacuation Study 2013 and Post Disaster Redevelopment Plan.

This compilation of information is under continual review and revisions. Often programs, policies, and goals change, and these changes will be reflected in the LMS when it is updated. This assures that the information in the LMS is the most current and applicable to the efforts of the hazard mitigation initiatives. Additionally newly written and adopted plans will be reviewed when they become available and applicable policies and other items will be incorporated into the plan when deemed necessary. Currently, according to FEMA, the Cities of Jacksonville, Atlantic Beach, Jacksonville Beach, and Neptune Beach and the Town of Baldwin are all active participants in the National Flood Insurance Program (NFIP). There is an ongoing process to keep this section of the LMS updated and current with recent plans, studies, and technical reports.

### **F. Incorporation of LMS into other Documents**

Through the process described above, existing documents, such as the CEMP and other City of Jacksonville Plans, were reviewed during their update cycles to integrate language pertinent to the LMS. In doing this, the Advisory Committee was able to identify ways that existing documents can be strengthened, and

identified any gaps in existing policies, implementation of those policies, enforcement, or conflicts between policies. In this way, the principles and goals of the LMS are able to be incorporated into existing documents by identifying sections of these overarching and related plans where the LMS can be incorporated in order to adequately address hazard mitigation issues.

Current mitigation initiatives include projects arising from the CRS plan and the annual community outreach activity, which incorporated mitigation of repetitive loss and severe repetitive loss properties with \$1,000 to \$5,000 in damage claims for building and contents as submitted to the NFIP. These mitigation projects are to elevate, acquire or relocate repetitive loss properties and most of them are located within the Repetitive Loss Areas identified by the City of Jacksonville CRS Plan.

**Table 2: LMS Jurisdictional Plan Incorporation**

LMS Incorporation into Plans as of 2020 Matrix		
<b>Jurisdiction</b>	<b>Incorporation of LMS into Comprehensive Plan</b>	<b>Incorporation into other Planning Document</b>
City of Jacksonville	Yes	City of Jacksonville CEMP Post Disaster Redevelopment Plan
City of Jacksonville Beach	Yes	
City of Atlantic Beach	Yes	
City of Neptune Beach	Yes	
Town of Baldwin	Yes	

## **G. New Strategies for Mitigation and Resilience**

The City of Jacksonville's strategic approach to mitigation is part of a larger resiliency initiative aligned with the most current practices to transform the future of our city into a stronger and safer community. These efforts will address the physical, social, and economic challenges that 21<sup>st</sup> century cities are increasingly facing.

The City of Jacksonville supports the adoption and incorporation of a view of resilience that includes not just the acute shocks that are typically identified and analyzed in a LMS— hurricanes, fires, floods, etc. — but also the chronic stresses that weaken the fabric of a city on a day-to-day or cyclical basis. Examples of these stresses include urban blight, homelessness, insufficient public transportation systems, or endemic violence. By addressing both the shocks and the stresses, a community becomes more able to respond to adverse events, and is overall better able to deliver basic functions in both good times and bad, to all populations. This document reflects the view of “community resilience” as the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow despite the chronic stresses and acute shocks they experience.

### Adaptation Action Area Working Group

Pursuant to Section 163.3177(6)(g)(10) Florida Statutes, the City has adopted an Adaptation Action Area (AAA) designation that is based on a medium range impact of a two-foot rise in sea level by 2060. The AAA is a policy tool that facilitates consideration of the potential for impacts related to sea level rise, designates vulnerable areas, and prioritizes adaptation strategies as deemed appropriate. An AAA Working Group was been established in 2019 to review existing City programs and policies in relation to the AAA and to determine the need and appropriate timing for additional and financially feasible responses to the effects of coastal flooding within the AAA. The goal of the AAA Working Group was to evaluate the City's existing programs and policies in relation to the 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. The Working Group's Tasks included:

#### **TASK 1: Identify the Impacts of Coastal Flooding within the AAA**

- Define the condition of, and affects resulting from, coastal flooding within the AAA.
  - At a minimum, considerations should include population, critical infrastructure, natural resources, and economic impact.

#### **TASK 2: Evaluate the City's Existing Programs and Policies**

- Examine the strengths, weaknesses and opportunities of the City's existing policies and regulations in relation to the AAA.
  - The review may include, but is not limited to, drainage regulations and infrastructure, flood zone regulations, land use policies, and zoning regulations.

#### **TASK 3: Recommendations**

- Based on the findings of Task 2, recommend policy and regulatory changes deemed necessary and appropriate to protect private and public investment within the AAA.
  - Recommendations should include, but may not be limited to, additional and financially feasible actions/initiatives regarding to the

The complete findings of the AA Working Group are included in **Appendix C**.

### City of Jacksonville Storm Resiliency and Infrastructure Development Review Committee

The City of Jacksonville Storm Resiliency and Infrastructure Development Review Committee (SRAIDRC) was formed in response to recommendation of the Jacksonville Waterways Commission (August 2018). The SRAIDRC was charged 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.”

The SRAIDRC held bi-weekly meetings from February 15, 2019 – June 7, 2019. The committee was comprised of members of the City of Jacksonville, FEMA, JEA, and the US Navy. Additional liaisons from COJ, FDEP, SJRWMD, USACE, FEMA, and JEA also contributed during the course of the process. Highlights, challenges, and the official Committee Response are captured in the SRAIDRC final presentation, which is included in its entirety as *Appendix D* of this document.

### Conflict Resolution

Realizing that conflict is inherent in political interaction and inevitable in policy making and resource allocation decisions, and recognizing the diversity of perspective represented by its members, the LMS Advisory Committee agreed to resolve all conflicts in policy, procedures and issues based on the following group values:

- The guiding principles, goals, and objectives adopted by the Advisory Committee will guide all decisions.
- All decisions will be ultimately resolved by democratic rule.
- All Advisory Committee representatives will have equal input into the process.
- Each Advisory Committee member will acknowledge and respect differing points of view.
- Decisions on resource allocation will be based on project criteria to be established by the Advisory Committee.
- Each Advisory Committee member recognizes the importance of showing community consensus to potential funders/grantors.

The conflict resolution process adopted by the Advisory Committee will be a three level process, utilizing a combination of personal and intergroup communication skills, and a model based on the “Regional Dispute Resolution Process”, established by the Florida Legislature as part of the 1993 Environmental Land Management Study legislation to facilitate intergovernmental problem-solving. This model is currently used by the NEFRC and offers a reasonable approach to solving public problem. It provides a forum to cooperatively resolve issues and differences between local governments and private interests in a timely, informal and a cost-effective manner. This process was amended in 2009 to make it mandatory to use the Regional Council for mediation in some cases involving planning and growth management. The Advisory Committee will use this approach in an effort to voluntarily resolve disputes, and will use the Regional Planning Council process when required by statute or when deemed necessary by the Advisory Committee (*Source: NEFRC document, Conflict Resolution Clay County LMS, and SB360er Section 3 amendments to Section 163.177, Florida Statutes*).



**Table 3: Regional Dispute Resolution Process**

<b>Level I: Communication/Cooperation</b> Emphasis on personal communication and listening skills, focusing on over-all project goals and objectives.
<b>Level II: Consensus-Building/Facilitation</b> Formal intergroup process to achieve mutual consensus. The process is based on a settlement meeting at which disagreeing parties explain their interests, explore options and seek a mutually acceptable agreement. Most issues are expected to be resolved at this level, but if a solution is not reached additional settlement meetings can be held. Disputes and conflicts that cannot be resolved at this level can be escalated to mediation.
<b>Level III: Mediation</b> Formal technique using a trained, neutral third party to guide the dispute resolution process. If a solution is not reached following this procedure, the issue will be resolved through democratic rule with a 2/3 majority vote of the Working Group.

The over-all goal of the conflict resolution process is to emphasize direct communication as a means of controlling outcomes and quality. Saving time and money, and reaching mutually beneficial solutions.

## **H. Evaluation Process**

The LMS is not a static document, but is subject to redefinition and alteration over time, although this process for evaluating and updating the LMS has remained consistent over the life of the plan. Structured periodic assessments of the ability of the LMS to meet its goals will be conducted with broad input from all stakeholders and will assist policy-makers and the public in learning whether mitigation activities and policies are reducing future damages and whether such benefits match or exceed the costs. Evaluation mechanisms may include:

- Broad-based, structured self-assessments of progress in implementing the Strategy;
- Periodic surveys of the customers of mitigation programs, through concise, easily understood survey instruments;
- Review of annual mitigation expenditures in public and private sector projects and programs, and
- Assessment of the ability of the Strategy process to maximize benefits and enhance resources.

### Evaluation

The Evaluation Procedures and Review Process adopted by the Advisory Committee are incorporated in the Local Mitigation draft ordinance and implemented under the Local Mitigation Strategy. The City of Jacksonville LMS Advisory Committee bases its evaluation of the LMS on the following criteria:

- Supports LMS goals and objectives;
- Maintains opportunity for participation from all stakeholders;
- Considers all relevant new or intensified hazards, which may affect local vulnerabilities to population, property and/or environment;
- Incorporates new technologies and information that may enhance or improve the mitigation effort;
- Demonstrates far-reaching, cost-effective use of limited resources, develops new resources, and encourages coalition-building and partnerships to maximize resources; and,
- Encourages individual, family and private sector participation and involvement.

### Recommended Components of the Evaluation Process

- Designated responsible agency
- Ongoing communication
- Notification of funding cycles/solicitation of projects
- Collection of projects; coordination of potential funding sources
- Plan/project analysis
- Plan/projects forwarded for approval
- Approval process monitored
- Projects recycled
- Planning, study, revision

### Annual Evaluation Procedures

Both Duval Prepares and the Mayor's SEPPC meet quarterly to review grant cycles and post-disaster grant opportunities. The LMS is reviewed annually against update manuals provided by FEMA, the FDEM, Emergency Management Accreditation Program (EMAP) standards, CRS Coordinator's Manual, the National Mitigation Framework, and any other relevant guidance.

## **I. Review and Maintenance**

The LMS will be reviewed a minimum of every five years by the Advisory Committee, and changes and updates must be approved by the SEPPC. Review and maintenance of the 2020 LMS Plan Update will continue to be implemented by the Working Group with assistance from the Emergency Preparedness Division. Review of the LMS will include the hazard identification and vulnerability element, the guiding principles element, the goals and objectives element, and mitigation initiatives element. Other elements will be reviewed as determined by the Working Group or the Emergency Preparedness Division and Duval Prepares as necessary.

### Monitoring of the Plan

Monitoring of the 2020 LMS Update resides with the City of Jacksonville Emergency Preparedness Division on behalf of the LMS Working Group and the LMS Advisory Group. The implementation of the LMS is a multi-faceted initiative among local government, business, industry, and county jurisdiction residents. Each of these entities can ensure mitigation is undertaken effectively to reduce the potential for property loss or personal injury as a result of a disaster. The City of Jacksonville currently utilizes comprehensive land use planning, capital improvements planning, and building codes to guide and control development in the County. Upon adoption of the LMS Update, these existing mechanisms will have hazard mitigation strategies integrated into them. The 2020 LMS sets forth six guiding principles, and six goals, with multiple objectives, for the county and jurisdictions as achievable benchmarks. Several of the goals required action through enhanced regulations, building code revisions, ordinance review and updates, and infrastructure improvements to reduce vulnerability to specific hazards.

During the interim between the adoption of the 2020 LMS and the 2025 LMS Update, Duval Prepares, the LMS Advisory Committee, will continue to review the plan and current mitigation initiatives on an annual basis. The quarterly meeting held in August has been accepted as the LMS maintenance meeting. Mitigation projects are continuously adopted as identified and removed as they are completed, rather than waiting to the end of the five-year review period.

## **J. Continued Public Participation**

The Duval Prepares Partnership is always seeking to involve more businesses, non-profits, and citizens in disaster preparedness and hazard mitigation planning. Future review, evaluation, maintenance and updates of the LMS will involve the public by continuing to post notices of the Advisory Committee meetings, seeking out new ways to educate, inform and involve the public, and making the LMS available through the Duval Prepares webpage on the City of Jacksonville Emergency Preparedness Division website. Any opportunity that arises to provide the public with information on hazard mitigation and the mitigation strategy via seminars, outreach, or workshops will be incorporated through the Duval Prepares scope of work.

## **K. Geographic Information**

The analysis of potential hazards is the basic component of any community's CEMP. A comprehensive understanding of the community's geography, demographics, and land use trends is essential to be able to minimize the possible loss of life, human suffering, and damage to public and private property associated with major natural or man-made incidents. The information developed can provide the City of Jacksonville's emergency managers with a tool, which can be used to identify those hazards that require an organized response to properly manage related activities, so that needed priorities and actions can be established.

The hazards analysis involves not only knowledge of the kinds of hazards to which the City of Jacksonville is subjected, but also specific estimates of population and property at risk from a particular hazard. When this measure of vulnerability, reflecting a worst-case situation, is combined with available hazard information, the community can estimate the frequency and extent of damage and the areas and persons affected. This combination of factors is the key to determining if present capabilities are adequate for mitigating, preparing for, and responding to an emergency, and if found inadequate, identifying procedures needed to upgrade these capabilities.

### Geographic Characteristics

The City of Jacksonville is located in the northeast corner of the State of Florida, approximately ten miles from the State of Georgia. The City of Jacksonville comprises 850.27 square miles (i.e., 544,175 acres). It measures approximately 40 miles from east to west at its widest extent, and 33 miles from south to north. The highest elevation in the City of Jacksonville is 40 feet above sea level. This elevation is found in the extreme southwest corner of the county. From that point, the land surfaces gently slope eastward toward the ocean. The county is characterized by low level coastal plains, interrupted by a series of ancient marine terraces. These terraces, or ridges, have been modified by stream erosion (*Source: Jacksonville Planning and Development Department, JPDD*) (*Source: USGS, 2019*).

The major geographical feature of the county is the St. Johns River, which splits the county into two unequal parts. The St. Johns, its tributaries, and the Nassau River control drainage in the western, northern, and central portions of the county. The eastern part of the County is dominated by numerous brackish streams that empty into Pablo Creek (the Intracoastal Waterway) or directly into the Atlantic Ocean. Of that acreage, 47,535 acres of the City of Jacksonville's area, or almost 9 percent, is inland water (*JPDD*).

A considerable amount of the City of Jacksonville is comprised of freshwater marshes and swamps along with salt marshes. The freshwater wetlands are found in conjunction with the creeks and stream valleys in the southeastern, western, and northern portions of the county and in isolated pockets in the western sector. Salt marshes are found in the St. Johns and Nassau River valleys in the northeast part of the City.

### Existing Land Use Characteristics.

The City of Jacksonville has developed over the past 200 years from a crossing at the St. Johns River on the Kings Road from Georgia to St. Augustine into a sprawling, diversified community. Urban development originated in 1822 when the site of Jacksonville was first surveyed and formally organized. Duval County was created in the same year, with Jacksonville designated as the county seat. The settlement was originally established to service the traffic crossing the river, but soon became a center of river-borne traffic into the state's interior. Developments spreading along the St. Johns River, such as Chaseville, New Berlin, Mayport, and Mandarin, were linked by the river. The advent of railroads into this area spurred further development, especially with the crossing of the St. Johns. The City of Jacksonville became a tourist destination in the late 1800's, as well as a terminus for tourists proceeding up river to interior resorts, such as Green Cove Springs and Switzerland. A railroad line was built to Pablo Beach (now Jacksonville Beach), establishing a new corridor of development from the South Jacksonville area to the beach.

As Jacksonville became a railroad and water traffic hub, commercial and industrial development spread along these avenues of commerce. Major commercial and industrial activity is now found radiating from the original center of Jacksonville along major railroads and highways as well as northward along the St. Johns towards the Atlantic Ocean.

Residential development often followed this commercial and industrial growth, but not entirely unique to our area, major residential satellite developments grew up in remote areas of the county. Areas such as Arlington, Mandarin, Ortega and the Beaches grew, attracting supporting commercial uses, and have grown to where today these and numerous other once-outlying areas now make up the unified urban fabric of the City of Jacksonville.

### Surface Water System

Headwaters of the St. Johns River are located in a marsh area west of Fort Pierce in St. Lucie County, more than 300 miles from the river's mouth at Mayport. Over these 300 miles, the drop in elevation is only about 25 feet. Of this 25 foot drop in elevation, approximately 20 feet occur during the river's first 90 miles. For this reason, the river has the appearance of a vast lake often with indiscernible flow.

Tidal conditions are clearly evident near the St. John's River's mouth in the City of Jacksonville. The drainage area of this vast river encompasses 8,850 square miles (USGS, Water Quality Watch), well beyond the borders of the City of Jacksonville. Due to the extremely flat terrain, high evapotranspiration rates, and variable freshwater flows, these tidal variations are also experienced as far upriver as Lake George (Volusia/Putnam Counties), 115 miles from the river's mouth. Tidal effects have been recorded as far as 161 miles upstream at Lake Monroe (Volusia/Seminole Counties) under combined conditions of extreme drought and high tide conditions. From Lake George north to the Atlantic Ocean, the river's flow normally reverses with the change in the tide.

The average discharge of the St. Johns River at its mouth is estimated at 8,300 cubic feet per second (CFS). Reversal of flow by tidal action causes upstream and downstream flow at Jacksonville to reach 130,000 CFS. At the St. Johns River entrance, flood tides (incoming tides) with average velocities of 1.9 knots and ebb tides (outgoing tides) with average velocities of 2.3 knots occur. This changing direction of flow in the St. Johns River occurs throughout the county area. However, at Mandarin Point, essentially opposite Orange Park (Clay County), average flood tide and ebb tide velocities are diminished to 0.6 and 0.7 knots, respectively. The capacity of the main stem of the St. Johns River to store water is tremendous owing to the great width of channel in the reach between Palatka and Jacksonville, the low hydraulic gradients, and flood plain which in places is more than ten miles wide. Storm water is held in storage for long periods before being discharged to the ocean.

### Flood Plain Areas

Extensive flood plain areas exist in the City of Jacksonville due to the slight elevations of land above sea level and the relatively flat topographic relief of the land surface. Flood plain areas exist around the St. Johns River and its tributaries as well as around the coastal lagoon and salt marsh system. In addition to flood plains surrounding large water bodies and their tributaries, there are large areas within the county's interior which experience periodic flooding. These flood prone areas are generally the result of flat, poorly drained land where accumulated rainfall runs in a sheet flow or ponds on the surface.

The City of Jacksonville experiences its most severe flooding when heavy rainfall is accompanied by a rise in sea level due to a storm surge or wind and wave set-up. Hurricanes and prolonged or severe northeasters are the predominant causes of such flooding which can be greatly exaggerated when occurring during one or more periods of high tide. However, even in less severe events such as tropical storms or localized thunderstorms, rainfall alone can, and has, caused flooding. Significant events that demonstrate the vulnerability to this hazard are the declared disasters for Tropical Storm Fay (2008), Tropical Storm Debby (2012), Hurricane Matthew (2016), Hurricane Irma (2017), and Hurricane Dorian (2019). As the City of Jacksonville has significant percentages of older housing not built to current building codes, coupled with housing built before the FEMA flood maps were drawn, and an extensive tree canopy, even a severe thunderstorm and its rainfall can result in flooding for certain areas throughout the City of Jacksonville.

### Flood Hazard Areas

Major flood hazard areas exist along the Intracoastal Waterway and adjoining creeks and salt marshes. Inland to the west, a flood zone of similar size and shape exists from just above McCormick Road south of Fort Caroline to past Beach Boulevard. Although large portions of land east of the Intracoastal Waterway are outside of the 100-year flood zone, the entire Beaches Municipalities (Beaches) are susceptible to flooding from coastal storms. Low-lying areas adjacent to water bodies or areas of high surface runoff are generally at risk. Most of the areas along these waterways are developed for residential uses.

The majority of the land bounded by Southside Boulevard on the west, Hodges Boulevard to the east, J. Turner Butler Boulevard to the south, and Beach Boulevard on the north, is within the flood hazard area. Much of this area is wetlands. An extensive 100-year flood hazard area exists south of J. Turner Butler Boulevard, west of Southside Boulevard and northeast of U.S. 1.

Another large flood hazard area exists between Hood and Losco Roads in Mandarin. Perhaps the largest continuous flood hazard area occurs in the relatively undeveloped southeast corner of the City of Jacksonville. The large wetland area drains southwestward toward Durbin Creek and northeastward toward Pablo Creek. Pablo Creek has an extensive flood plain area that drains much of the land surrounding the University of North Florida, from Mill Dam Branch to Cedar Swamp Creek. Julington Creek forms a major flood plain area in conjunction with its tributaries. Several low areas along the St. Johns River in the Southeast District would be flooded by a 100-year flood. The northern part of the City of Jacksonville is heavily influenced by the St. Johns River, Nassau River, and Atlantic Ocean, being heavily dissected by many tributaries and branching creeks along which flood hazard zones exist. Aside from the highest uplands and barrier island ridges, a majority of all land east of Dames Point falls within the 100-Year Flood Hazard Zone.

The Nassau River and Intracoastal Waterway are surrounded by extensive marsh lands which are all at risk of flooding. Thomas Creek's flood plain borders the county boundary on the northwest. Flood hazard zones of irregular size and shape are scattered over the entire district.

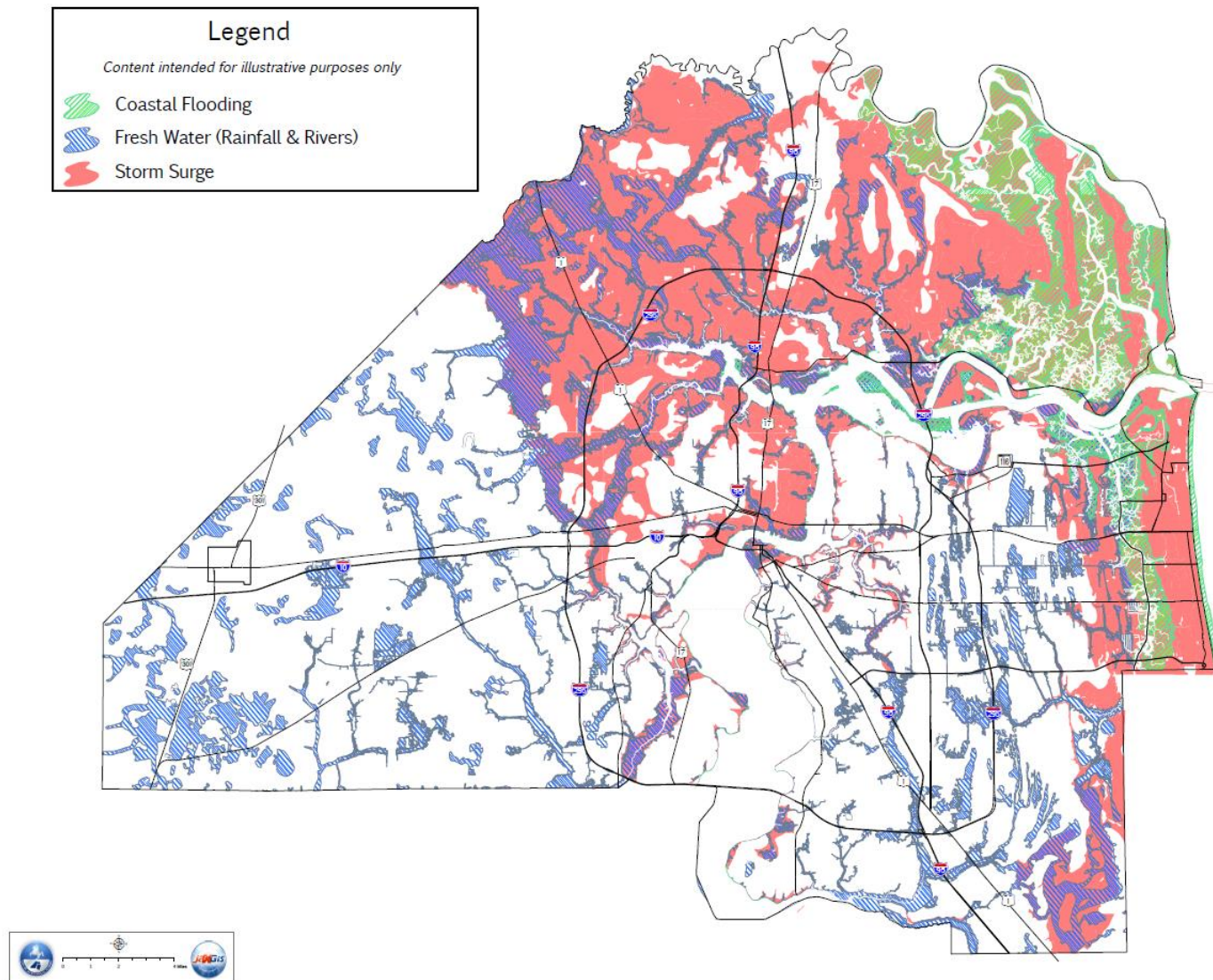
The Cedar River, Sawmill Creek, and Ribault River comprise the main flood plain area in the northwest

part of the City of Jacksonville. Isolated parcels of flood hazard areas can be found; however, most of the western part of the City of Jacksonville is of relatively high elevation.

The Southwest part of the City of Jacksonville contains some of the highest elevations in the county, yet there are extensive flood hazard zones west of Yellow Water Creek. McGirts Creek and the Ortega River form a major flood plain area that extends from Old Plank Road southeast to the Clay County line then curves toward the northeast where it meets the Cedar River and then enters the St. Johns River. **Figure 3** depicts flood hazards from various types of flooding, both freshwater and from the ocean.

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**Figure 3: Flood Hazard Areas in Duval County**



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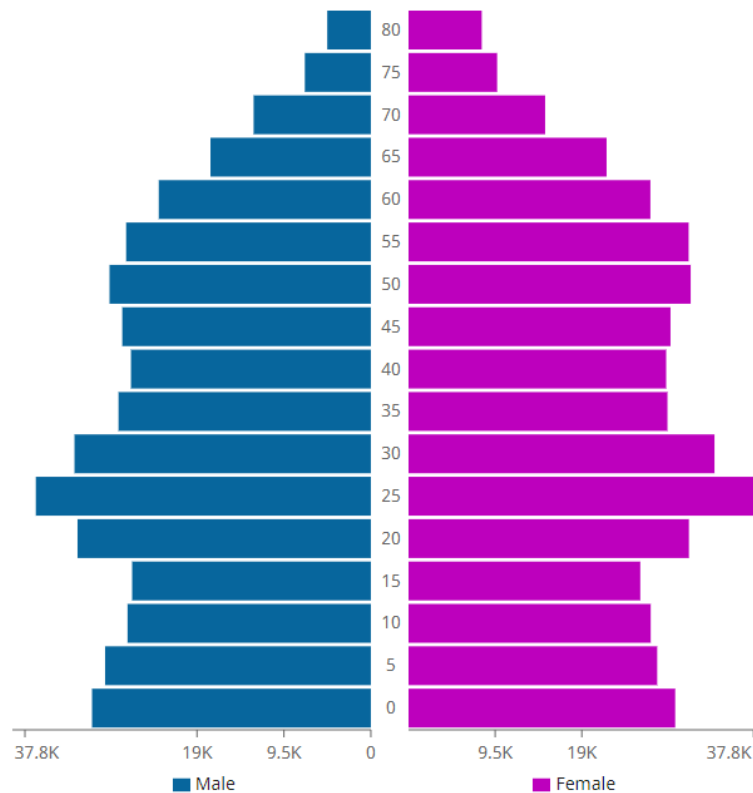


## L. Demographics

The population of the City of Jacksonville is distributed primarily along the St. Johns River radiating out from the downtown area. In the last ten to fifteen years, the area between Southside Boulevard and the Beaches have been developed with residential land uses averaging three to four dwelling units to the acre. The Beaches are nearly built out and with a combined total of close to 50,000 people.

The overall distribution of population by planning district can be seen on the following table. The age distribution chart that follows shows that by far the majority of the population is less than 65 years old. The estimated population of the City of Jacksonville in 2017 was 912,043; of which 469,928 (51.5percent) are females and 442,115 (48.5 percent) are males. Of the total, 23.1 percent of the population were under 18 years and 13 percent were 65 years and older. Data has been collected from the 2017 American Community Survey, which is the most recent survey available at the time this plan is being updated.

**Figure 4: Approximate Age Distribution of People in the City of Jacksonville**  
**Jacksonville Population Pyramid 2019**



Source: <http://worldpopulationreview.com/us-cities/jacksonville-population/>

Adapted from US Census 2017 ACS 5-Year Survey (Table S0101)

**Table 4: The City of Jacksonville Population Density and Distribution**

<b>Linear by Planning District</b>									
	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2006</b>	<b>2011</b>	<b>2016</b>	<b>2021</b>	<b>2026</b>	<b>2031</b>
Urban Core	56,295	46,622	42,635	43,569	46,636	49,708	52,702	55,495	57,989
Arlington	110,286	147,927	186,072	209,557	224,310	239,088	253,487	266,921	278,919
Southeast	95,753	146,175	195,721	229,088	245,215	261,371	277,112	291,798	304,914
Southwest	102,861	122,527	133,867	161,790	173,180	184,589	195,706	206,078	215,341
Northwest	142,317	132,584	128,848	139,069	148,860	158,667	168,223	177,138	185,100
North	33,408	39,395	48,474	67,025	71,744	76,470	81,076	85,373	89,210
Beaches & Baldwin	30,083	37,741	43,262	41,094	43,987	46,884	49,708	52,343	54,695
<b>Totals</b>	<b>571,003</b>	<b>672,971</b>	<b>778,879</b>	<b>891,192</b>	<b>953,932</b>	<b>1,016,778</b>	<b>1,078,014</b>	<b>1,135,147</b>	<b>1,186,169</b>

Source: U.S. Census Bureau 2017, Florida Office of Vital Statistics, City of Jacksonville Planning and Development

**Table 5: Demographic Description of the City of Jacksonville's Population**

<b>Characteristic</b>	<b>Estimate</b>	<b>Percent</b>	<b>U.S. Avg.</b>
Total population	912,043	N/A	N/A
Male	442,115	48.5	49%
Female	469,928	51.5	50.8%
Median age (years)	36	N/A	37%
Under 5 years	61,722	6.8	6.1%
18 years and over	704,409	77.2	76%
65 years and over	118,638	13	15.6%
White	578,523	63.4	76.6%
Black or African American	285,314	31.3	13.4%
Hispanic or Latino (of any race)	81,639	9.0	18.1%
American Indian and Alaska Native	1,956	0.2	1.3%
Asian	42,206	4.6	5.8%
Native Hawaiian and Other Pacific Islander	850	0.1	.2%
Some other race	16,790	1.8	5%
Two or more races	29,416	2.9	2.7%
<b>Social characteristics</b>			
Population 21 years and over	670,368	73.5	N/A
High school graduate or higher	N/A	89.4	87.3%
Bachelor's degree or higher	N/A	28.7	30.9%
Civilian veterans (civilian pop. 18 yrs. and over)	82,265	11.9	5.8%
Disability status (population 5 years and over)	120,508	13.5	12%
Foreign born	94,235	10.3	13.4%
Speak a language other than English at home (population 5 years and over)	117,869	13.9	21.3%
<b>Economic Characteristics</b>			

Characteristic	Estimate	Percent	U.S. Avg.
In labor force (population 16 years and over)	476,910	65.7	63%
Mean travel time to work in minutes (workers 16 years and over)	24.5	N/A	26.4
Median household income (in 2017 dollars)	51,296	N/A	57,652
Median family income (i)	63,082	N/A	60,609
Per capita income (in 2017 dollars)	28,593	N/A	31,177
Families below poverty level	N/A	12	11%
Persons in poverty, percent below poverty level	N/A	15.1	12.3%
<b>Housing Characteristics</b>			
Average household size	2.57	N/A	2.63
Average family size	3.23	N/A	
Total housing units	399,736	N/A	137,403,460
Occupied housing units	347,783	87	97%
<b>Housing Characteristics Continued</b>			
Owner-occupied housing units	200,667	57.7	63.8%
Renter-occupied housing units	147,116	42.3	33%
Vacant housing units	51,953	13	13%
Owner-occupied homes	200,667	N/A	N/A
Median value (of owner-occupied housing units, 2013-2017)	156,200	N/A	193,500
Median of selected monthly owner costs	N/A	N/A	N/A
With a mortgage (dollars)	1,344	N/A	1,515
Not mortgaged (dollars)	448	N/A	474

Source: US Census Bureau City of Jacksonville, US Census 2017 ACS 5-Year Survey

#### Jurisdictional Demographic Data

The estimated population of the City of Jacksonville for 2017 is 912,043 (United States Census Bureau, 2017 Population Estimates, American Fact Finder and Quick Facts). The growth rate for the County overall is currently at 1.45%. The City of Jacksonville Urban Core district, which had previously experienced population decline over the previous two census periods (17 percent loss in 1980-90 and 9 percent loss in 1990-00), has increased in population since 2000. The Beaches remains stable due to their existing high density and near built-out status. Separate population counts for Jacksonville, the Beaches, and Baldwin are shown in **Table 6**.

**Table 6: Population of the City of Jacksonville by Municipalities**

Municipality	2017 Estimates
Atlantic Beach	13,608
Baldwin	1,425
City of Jacksonville	892,062
Jacksonville Beach	23,518
Neptune Beach	7,280

Source: US Census American Factfinder and Quick Facts, February 2019

The Florida Housing Data Clearinghouse projects that the City of Jacksonville will have approximately 1,179,900 residents by the year 2040, making it the sixth largest county in population in Florida. Of this total projected population for 2040, more than 45,000 are anticipated to be living in other municipalities, mainly the beach communities. In short, there will be a larger number of people with the potential to experience hurricane or tropical storm events every year for the foreseeable future. This population growth will impact disaster planning and capabilities, particularly evacuation routes for the larger population in the Beaches. This coastal population may increase during the next five years dependent upon a proposed reassigned vessels at Naval Station Mayport. The additional Navy and civilian personnel that would support such reassignments, could be close to 5,000 individuals (*Source: Florida Housing Data Clearinghouse Population Projection by Age for 2000- 2040*).

The economic downturn impacted every aspect of Jacksonville's economic profile. As an example, in 2007, the City of Jacksonville permitted 9,422 residential units. The total construction value of these units was \$1,163,008,658. In 2011, the City permitted 957 residential units for a value of \$133,291,560 (*Source: City of Jacksonville Planning and Development Annual Statistical Package, 2011*) for a decrease of 39.3 percent. In 2016, the City of Jacksonville permitted 4,658 residential units with an average construction value of \$138,125 (*Source: City of Jacksonville Planning and Development Department 2016 Statistical Package*).

**Table 7: Duval County Population Projection Table**

Table of Projected Population 2010 - 2045							
Duval County, Florida							
Census	Projections						
2010	2016	2020	2025	2030	2035	2040	2045
864,263	923,647	975,000	1,035,100	1,089,300	1,138,300	1,179,900	1,216,700

*Source: City of Jacksonville Planning and Development Department 2016 Stat-Pack*

## **M. NFIP Participation**

### Local Government Status in the National Flood Insurance Program

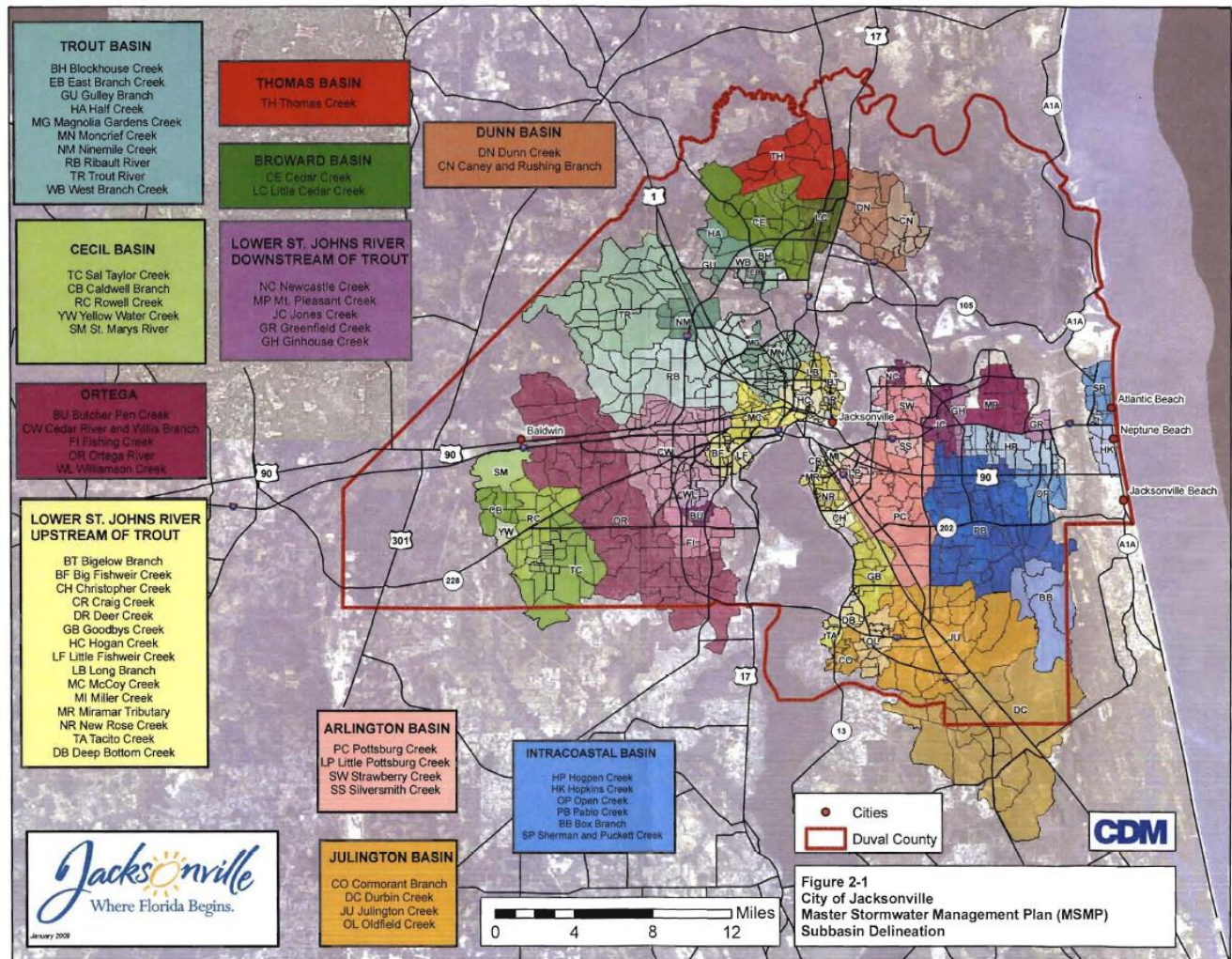
The City of Jacksonville is a participant in the NFIP. The City of Jacksonville participates in the CRS, which allows communities to have a discount on the premium rates paid by their citizens for flood insurance. Communities are classified in a system scored between 1 -10; Class 1 affords the highest premium reduction allowed, and Class 10 affords no reduction in premiums. Communities not participating are classified as Class 10. Jacksonville currently possesses a CRS rating of 6 (*Source: JPPD, 2019*).

A certified Floodplain Manager in the Planning and Development Department coordinates the City of Jacksonville's participation. Portions of the City of Jacksonville are in a special hazard flood zone. The significance of this program is that citizens would not be able to buy flood insurance if their local jurisdictional government does not participate in the NFIP.

The City of Jacksonville citizens may receive flood zone determinations or CRS information from the Development Management Group office within the Planning and Development Department. The City of Atlantic Beach, the City of Jacksonville Beach, the City of Neptune Beach and the Town of Baldwin also participate in the NFIP as Class 8 communities. As much of the development now in place along the City of Jacksonville's coast and rivers was developed prior to adoption of NFIP standards and rating zones, it is anticipated that should a major hurricane strike our area, many structures, both private and public, would have to be rebuilt or replaced by structures meeting NFIP and the current edition of the Florida State Building Code standards. To support federal mitigation efforts that are associated with the NFIP, the City of Jacksonville participates in the Federal Unified Hazard Mitigation Assistance Program and hosts local workshops to educate residents on flood damage reduction techniques.

The CRS has identified repetitive loss areas within the City of Jacksonville, as follows. Within these areas, are 521 repetitive loss (RL) properties (Source: FEMA Flood Insurance Detail Report, Duval County, 2019). A general description of RL structures follows this section.

**Figure 5: Description of the Repetitive Loss Areas Map**



Source: Planning and Development Department, Development Services, Master Stormwater Management Plan, Duval County

## Repetitive Loss (RL) Areas of Jacksonville

### **North Side**

#### **Sandra Lane RL Area**

This area on the north side of Jacksonville has been “built out” for many years with residential development and a few commercial locations. A rural cross section with minimal grades appears to slow the travel of runoff that travels to the Ribault River. This buildup allows water to rise that can affect private property.

### **South Side**

#### **Bedford Road RL Area**

Forest and open land accounts for half of the land use of the drainage basin. Low density and wetlands are the next common land uses. Class A and D soils joined with a high ground water table develops a high runoff potential. Properties were developed according to regulations which would be less acceptable today. Lower finished floor elevations near floodways, minimal drainage infrastructure, and low flow potentials of outfalls to Little Pottsburg Creek allow storm water to build and flood private property. This RL area is located in an area designated Doctor’s Branch Restricted Basin by the City of Jacksonville and proposed development pre/post discharge is limited to ½ CFS per acre.

#### **Caddell Drive RL Area**

This location is mostly medium density residential properties nearing the build-out levels of development. The remaining amounts of forest and open land are being converted to medium density residential and commercial development. The combined conditions of large storm events and aged drainage infrastructure allows a buildup of storm water that affects private property. This area drains into the St. Johns River that is tidal but has a large storage potential.

#### **Hickson Road RL Area**

This area consisting of forest and open land accounts for half of the land use of the drainage basin. Low density and wetlands are the next common land uses. Class A and D soils joined with a high ground water table develops a high runoff potential. Properties were developed according to regulations which now would be less acceptable. Lower finished floor elevations near floodways, minimal drainage infrastructure, and low flow potentials of outfalls to Little Pottsburg Creek allow storm water to build and flood private property. This RL area is located in an area designated Doctor’s Branch Restricted Basin by the City of Jacksonville and proposed development pre/ post discharge is limited to ½ CFS per acre.

#### **Martha Ann Drive RL Area**

This area consisting of forest and open land accounts for half of the land use of the drainage basin. Low density and wetlands are the next common land uses. Class A and D soils joined with a high ground water table develops a high runoff potential. Properties were developed according to regulations which now would be less acceptable. Lower finished floor elevations near floodways, minimal drainage infrastructure, and low flow potentials of outfalls to Little Pottsburg Creek allow storm water to build and flood private property. This RL area is located in an area designated Doctor’s Branch Restricted Basin by the City of Jacksonville and proposed development pre/ post discharge is limited to ½ CFS per acre.

#### **San Marco RL Area**

The land use for this basin is medium density residential and commercial. This area has been an established built-out location for many years. The commercial improvements creating large runoff

events coupled with dated infrastructure slows the runoff which builds in the roadway and impacts private property. This location drains directly into the St. Johns River which affects the drainage system with tidal influence.

#### Short Road RL Area

This area includes medium density residential development on large properties. This type of construction leaves a large portion of properties as open land. Some roadways are private dirt roads with no drainage infrastructure, and are not maintained by the City of Jacksonville. There is also a large section of wetlands along the upper portions of Julington Creek. These wetlands have vast storage capacity, but development has encroached in some locations.

### West Side

#### Bakersfield Drive RL Area

The predominant land uses in the drainage basin are forest and open land, medium density residential development, and mixed commercial/light industrial development. Future development is primarily forest and open land being converted to medium density residential commercial/ light industrial development. Some homes were built on low banks of this portion of Wills Branch, which is tidally influenced. During heavy storms, water overflows the banks when Cedar River and Wills Branch Creek cannot carry the volume of runoff. The channel in this area has been straightened and dredged by the USACE. The City of Jacksonville will continue the ongoing maintenance in this channel. This area is located in an area designated as Cedar Creek/ Wills Branch Restricted Basin by the City of Jacksonville and proposed development must use a volumetric calculation for pre/post runoff.

#### Machelle Drive RL Area

This land in this basin is primarily open forest. The remainder is medium density residential, with most development south of RL area. Land use will continue in a like manner with further in-fill through time. Drainage issues in the area are the undersized structures in the secondary storm water management system. The runoff drains into the upper reaches of McGirts Creek.

#### West Fourth Street RL Area

This area is highly developed with half residential and parks, and half commercial/ industrial. The sub-basin is "built-out". The site utilizes street paving to transport water into roadside ditches that have minimal grades. This area outfall into Upper McCoy's Creek which is a series of undersized bridges and culverts with many being severely overtopped.

### Repetitive Loss Data for Duval County

According to the April 2019 NFIP Flood Insurance Manual, Appendix F: CRS, the jurisdictions in the City of Jacksonville which participate in the NFIP include the City of Jacksonville (CRS rating 6); City of Jacksonville Beach (CRS Rating 6); City of Atlantic Beach (CRS Rating 7); and the City of Neptune Beach (CRS Rating 7). The number of repetitive loss structures for the City of Jacksonville is 106 and severe repetitive loss structures are 35, according to the validated 2019 SRL/RL property list furnished by FEMA. The number of structures with a RL status is not static. The total number of structures will increase over time based on flooding and damages claimed by individual property owners.



**Table 8: Description of Repetitive Loss Structures in Duval County**

Community Name	Repetitive loss Structures	SF	2-4 Family	Other Res	Condo Assoc.	Non-Res.
Duval County	289	255	4	7	1	22
Atlantic Beach	8	5	3			
Jacksonville Beach	25	14	4		1	6
Neptune Beach	2	1	1			
Town of Baldwin	0					

Source: FEMA, CRS Data Base, 2012. Hurricane Evacuation Study, 2013, Vol. II, pg. II-55

City of Jacksonville Comprehensive Plan Coastal Conservation Management Element Policy 7.3.2 states that the City shall continue to participate in the NFIP. Jacksonville Beach Comprehensive Plan Coastal Management Element Policy CM.3.1.2 states that the City's Floodplain Management and Storm water Ordinance shall comply with the minimum building elevations of the FEMA Flood Insurance Rate Maps and the building requirements of the NFIP. Neptune Beach Comprehensive Plan Policy E.1.5.3 states that the City will enforce the requirements of the Federal Flood Insurance Program and consider increasing those requirements, if appropriate. City of Atlantic Beach Section 8-3 of the Code of Ordinances states that flood load and flood resistant construction requirements are adopted to in part meet the requirements of the NFIP for community participation. The Town of Baldwin Code of Ordinances Section 22-233 states that a purpose of the Floodplain Management Ordinance is to meet the requirements of the NFIP for community participation.

#### Continued NFIP Participation Methods

All City of Jacksonville jurisdictions participate in CRS and NFIP activities. All City of Jacksonville jurisdictions will continue their commitment to the NFIP by continuing to:

- Enforce the ordinances which regulate new development and substantial improvements in the special flood hazard areas
- Inform the community by the Emergency Preparedness Guide and open public meetings
- Perform community outreach
- Maintain elevation certificates on file for all new construction in the SFHAS or for substantial improvements to properties in the SFHA
- Use best available flood map data for issuing construction permits
- Provide updated mapping provided to each jurisdiction
- Maintain public records and make them available for review
- Promote NFIP through the publication of the annual Emergency Preparedness Guide
- Maintain records pertaining to LOMAS and LOMRS
- Provide information related to flood hazards, flood maps, etc., to the public upon request
- Promote community outreach efforts for compliance with the CRS program
- Integrate new NFIP information and mapping into already existing strong community presentations
- Promote flood insurance to property owners
- Identify and acquire land in the SFHA open space/preservation
- Promote hazard flood mitigation to the public LMS and Grant information on county website
- Provide drain maintenance and fund drainage system improvement projects
- Perform floodplain management activities and target a Class 5 Rating
- Participate in the Northeast Florida CRS User Group through the Regional Planning Council



*Section I*

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## SECTION II – GUIDING PRINCIPLES AND GOALS

### A. Guiding Principles

During the planning process, the City of Jacksonville LMS Advisory Committee developed a set of community values or Guiding Principles that serve as a vision for hazard mitigation in the City of Jacksonville. This set of values guided the Advisory Committee Group in the formulation of specific goals and objectives and helped to direct the planning process and the selection and implementation of mitigation initiatives and programs.

The set of Guiding Principles that were affirmed by the Advisory Committee are as follows:

- I. Hazard mitigation should prevent future losses by reducing the risk to people and property;
- II. Hazard mitigation should emphasize both pre and post disaster efforts for decreasing the vulnerability of existing and new construction to loss;
- III. Hazard mitigation should emphasize prevention of repetitive losses from hazards;
- IV. Hazard mitigation efforts should strengthen and utilize land use guides to comprehensive planning, regional and local area plans, zoning codes, development standards and incentives to protect vulnerable properties and vulnerable areas;
- V. Hazard mitigation efforts should strive to protect the public and private sectors by reducing their economic vulnerability and increasing their recovery capabilities; and
- VI. Hazard mitigation should promote personal awareness and responsibility, with an emphasis on education and training for property owners, families and individuals, which should be communicated to the public in a simple, easy to understand format.

### B. Goals and Objectives

The following goals and their associated objectives stemmed directly from the values that were created by the Advisory Committee. New information has been Included in the 2020 version of the LMS to further classify these goals and objectives. The revisions have been incorporated into **Table 9: Local Mitigation Strategy Goals and Objectives**. The major changes are described below, and the table shall follow on subsequent pages.

Activity classes were incorporated to further define each individual objective and facilitate the logical grouping of mitigation project initiatives included in Section IV of the LMS. The activity classifications were as follows: prevention, property protection, natural resource protection, and public education and awareness.

Prevention is defined in this capacity to refer to government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space, preservation and storm water management regulation.

Property Protection is defined as actions that involve the modification of existing building or infrastructure to protect them from a hazard or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, flood proofing, storm shutters, and impact-resistant glass. This may also include actions that involve the construction of structures to reduce the impact of a hazard. Such structures include storm water controls, floodwalls, seawalls, retaining walls and safe rooms. Physical measures to provide mitigation fall into this category.

Public Education and Awareness encompasses actions to inform and educate citizens, elected officials and property owners about potential risks from hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

Natural Resource Protection includes actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management and wetland restoration and preservation. This category may include regulatory, administrative, or physical mitigation components.

Suggested actions to take to accomplish each objective have been incorporated. The actions range from broad suggestions to specific examples of how each objective may be accomplished. The purpose of including these actions is to facilitate development of mitigation project initiatives included in Section IV of the LMS. These actions should correlate directly to projects included in the list, and ensure that new projects can be straightforwardly tied to the LMS Goals and Objectives. Existing documentation that supports the objectives and actions has been identified, along with agencies that are responsible or may otherwise have an interest in supporting the objectives. A timeline has been included for reference to identify the estimated length of time required to address each objective (i.e. are the objectives long or short term, are they ongoing, etc.). Additional information about specific implementation documentation (plans, policies, and procedures) immediately follows and is included in **Section C. Policies, Ordinances, and Programs.**

Local agencies are encouraged to determine how to measure the progress made on goals, objectives, and policies. The below table provides a clear representation of what the existing policies are, where the policies live, and who owns them. The table does not describe what constitutes accomplishment (i.e. ordinance adopted, number of affordable houses built resiliently) of a goal, objective, or policy. Local agencies, authorities, nonprofits, and other stakeholders should incorporate the mitigation goals and objectives into their own strategic plans and adopt performance measures as necessary.

**Table 9: Local Mitigation Strategy Goals and Objectives**

Goal	Activity Class	Objectives	Actions	Implementation Documents	Agency / Depts.	Timeline
<b>Goal 1:</b> Minimize future losses from disasters by reducing the risk to people and property.						
<b>Goal 1</b>	Prevention	Objective 1.1 Protection of populations and properties in the City of Jacksonville susceptible to economic or physical loss from natural and man-made disasters shall be consistent with the standards established in the Local Mitigation Strategy and other planning documents.	<ol style="list-style-type: none"> <li>1. Examine current practices related to construction of infrastructure</li> <li>2. Identify ways to build infrastructure more resiliently</li> <li>3. Identify ways to retrofit resiliency and build it into new construction.</li> <li>4. Identify regulations that need to change to allow for wet and dry flood-proofing and elevation</li> <li>5. Change regulations to allow resiliency and to require it</li> <li>6. Identify areas appropriate for development limitations</li> </ol>	COJ Ordinance Chapter 674, Emergency Preparedness	COJ EPD COJ DPW COJ PDD COJ HCDD (Neighborhoods)	Ongoing
<b>Goal 1</b>	Prevention	Objective 1.2 Encourage higher standards of maintenance to existing drainage systems and retention ponds, and monitor cumulative development impacts with a macroscopic view.	<ol style="list-style-type: none"> <li>1. Implement solutions of the Storm Resiliency &amp; Infrastructure Development Review Committee</li> <li>2. Coordinate with USACE and FDEP to discover best practices from other communities within Florida</li> </ol>	COJ Ordinance (2018-157-E)	COJ DPW COJ PDD JEA	Short Term Ongoing

Goal	Activity Class	Objectives	Actions	Implementation Documents	Agency / Depts.	Timeline
<b>Goal 1</b>	Prevention	Objective 1.3 Work with the National Weather Service to enhance communication and coordination before and during severe weather events.	1. Ensure NWS is contacted prior to any event, and during plan review process 2. Review and revise hazard specific plans (HSPs) and emergency operations plans (EOCs) to ensure NWS is included as an assisting agency	COJ CEMP HSPs EOPs Incident Action Plans	COJ EPD COJ JSO NWS Jacksonville	Per Incident Ongoing
<b>Goal 2:</b> Emphasize pre- and post-disaster planning to decrease vulnerability of existing and new construction to loss.						
<b>Goal 2</b>	Property Protection	Objective 2.1 Identify and prioritize vulnerable properties by using topographic and storm surge maps, traffic analysis and evacuation modeling, economic and environmental impact analysis.	1. Implement recommendations of the AAAWG 2. Determine “critical” infrastructure improvements 3. Prioritize Infrastructure Improvements 4. Develop CIP (5, 10, 25, 50 year)	Section 163.3177(6)(g)(10) Florida Statutes COJ 2030 Comprehensive Plan - Conservation/Coastal Management Element	COJ EPD COJ PDD COJ Neighborhoods Private Sector	Short Term Ongoing
<b>Goal 2</b>	Prevention	Objective 2.2 Review evacuation time estimates taking into consideration the impact of railroad and bridge openings on travel times.	1. Consult with transportation agencies during planning process and prior to or during incidents	Regional Evacuation Study Hurricane HSP Evacuation EOP	COJ EPD	Short Term Per Incident

Goal	Activity Class	Objectives	Actions	Implementation Documents	Agency / Depts.	Timeline
Goal 2	Property Protection	Objective 2.3 Encourage structure retrofit programs to address identified flood, wind, and evacuation vulnerabilities based on income level.	1. Require resiliency be considered in affordable housing programs	Comprehensive Plans	COJ Neighborhoods	Long Term
Goal 2	Property Protection	Objective 2.4 Where feasible, purchase land in known vulnerable areas to prevent placing people and infrastructure in harm's way.	1. Leverage pre- and post-disaster mitigation grant program funding to acquire property when possible	Comprehensive Plans COJ CEMP	COJ EPD COJ DPW COJ Real Estate COJ HCDD (Neighborhoods)	Ongoing
Goal 2	Natural Resource Protection	Objective 2.5 Identify post-storm redevelopment options in vulnerable coastal areas, taking into consideration short and long-term environmental, economic, and structural issues.	1. Perform comprehensive coastal vulnerability analysis 2. Leverage federal and state-funded vulnerability analyses	Comprehensive Plans: Conservation/Coastal Management Elements PDRP - Section 3.1.2 Florida Resilient Coastlines Program	COJ PDD COJ DPW COJ EQD SJRWMD	Short Term
Goal 2	Property Protection	Objective 2.6 Identify vulnerable existing public and private critical facilities and encourage pre-disaster retrofit.	1. Recognize vulnerability/resiliency work of JEA 2. Perform comprehensive vulnerability analysis	COJ Ordinance Chapter 674, Emergency Preparedness	COJ EPD COJ DPW JEA Private Sector	Ongoing

Goal	Activity Class	Objectives	Actions	Implementation Documents	Agency / Depts.	Timeline
<b>GOAL 3:</b> Prevent flood-related repetitive losses from natural disasters through retrofitting, infrastructure protection, regulation, and education.						
<b>Goal 3</b>	Property Protection	Objective 3.1 Develop and support public and private projects and programs to retrofit, relocate or acquire properties susceptible to repetitive flooding.	1. Continue direct outreach to RL and SRL property owners 2. Highlight successes and showcase previously acquired properties that have been returned to floodplain conservation area	COJ Ordinance Chapter 652, Floodplain Management COJ Ordinance Chapter 674, Emergency Preparedness	COJ PDD COJ EPD COJ HCDD (Neighborhoods) COJ Real Estate	Ongoing  Long-term strategy for repetitive loss areas
<b>Goal 3</b>	Prevention	Objective 3.2 Require systematic maintenance programs for storm water management systems.	1. Revise Master Stormwater Management Plans (MSMPs) as needed 2. Incorporate resiliency analysis into MSMPs	COJ Ordinance Chapter 652, Floodplain Management Baldwin	COJ DPW JEA	Ongoing
<b>Goal 3</b>	Prevention	Objective 3.3 Encourage non-residential or low-density residential development in flood zones consistent with municipal plans and policies that guide development.	1. Amend ordinances or adopt new ordinances to promote desired growth patterns	Comprehensive Plans COJ Ordinance Chapter 656, Zoning Code COJ Ordinance Chapter 654, Code of Subdivision Regulations	COJ PDD Beaches Municipalities PDD	Ongoing

Goal	Activity Class	Objectives	Actions	Implementation Documents	Agency / Depts.	Timeline
<b>Goal 4:</b> Strengthen and utilize comprehensive planning, regional and local area plans, zoning codes, development standards and Incentives to protect vulnerable properties and vulnerable areas, and support development in less vulnerable areas.						
<b>Goal 4</b>	Prevention	Objective 4.1 Monitor floodplain regulations and enforcement to assess effectiveness.	1. Monitor floodplain regulations and enforcement 2. Assess effectiveness and provide recommendations for policy updates as necessary	Land Development Procedures Manual (LDPM) COJ Ordinance Chapter 652, Floodplain Management	COJ PDD (Floodplain Manager)	Ongoing
<b>Goal 4</b>	Property Protection	Objective 4.2 Develop and support economic incentive programs for both public and private sectors promoting benefits of structural retrofitting.	1. Identify funding sources for incentives 2. Develop promotional material to educate public and private sector about benefits of retrofitting	CEMP FEMA Hazard Mitigation Planning Resources (Planning Advisory Service Report Number 560, 576, 584)	OED SBA COJ EPD Private Sector Partners	Short Term
<b>Goal 4</b>	Prevention	Objective 4.3 Discourage variances and exceptions in flood hazard areas as identified by Flood Insurance Rate Maps, storm surge, and historical flooding.	1. Assess current criteria that allows for variances and exceptions 2. Revise criteria as necessary	COJ Ordinance Chapter 656, Zoning Code	COJ PDD	Short Term



Goal	Activity Class	Objectives	Actions	Implementation Documents	Agency / Depts.	Timeline
<b>Goal 4</b>	Prevention	Objective 4.4 Promote the Florida Building Code standards requiring new developments and construction to meet applicable wind load standards for proximity to coast.	1. Enforce current regulations 2. Provide comment as necessary to the Florida Building Commission regarding building code standards	Florida Building Code, Sixth Edition (2017) COJ Ordinance Ch. 321, Building Code	COJ PDD Beaches Municipalities PDD	Ongoing
<b>Goal 4</b>	Prevention	Objective 4.5 Promote regulations for new structures in 100-year flood areas to be elevated in conformance with or exceeding current Florida Building Code.	1. Require building at higher elevations, i.e. BFE + height required by ordinance	LDPM COJ Ordinance Chapter 652, Floodplain Management	COJ PDD	Short Term
<b>Goal 4</b>	Property Protection	Objective 4.6 Encourage locations of critical facilities (schools, hospitals, etc.) to be away from the proximity of identified hazardous material facilities and areas prone to flooding.	1. Define and/or expand "critical facilities." 2. Identify buffer zones for hazard areas	Comprehensive Plans	COJ EPD COJ PDD	Long Term
<b>Goal 4</b>	Property Protection	Objective 4.7 Enact development standards in wildland urban interface areas, such as setbacks, forest maintenance, access of response vehicles and construction materials.	1. Research existing standards in other locations 2. Devise local standards 3. Adopt local standards	Potentially COJ Comprehensive Plan and COJ Zoning Code Ch. 656 (None currently exist) Baldwin 2025 Comp Plan	COJ PDD	Long Term

Goal	Activity Class	Objectives	Actions	Implementation Documents	Agency / Depts.	Timeline
<b>Goal 4</b>	Property Protection	Objective 4.8 Strengthen existing land use regulations and policies through enhancement of review procedures, and enforcement.	1. Analyze effectiveness of current regulations 2. Strengthen enforcement of current regulations	Comprehensive Plans	COJ PDD Beaches Municipalities PDD	Short Term
<b>Goal 4</b>	Property Protection	Objective 4.9 Review and consider policies to assure more permeable area in development, by limiting construction of paved surfaces and decreasing run-off.	1. Research additional policies to promote permeable areas 2. Implement policies that limit construction of paved surfaces in vulnerable areas	LDPM Baldwin Code of Ordinances Land Development Code Article VIII Division 3 Section 22-384-409	COJ PDD	Long Term
<b>Goal 4</b>	Property Protection	Objective 4.10 Promote and support incentives to encourage higher standards of protection to structures and facilities from hazards.	1. Review existing standards of protection for effectiveness 2. Develop incentive schemes for adherence to higher standards of protection	LDPM Comprehensive Plan COJ Ordinance Ch. 652 COJ Ordinance Ch. 321	COJ PDD	Short Term Ongoing
<b>Goal 4</b>	Natural Resource Protection	Objective 4.11 Identify and implement a system to rebuild and protect the dunes system, with crossovers, restoration, and revalidation.	1. Conduct pre-storm planning to address dune resilience 2. Identify funding sources to implement dune resilience system	Comprehensive Plans	COJ PDD COJ DPW USACE	Long Term Ongoing

Goal	Activity Class	Objectives	Actions	Implementation Documents	Agency / Depts.	Timeline
<b>Goal 5: Strive to protect the public and private sector by reducing their economic vulnerability and increasing their recovery capabilities.</b>						
Goal 5	Public Education and Awareness	Objective 5.1 Encourage disaster planning training through collaborative programs with appropriate government agencies and the private sector.	1. Identify appropriate agencies and private sector partners to engage with in training 2. Revise County Multi-Year Training and Exercise Program (MYTEP) to bring disaster planning training 3. Provide disaster training to public	MYTEP COJ Ordinance Chapter 674, Emergency Preparedness	COJ EPD Public and Private Sector Partners NEFRC	Ongoing
Goal 5	Public Education and Awareness	Objective 5.2 Analyze the factors involved in small business decision making regarding preparing for disasters and integrating hazard mitigation into their management practices.	1. Perform research and analysis for small business decision making 2. Perform stakeholder meetings and education sessions for best practices	COJ Ordinance Chapter 674, Emergency Preparedness	COJ EPD Public and Private Sector Partners NEFRC	Ongoing
Goal 5	Public Education and Awareness	Objective 5.3 Promote mitigation guidelines for businesses to raise awareness about local hazards, assist in vulnerability assessment, aid in the identification of financial and technical assistance available, and facilitate hazard mitigation implementation to include continuity of operations.	1. Develop mitigation guidelines 2. Perform stakeholder meetings with businesses to discuss mitigation guidelines and strategies	COJ Ordinance Chapter 674, Emergency Preparedness NEFRC Community Conversations	COJ EPD NEFRC	Ongoing

Goal	Activity Class	Objectives	Actions	Implementation Documents	Agency / Depts.	Timeline
<b>Goal 6:</b> Hazard Mitigation should promote personal awareness and responsibility, with an emphasis on education and training for property owners, families and individuals, which should be communicated to the public in a simple, easy to understand format.						
<b>Goal 6</b>	Public Education and Awareness	Objective 6.1 Promote disaster preparedness education and awareness programs, targeting specific benefits to homeowners, families and individuals.	1. Produce and continually revise disaster preparedness educational programs 2. Identify most effective means to reach the target population	COJ Ordinance Chapter 674, Emergency Preparedness	COJ EPD	Short Term
<b>Goal 6</b>	Public Education and Awareness	Objective 6.2 Promote disaster preparedness education and awareness programs, targeting specific benefits to public and private sector.	1. Produce and continually revise disaster preparedness educational programs 2. Identify most effective means to reach the target population	COJ Ordinance Chapter 674, Emergency Preparedness	COJ EPD NEFRC	Short Term
<b>Goal 6</b>	Public Education and Awareness	Objective 6.3 Encourage public information programs for hazard mitigation, emphasizing its direct benefits to citizens, including public officials and private businesses.	1. Produce and continually revise hazard mitigation educational programs 2. Identify most effective means to reach the target population	COJ Ordinance Chapter 674, Emergency Preparedness	COJ EPD NEFRC	Ongoing
<b>Goal 6</b>	Public Education and Awareness	Objective 6.4 Identify and coordinate hazard mitigation public information programs and events such as contests and festivals with public and private partners.	1. Research existing programs and events 2. Participate in the planning and implementation of programs and events	COJ Ordinance Chapter 674, Emergency Preparedness	COJ EPD NEFRC	Short Term

Goal	Activity Class	Objectives	Actions	Implementation Documents	Agency / Depts.	Timeline
<b>Goal 6</b>	Public Education and Awareness	Objective 6.5 Identify and seek multiple funding sources that will support hazard mitigation awareness and training program.	1. Identify funding sources 2. Establish a distribution list and provide information as it becomes available	COJ Ordinance Chapter 674, Emergency Preparedness	COJ EPD COJ Grants Office	Ongoing
<b>Goal 6</b>	Public Education and Awareness	Objective 6.6 Educate and promote elected officials, builders and potential homeowners, the economic and safety benefits of designing mitigation features into new construction.	1. Produce and continually revise disaster preparedness educational programs 2. Identify most effective means to reach the target population	COJ Ordinance Chapter 674, Emergency Preparedness	COJ EPD COJ PDD Beaches Municipality PDD NEFRC	Short Term

## C. Policies, Ordinances, and Programs

The following tables contain information on policies, ordinances and programs for the City of Jacksonville and its associated jurisdictions, agencies, and local United States Coast Guard (USCG) for maritime mitigation planning. Mitigation related items were identified and evaluated by the Advisory Committee. The information was collected and categorized into 13 major issue areas. The policies, ordinances and programs were evaluated by assessing their effectiveness in terms of hazard mitigation. These policies, ordinances and programs were reviewed and confirmed for the purposes of the 2020 LMS Update.

The policies, ordinances, and programs referenced in Table 10 identify several different local planning documents that contain goals, objectives, policies, and in some cases action items. These documents include the Comprehensive Plans (Comp Plan), Ordinance Code, Land Development Regulation, Jacksonville Beach Emergency Operation Plan (JB EOP), CEMP, and Post- Disaster Redevelopment Plan (PDRP). These documents are managed and maintained by various City of Jacksonville departments and updated on varying schedules depending on the document.

According to Rule Chapter 73C-49, Florida Administrative Code, at least every seven years, local governments with Comprehensive Plans are responsible for determining whether the need exists to amend the plan to reflect changes in state requirements since the last time the plan was updated. This applies to all municipalities participating in the City of Jacksonville Local Mitigation Strategy Process. All municipalities represented will have to determine if the Comprehensive Plan for the jurisdiction needs to be updated between 2016 and 2018, based on the current schedule. It is during that update that policies related to hazard mitigation can be reviewed and updated. Comprehensive Plans can be updated during any time by local jurisdictions with approval at the local and state levels.

City of Jacksonville Comprehensive Plan Policy 7.5.7 of the Coastal Management Element states that Emergency Management shall propose amendments to the Comprehensive Plan that reflect recommendations in any interagency hazard mitigation reports or other reports prepared pursuant to Section 406 of the Disaster Relief Act of 1974. Other plans such as the Comprehensive Emergency Management Plan and Post Disaster Redevelopment Plan are reviewed and updated as needed, and it is at this time that hazard mitigation goals, and policies can be updated to maintain consistency with the updated LMS. Land Development Codes are updated as needed by the appropriate codifiers. The appropriate Building and/or Planning Department for each municipality are responsible for ensuring that Land Development Codes and Zoning Codes are adhered to.

Atlantic Beach Coastal Management Element Policy D.1.2.2 states that the City will be a partner in the City of Jacksonville LMS process and maintain consistency with the LMS. Objective A.1.8 is supported by a Policy for the City to participate in LMS Planning, and Policies D.2.3.1 and D.2.3.2 support the implementation of hazard mitigation policies from the LMS. Jacksonville Beach Coastal Management Policy CM.5.2.2 states that the City shall assist the County with the development of the LMS. The Comprehensive Emergency Management Plan identifies that the Emergency Preparedness Division for the City of Jacksonville will spearhead County Mitigation Advisory Committee efforts. All municipalities are represented and actively participate on the LMS Advisory Committee and regularly send representatives to meetings.

Representatives from various departments and divisions of the City of Jacksonville, City of Jacksonville Beach, City of Atlantic Beach, City of Neptune Beach, and the Town of Baldwin actively participate in LMS meetings. Sign in sheets for LMS meetings show active participation by all jurisdictions within the County with respect to regular quarterly meetings, update meetings, and special meetings.

The City of Jacksonville Emergency Preparedness Division is responsible for overseeing the review and updating the Comprehensive Emergency Management Plan and the Local Mitigation Strategy. This is completed in coordination with partner agencies and other stakeholders. Municipal Planning and Development Departments are generally responsible for maintaining and updating Comprehensive Plan and other related land use and community planning documents.

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**Table 10: Duval County Mitigation Policies**

<b>Duval County Mitigation Policies</b>			
<b>Category</b>	<b>Policy/ Objective</b>	<b>Source</b>	<b>Notes</b>
Land Use/ Zoning / Development Controls/ Incentives	Future Land Use Goal states Atlantic Beach (AB) shall manage growth and redevelopment in a manner that among other things provides for reasonable public safety and security from hazardous conditions associated with coastal locations.	AB 2030 Comp Plan - CM Goal A.1	Supported by associated objectives and policies, including post-disaster redevelopment.
Decrease Vulnerability	Atlantic Beach shall maximize, to the extent feasible, provisions and opportunities for the protection of life and property from the effects of hurricanes and other natural disasters.	AB 2030 Comp Plan - CM Goal D.2	Supported with objectives to address hurricane evacuation, redevelopment within the CHHA, and hazard mitigation.
Land Use/ Zoning / Development Controls/ Incentives	Atlantic Beach shall encourage innovative land development approaches and concepts in the event of post-disaster redevelopment, which will have the effect of reducing dependence upon automobile travel, conserving valuable natural resources and environmentally sensitive areas, and preventing property damage as well as threats to human safety and security.	AB 2030 Comp Plan - CM Objective A.1.8	Supported by associated policies encouraging the use of innovative land development practices, participating in LMS planning, development in the CHHA, and increasing population provisions.



Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	Atlantic Beach shall limit public expenditures that subsidize development within the Coastal High Hazard Area (CHHA) except for the maintenance, restoration, or enhancement of natural resources, and the provision for appropriate public access to and use of natural resources.	AB 2030 Comp Plan - CM Objective D.1.1	Supported with a policy to implement a Storm Water Master Plan, and a policy to limit new public construction in the CHHA to improvements that do not increase residential density.
Decrease Vulnerability	Hurricane Evacuation policies that support maintaining a comprehensive hurricane evacuation management plan that incorporates measures deemed necessary to maintain or reduce Atlantic Beach's evacuation clearance times.	AB 2030 Comp Plan - CM Policies D.2.1.1, D.2.1.2, D.2.1.3, D.2.1.4, and D.2.1.5	Policies address public shelters, Level of Service Standards, density increases, intergovernmental coordination, and consistency with County plans.
Decrease Vulnerability	Redevelopment policies that support redevelopment activities in the CHHA being guided by redevelopment provisions set forth in the LDR which serve the purpose of reducing the vulnerability of people, property and natural resources to damage from coastal storms.	AB 2030 Comp Plan - CM Policies D.2.2.1, D.2.2.2, D.2.2.3, D.2.2.4 and D.2.2.5	Policies address coordinating with the City's Hurricane Plan, implementing moratoriums as needed, re-entry criteria, redevelopment standards, and the definition of the CHHA.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Decrease Vulnerability	Hazard Mitigation policies that supporting seeking appropriate means of reducing the potential for loss of life and property through provisions within the LDR, including implementation of hazard mitigation policies from the LMS.	AB 2030 Comp Plan - CM Policies D.2.3.1 and D.2.3.2	Policies that require that all new residential development within the CHHA access impacts to hurricane evacuation times and shelter provision.
Land Use/ Zoning/ Development Controls/ Incentives	Atlantic Beach shall rigorously enforce its floodplain management regulations to conform with or exceed the requirements of FEMA.	AB 2030 Comp Plan - CM Policy D 1.2.1	Enforce floodplain regulations.
Land Use/ Zoning/ Development Controls/ Incentives	Atlantic Beach shall continue to be a partner in the Duval County LMS and participate in emergency preparedness operations. The City shall review new Land Development Regulations for consistency with the LMS prior to adoption.	AB 2030 Comp Plan - CM Policy D.1.2.2	City will maintain consistency with the LMS.
Decrease Vulnerability	Adequate storm water management and provision for drainage shall be provided to afford reasonable protection from flooding and to prevent degradation in the quality of receiving surface water and ground water.	AB 2030 Comp Plan - Infrastructure Goal C.2	Supported by associated objectives and policies for protection of natural drainage features, stormwater management and drainage facilities.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Land Use/ Zoning / Development Controls/ Incentives	Provisions pertain to all development within any flood hazard area.	AB Code of Ordinances Chapter 8 - Flood Hazard Areas	Purpose is to establish minimum requirements to safeguard the public health, safety, and general welfare and minimize public and private losses due to flooding.
Land Use/ Zoning / Development Controls/ Incentives	Relates to the alteration of sand dunes and mangrove stands.	AB Code of Ordinances Section 8-62 - CHHA	Sets limitations on sites in CHHA (Zone V)
Increase Recovery Capabilities of Business and Industry	Business and Industry Preparedness Training.	American Red Cross (ARC)	Training opportunities for businesses to help them become better prepared for emergencies.
Increase Recovery Capabilities of business and industry	Disaster coordinators and plans for major employers.	Association of Contingency Planners	Local chapter promotes professional disaster planning for businesses.
Prevent Repetitive Flooding	The LDR will include provisions for the regulation of land, subdivisions, and areas subject to seasonal or periodic flooding.	Baldwin 2025 Com Plan - FLUE Policy L.1.1.6	Updated in 2011 EAR.
Land Use/ Zoning/ Development Controls/ Incentives	Protect the natural functions of the 100-year floodplain so that the flood water storage capacity is maintained.	Baldwin 2025 Comp Plan - Conservation Objective C.1.2.3	Updated in the 2011 EAR with supporting policies.
Decrease Vulnerability	Baldwin shall restrict hazardous waste sites from locating in or around the town.	Baldwin 2025 Comp Plan - Conservation Objective C.1.7	Updated in the 2011 EAR and supported by associated policies.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Decrease Vulnerability	No development shall be allowed within 50 feet of a potable drinking well, except structure required for water supply. Only residential development may be permitted within 500 feet of any potable drinking well.	Baldwin 2025 Comp Plan - FLUE Policy L.1.1.11	Updated in the 2011 EAR.
Land Use/ Zoning/ Development Controls/ Incentives	Land Development Regulations shall contain provisions for open space and storm water management and these provisions shall be maintained.	Baldwin 2025 Comp Plan - FLUE Policy L.1.1.9	Included in Land Development Regulations (6.05.00.04) and updated in the 2011 EAR
Reduce Risk	Baldwin shall review the Landscape Section of the LRD to assure that they are consistent with the principles of "Firewise".	Baldwin 2025 Comp Plan - FLUE Policy L.1.9.4	Added per the 2011 EAR.
Reduce Risk	Adequate storm water drainage will be provided to afford reasonable protection from flooding; protect life, property and the natural environment; work to improve existing drainage problems and seek funding.	Baldwin 2025 Comp Plan - Water Goal U.3, Objectives and Policies	Supported by associated objectives and policies updated in the 2011 EAR.
Reduce Risk	All development in Baldwin shall be connected to the centralized sanitary sewer system.	Baldwin 2025 Comp Plan - Water Policy U.1.3.1	Updated in the 2011 EAR.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Land Use/ Zoning/ Development Controls/ Incentives	Floodplain Management Ordinance.	Baldwin Code of Ordinances Land Development Code Article VIII Chapter 22 Section 22-231 Floodplains	The provisions of this article shall apply to all development that is wholly within or partially within any flood hazard area.
Land Use/ Zoning / Development Controls/ Incentives	Flood Resistant Development.	Baldwin Code of Ordinances Land Development Code Article VIII Division 3 Section 22-384-409	Code being implemented.
Land Use/ Zoning / Development Controls/ Incentives	All electric, telephone, cable television, other communication lines, and gas distribution lines shall be placed underground within easements or dedicated public rights-of-way.	Baldwin Code of Ordinances Land Development Code Article XI Development Standards 3 Division 5 Section 22-522(a)	This regulation serves both aesthetic and mitigation purposes, and is being implemented.
Land Use/ Zoning/ Development Controls/ Incentives	Regulates storm water performance and design standards; use natural systems to “maximum extent practicable”.	Baldwin Code of Ordinances Land Development Regulations Article XI Division 6 Storm water Management	Implemented as development proposals are submitted for review.
Decrease Vulnerability	Head of City of Jacksonville Emergency Preparedness Organization shall be the Mayor, who shall be responsible (with EOC support) for those actions necessary to reduce the vulnerability of the people and the City to damage and loss of life and property.	COJ 2017 CEMP – Basic Plan	The CEMP establishes the framework of preparedness for all hazards and addresses the four phases of emergency management, preparedness, response, recovery and mitigation.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Decrease Vulnerability	Schedule of disaster/emergency exercises.	COJ 2017 CEMP - Exercises	The purpose of the exercise process is to provide an opportunity for the City of Jacksonville, with private organizations and other governmental agencies, to learn roles and responsibilities in a disaster.
Decrease Vulnerability	Procedures for hurricane evacuations.	COJ 2017 CEMP - Hurricane Evacuation Plan	Procedures tested through training and exercises.
Education/Awareness/ Training/ Communication	Plans that detail participating agencies and their roles and responsibilities in the four phases of an emergency or disaster.	COJ 2017 CEMP – Interagency Coordinating Procedures	ICPs cover a variety of topics including debris management, damage assessment, evacuation, search and rescue, etc. A full list can be found on Page 13 of the CEMP.
Education/Awareness/ Training/ Communication	Mitigation Opportunities overseen by the Duval Prepares Partnership.	COJ 2017 CEMP - Mitigation Opportunities	Voluntary organization that communicates mitigation opportunities through educational outreach programs.
Education/Awareness/ Training/ Communication	EPD will coordinate education and training in mitigation-related issues concerning any actions that may save lives and property.	COJ 2017 CEMP - Public Awareness and Education	Information is communicated to the public throughout the year about hazards, vulnerabilities and disaster preparedness. Public education promotions and on-site presentations are conducted annually.
Decrease Vulnerability	Training Activities for preparedness, recovery, mitigation and response.	COJ 2017 CEMP - Training	The Planner for Training and Exercise is also responsible for emergency preparedness training.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	Examples of long-term redevelopment actions focus on economic resumption, land use planning, infrastructure reconstruction, structural and facility repair, environmental restoration, historic and cultural site preservation and restoration and hazard mitigation.	COJ 2012 Post Disaster Redevelopment Plan - Section 3.1.2	Completed in 2012 with coordination from various local, state and federal agencies and organizations.
Reduce Risk	The PDRP emphasizes seizing opportunities for hazard mitigation.	COJ 2012 Post Disaster Redevelopment Plan - Section 5.3.1.1	Include mitigation in post-disaster decisions, planning, and redevelopment.
Reduce Risk	Establish and coordinate damage assessment reports and mitigation opportunities for historic structures and sites.	COJ 2012 Post Disaster Redevelopment Plan - Section 6.2 Objective 2.1.5	Under Goal 2.1 to preserve and protect historic properties.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	Using hazard mitigation measures when assessing recovery needs prior to issuing permits post disaster.	COJ 2012 Post Disaster Redevelopment Plan - Section 6.2 Objective 5.3.8	Under Goal 5.3 to support means that expedite housing recovery.
Reduce Risk	Damage assessment inspectors should be cross trained to identify hazard mitigation opportunities.	COJ 2012 Post Disaster Redevelopment Plan - Section 6.2 Objective 5.4.4	Under Goal 5.4 to identify protocols for habitability evaluations



Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	Identify critical infrastructure mitigation project sites; encourage requiring damaged structures to be restored using hazard mitigation measures to reduce vulnerability.	COJ 2012 Post Disaster Redevelopment Plan - Section 6.2 Objective 6.6.2 and 6.6.7	Under Goal 6.6 to support long term infrastructure and facility repairs and restoration.
Land Use/ Zoning/ Development Controls/ Incentives	To ensure that development within the coastal area is compatible with the coastal area's natural character.	COJ 2030 Comp Plan - CCM Goal 11, Objective 11.1	Supported with associated policies.
Decrease Vulnerability	The City shall make every reasonable effort to ensure the public safety, health and welfare of people and property from the effects of coastal storms and hurricane damage.	COJ 2030 Comp Plan - CCM Goal 7, Objective 7.1, and Policy 7.1.1	Evacuation times have been established. Goal and objective supported by associated policies.
Decrease Vulnerability	New or expanding boat facilities shall provide adequate protection against storm surges, winds, hurricanes, petroleum, chemicals, or other hazardous material spills.	COJ 2030 Comp Plan - CCM Objective 10.3	Being implemented through boat facilities citing criteria and state and federal regulations that address spills/hazardous materials. Supported by associated policies.
Decrease Vulnerability	All boat facilities must ensure protection of water quality consistent with the Boat Facilities Siting Plan requirements and the other water quality requirements.	COJ 2030 Comp Plan - CCM Objective 10.4	Being Implemented through a State permitting process with SJRWMD and FDEP.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	The City shall reduce the potential for contamination of water and natural resources as a result of chemical spills, and will continue to implement the hazardous waste management program.	COJ 2030 Comp Plan - CCM Objective 2.5 and 2.6	Supported by associated policies.
Reduce Risk	The City shall protect the hydrological and ecological benefits of flood plain areas, such as water quality, fish and wildlife habitat, and prevention of downstream flooding.	COJ 2030 Comp Plan - CCM Objective 2.7	Supported by associated policies to prevent local flooding hazards.
Decrease Vulnerability	City shall encourage the continuance of federally authorized Jacksonville Beach, beach restoration projects.	COJ 2030 Comp Plan - CCM Objective 6.2	All policies under this objective are either being implemented or part of ongoing programs. Objective supported by associated policies.
Reduce Risk	City shall continue to ensure access to beaches, coastal shoreline, and the St. John's River and its tributaries available to public.	COJ 2030 Comp Plan - CCM Objective 6.5	All policies under this objective are either being implemented or are part of ongoing programs.
Decrease Vulnerability	Calls for implementation of the Basin Management Action Plan and restoration of the health of the River and its tributaries.	COJ 2030 Comp Plan - CCM Objective 6.6	Being implemented. The City continues to coordinate with FDEP and St. Johns Water Management District to implement the Total Maximum Daily Load (TMDL) program.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	Adequate shelter space shall meet standards for populations in Hurricane Evacuation Zones at risk under Zone C storm event; the City should assist in providing shelter and transportation for special needs population.	COJ 2030 Comp Plan - CCM Objective 7.2 and Policies 7.2.1 and 7.2.6	Being implemented. Shelter criteria and standards under constant review with American Red Cross and Duval County Public Schools, Florida State College at Jacksonville and University of North Florida.
Decrease Vulnerability	Limit public expenditures that subsidize growth by ensuring that building and development activities are carried out in a manner which minimizes danger to life and property from natural disasters and restricting intensity of development within CHHA.	COJ 2030 Comp Plan - CCM Objective 7.3	Successfully implemented under existing policies; existing codes, FEMA requirements and FDEP regulations adequate for compliance. Supported by associated policies.
Reduce Risk	Limit development and density within CHHA; direct it outside the CHHA; mitigate impact of natural hazards in area.	COJ 2030 Comp Plan - CCM Objective 7.4	Being implemented; policy in place that promotes clustering; further defined facilities prohibited in CHHA.
Decrease Vulnerability	Within 60 days of occurrence of major destructive storm, City shall prepare post-disaster plan to reduce or eliminate exposure of human life and property to natural hazards.	COJ 2030 Comp Plan CCM Objective 7.5	A Post Disaster Redevelopment Plan has been drafted and adopted by the City. Objective supported by associated policies.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	The City will continue to update the Master Storm water Management Plan to ensure that the necessary storm water system is in place.	COJ 2030 Comp Plan - CCM Policy 2.3.3	Takes place within the 22 targeted septic tank phase out areas. For pollution control.
Reduce Risk	The City shall limit public expenditures in the CHHA, to those improvements which restore or enhance natural resources or which maintain existing public facilities and services at their existing levels.	COJ 2030 Comp Plan - CIE Objective 1.4 Policy 1.4.4	Excluding public recreation expenditures.
Decrease vulnerability	The City must utilize Level of Service (LOS) standards for Mass Transit, Traffic Circulation, Drainage, Sanitary Sewer, Solid Waste, Potable Water, Recreation and Open Space and Schools when reviewing the impacts of new development.	COJ 2030 Comp Plan - CIE Policy 1.1.5	Specific standards for each concurrency area can be found within the Capital Improvement Element (CIE) of the Comp Plan.
Decrease Vulnerability	Maintain, enhance and conserve natural and environmental resources, especially coastal resources, and ensure that all development and redevelopment within the coastal areas is consistent with the CCM Element including the Hurricane Evacuation Plan.	COJ 2030 Comp Plan - FLUE Objective 1.5	Supported by associated policies.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	Regulation of the type and density/intensity of development in the CHHA in order to protect the public health, safety and welfare, and the natural environment.	COJ 2030 Comp Plan - FLUE Policy 4.1.1	Regulation of CHHA development.
Decrease Vulnerability	The City shall maintain a method for financing the operation and management of storm water facilities; funding shall be used to reduce existing flooding.	COJ 2030 Comp Plan - Infrastructure Policy 1.4.1	Flood reduction policies.
Decrease Vulnerability	Public Works shall deny permits to any new development that fills a flood plain without compensation for the fill by excavating an equal volume or improvement to the drainage system.	COJ 2030 Comp Plan - Infrastructure Policy 1.5.2	Flood reduction policies.
Decrease Vulnerability	The City shall delineate for all new or expanded roadway facilities planned for construction within four miles of the Atlantic Ocean, the facility's role in the hurricane evacuation plan for the Beaches.	COJ 2030 Comp Plan - Transportation Policy 3.1.1	Coordination of roadway planning with the current Hurricane Evacuation Plan.
Decrease Vulnerability	City shall establish construction standards that minimize the impacts of man-made structures on beach or dune systems.	COJ 2030 Comp Plan, CCM Objective 6.3	Implemented and regularly updated as need requires. Building codes have been adopted that include hurricane wind force standards.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Decrease Vulnerability	Facilities designated as a hurricane evacuation route will be clearly identified as such with proper signage. Improvements to primary hurricane evacuation routes shall be maintained at elevations above the Zone C and D storm surge.	COJ 2030 Comp Plan, TE Policy 3.1.2	A portion of this policy is new from the 2009 EAR-based amendments.
Prevent Repetitive Flooding	City Floodplain Management Ordinance.	COJ Code of Ordinances Chapter 652 - Floodplain Management	The provisions of this Chapter shall apply to all development that is wholly within or partially within any flood hazard area.
Land Use/ Zoning / Development Controls/ Incentives	Strict regulation of standards for development.	COJ Code of Ordinances Chapter 654 – Subdivisions	On-going
Land Use/ Zoning / Development Controls/ Incentives	Strict regulation of exceptions and variances.	COJ Code of Ordinances Chapter 656 - Zoning Code	On-going
Decrease Vulnerability	To create and maintain a local disaster preparedness agency in the City and to authorize cooperation with the federal and state governments, other local disaster preparedness agencies, and other local groups and individuals.	COJ Code of Ordinances Chapter 674 - Disaster Preparedness and Mayor's Executive order 96-201	Disaster preparedness and civil emergency. Establishes Security and Emergency Preparedness Planning Council (SEPPC) and specifies disaster preparedness, response and recovery procedures.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	Storm-water Management Plan.	COJ Code Of Ordinances Chapter 754 - Master Storm-water Management Utility Code	To improve the public health, safety and welfare by providing for the safe and efficient capture and conveyance of storm-water runoff and the correction of storm-water problems.
Education/Awareness/ Training/ Communication	Public education and awareness for disaster preparedness.	COJ Emergency Preparedness Programs	On-going Programs
Land Use/ Zoning/ Development Controls/ Incentives	NFIP/CRS/FIRM's standards and requirements for flood insurance policies, community discounts.	COJ FEMA Programs	City passed FEMA audit/Application submitted for CRS
Land Use/Zoning/ Development Controls/ Incentives	Recommends protection of environmentally sensitive and unique features with Special Management Area activities (natural drainage systems).	COJ Growth Management Task Force Report – Final Recommendations: Issue Six p.61	5 areas created by COJ Comp Plan for conservation. One area (Timucuan Preserve) protected under Federal program Public Law 100-249 (1988). Another under F.S. Ch.258 (Aquatic Preserve) Third area (Julington-Durbin Creek Peninsula) acquired by COJ, State and St. Johns River Water Management District (SJRWMD). Conservation easement over portion of 4th area (Cedar Swamp) was acquired by COJ, State and SJRWMD
Reduce Risk	Evaluate potential sensitive natural areas for protection.	COJ Growth Management Task Force Report – p. 30	Conservation dedications encouraged where possible with land use changes.
Increase Recovery Capabilities	Promote more “Supply side” economic development opportunities.	COJ Growth Management Task Force Report – p. 58	Encourages diversification with 2 initiatives.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Land Use/ Zoning / Development Controls/ Incentives	Encourage infill development and improve and maintain sound infrastructure conditions (roads, drainage, water and sewer).	COJ Growth Management Task Force Report - p.53	Incentives for infill housing investments in specified area adopted; mixed use districts being established; Springfield Zoning Overlay Study completed; funding for septic tank replacement complete.
Reduce Risk	Promote implementation of on-going storm water management program and create dedicated funding source (long-term funding for drainage projects).	COJ Growth Management Task Force Report – p.55, 59;	Funding for drainage improvements.
Decrease Vulnerability	Master transportation plan should address area wide integrated, multi-modal transportation approach that includes roadway prioritization and linkages of transportation facilities for ultimate build out of City.	COJ Growth Management Task Force Report (Transportation Section)– p. 5	Broad transportation master planning process funding initiated in 1998.
Reduce Risk	Recommends underground utilities where possible.	COJ Growth Management Task Force Report p.17	Recommended for both aesthetic reasons and as a mitigation function.
Education/Awareness/ Training/ Communication	Enhanced procedures and routes to facilitate expedient evacuation.	COJ Hurricane Evacuation Traffic Management Plan (EPD)	Plan has been approved.
Land Use/ Zoning / Development Controls/ Incentives	Regulates development/building process.	COJ Land Development Regulations	Referred to as the “Red Book”



Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	Industrial wastewater facilities must provide information to describe practices to be followed to ensure adequate wastewater treatment during emergencies such as power loss and equipment of the proposed/permitted facility.	FDEP Industrial Wastewater Permit Application Form	Permit issuance is dependent upon satisfaction of all conditions in the application (Compliance and enforcement are a routine part of the Department's activities).
Decrease Vulnerability	Management of federal disaster related policies and programs; National Mitigation Strategy guides federal policy.	Federal Emergency Management Agency (FEMA)	County meeting state and federal requirements.
Reduce Risk	Wetland projects must not cause adverse flooding to on-site or off-site property.	Florida Administrative Code 62-330.200(2)(c) which adopts 40C-4.301(1)(b) Florida Department of Environmental Protection (FDEP)	This requirement is evaluated and addressed during review of the permit application (Compliance and enforcement are a routine part of the Department's activities).
Reduce Risk	Solid waste disposal sites are prohibited from being located in the 100-year floodplain where it will restrict the flow of the 100-year flood, reduce the temporary water shortage capacity of the floodplain unless compensating storage is provided, or result in a washout of solid waste.	Florida Administrative Code 62-701.340(4)(b) (FDEP)	This requirement is evaluated and addressed during review of the permit application, (Compliance and enforcement are a routine part of the Department's activities).

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Decrease Vulnerability	Emergency provisions for damage of existing coastal structures and protection of public infrastructure and private structures.	Florida Administrative Code Ch. 62B-33.0051 Coastal Armoring (FDEP)	Ongoing.
Decrease Vulnerability	Public drinking water supply wells shall be located on ground least subject to localized flooding.	Florida Administrative Code Chapter 62-555.312(5) (FDEP)	This is addressed during permit application review, (Compliance and enforcement are a routine part of the Department's activities).
Decrease Vulnerability	Firewise Community Program.	Florida Forest Service	Educates homeowners and community professionals about creating defensible space around their homes, helping to protect them from the dangers of wildfire.
Reduce Risk	(1) Wetland projects shall not be harmful to the water resources or contrary to the public interest, (2) Wetland permits shall not be issued for projects that are harmful to the water resources, or are contrary to the public's interest.	Florida Statute 373.414 and Florida Administrative Code 62-330.200(2)(c) which adopts 40C-4.302 (FDEP)	On-going; during review process.
Decrease Vulnerability	Creation of the Florida Division of Emergency Management and their responsibilities.	Florida Statute Chapter 252 - Florida Division of Emergency Management	The Florida Division of Emergency Management plans for and responds to both natural and man-made disasters. These range from floods and hurricanes to incidents involving hazardous materials or nuclear power.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	It is the intent of the Legislature that local government comprehensive plans restrict development activities where such activities would damage or destroy coastal resources, and that such plans protect human life and limit public expenditures in areas that are subject to destruction by natural disaster.	Florida Statutes 163.3178 Coastal Management	Supported by Florida Statute Chapter 163.3177 requiring that Comprehensive Plans include a Coastal Management Element.
Reduce Risk	Florida Forest Service will identify activities required to minimize threat of wildlife in areas of new development or adjacent to wild lands.	Florida Statutes Chapter 590.02(6)	The Florida Forest Service shall undertake privatization alternatives for fire prevention activities including constructing fire lines and conducting prescribed burns and, where appropriate, entering into agreements or contracts with the private sector to perform such activities.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Decrease Vulnerability	Permitted hazardous waste facilities must meet all siting requirements of both rules before permit will be issued. Florida Statute 403 requires specific setback distances from residences, hospitals, nursing homes, day care facilities, schools, and churches. 40 CFR 264 location standards restrict hazardous waste treatment, storage or disposal facilities in seismic fault areas, 100 year floodplains and salt dome formations.	Florida Statutes, 403.7211, and 40 CFR 264.18 (FDEP)	Permits are not issued unless all conditions for siting are met, (Compliance and enforcement are a routine part of the Department's activities).
Land Use/ Zoning / Development Controls/ Incentives	Regulates building code for construction in coastal areas.	Florida Statutes, Ch. 161.053	Establishes Coastal Construction Control Lines.
Decrease Vulnerability	The vulnerability of the people and property of Jacksonville Beach to coastal hazards such as hurricane damage and coastal flooding shall be minimized.	Jacksonville Beach (JB) 2030 Comp Plan - CM Goal CM.3 and Objective CM.3.1	Supported by policies aimed to restrict development within CHHA and curtailing public funding in this area.
Decrease Vulnerability	The City's hurricane evacuation time for a Zone C storm shall be less than 12 hours.	JB 2030 Comp Plan - CM Objective CM.3.2	Supported by policies aimed to keep evacuation times below 12 hours.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Decrease Vulnerability	The City shall provide immediate response to post-disaster emergency situations. Priority shall be given to ensure public health, safety and welfare.	JB 2030 Comp Plan - CM Objective CM.3.3	Supporting policies include Local Peacetime Emergency Plan, evacuation re-entry, Recovery Task Force Development, repair and clean up actions, coastal zone requirements, and the contingency fund.
Reduce Risk	Construction seaward of the CCCL shall be strongly discouraged.	JB 2030 Comp Plan - CM Policy CM.1.3.1	Development in strict compliance with existing regulations.
Decrease Vulnerability	New sanitary sewer facilities shall be flood proofed and designed to insure that raw sewage will not leak from them during flooding and storm events.	JB 2030 Comp Plan - CM Policy CM.3.1.4	On-going
Land Use/ Zoning/ Development Controls/ Incentives	Undeveloped lands within Coastal High Hazard Area (CHHA) shall be designated "conservation-protected areas" on Future Land Use Map, and CHHA shall be shown on city zoning map.	JB 2030 Comp Plan - CM Policy CM.3.1.7	On-going
Land Use/ Zoning / Development Controls/ Incentives	Land use amendments shall not be approved in Zone C Hurricane Vulnerability Zones unless they (1) reflect existing conditions, (2) are for lower density or (3) the developer pays impact fee for all road improvements.	JB 2030 Comp Plan - CM Policy CM.3.2.2	On-going

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Decrease Vulnerability	Future improvements to Emergency Evacuation Route roads shall include remedies to reduce or eliminate hindrances likely to result from flooding.	JB 2030 Comp Plan - CM Policy CM.3.2.3	All evacuation routes in Jacksonville Beach are under control of JTA and/or FDOT.
Education/Awareness/ Training/ Communication	The City of Jacksonville shall assist the County with the development of the LMS.	JB 2030 Comp Plan - CM Policy CM.5.1.4	A JB representative will be present on the LMS advisory committee.
Decrease Vulnerability	City will join with adjacent local communities to coordinate local input into future beach re-nourishment projects performed by USACE (also Intergovernmental Coordination).	JB 2030 Comp Plan - CM Policy CM.5.2.2	On-going; cyclical USACE contract.
Reduce Risk	Identify and recommend to the State and SJWMD floodplains that would warrant acquisition under Conservation and Recreation Lands (CARL) program.	JB 2030 Comp Plan - Conservation Pol.1.3.1	On-going, various grant program applications, i.e. Preservation 2000, Surface Water Improvement and Management (SWIM), and CARL programs.
Reduce Risk	Future land development shall protect the natural functions of floodplains.	JB 2030 Comp Plan - FLUE Policy LU.1.4.7	Reduce development in floodplains.
Decrease Vulnerability	Work with MPO (now the TPO) and FDOT on identifying and finding solutions to deficiencies on State maintained road (Evacuation Routes).	JB 2030 Comp Plan - Traffic Circulation Pol. 1.2.4	On-going

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Decrease Vulnerability	All buildings must be built to withstand various wind loads.	JB Code of Ordinances - Buildings and Building Regulations	Chapter 7
Decrease Vulnerability	Calls for evacuation of entire city for Category 3, 4, or 5 hurricanes.	JB Emergency Operations Plan	As needed; Now superseded by new Storm Surge evacuation Zone maps.
Decrease Vulnerability	Outlines emergency procedures – Hurricane SOP calls for identification and initiation of long term mitigation strategies based on Comprehensive Plan.	JB Emergency Operations Plan	Post-disaster, on-going.
Land Use/ Zoning / Development Controls/ Incentives	Regulations for building and development in flood hazard areas – standards for variances.	JB Land Development Regulations Section 34-467	On-going
Land Use/ Zoning / Development Controls/ Incentives	Flood Hazard area development code restricts use and density.	JB Land Development Regulations Section 34-467	On-going
Land Use/ Zoning / Development Controls/ Incentives	For any structure damaged by more than 50percent of its assessed value, the entire structure must be brought into compliance with current codes.	JB Zoning Code	On-going

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Decrease Vulnerability	Neptune Beach (NB) will restrict further new development or redevelopment that would destroy or otherwise damage coastal resources; discourage development in the CHHA; cooperate and participate with all applicable agencies on hurricane preparedness planning; and prepare a post-disaster redevelopment plan.	NB 2012-2022 Comp Plan - Coastal Resources Goal E.1, Objectives E.1.4, E.1.5, and E.1.6	Supported with associated policies.
Decrease Vulnerability	Neptune Beach shall coordinate future land uses and coastal area population densities with appropriate regional hurricane plans.	NB 2012-2022 Comp Plan - FLUE Objective A.1.0 and Policy A.1.6.1, .2, and .3	Policy E.1.6.1 specifies that the city will update its hurricane evacuation plan as necessary to achieve related policies.
Land Use/ Zoning/ Development Controls/ Incentives	Neptune Beach shall restrict any further new development or redevelopment that would destroy or otherwise damage coastal resources; discourage further urban development and shall limit public expenditures that subsidize development in CHHA; cooperate and participate with county hurricane evacuation times; and prepare a post-disaster redevelopment plan.	NB 2012-2022 Comp Plan - Goal E.01 Coastal Resources, Objectives E 01.4, E.01.5, E.1.6.	Supported by policies related to hurricane evacuation, post-disaster redevelopment and intergovernmental coordination.



Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Land Use/ Zoning / Development Controls/ Incentives	Through a PDRP, direct population concentrations away from defined CHHA.	NB 2012-2022 Comp Plan - Objective E.1.4.1, E.2.2	Control redevelopment activities within storm-damaged areas.
Reduce Risk	Storm-water drainage regulations will provide for efficient system to protect life, property and natural environment at a cost consistent with the public welfare, protect and maintain natural groundwater aquifer recharge areas.	NB 2012-2022 Comp Plan - Policies and Objectives D.1.1.1, D.3.1, E.1.2, E.2.2, H.1.1	
Land Use/ Zoning/ Development Controls/ Incentives	Eliminate septic tanks as centralized service is made available, as requested by residents, or because of septic tank failures.	NB 2012-2022 Comp Plan - Policy D.1.3.1	Supported by additional policies.
Decrease Vulnerability	Storm-water Drainage Regulations in Neptune Beach's Land Development Regulations (LDR) will provide for an efficient storm drainage system in order to protect life, property and the natural environment.	NB 2012-2022 Comp Plan Goal D.3, Objective D.3.1	Supported by associated policies to prevent local flooding hazards.
Land Use/ Zoning/ Development Controls/ Incentives	Establish processes among the various governmental agencies to achieve coordination of all development activities; preservation of the quality of life; and efficient use of available resources.	NB 2012-2022 Comp Plan Goal G.1	Supported by associated objectives and policies for intergovernmental coordination.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Decrease Vulnerability	Land development regulations shall contain provisions for regulations for areas subject to seasonal and periodic flooding.	NB 2012-2022 Comp Plan Policy A.1.1.5	
Land Use/ Zoning / Development Controls/ Incentives	Neptune Beach shall establish policies which will restrict development and redevelopment activities within the 100-year flood plain. Floodplain LDRs shall establish minimum first floor levels above the FEMA 100-year floodplain elevation.	NB 2012-2022 Comp Plan Policy E.1.2.1	
Reduce Risk	Minimize capital investment that subsidizes development in high-hazard coastal areas.	NB 2012-2022 Comp Plan, Obj. H.1.2	Supported by associated policies.
Decrease Vulnerability	Neptune Beach adopted the latest edition of the Florida Building Code.	NB Code of Ordinances Section 8-26	
Decrease Vulnerability	Hurricane evacuation procedures for community and Neptune Beach city government; protection of public health and welfare, critical records and facilities during evacuation, response and recovery.	NB Hurricane Preparedness Plan	Plan anticipates 4 day operation of government without outside assistance; reviewed each April.
Decrease Vulnerability	Establishes pre-approved local wind load standards for single family wood frame construction.	NEFBA Wind Standards for Single Family Dwellings	Promotes pre-engineered local standards for specific types of construction; under-used.

Duval County Mitigation Policies			
Category	Policy/ Objective	Source	Notes
Reduce Risk	Updated SLOSH model of potential storm surge and flooding from hurricanes of five different intensities.	NEFRC Storm Surge Atlas, December 2010	Updated in 2010 with new data.
Increase Recovery Capabilities of Business and Industry	Resources for training businesses in disaster planning.	U.S. Chamber of Commerce	Resources to agencies and organizations and tools for planning and training for business.

## D. USCG Maritime Mitigation Plans

The below table provides a description of the various standing Area and Port level committees that provide contingency planning and response support for pre-incident planning and response mitigation within the maritime domain. The USCG maintains jurisdictional responsibility for safety and security of Jacksonville's Port facilities and coastal waters.

A brief description of the committees:

1. Harbor Safety Committee – led by the local Marine Exchange, this committee provides professional maritime expertise and recommendations to the USCG in regard to navigation safety and maritime response planning issues. This group meets quarterly. Recent topics include the development of Regulated Navigation Areas within the port, maritime firefighting procedures, and towing vessel safety issues.
2. Area Maritime Security Committee – Co-chaired by the USCG Captain of the Port and the Jacksonville Port Authority and developed post 9-11, this group provides insight and guidance into the development of risk reduction strategies in North East and East Central Florida Ports. This includes development and management of the Area Maritime Security Plan, conducting annual Security Risk Analysis and Mitigation Planning, and coordinating multiple federal, state, and local agency resources for post-incident response management.
3. Area Planning Committee – Chaired and led by the USCG and the Florida Department of Environmental Protection, this committee provides subject matter expertise and guidance into the development of the Area Contingency Plan for Oil and Hazardous Material Response. This comprehensive plan provides detailed information on pre-identified high risk environmental risk areas, critical wildlife habitats, pre-determined priority protection strategies, resources, and incident management organization. This committee also aligns closely with the Local Emergency Planning Committees (LEPCs) in Duval County to ensure alignment of plans and integration of resources in addition to pre-incident training/collaboration opportunities.

Most committees meet on a semiannual or quarterly basis. The meeting membership, schedule, agenda development, and final delivery of products are typically the responsibility of the appropriate USCG Sector Jacksonville representatives who also act as the Executive Secretary for the committees.

Contingency plans contain elements of prevention, preparedness, response, and recovery. All of the below Contingency Plans can be found on U.S. Coast Guard Sector Jacksonville's Homeport Website: <https://homeport.uscg.mil/jacksonville>.

The Area Maritime Security Plan (AMSP) will require registration in Homeport and the completion of a Non-Disclosure Agreement (NDA) prior to receiving access to the contingency plan. All other plans can be found on the open-source side of homeport and do not require registration.

**Table 11: USCG Maritime Plans**

<b>Committee</b>	<b>Hazard Type</b>	<b>Applicable Contingency Plan(s)</b>	<b>Hyperlink to Contingency Plan</b>
<b>Harbor Safety Committee (HSC)</b>	Heavy Weather (Hurricane/Tropical Storm)	Port Heavy Weather Plan for NE and East Central Florida	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29</a>
	Marine Firefighting	Area Contingency Plan for NE and East Central Florida (ACP)	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29</a>
	Vessel Sinking (Marine Casualty)	Salvage Response Plan for NE and East Central Florida	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29</a>
	Port Closure or Port Business Interruption	NE and East Central Florida Marine Transportation System Recovery Plan	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29</a>
	Oil Discharge/Spill	Area Contingency Plan for NE and East Central Florida (ACP)	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29</a>
	Transportation Security Incident (TSI)	Area Contingency Plan for NE and East Central Florida / Sector Jacksonville Marine Transportation System Recovery Plan	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29</a>
	Hazardous Material Discharge/Incident Response	Area Contingency Plan for NE and East Central Florida (ACP)	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/area-contingency-plan?cotpid=29</a>
<b>Area Maritime Security Committee (AMSC)</b>	Transportation Security Incident	NE and East Central Florida Area Maritime Security Plan (AMSP)	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29</a>
	Port Closure or Port Business Interruption	Sector Jacksonville Marine Transportation System Recovery Plan	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29</a>
<b>Area Planning Committee (APC) (2 committees – NE and East Central Florida)</b>	Heavy Weather	Port Heavy Weather Plan for NE and East Central Florida	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29</a>
	Marine Firefighting	Area Contingency Plan for NE and East Central Florida (ACP)	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29</a>
	Oil Spill	Area Contingency Plan for NE and East Central Florida (ACP)	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29</a>
	Hazardous Material Discharge/Incident Response	Area Contingency Plan for NE and East Central Florida (ACP)	<a href="https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29">https://homeport.uscg.mil/my-homeport/contingency-plans/local-contingency-plans?cotpid=29</a>

*Section II*

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## SECTION III – HAZARD IDENTIFICATION AND VULNERABILITY ANALYSIS

### A. Identifying Hazards

FEMA defines natural hazards as natural events that threaten lives, property, and other assets. Therefore, identification of consequences in emergency management planning stress the identification of consequences in emergency management planning on vulnerability (the expected severity of the event), probability (the frequency of past events) and risk (equal to the vulnerability as compared to the probability of future events).

The science, collaboration, and planning for the implementation of an effective mitigation program in the City of Jacksonville has grown exponentially since the inception of the Disaster Mitigation Act of 2000. Over the past 19 years, the City of Jacksonville, in cooperation with its jurisdictions, partners, and stakeholders, have integrated the planning and strategies that comprise mitigation and resilience into the “whole community” approach espoused by FEMA for an effective mitigation program. The program follows through the cycle of preparedness, response, recovery and mitigation.

The process for the update of the 2020 LMS is contained in **Appendix B**. To ensure the development of a functional document that will facilitate hazard mitigation activities in the City of Jacksonville, the LMS Advisory Committee (also known as Duval Prepares) members who are subject matter experts, practitioners or representatives of municipalities, convened to examine a county-wide HIVA that considered natural and man-made/technological hazards. This assessment built upon the initial LMS adopted in 1998, which was ratified and expanded in the subsequent 2005, 2010, and 2015 updates. This comprehensive process provides planning assumptions for pre-disaster statistical basis for post-disaster planning and recovery by identifying local hazards and hazard areas, defining all areas of vulnerability, both geographic and demographic, and assessing the capacity of the community to mitigate the effects of those hazards. In addition, this assessment addresses the probability of occurrence of each hazard.

#### Planning Assumptions

The planning assumptions established by the committee members for the basis for prioritizing hazards, vulnerabilities, and risks, are as follows:

- Hazard identification was accomplished by examining the City of Jacksonville’s geography, population estimates and demographics, land use, and development patterns. This assessment assisted the committee in determining hazards and ranking them.
- The committee examined the most significant hazards to the City of Jacksonville, based on:
  - Probability of occurrence,
  - Severity of the hazard,
  - Percent of population affected,
  - Frequency of occurrence, and
  - Potential Impacts from hazards.
- As ratified in the 2015 LMS Update, thunderstorms hail, and tornados were combined into one hazard; this combination was maintained as “Severe Weather” in the 2020 update.
- All information not attributed in the LMS to a specific source is sourced with the City of Jacksonville’s CEMP, updated in 2017, and currently in the midst of its three-year planning cycle. The CEMP will be updated to reflect any new hazards identified in the 2020 LMS.

- Specific impacts were included for each hazard, and a range of potential impacts to the following core areas were included. Wherever possible, these potential impacts were standardized to the impacts included in the Florida Enhanced State Hazard Mitigation Plan (*SHMP, 2018*) for consistency in planning and funding source allocation:
  - Public
  - Responders
  - Continuity of Operations (including continued delivery of services)
  - Property, Facilities, Infrastructure
  - Cost of repairing damage to property such as buildings
  - Environment
  - Economic Condition
  - Public Confidence in Jurisdiction's Governance
- Historically, numerous natural and man-made disaster events have impacted the City of Jacksonville. However, while historic data can provide significant knowledge of disaster types, extent of impact and frequency of occurrence, neither past frequency nor the historical absence of particular events can accurately predict the likelihood of future events or their magnitude. Assumptions are made concerning the parameters and definitions of magnitude. Historical record, if available, is provided in this section. See **Table 13**.
- The risk assessment was conducted with an all-hazards approach and a few hazards were not considered to be significant enough to be address in the final document. For the purposes of this analysis and to ensure compliance and cohesion among the baseline documents used for emergency management planning, the following hazards are eliminated from further discussion in this update:
  1. Dams/Levee Failure
  2. Tsunami
  3. Earthquake
  4. Volcano

These hazards were eliminated from further review due to the extremely low probability of occurrence, no recorded history or data of the hazard taking place within the City of Jacksonville, difficulty in prediction and/or unlikelihood of effective mitigation.
- Two natural hazards are addressed through non-infrastructure based mitigation strategies, as follows:
  1. Extreme Temperatures < 28 degrees or > 98 degrees Fahrenheit
  2. Drought
- Man-made and technological hazards are included in this analysis after the Duval Prepares advisory body concluded the vulnerability, risk and probability of these hazards remain a concern for the City of Jacksonville. Subject matter experts available to the City of Jacksonville provided assessments from the military, Florida Department of Health, the Jacksonville Department of Environmental Compliance, Jacksonville Sheriff's Office, Department of Homeland Security, and JEA - the authority responsible for the electrical, water and sewer utility serving 99 percent of the county. The Human-caused and technological hazards that are identified are as follows:
  - Cyber Attacks
  - Terrorism/Targeted Violence (Active Shooter/Lone Offender, Biological/ Chemical Attack, and Explosive Attack)
  - Hazardous Materials Incidents
  - Critical Infrastructure Disruption



## Natural Hazards

The description of the hurricane hazard to the City of Jacksonville and its jurisdictions has been based upon the information available through the 2013 Florida Statewide Regional Hurricane Evacuation Program (hereafter referred to as the Hurricane Evacuation Study). The National Weather Service (NWS) updated the natural hazard analysis using a 64-year period rate of return for the following hazards:

- Tropical Cyclone
- Severe Weather
- Storm Surge
- Extreme Heat
- Sea Level Rise
- Flooding
- Human and Animal Disease
- Drought
- Saltwater Intrusion
- Coastal Erosion
- Winter Storm and Freezing Temperatures

## **B. Geography and Relationship to Hazards**

The geography of the City of Jacksonville and its jurisdictions was discussed in Section I of the LMS. The business, commercial, and industrial development in the county led to the expansion of job opportunities. The economic growth stimulated the residential growth. Satellite developments grew up and continue to expand in remote areas of the City of Jacksonville. Areas include Arlington, Mandarin, Ortega, the communities west of the Intracoastal Waterway, and the Beaches. The population growth in these areas, which were once remote and isolated, today makes up the unified urban fabric of the City of Jacksonville. The population is now located in significant segments of floodplain, coastal plains, and other areas vulnerable to the hazards identified in this section.

### Transportation Network

The City of Jacksonville is well-connected to its region, the state and nation by several interstate and other federal highways, an international airport, two municipal airports, extensive rail service provided by three major railroads (Norfolk Southern, Florida East Coast, and CSX) and a major port for ocean and river traffic at JAXPORT.

The City of Jacksonville contains approximately 152 miles of highways, 403 miles of arterial roads, and 465 miles of collector streets (*JPPD, 2018*). In recent years, the I-295 Beltway connecting roads have been completed, enabling adjoining St. Johns and Clay counties improved access to and through the City of Jacksonville. The transportation network is the primary conduit for daily life activities of the City of Jacksonville and would be impacted by the natural and man-made/technological hazards for which the county has the most susceptibility. In the case of a tropical cyclone/hurricane, evacuation times would be impacted by the rate of road clearance and ensuing gridlock at the peak of evacuation.

### C. Land Use and Development Patterns in the the City of Jacksonville

More than 903,889 persons are estimated to live in the City of Jacksonville as of 2018. The pattern of development has resulted in large and scattered undeveloped areas within the City of Jacksonville. While some areas contain farms and large lot residential uses, large parts of the county, notably the southwest portion, is largely untouched, mostly held in large tracts of land devoted to tree farming. Economic downturns during the mid-2000s suppressed land use development throughout the City of Jacksonville. As the economy improves beyond 2020, more development will be proposed towards areas with a significant concentration of conservation land, rural residential, agriculture, and marshland, subject to storm surge and tidal waters. Development to the north and east towards the Intracoastal Waterway, and to the south, has resurged as the economy continues to stabilize. The following is a description of the most distinctive transportation, land use, and development patterns geographic features within the City of Jacksonville that contribute to the hazards with the most probability of risk and vulnerability. The following list summarizes the existing land use of the City of Jacksonville: (Source: U.S. Census Bureau, American Fact Finder, 2018 Population Estimates).

**Table 12: Generalized Future Land Uses in the City of Jacksonville**

Statewide Regional Evacuation Study Program

Volume 1-4 Northeast Florida

Table IC-17. Generalized Future Land Uses, 2010

Code	Land Use Category	Acres	%
AG	Agriculture	127,727	23.17
COM	Commercial / Office	32,876	5.96
CONS	Conservation	27,293	4.95
IND	Industrial	22,818	4.14
MU	Mixed-Use	33,178	6.02
PUB	Public	54,982	9.97
REC	Recreation / Open Space	9,552	1.73
RL	Residential Low Density	18,370	3.33
RM	Residential Medium Density	174,355	31.63
RH	Residential High Density	178	0.03
UNK	Unknown	0	0.0
WAT	Water Bodies	49,885	9.05
Total		551,214	100

Source: Duval County, Baldwin, Atlantic Beach, Neptune Beach, Jacksonville Beach

Source: Hurricane Evacuation Study 2013

The City of Jacksonville Beach is the largest inland area of the three beach communities in the City of Jacksonville, occupying more than 22 square miles. It has 3.8 miles of beach, which suffers erosion mainly from northeasters and seasonal tropical storms. Approximately 68 percent of the city's land area is developed, and wetlands along the Intracoastal Waterway comprise approximately 25 percent of the land area. Current residential use of developed land is 32.1 percent. Estimates projected the population at more than 23,000 by the year 2015 (Source: Comprehensive Plan, City of Jacksonville Beach).

The City of Atlantic Beach is approximately 3.75 square miles in area, with about two miles fronting the Atlantic Ocean. Three physiographic regions cover the city: coastal, upland, and wetlands. Development in the city has traditionally been oriented toward the coastal area, which is almost fully developed with low and medium density residential land uses. The wetland zone is unsuited for development and remains open, while the upland zone is undergoing development with a wide range of land use types. The city is nearly built out with less than 10 percent of the incorporated land area currently undeveloped. (Source: City of Atlantic Beach 2020 Comprehensive Land Use Plan - Coastal Management/Conservation Element).

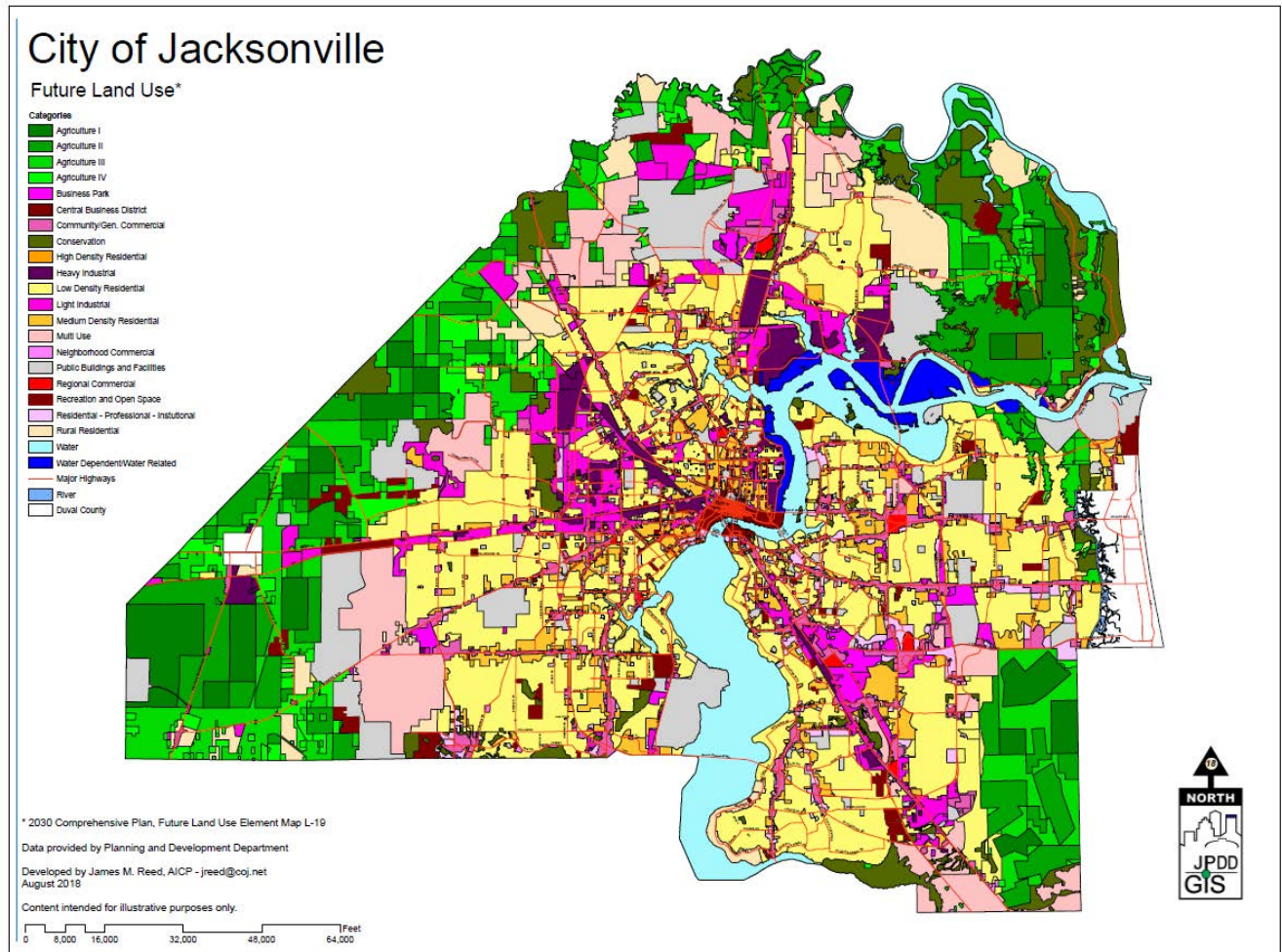
The City of Neptune Beach encompasses an area of approximately 2.5 square miles and is predominantly residential (more than 37percent). It is bounded by City of Atlantic Beach to the north and City of Jacksonville Beach to the south. It has more than one mile of beachfront and about 275 acres of marshland between the developed section on its western edge and the Intracoastal Waterway. The City Public Works Department reported that the City primarily has infill development and redevelopment since the City is mostly built out. All new development must adhere to the new flood plain ordinance and the new storm water ordinance (Ord. # 2013-02, City of Neptune Beach) *(Source: 2010 Comprehensive Plan, Neptune Beach)*.

As a result of oceanfront development and attendant seawall construction, inlet improvements and similar projects, the stability of the beaches has been jeopardized along the shoreline of the City of Jacksonville. Approximately 10.1 miles of shoreline in the county, which includes all three beach municipalities and a portion of Little Talbot Island north of the mouth of the St. Johns River near the Fort George Inlet, is considered critically eroded. Area is part of a Federal and State beach restoration project, which is continually maintained *(Source: Florida Department of Environmental Protection, Beaches and Coastal Systems)*.

The Town of Baldwin is located within 1,275 acres and developed land is chiefly residential (29 percent). However, large industrial facilities, a central rail facility, and major rail and highway transportation corridors are in close proximity. More than 60 percent of total land use in Baldwin is undeveloped, leaving large areas in and around Baldwin in agricultural use. Through inter-local agreements, water, sewer and police services from within the town are provided beyond the town limits *(Source: Town of Baldwin Comprehensive Plan)*.

Future land use plans and economic incentives are encouraging development in the north and northwest quadrants of the county. Additional industry has developed around the Jacksonville International Airport and more is expected. On the west side of Jacksonville, the City of Jacksonville Office of Economic Opportunity (OEC), the successor agency to the Jacksonville Economic Development Commission (JEDC), was tasked to continue the redevelopment master plan for the former Naval Air Station Cecil Field for civilian and commercial usage. Since the conveyance of approximately 8,300 acres, the OEC continued to promote the site as a prime location for companies in the manufacturing, industrial-related and distribution industries, as well as other uses including support retail and office space along the main roads. Educational and recreational resources have been located on the property. As of 2019, the OEC advised the complex is 100 percent occupied; the current redevelopment uses of the site include commercial, recreational and residential. Vacant, developable land is limited in the Beach communities. Jacksonville Beach and Neptune Beach are both approaching build-out and their boundaries cannot be extended *(Source: 2010 Comprehensive Land Use Plan, Neptune Beach; 2030 Plan-Jacksonville Beach)*.

Figure 6: The City of Jacksonville Future Land Use Map



Source: City of Jacksonville Planning and Development Department

## D. Hazards Update and Hazard Profiles

### Hazards Matrix

Listed below are hazards that were ranked by the LMS Working Group for the 2020 LMS Update. During the fall of 2018, the LMS Advisory Committee initiated the process to re-examine hazards and their impacts upon the City of Jacksonville and its jurisdictions. In consultation with the NEFRC, the 2020 LMS Update defines these vulnerabilities, probabilities and risks as an ordinal series of measurements of “low, Increased, moderate, High and Very High. According to the City of Jacksonville CEMP, no specific emergency sequence can be isolated as the model for which to plan because each emergency related to the hazard could have different consequences, both in nature and degree. Therefore the parameters for planning are based upon knowledge of the potential consequences, timing and release characteristics for a spectrum of emergencies including major natural and man-made incidents. Therefore, identification of consequences in emergency management planning focus on vulnerability (the expected severity of the event), probability (the frequency of past events) and risk (equal to the vulnerability as compared to the probability of future events).

## E. Probability of Occurrence - Summary

Determining the probability of occurrence of hazardous events is a complex and difficult process in analyzing the historical frequency of these events. Historical data is helpful, but cannot guarantee an accurate probability.

For hurricanes, three conclusions can be drawn from the historical data. One is that the City of Jacksonville will be affected by a hurricane, although, the probability of a hurricane hitting the county directly is low in any given year. The second conclusion is that any hurricane striking the area is likely to possess Category 1 or 2 winds, since these are more common than storms in higher categories. There is little in the area, except distance from the coastline, to mitigate wind effects. Wind damage, including that from tornados spawned by a hurricane is likely a risk factor as storm-caused flooding. The State of Florida adopted new construction standards with the 2010 State Building Code, with which new construction and permitted retrofits will aid with the mitigation of hurricane wind effects.

**Table 13: Duval County Major Disaster Declarations**

Year of Declaration	Title	Disaster Number
1964	Hurricane Dora	176
1968	Hurricane Gladys	252
1992	Severe Storm, Tornadoes and Flooding	966
1993	Tornadoes, Flooding, High Winds and Tide, Freezing	982
1996	Tropical Storm Josephine	1141
1998	Extreme Fire Hazard	1223
	Severe Storm, High Winds, Tornadoes and Flooding	1195
1999	FL Fires 04/15/99	3039
	Hurricane Floyd Emergency Declaration	3143
	Hurricane Floyd Major Disaster Declaration	1300
	Jacksonville District Fire	2262
2000	FL Jacksonville Fire Complex	2305
2001	Severe Freeze	1359
2004	Hurricane Frances	1545
	Hurricane Ivan	1551
	Hurricane Jeanne	1561
	Tropical Storm Bonnie and Hurricane Charley	1539
2005	Hurricane Katrina Evacuation	3220
2008	Tropical Storm Fay	1785
		3288
2012	Tropical Storm Debby	4068
2016	Hurricane Matthew	3377
		4283
2017	Hurricane Irma	3385
		4337
2019	Hurricane Dorian	3419
		4468

Source: FEMA's Open FEMA Datasets; <https://www.fema.gov/disasters>

The third conclusion is that the relative infrequency of hurricanes in the area, and the substantial growth of a population without direct experience of a hurricane event, has made the population complacent in determining personal risk and exposure, and consequently, minimizing the impacts of being exposed to a hurricane. The population growth and the pressures placed on the existing roadway system also greatly complicate evacuation measures. The emphasis placed on the danger of hurricanes downplays the danger of tropical storms, which affect the City of Jacksonville more often than hurricanes.

All people living at the Beaches, in manufactured housing, or within 100-year flood zones are at risk for serious property damage and personal injury from flooding and wind associated with tropical storms and hurricanes up to Category 3 which can be expected every 5 to 30 years. According to the 2008 Florida Hurricane Catastrophic Fund, the worth of property at risk to hurricane damage in that year amounted to \$87.8 billion. A Category 3 Hurricane can also be expected to disrupt economic activity for several months, resulting in the permanent loss of more than 50 percent of small businesses over the five year period following the event. The risk of taking no action to mitigate these losses is significant.

Other hazards were also assessed for the type of impact typically expected and historical frequency of occurrence. Tables 20 and 21 combines the frequency with which each hazard may occur and the severity or impact each could inflict to show the highest priority for mitigation efforts. This information was obtained from varied sources. This analysis indicates that of all hazards studied, hurricanes and tropical storms and their winds with storm surge potential, have the largest impact making it the best target for cost-effective mitigation efforts. The flood hazard for the City of Jacksonville is the third highest priority. Wildfire in the Urban Interface and thunderstorms are the fourth and fifth level priorities. Extreme temperatures and drought hazards are rated highly and the specific measures that are implemented include the Warning Notification Systems used by the NWS and the Emergency Preparedness Division to alert the public to the hazard.

## **F. Vulnerability and Loss Estimates**

### Geographic Areas Vulnerable To Hazards

According to the United States Census Bureau, Duval County's total area is 762.19 square miles with the city of Jacksonville encompassing a total area of 747 square miles, making Jacksonville the largest city in land area in the contiguous United States; of this, approximately 87% is land and 13% is water. Jacksonville is centered on the banks of the St. Johns River in northeast Florida, about 25 miles south of the Georgia state line. Duval county population is estimated at 950,181 of which 903,889 live within the city of Jacksonville, that's an estimated 1,100 people per square mile with in the city of Jacksonville. Just south of Jacksonville and north of Saint Augustine is the boundary of where the Floridian Peninsula ends and Continental North America begins; Jacksonville is north of that line. While still in the North American Coastal plain, the topography begins to take on slight Piedmont characteristics. Like the Central Florida ridge and the Piedmont, the area begins sloping several miles inland. On the west side of Jacksonville, a series of low ridges predominate. The high point of Jacksonville raises to 190 feet above sea level on Trial Ridge, along the boundary with Baker County.

### At Risk Properties

According to 2019 data from the Insurance Information Institute, in Florida, 2.8 million homes are at risk from hurricane related hazards. These homes would cost \$552.4 trillion to completely rebuild, including labor and materials. Florida leads the nation in the number of flood policies, according to the National Flood Insurance Program, with about 1.8 million policies in force in 2017. The number of people living in



coastal areas in Florida increased by 4.2 million, or 27 percent, from 15.6 million in 2000 to 19.8 million in 2015, according to the U.S. Census Bureau. About 98 percent of the total population of Florida lives in one of the coastal counties. Table 14 shows that Jacksonville is ranked eighth among Florida counties in terms of exposure of property at risk from hazards associated with hurricanes. Duval County is reporting \$93.8 billion in insured property's within the county. These figures are based on insurance company estimates of what costs would be necessary to replacement structures and contents. More comprehensive data, drawn from figures supplied by the Duval County Property Appraiser, estimates the actual dollar value and the fair market value of property in the County somewhat differently than the estimate indicated in Table 14 by the Hurricane Catastrophe Fund's data. Table 15 provides information on the value of real property in the City as a whole, as well as the values estimated for property in the more vulnerable Beaches Municipalities.

**Table 14: 2017 Florida Hurricane Catastrophe Fund Exposures Reporting for Selected Counties**

<b>Contract Year 2017-2018 Exposure Concentration by County (\$ billion)</b>		
<b>County</b>	<b>Dollar Amount of FHCF Exposure</b>	<b>Percent of Total FHCF Exposure</b>
<b>Palm Beach</b>	197.3	9.1
<b>Broward</b>	165.8	7.6
<b>Miami-Dade</b>	157.9	7.3
<b>Orange</b>	142.3	6.5
<b>Hillsborough</b>	133.5	6.1
<b>Lee</b>	104.9	4.8
<b>Pinellas</b>	95.4	4.4
<b>Duval</b>	93.8	4.3
<b>Collier</b>	80.3	3.7
<b>Brevard</b>	68.6	3.2
<b>All Other Counties</b>	936.8	43.0
<b>Totals*</b>	2,176.5	100.0

*Source: 2017 Annual Report 2017 Annual Report*

Manufactured housing is extremely vulnerable to hurricane force winds especially along the coast. The value of residential construction for each of the beach cities is shown below. As the Table 15 illustrates, more than a billion dollars of property improvements are at risk in the Beaches. The emphasis placed on the danger of hurricanes suppresses the danger of tropical storms, which affect the City of Jacksonville more often than hurricanes. In 2016, Hurricane Matthew resulted in \$50 million in damage, in 2017 Hurricane Irma resulted in 77 million in damage and in 2019 Hurricane Dorian resulted in 11 million in damage to public infrastructure in business disruption. (Source: EPD estimates)

**Table 15: Value of Construction in Atlantic Beach, Jacksonville Beach, and Neptune Beach**

City	No. of Buildings	Building Value	Property Market Value
City of Atlantic Beach	9,103	\$ 1.59 Billion	\$3.35 Billion
City of Jacksonville Beach	13,825	\$ 3.08 Billion	\$5.78 Billion
City of Neptune Beach	3,00	\$ 5.4 Million	\$ 1.35 Billion

*Source: Duval County Property Appraisers, December 2019*

#### Vulnerable Critical Facilities

The City of Jacksonville controls a huge inventory of properties. Therefore, all non-critical municipal public buildings and facilities will be maintained by the City of Jacksonville and each jurisdiction within the county. The City of Jacksonville Emergency Preparedness Division and the Information Technology Department of facilities maintains a critical facilities inventory. This inventory consists of the critical facilities; the NFIP repetitive loss data; historic flood data and the locations of hazardous materials that fall under the jurisdiction of Section 302 of the Federal Emergency Planning and Community Right to Know Act. This data has been furnished by the City of Jacksonville Department of Regulatory Compliance.

The following facilities are deemed critical by the state and federal governments:

- Hospitals
- Fire Stations
- Hurricane Risk Shelters
- Public Schools, Colleges and Universities
- Evacuation Routes
- Water Treatment Plants
- Sewage Treatment Plans
- Electric Substations
- Government Buildings
- Emergency Response Facilities

A copy of this list has been supplied to FDEM as well.

The City of Jacksonville and the JEA have prioritized critical facilities power restoration. The priority facilities include the following:

- Level One - Hospitals
- Level Two – Includes, but not limited to, Federal Aviation Authority Transmitting Towers, Jacksonville International Airport, government buildings inclusive of fire stations and military complexes, JEA substations for electrical power and sewer facilities; waste treatment plants..
- Level 3 –Includes, but not limited to, the City of Jacksonville EOC, dialysis centers, and the activated hurricane risk shelters.
- Level 4 – Includes, but not limited to, American Red Cross Command Post, City Hall complex, Motor Pool Complex, CSX transportation, blood alliance center, jail and correctional institutes within the County.
- Level 5 Includes, but not limited to, JEA lift stations and major intersections on the evacuation routes.

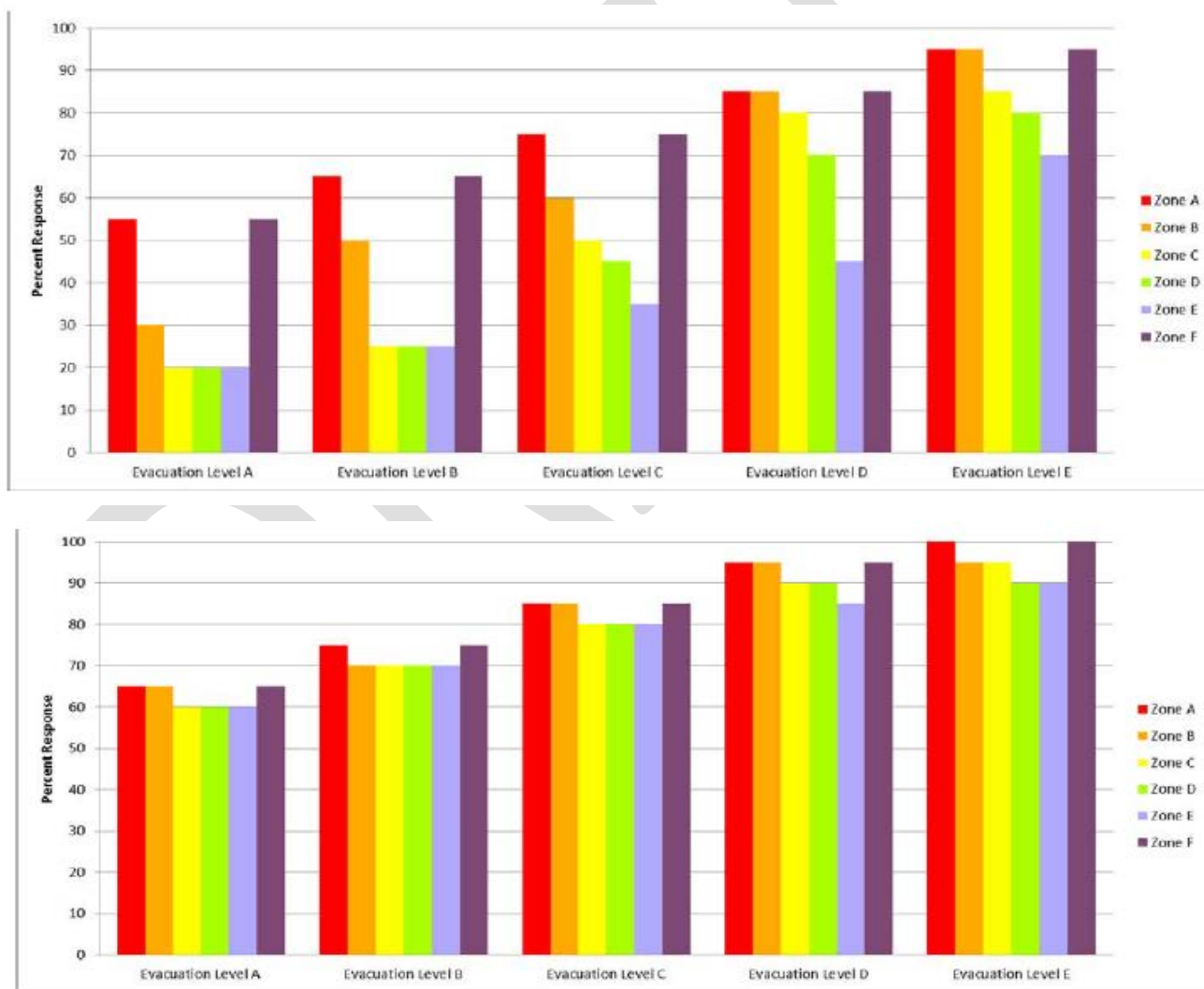


## Vulnerable Populations

The vulnerable population includes but is not limited to, persons with physical, cognitive or developmental disabilities. These include persons with limited English proficiency, geographically or culturally isolated, medically or chemically dependent, homeless, frail elderly and children and may require additional levels of support for evacuation, transportation, sheltering and disaster housing.

It also includes the populations who live in Manufactured housing along the coast and low-lying areas that are Flood hazards and storm surge zones and households that do not own a car. Approximately, 33,509 households, or 8.7 percent, in the City of Jacksonville do not have a car, making them more vulnerable during an evacuation (Source: <https://www.governing.com/gov-data/car-ownership-numbers-of-vehicles-by-city-map.html>)

**Figure 7: Evacuation Participation Rates: Duval County – Site Built Homes**



Source: Hurricane Evacuation Study 2013, Vol. 1-4, pg. VI-16

Figure 8: Florida Access and Functional Needs Profile, Duval County – 2018

Florida Access and Functional Needs Profile, Duval County - 2018						
Indicator	Year(s)	Rate Type	County Count	County Rate	State Count	State Rate
<b>Demographic Data</b>						
Resident Live Births	2018	Per 1000 Population	12,971	13.6	221,508	10.6
Total Population	2018	Count	954,454		20,957,705	
Children under 18 in Foster Care	2018	per 100,000 Population, Under 18	986	457.5	20,970	500
Population 65-84 Years Old	2018	Percent of Total Population	115,694	12.1	3,644,529	17.4
Population 85+ Years Old	2018	Percent of Total Population	14,794	1.5	552,802	2.6
Individuals 65 years and over living alone	2017	Percent of Population 65+	34,213	29.6	945,363	24.6
<b>Socioeconomic Data</b>						
WIC Eligibles Served	2018	Percent of WIC Eligibles	21,243	54.1	451,935	67.8
WIC Eligibles	2018	Percent of Total Population	39,300	4.1	666,473	3.2
Census Population Below Poverty Level	2017	Population for Whom Poverty Status is Determined	143,014	16	3,070,972	15.5
Population 5+ that speak English less than very well	2017	Percent of Census Population 5+	45,079	5.3	2,271,001	11.8
Median Monthly Medicaid Enrollment	2018	per 100,000 Population	205,591	21540.2	3,846,917	18355.62
Households receiving cash public assistance or food stamps	2017	Percent of Households	56,243	16.2	1,126,772	15
Homeless Estimate	2018	Percent of Total Population	1,640	0.2	29,717	0.1
Census Population Uninsured (Under 65)	2017	Percent of Population Under 65	113,352		2,929,460	
<b>Vulnerability Data</b>						
Percent of Adults Limited in Activities because of Physical, Mental, or Emotional Problems	2016	Percent of Surveyed		23.5		21.2
Percent of Adults Who Use Special Equipment because of a Health Problem	2016	Percent of Surveyed		9.7		9.9
Civilian non-institutionalized population with a disability	2017	Percent of Civilian non-institutionalized population	120,508	13.5	2,673,685	13.4

Source:

<http://www.flhealthcharts.com/ChartsReports/rdPage.aspx?rdReport=ChartsProfiles.AccessAndFunctionalNeeds>

Data Note(s) Population - Rates are calculated using July 1 population estimates from the Florida Legislature, Office of Economic and Demographic Research which have been allocated by race based on information from the US Bureau of the Census. The population data for 2011-2021, along with rates affected by the population data, was updated on FLHealthCHARTS in November 2017. It is customary to periodically revise population estimates based on new information, such as a census or new mid-course

census estimates for prior years. Revising these estimates ensures accurate accounting of the racial, ethnic, and gender distribution of the population. These changes affect the population data and rates calculated for your community. Blanks are shown if there is no access and functional needs profile count or rate available for the indicator.

(Source: <http://www.flhealthcharts.com/ChartsReports/rdPage.aspx?rdReport=ChartsProfiles.AccessAndFunctionalNeeds>)

#### Maximum Evacuating Population Clearances

From an emergency management standpoint, it is important to get an understanding of the maximum proportion of the evacuating population that can be expected to evacuate at various time intervals during an evacuation. Should storm conditions change during an evacuation, emergency managers will need to be able to estimate what portion of the evacuating population is estimated to still remain within the county trying to evacuate. Using the base scenarios, which assume 100% of the vulnerable population is evacuating, along with shadow evacuations and evacuations from adjacent counties, an estimate was made of the evacuating population actually able to evacuate out of each county by the time intervals of 12, 18, 24, and 36 hours.

It is important to note that these estimates take into account many variables, including roadway capacity, in-county evacuating trips, out of county evacuating trips, evacuating trips from other counties, and background traffic that is impeding the evacuation trips. For this reason, the maximum evacuation population by time interval will vary slightly between evacuation level and either increase or decrease from one evacuation level to the next.

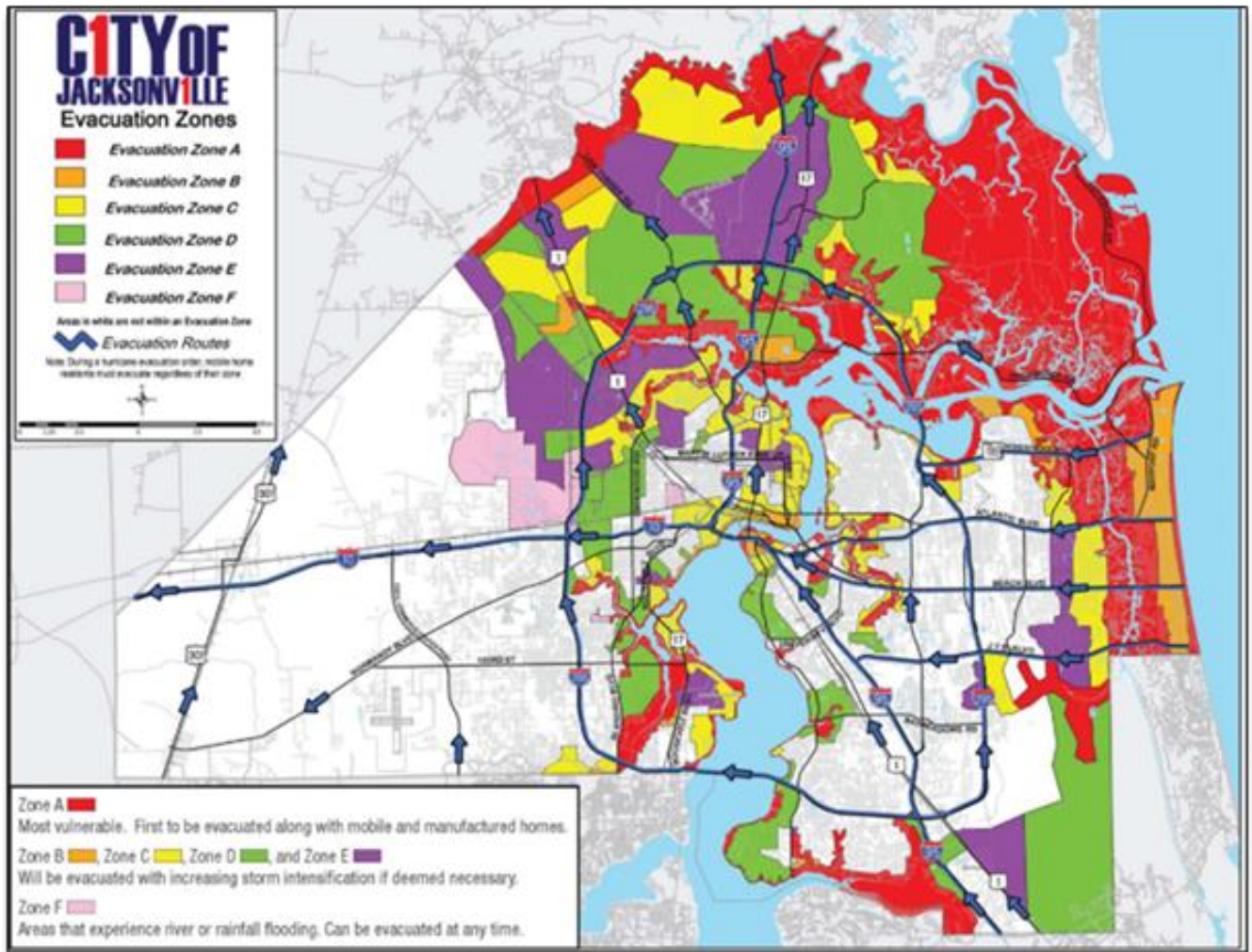
**Table 16: Estimated Population Evacuating Duval County for 2020**

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
<b>Estimated Evacuating Population Clearing Duval County</b>					
12 Hour	234,465	210,042	261,367	265,024	231,454
18 Hour	293,081	315,063	392,051	397,536	347,181
24 Hour		358,822	490,064	530,048	462,908
36 Hour				563,176	636,499

Source: Hurricane Evacuation Study 2013, Vol. 4, pg. IV-87



Figure 9: The City of Jacksonville Hurricane Evacuation Zones



Source: <https://www.JaxReady.com>, retrieved February 2019

### Emergency Shelters

There may be significant demand for public shelter in the Northeast Florida region during an evacuation event. The number of evacuees who choose public shelter as their evacuation destination is based on demographic characteristics of the population including income and age, risk area and housing (mobile home vs. site built homes).

Public shelter demand is the result of several factors:

- Evacuees may not have friends or relatives in a safe location.
- Evacuees may not have the means to evacuate to a hotel/motel.
- Evacuees may not be able locate vacant hotel/motel rooms outside of evacuation zones in the region (space is limited and demand will be high).
- Evacuees may not understand their options.
- Some evacuees choose public shelter because they feel it is safer, than in their home.

The County currently has 29 shelters; 9 of them are special needs with 6 of the 9 special needs being dual use and 4 of the 29 are pet friendly. The 29 shelters have a total capacity of 35,689 spaces at 20 sq ft or 2,810 spaces at 60 sq ft. The City of Jacksonville shelter capacity remains insufficient for the population

anticipated to evacuate in case of a CAT 2 or higher Hurricane, prior to considering the out of county evacuation of the surrounding counties into the City of Jacksonville.

It should also be noted that these population figures will not remain static. Population increases east of the Intracoastal Waterway will result in an increase in the number of people evacuating during hurricanes. Improved economic conditions have begun to reflect increased development in the areas surrounding the Coastal High Hazard Area (CHHA) of the City of Jacksonville, as defined by the State of Florida. Design and construction appropriate to the hazards of the area, and building structures that conform to current State building codes will mitigate the impacts, but the increase of density of population will require additional resources to be allocated for hurricane evacuation routes and hurricane risk sheltering as well as the planning for post-disaster housing.

#### Estimated Losses – Summary

The analysis of potential dollar loss volume to vulnerable structures within the City of Jacksonville will include, and is not limited to, methodology descriptions, hazard area maps, and data tables that provide the outcome information for each analysis. The Hazards U.S./Multi-Hazard (HAZUS-MH) software was used by the Northeast Florida Regional Council to generate the 2013 Hurricane Evacuation Study's regional inventory of assets, advanced analysis functions, and mapping capabilities. The HAZUS-MH-derived data has features that allow advanced GIS layers, inclusive of census tracts/blocks featuring demographics, general building inventories, line data features, inclusive of utilities and roads. Additionally, there are point data features such as critical infrastructure, high potential loss facilities and bridges. Additionally, dollar damage information was retrieved from the City of Jacksonville 2012 Post Disaster Redevelopment Plan.

To supplement information derived from the outcome of the damage loss estimate alternative methods, information has been provided from the City of Jacksonville Property Appraiser's Office in order to demonstrate assessed property values in the City. The Property Appraiser determines just value (also called market value) for all real estate in the City of Jacksonville in accordance with Florida law. Just value is based on fair market value which is the estimated price a purchaser willing but not obliged to buy would pay a seller willing but not obliged to sell. The market value listed on the annual notices of property assessment is determined by the Property Appraiser's Office. Property is assessed as of January 1 each year, so market value is typically determined by analyzing sales data of comparable properties which have occurred prior to January 1.

**Table 17: Potential Impact as Percent (%) of Population in Duval County and Jurisdictions**

<b>Hazard</b>	<b>Duval County</b>	<b>City of Jacksonville</b>	<b>Town of Baldwin</b>	<b>Jacksonville Beach</b>	<b>Neptune Beach</b>	<b>Atlantic Beach</b>
<b>Natural Hazards</b>						
Wind from Tropical Storm > 39MPH	100%	100%	100%	100%	100%	100%
Severe Weather	100%	100%	100%	100%	100%	100%
Storm Surge (from Hurricane, Tropical Storms, Nor'easters)	71%	71%	0%	100%	100%	100%
Extreme Heat	100%	100%	100%	100%	100%	100%
Sea Level Rise (4ft.)	2.5%	3%	0%	8.5%	4%	1.5%
Flooding (from Seasonal Heavy Rains,	20% in FEMA Flood Zones	17%	<5%	100%	100%	100%
Human and Animal Disease	100%	100%	100%	100%	100%	100%
Drought	100%	100%	>90%	100%	100%	100%
Coastal Erosion	15%	10%	0%	100%	100%	100%
Saltwater Intrusion	100%	100%	100%	100%	100%	100%
Wildfire	>30%	>30%	100%	<25%	< 25%	< 25%
Winter Storm	<20%	17%	17%	17%	17%	17%
<b>Natural or Man-Made Hazards</b>						
Critical Infrastructure Disruption	100%	100%	100%	100%	100%	100%
<b>Man-made/Technological Hazards</b>						
Hazardous Materials Accidents	100%	>50%	100%	>25%	>25%	>25%
Terrorism/Targeted Violence	100%	100%	100%	100%	100%	100%
Cyber-Attack	100%	100%	100%	100%	100%	100%

#### Hazards Formula

The planning assumption is to calculate a percentage of the population exposed to each hazard, vulnerability, or risk, in using standard statistical models such as SLOSH or HAZUS data, if data was readily available. Otherwise, percentages were calculated for the population exposed to specific hazards.

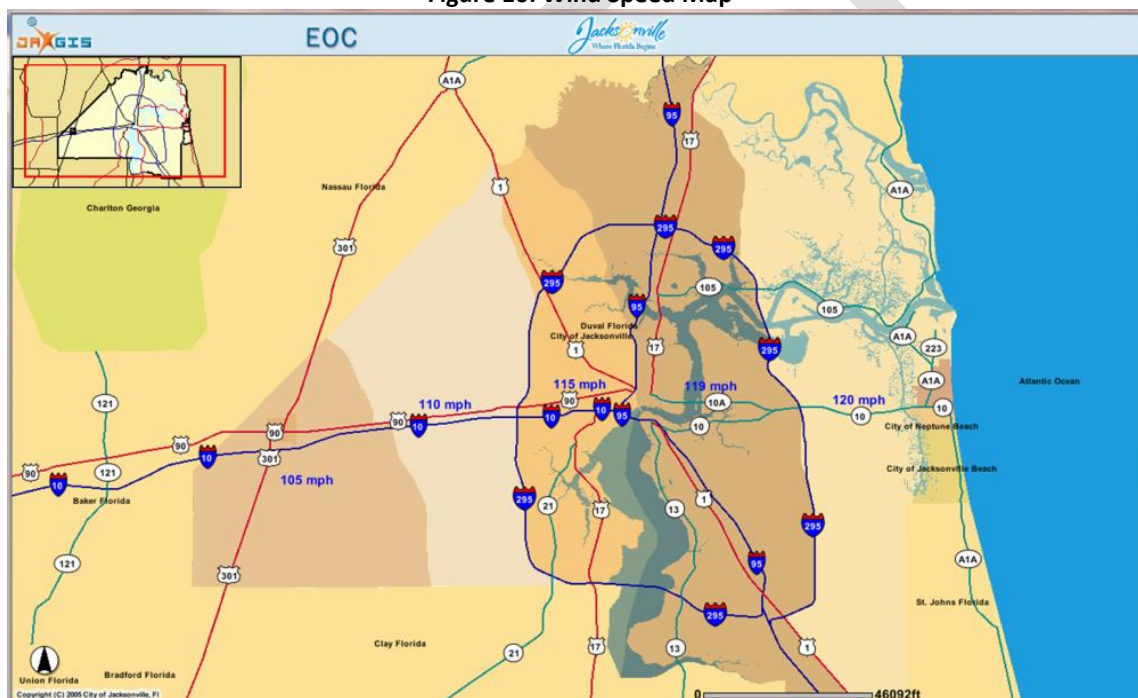
Wind from Tropical Storm Force Winds (greater than 39 MPH): The City of Jacksonville is considered a coastal community. Population had to be redistributed as the Wind Speed Zones were eliminated in the

Florida State Building Code of 2010. The wind speed map is still posted on the City JAXGIS site, and the population was distributed according to that map.

**Table 18 Population Wind Speed Zones**

Geographic Area	Wind Speed	Est. Population Impacted
Beaches Municipalities, Mayport – Atlantic Ocean west to I-295	120 MPH	100,200
East Jacksonville west of I-295 to I-95	119 MPH	403,000
West Jacksonville, east of I-95 to I-295 Loop northbound	115 MPH	196,000
West Jacksonville, east of I-295 to Cecil Field	110 MPH	113,000
West of Cecil Field, including Whitehouse, Town of Baldwin	105 MPH	6,250

**Figure 10: Wind Speed Map**



Source: EOC Maps, JAXGIS, retrieved January 28, 2019

### Storm Surge

The City of Jacksonville is a coastal community with extensive coastline on the Atlantic Ocean. It is a part of the upper St. Johns River watershed, which was designated an American Heritage River in 1998 by U.S. Department of Environmental Protection. Major rivers and tributaries experience tidal influences which are worsened by the effects of flooding, seasonal tropical storm rain and rain associated with hurricane hazard. The City of Jacksonville evacuation zones were established using a Zone A-F designation to better account for the storm surge hazard, using the SLOSH Model Depth Analysis coupled with NWS modeling. The City of Jacksonville adopted the Evacuation Zones A-F as in 2014 to derive the population at risk for exposure to storm surge.

### Flooding

The City of Jacksonville is a coastal county in the Upper St. Johns River watershed, with numerous rivers, streams, creeks, tributaries, marshes and drainage basins. The formulas are based on the number of population residing in the 100-year and 500-year floodplains as outlined in the 2018 FEMA FIRM maps and the County drainage basins.

### Extreme Temperatures

Families living in poverty are most susceptible to this hazard. The U.S. Census Bureau estimates 17 percent of households are in poverty. (Source: *U.S. Census Bureau Quick Facts, 2017 Estimates*)

### Drought

All of the population in the county and jurisdictions are susceptible to this hazard.

### Critical Infrastructure Disruption

All of the population in the county and jurisdictions are susceptible to this hazard. Unless there are backup generators present, any location could be disrupted from a variety of methods. (Source: JEA Compliance Standards, Electric System Reliability History, retrieved June 2018, <https://www.jea.com/About/>).

### Hazardous Materials Accidents

All properties and population residing within 2000 feet of I-95, I-10, I-295, Haines Street/ 20<sup>th</sup> Street, the channel of the St. Johns River, the major rail corridors and the properties contained in JAXPORT. The most vulnerable population as far as hazardous materials accidents are residents of the downtown area reaching as far north as the Trout River. A relatively dense network of rail lines places this lower income area at risk. About one third of the recorded river spills have also taken place in the St. Johns River adjacent to this same area. All of the County and jurisdictions are susceptible to this hazard.

### Terrorism

All of the county and its jurisdictions are susceptible to this hazard. (Source: *City of Jacksonville CEMP 2017; USMC Threat Identification Matrix; Florida Department of Health in Duval Risk Assessment Tool*)

### Sea Level Rise

Significant portions of the county, and primarily the coastal area, are susceptible to this hazard. The jurisdictions of Atlantic Beach, Jacksonville Beach and Neptune Beach are highly exposed to this hazard, through both direct impacts and indirect. During the past decade, potential impacts have been substantiated through coastal erosion and the mitigation strategy used by Army Corps of Engineers to periodically re-nourish the shoreline. The City of Jacksonville is exposed in the area east of the Intracoastal Waterway and to the north towards Mayport. The Town of Baldwin is relatively immune to coastal hazard threats, although climatic changes could severely impact agricultural interests, and increase the vulnerability to wildfire conditions.

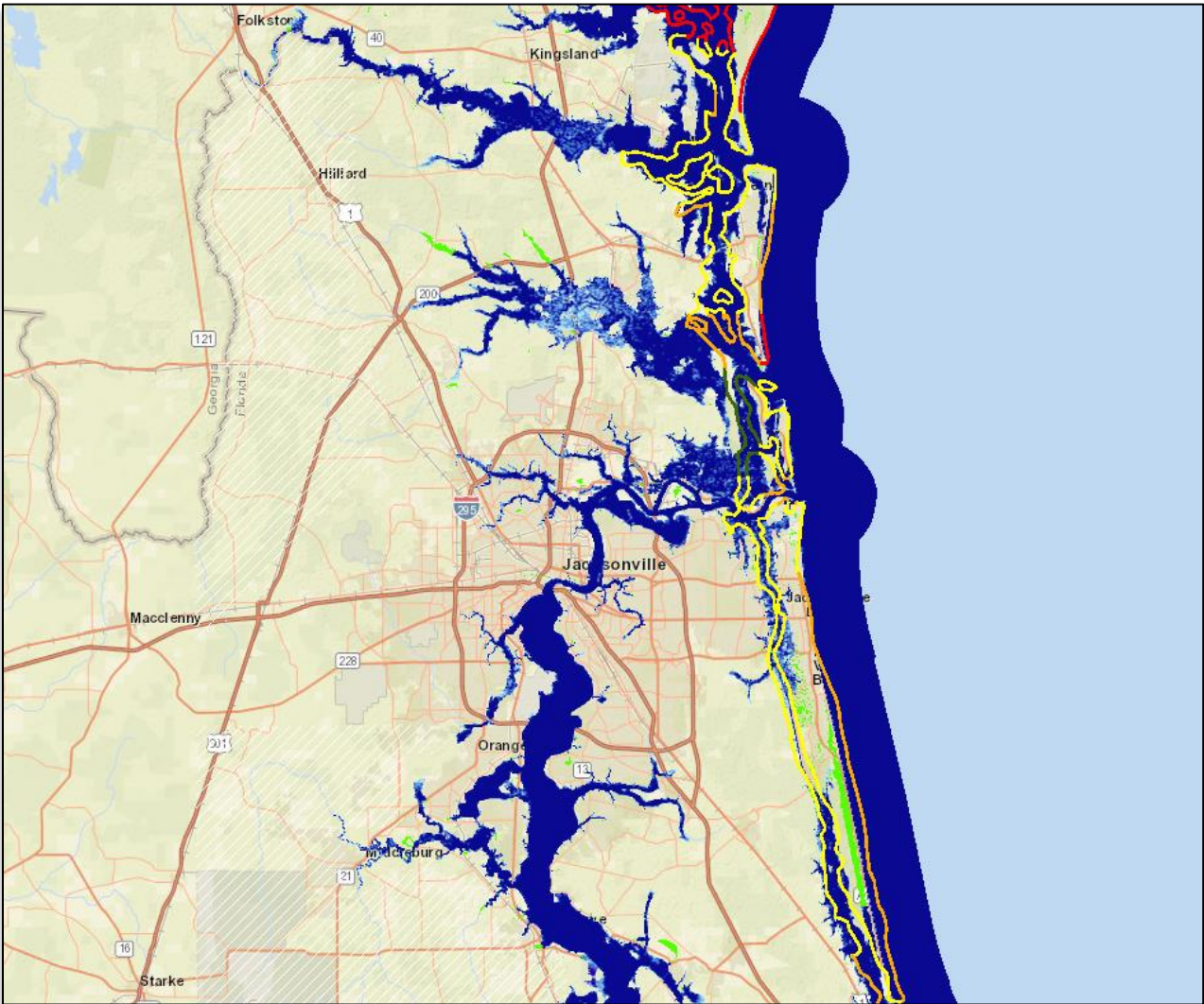
The following hazards were not rated due to very low probability of occurrence: Sinkhole/Landslide; Tsunami; Earthquake; Dams/Levee Failure; and Volcano. These hazards are not expected to occur in Duval County. Based on historical research, if one of these hazards were to occur at the nearest likely location, there would be no impacts felt in Duval County.



## **G. Hazard Vulnerabilities**

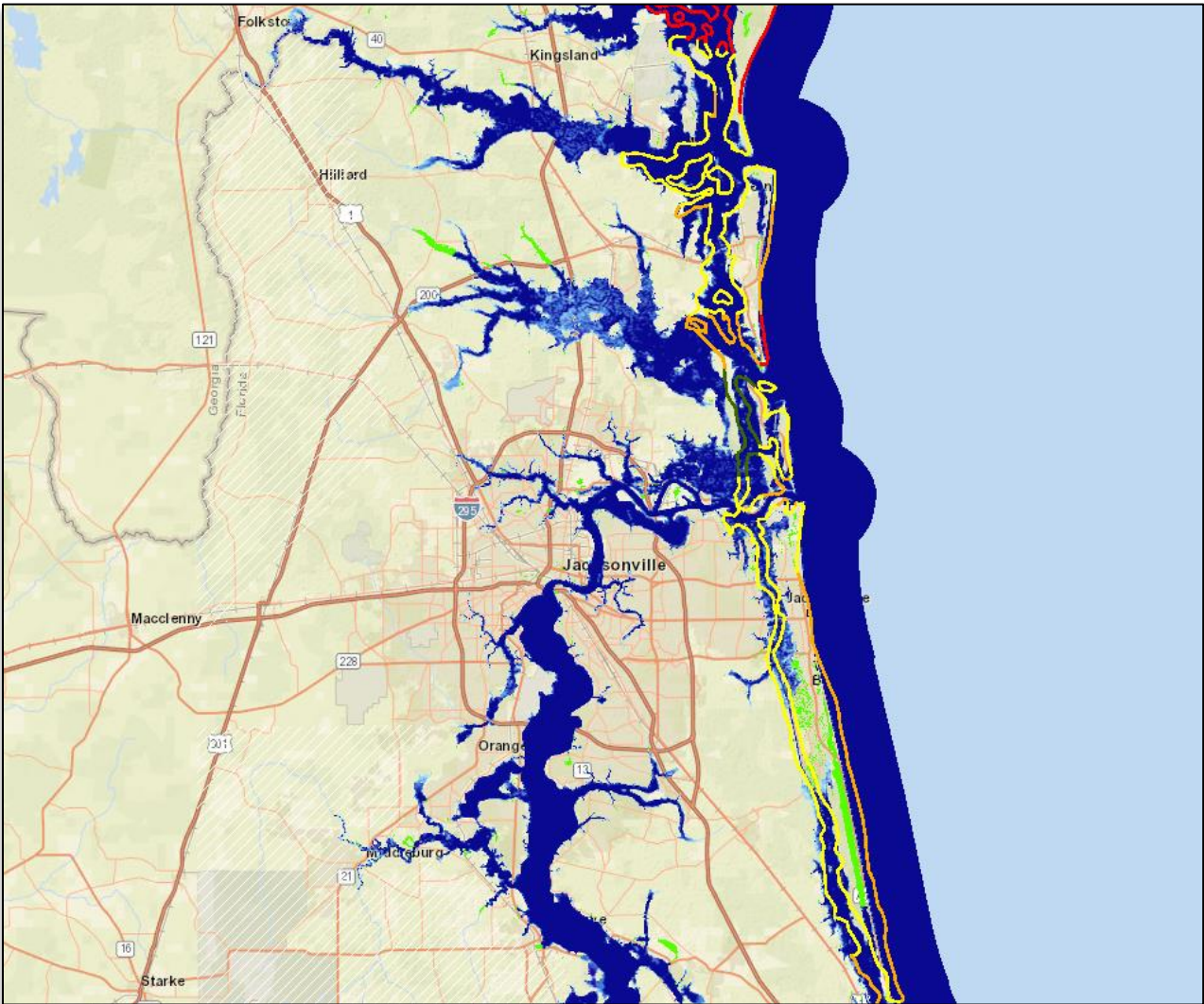
Listed below are narratives and matrices addressing hazards that were ranked by the LMS Working Group and the LMS Advisory Committee as having the potential to have impact upon the City of Jacksonville and its jurisdictions. These narratives and matrices will have the intent to rate the vulnerability, probability and risk associated with each hazard. In consultation with the Northeast Florida Regional Council, the LMS defines these vulnerabilities, probabilities and risks as an ordinal series of “very low,” “low,” “moderate,” and “high,” according to the City of Jacksonville Comprehensive Emergency Management Plan (Source: CEMP, pg. 32) varied parameters were established based upon knowledge of the potential consequences, timing and release characteristics for a spectrum of emergencies, natural and man-made. Therefore, identification of consequences in emergency management planning on vulnerability is based on the expected severity of the event, probability is based upon the frequency of past events, and risk is equal to the vulnerability as compared to the probability of future events. Wherever possible, predictions of potential impacts listed in the Impact Analysis sections of each hazard profile were standardized with the impact predictions included in the State of Florida Enhanced Hazard Mitigation Plan (2018) for consistency and planning purposes.

**Figure 11: Coastal Flooding Risk at One Ft. Elevation, Duval County and NE Florida Region**



Source: <http://toolkit.climate.gov/climate-explorer/>; U.S. Climate Resilience Toolkit, U.S. Federal Agencies Consortium led by the National Oceanographic Atmospheric Agency (NOAA); retrieved February 28, 2019

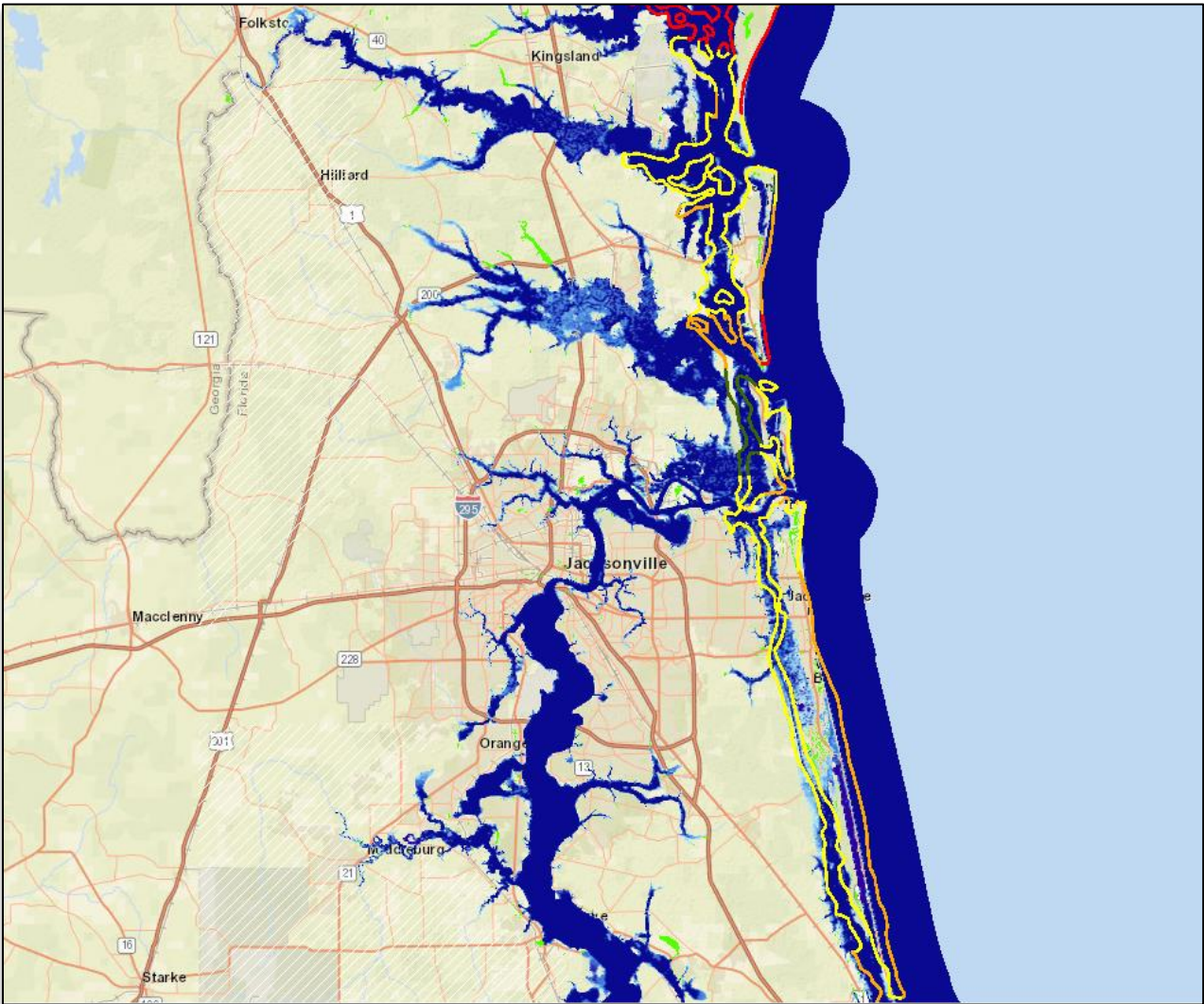
**Figure 12: Coastal Flooding Risk at Two Ft. Elevation, Duval County and NE Florida Region**



Source: <http://toolkit.climate.gov/climate-explorer/>; U.S. Climate Resilience Toolkit, U.S. Federal Agencies Consortium led by the National Oceanographic Atmospheric Agency (NOAA); retrieved February 28, 2019



**Figure 13: Coastal Flooding Risk at Three Ft. Elevation, Duval County and NE Florida Region**



Source: <http://toolkit.climate.gov/climate-explorer/>; U.S. Climate Resilience Toolkit, U.S. Federal Agencies Consortium led by the National Oceanographic Atmospheric Agency (NOAA); retrieved February 28, 2019

## **H. Multi-Hazard Maps**

The multi-hazard maps used in the 2015 LMS Update could not be replicated for the 2020 LMS Update as the MEMPHIS data set used to develop the maps is no longer supported. Therefore, the data sets used to establish the risks to populations within the City of Jacksonville are the HAZUS/SLOSH models used in analyze vulnerability in the 2012 Post Disaster Redevelopment Plan and the Vulnerability Analysis of the 2013 Hurricane Evacuation Study, inclusive of the City of Jacksonville. These vulnerability analyses document the highest levels of risk to the City of Jacksonville for the following hazards: Hurricane hazard (high winds and storm surge); wildfire in the wildland/urban interface hazard; hazardous material impact; hazard flooding hazard, and tornado hazard.

Staff examined the hazards in terms of risk to population and determined the hurricane hazard inclusive of wind and storm surge, is the greatest risk to the geographic area from the coast inland to the Intracoastal Waterway and the population living in low-lying areas, housing not built to current building codes, manufactured housing, or living in housing built in pre-FIRM floodplain areas. Tables 19 and 20 summarize the probabilities, risks and vulnerabilities.

## **I. Hazard Prioritization Process**

In January of 2018, the Duval Prepares partnership evaluated the historic hazards previously identified in the 2015 LMS Update. Each municipality has different level and degrees of exposure based this hazard analysis. The City of Jacksonville used the Duval Prepares members to review the hazards and to identify new emerging hazards. The members reviewed the existing hazards as previously identified and used a normative group process to rank order hazards based on frequency, severity, damage estimates and other professional knowledge using group consensus to arrive at the hazard priority.

That prioritization process yielded the top hazards to be:

- Winds from Tropical Cyclones
- Severe Weather
- Storm Surge
- Extreme Heat
- Sea Level Rise
- Flooding
- Human and Animal Disease
- Drought
- Coastal Erosion
- Saltwater Intrusion
- Wildfires
- Winter Storm and Freezing Temperatures
- Improvised Explosive Device
- Active Shooter
- Biological
- Cyber-Attack
- Terrorism/Targeted Violence
- Chemical
- Critical Infrastructure disruption
- Hazardous Material Release

Duval Prepares reaffirmed the above hazards as the top priorities for the 2020 LMS Update at the January 2020 hazard prioritization meeting. The description of the planning process and meeting schedule for the Local Mitigation Strategy 2020 update is contained in **Appendix B**.

### Resilience and Climate Change

In the 2015 update of the LMS, the Duval Prepares partnership voted to include a hazard to be called “Adaptation to Climate Change” in order to address the multiple impacts that the City of Jacksonville can anticipate during the next 15 to 30 years from this risk (among the impacts, but not limited to, drought, flooding from rising waters, storm surge inundation from tropical cyclone, displacement of population,

salinization of fresh water sources; loss of land and coastal waterfront, and economic impacts). During the 2020 update, the effects of climate change were analyzed in greater detail by incorporating a section entitled “Potential Effects of Climate Change” to each hazard profile. Climate change will be analyzed with respect to its various components (i.e. global temperature warming trends, sea level rise) rather than as a singular phenomenon.

#### Type of Hazard

All disaster events and incidents that have taken place or have the probability to take place in the City of Jacksonville (with exception of hazards deleted from further consideration, as updated by the Duval Prepares Advisory Committee).

#### Documentation Sources

City of Jacksonville Comprehensive Plan City of Jacksonville Comprehensive Emergency Management Plan (2017); Duval County Post Disaster Redevelopment Plan (2012); Florida Forest Service; NWS Jacksonville; City of Jacksonville Emergency Preparedness Division event response files; City of Jacksonville Beach; Town of Baldwin; City of Neptune Beach and City of Atlantic Beach CEMPs and/or EARS; Duval County HAZmat Hazard Specific Plan (2017); Duval County Flood Hazard Specific Plan (2018); Duval County Hurricane Hazard Specific Plan (2017); Duval County Terrorism Response Hazard Specific Plan (2015); Duval County Severe Weather Hazard Specific Plan (2019); Duval County Tornado Hazard Specific Plan (2018); Duval County Wildfire Hazard Specific Plan (2017); Northeast Florida Regional Council Statewide Regional Evacuation Study: Northeast Florida (2013); JEA compliance records; City of Jacksonville Public Works and Planning and Development Departments; NFIP Community Rating System (CRS) data.

**Table 19.1: Vulnerability, Probability, Risk Assessment Table (1950– 2019) Vulnerability to Natural Hazards by Community**

Hazard	Frequency	Probability of Occurrence	Significant #s of People	Economic Impact	Overall Vulnerability Level	Duval County	City of Jacksonville	Jacksonville Beach	Atlantic Beach	Neptune Beach	Baldwin
<b>Natural Hazards</b>											
Wind from Tropical Cyclone	Very High	Very High	Moderate	Very High	Very High	Y	Y	Y	Y	Y	Y
Severe Weather, Incl. Thunderstorms (TH) and Tornadoes (T)	Very Likely	Very Likely	Moderate	Moderate	Very High	Y	Y	Y	Y	Y	Y
Storm Surge (from Hurricane, Tropical Storms, Nor'easters)	Very High	High	Moderate	Very High	Very High	Y	Y	Y	Y	Y	N
Extreme Heat	Very Likely	Very Likely	High	Low	High	Y	Y	Y	Y	Y	Y
Sea Level Rise	Likely	Likely	High	High	High	Y	Y	Y	Y	Y	Y
Flooding (from Seasonal Heavy Rains, Nor'easters)	Very Likely	Very Likely	Low	Minimal	High	Y	Y	Y	Y	Y	Y
Infectious Disease	Very Likely	Very Likely	High	Low	High	Y	Y	Y		Y	Y
Drought	Likely	Likely	Low	Minimal	Moderate	Y	Y	Y	Y	Y	Y
Coastal Erosion	Very Likely	Very Likely	Low	Minimal	Moderate	Y	Y	Y	Y	Y	N
Saltwater Intrusion	Very High	Very Likely	Minimal	Minimal	Moderate	Y	Y	Y	Y	Y	Y
Wildfire (Brush, Forest)	High	Moderate/High	Moderate	Low	Moderate	Y	Y	Y	Y	Y	Y
Winter Storm	Low	Low	Low	Very Low	Low	Y	Y	Y	Y	Y	Y

**Table 19.2: Vulnerability, Probability, Risk Assessment Table (1950– 2019) Vulnerability to Technological and Manmade Hazards by Community**

Hazard	Frequency	Probability of Occurrence	Significant #s of People	Economic Impact	Overall Vulnerability Level	Duval County	City of Jacksonville	Jacksonville Beach	Atlantic Beach	Neptune Beach	Baldwin
<b>Technological Hazards</b>											
Critical Infrastructure Disruption	Very High	Very High	Increased	Increased	High	Y	Y	Y	Y	Y	Y
Hazardous Materials Accidents	Very High	Very High	Low	Low	High	Y	Y	Y	Y	Y	Y
<b>Man-made Hazards</b>											
Improvised Explosive Device	Very High	Very High	Moderate	Increased	High	Y	Y	Y	Y	Y	Y
Active Shooter	Very High	Very High	Increased	Low	Moderate	Y	Y	Y	Y	Y	Y
Biological	High	Very High	Moderate	Low	Moderate	Y	Y	Y	Y	Y	Y
Cyber Attacks	Very High	Very High	Very Low	Low	Moderate	Y	Y	Y	Y	Y	Y
Terrorism and Targeted Violence	Moderate	Increased	Increased	Increased	Moderate	Y	Y	Y	Y	Y	Y
Chemical	Low	High	Very Low	Low	Increased	Y	Y	Y	Y	Y	Y



**Table 20: Vulnerability Assessment Rubric**

Category	Point Scale	Description
Frequency	0 – 10	Consider frequency of events occurring, per year:
		1 year Very High 10 points
		10 years High 8 points
		25 years Moderate 6 points
		50 years Increased 4 points
		100 years Low 2 points
		500 Years Very Low 1 point
Probability	0 - 5	Probability that event will result in impacts to the county: 0% Probability – 0 Pts, 100% Probability – 5 Pts (divide % by 20 and round) Ea. 20% = Low, Increased, Moderate, High, Very High
Magnitude		
0 = Very Low	1 = Low	2 = Increased 3 = Moderate 4 = High 5 = Very High
Injuries/Deaths	0 – 5	No Deaths – 0 Pts Indirect Deaths – 1 Pt Direct Deaths, MCI Level 1 or 2 (5 – 20 victims) - 2 Pts Direct Deaths, MCI Level 3 (21 – 100 victims) - 3 Pts Direct Deaths, MCI Level 4 (101 – 1000 victims) - 4 Pts Direct Deaths, MCI Level 5 (Over 1,000 victims) - 5 Pts
Infrastructure	0 – 5	Localized, Minimal – 0 Pts Localized, Moderate – 1 Pt Localized, Severe - 2 Pts Countywide, Minimal -3 Pts Countywide, Moderate - 4 Pts Countywide, Severe - 5 Pts
Environment	0 – 5	Localized, Minimal – 0 Pts Localized, Moderate – 1 Pt Localized, Severe - 2 Pts Countywide, Minimal -3 Pts Countywide, Moderate - 4 Pts Countywide, Severe - 5 Pts
Vulnerability Table Ranking		
Low Risk	Increased Risk	Moderate Risk High Risk Very High Risk
0 – 6	7 – 12	13 – 18 19 – 24 25 - 30

## J. Multi-Hazard Economic Vulnerability Analysis by Property Value

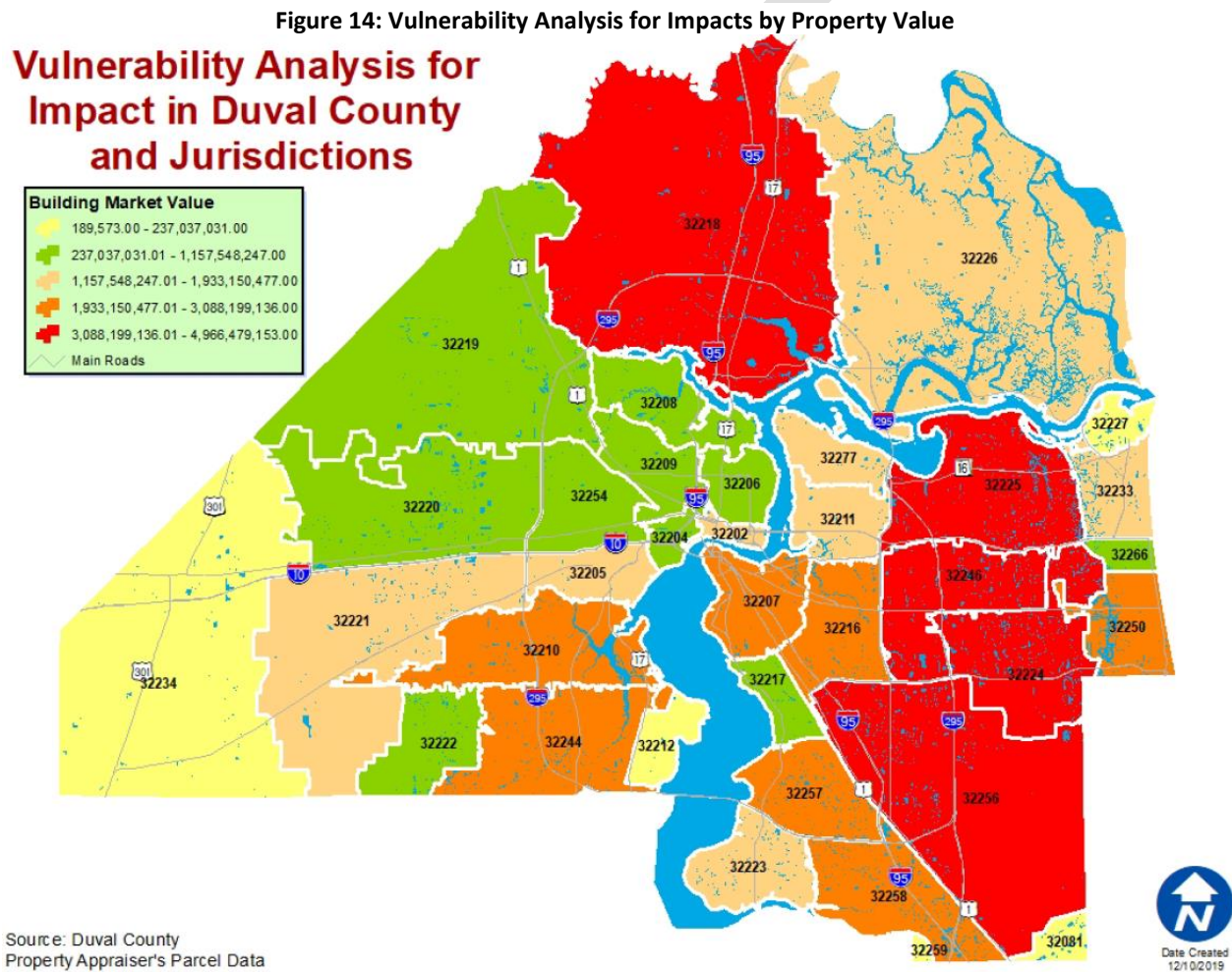
The multi-hazard risk maps have been consolidated into one map that depicts the market value of properties throughout the City of Jacksonville by zip code. This incorporates a vulnerability assessment based on economic impact for all jurisdictions in the county. A reviewer who examines the hazards maps in **Section III** should be able to compare and contrast the property value information through the vulnerability analysis to determine the correlation of the values and corresponding risk from the hazards of the parcels within the zip code. All market value information is collected from the City of Jacksonville Property Appraiser's data base, effective January 2015. The fair market value is assessed at 99 percent confidence level per the valuation process used by the Property Appraisers. A total of 345,578 structures valued \$42.06 Billion. The properties that these structures are located on have a combined market value of approximately \$67 Billion. (Source: City of Jacksonville Property Appraiser, 2019)

**Table 21: Property Values by Zip Code in Duval County**

ZIP Code	Number of Buildings	Total Building Value	Total Market Value
32081	990	\$237,037,031.00	\$319,425,492.00
32202	1,910	\$1,750,130,032.00	\$2,287,316,368.00
32204	3,586	\$1,132,276,969.00	\$1,578,164,740.00
32205	12,745	\$1,610,405,541.00	\$2,599,930,441.00
32206	8,423	\$646,446,851.00	\$1,006,201,931.00
32207	15,008	\$2,832,839,931.00	\$4,585,747,649.00
32208	14,126	\$973,675,939.00	\$1,332,657,592.00
32209	15,076	\$1,029,319,238.00	\$1,260,256,161.00
32210	23,843	\$2,704,500,487.00	\$4,185,544,786.00
32211	11,766	\$1,244,080,166.00	\$1,798,184,317.00
32212	3	\$189,573.00	\$37,060,877.00
32216	14,472	\$2,554,644,457.00	\$3,606,520,115.00
32217	7,291	\$1,157,548,247.00	\$1,807,023,653.00
32218	23,335	\$3,833,728,970.00	\$5,458,494,292.00
32219	6,124	\$885,319,000.00	\$1,330,567,889.00
32220	5,364	\$622,506,476.00	\$964,737,408.00
32221	10,885	\$1,549,913,367.00	\$2,302,953,512.00
32222	5,073	\$652,098,895.00	\$938,972,195.00
32223	10,438	\$1,933,150,477.00	\$3,034,290,256.00
32224	12,767	\$3,758,772,641.00	\$5,201,343,837.00
32225	20,315	\$3,763,350,356.00	\$5,527,692,794.00
32226	8,273	\$1,427,243,811.00	\$2,882,230,554.00
32227	3	\$207,885,305.00	\$304,360,661.00
32233	9,103	\$1,598,678,387.00	\$3,353,593,914.00
32234	2,190	\$222,466,322.00	\$458,109,636.00
32244	20,801	\$2,411,052,963.00	\$3,313,467,649.00
32246	18,383	\$3,527,603,710.00	\$5,032,829,767.00
32250	13,825	\$3,088,199,136.00	\$5,783,316,381.00
32254	7,656	\$749,646,292.00	\$1,075,733,866.00

ZIP Code	Number of Buildings	Total Building Value	Total Market Value
32256	16,289	\$4,966,479,153.00	\$6,863,486,818.00
32257	13,974	\$2,345,657,157.00	\$3,447,925,471.00
32258	12,870	\$2,849,188,367.00	\$3,804,271,166.00
32259	569	\$85,471,069.00	\$117,715,512.00
32266	3,000	\$541,764,401.00	\$1,357,486,862.00
32277	9,408	\$1,243,539,894.00	\$1,705,745,860.00

Source: Duval Property Appraisers Office, 2019



Source: Duval Property Appraisers Office, 2019, map created by JaxGIS

**Table 22: Hazard Identification Table**

<b>Hazard (from Natural Causes)</b>	<b>Records for Identification</b>	<b>Reason for Identification</b>
Winds from Tropical Cyclones	Review of Emergency Preparedness Division (EPD) Event Files – Incident Action Plans and After Action Reports FDEM After Action Reports National Weather Service Data Risk Assessments	All jurisdictions in the City of Jacksonville subject to Tropical Storm Force Wind (TSFW) on annual basis. Impact of hurricane, TSFW, and Nor'easters have caused significant damage (personal and property) with wind associated with events
Severe Weather	NWS data EPD Incident Records	Entire county is at risk for Impact is to an immediate area of touchdown, although dollar damage may not be particularly high
Storm Surge	Sea, Lake and Overland Surges from Hurricanes (SLOSH) 2018 Model Review NWS data Review of 2018 FEMA FIRM maps	Beaches / riverine sections of County subject to storm surge on annual basis Impact of hurricane, TSFW events caused significant damage (personal and property) associated with event
Extreme Heat	EPD incident files Small Business Administration (SBA) disaster declarations NWS records JEA records	Impact upon sensitive populations, such as elderly, special needs or homeless Potential dollar damage to agricultural concerns Impact upon electric grid of County, particular with high temperatures, resulting in "brown-outs" when there is peak demand for service
Sea Level Rise	NOAA studies FEMA studies NASA Academic studies and conferences Florida DEM Enhanced Mitigation Strategy, 2018 NEFRC planning materials	Impacts upon the population Potential dollar damage to economic sectors Long term coastal flooding salinization of potable water climatological conditions leading to drought, unusual weather patterns

Hazard (from Natural Causes)	Records for Identification	Reason for Identification
Flooding	EPD Incident files Review of 2018 FEMA FIRM maps Community Rating System 2019 Data for repetitive loss areas	Associated with seasonal storms, such as TSW events and Nor'easters, which impact all jurisdictions The County in its entirety is within the Upper St. Johns River watershed, which contains numerous rivers, streams, creeks, tributaries and low lying marsh and drainage basins
Human and Animal Disease	CDC Files Florida Department of Health EPD Files	Human and animal diseases are possible locally or as part of regional or pandemic outbreaks. As with some other hazards, Duval was analyzed in part in a global context where applicable.
Drought	Southeast Regional Climate Center, USC Fl. Dept of Agriculture records Keetch-Byram Drought Index Palmer Drought Index	Entire county is at risk - Impact upon agricultural interests
Coastal Erosion	NOAA studies FEMA studies NASA Academic studies and conferences Florida DEM Enhanced Mitigation Strategy, 2018 NEFRC planning materials	Impacts upon the population Potential dollar damage to economic sectors Long term coastal flooding salinization of potable water climatological conditions leading to drought, unusual weather patterns
Saltwater Intrusion	NOAA studies FEMA studies NASA Academic studies and conferences Florida DEM Enhanced Mitigation Strategy, 2018 NEFRC planning materials	Impacts upon the population Potential dollar damage to economic sectors Long term coastal flooding salinization of potable water climatological conditions leading to drought, unusual weather patterns

<b>Hazard (from Natural Causes)</b>	<b>Records for Identification</b>	<b>Reason for Identification</b>
Wildfires	FL. Forest Service Jacksonville Fire Marshal incident records Jacksonville Fire and Rescue Dept. records	Increasing impact upon urban/rural interface of population in County, particularly to west and north sides Potential dollar damage to interface populations and agricultural concerns
Winter Storm and Freezing Temperatures	EPD incident files Small Business Administration (SBA) disaster declarations NWS records JEA records	Impact upon sensitive populations, such as elderly, special needs or homeless Potential dollar damage to agricultural concerns Impact upon electric grid of County, particular with high temperatures, resulting in "brown-outs" when there is peak demand for service
<b>Hazard (Man Made or Technological Cause)</b>	<b>Records for Identification</b>	<b>Reason for Identification</b>
Cyber-Attack	Subject matter expert (JSO/DHS/FEMA) assessments	Becoming increasingly common across all sectors of government and society, could be inflicted by individuals, groups, or hostile foreign governments
Terrorism / Targeted Violence Expanded to include; Active Shooter-Lone Offender; Biological Disease Outbreak	Subject matter experts (military, health) assessments	USMC Identification Matrix Florida Department of Health Risk Assessment Study Florida Department of Law Enforcement Fusion Center
Critical Infrastructure disruption	JEA records EPD event files Special Needs Registration database for oxygen dependent population	Potential dollar impact to business disruption from event Impact to sensitive populations in facilities such as nursing homes, hospitals, congregate care All of the County is vulnerable

Hazard (from Natural Causes)	Records for Identification	Reason for Identification
Hazardous Material Release	Review of City of Jacksonville HazMAT Hazard Specific Plan Department of Regulatory Compliance data review Local Emergency Planning Committee (LEPC) files	Major transportation corridors in County, I-95, I-10, CXS railways (N-S and E-W) High volume of truck traffic moving through County increases vulnerability Railroads transport unknown amounts of hazardous materials

## K. Hazard Analysis

### Tropical Cyclone Hazard Profile

#### Tropical Cyclone Description

Tropical cyclones are defined as a warm-core non-frontal synoptic-scale cyclone, originating over tropical or subtropical waters, with organized deep convection and a closed surface wind circulation about a well-defined center. Once formed, a tropical cyclone is maintained by the extraction of heat energy from the ocean at high temperature and heat export at the low temperatures of the upper troposphere. Tropical cyclones and the extent/intensity of the system are commonly classified according to wind velocity. A tropical cyclone in which the maximum sustained surface wind speed ranges from 39 mph to 73 mph is known as a Tropical Storm. A tropical cyclone in which the maximum sustained surface wind is 74 mph or more is known as a Hurricane. Hurricanes are further categorized by the Saffir-Simpson Hurricane Scale, which assigns a numerical value between 1 and 5 based on the maximum wind speeds. See Table 23 for the associated wind speeds and description of the impacts.

**Table 23: Saffir-Simpson Hurricane Wind Scale with Damage Descriptions**

Scale number (category)	Sustained winds (mph)	Expected Damage
1	74 - 95	Very dangerous winds will produce some damage Minor damage to structure exteriors Tree branches, uprooting smaller trees Extensive power line damage, power outages
2	96-110	Extremely dangerous winds will cause extensive damage Major damage to structure exteriors Uprooting of small trees and blocked roads Guaranteed power outages for long periods of time (days to weeks)
3 MAJOR	111 - 129	Devastating damage will occur Extensive damage to structure exteriors Many trees uprooted and many roads blocked Extremely limited availability of water and electricity
4 MAJOR	130 -156	Catastrophic damage will occur Loss of roof structure and/or some exterior walls Most trees uprooted and most power lines down Isolated residential access due to debris pile up Power outages lasting for weeks to months
5 MAJOR	157 or higher	Catastrophic damage will occur High percentage of structure will be destroyed Fallen trees and power lines isolate residential areas Power outages lasting for weeks to months Most areas will become uninhabitable

Source: FEMA, <http://www.ready.gov/hurricanes>; retrieved December 6, 2019



#### **a. Tropical Cyclone Hazard: Winds**

Wind is the second ranked of the lethal components of a hurricane's destructive force. Strong winds can be a very dangerous element of a hurricane, reaching up to more than one hundred miles inland. The impact of the wind on structures, plus wind borne debris, can result in injury or death for those far from the coast. Gale force winds and tornados associated with hurricanes are very hazardous to manufactured housing. High winds often lead to downed power lines and trees thus inhibiting mobility during and after the storm.

In contrast to the effects of the storm surge, the high winds associated with a strong tropical storm or hurricane will have an impact on inland as well as coastal areas countywide. Inland and coastal areas will experience downed trees and power lines, which result in obstructions to roadways and loss of power, and structural damage from the winds and wind-borne debris. Wind from tropical cyclones may impact all construction in the county, including residential, commercial, healthcare facilities, education facilities, and public infrastructure. Manufactured and older housing infrastructure throughout the county is particularly vulnerable to winds emanating from strong tropical storms and hurricanes.

#### **b. Tropical Cyclone Hazard: Storm Surge**

As defined by the National Weather Service, several terms are used to describe water levels due to a storm. Storm surge is defined as the abnormal rise of water generated by a storm, over and above the predicted astronomical tide, and is expressed in terms of height above normal tide levels. The surge is caused primarily by a storm's winds pushing water onshore. The amplitude of the storm surge at any given location depends on the orientation of the coast line with the storm track; the intensity, size, and speed of the storm; and the local bathymetry. Because storm surge represents the deviation from normal water levels, it is not referenced to a vertical datum.

Storm tide is defined as the water level due to the combination of storm surge and the astronomical tide, and is expressed in terms of height above a vertical datum, i.e. the North American Vertical Datum of 1988 (NAVD88) or Mean Lower Low Water (MLLW). Astronomical tides are caused by the gravitational pull of the sun and the moon and have their greatest effects on seawater level during new and full moons—when the sun, the moon, and the Earth are in alignment. As a result, the highest storm tides are often observed during storms that coincide with a new or full moon.

Inundation is the total water level that occurs on normally dry ground as a result of the storm tide, and is expressed in terms of height above ground level. At the coast, normally dry land is roughly defined as areas higher than the normal high tide line, or Mean Higher High Water (MHHW) (*Source: [https://www.nhc.noaa.gov/data/tcr/AL142016\\_Matthew.pdf](https://www.nhc.noaa.gov/data/tcr/AL142016_Matthew.pdf)*).

Storm surge is considered the most destructive of the forces related to hurricanes, according to the National Weather Service. It is a phenomenon that occurs when the winds and forward motion associated with a hurricane, pile water up in front, as it moves toward shore. Storm surge heights, wind speed, fetch length, pressure and associated waves, are dependent upon the configuration of the continental shelf (narrow or wide) and the depth of the ocean bottom (bathymetry). These as well as other factors can affect storm surge height and wave height. A narrow shelf, or one that drops steeply from the shoreline and subsequently produces deep water in close proximity to the shoreline, tends to produce a lower surge but higher and more powerful storm waves. This is the situation along most of the Atlantic Ocean coastline of the state of Florida, which is the source of impact for the City of Jacksonville.

The surge is caused by the frictional forces of hurricane winds on the surface which, when over a large body of water such as the Atlantic Ocean, results in a high dome of wind-driven water. This surge of water contains immense, destructive power. At times, the effects of the moving water can be likened to a

bulldozer clearing everything in its path. Debris propelled by the storm surge can act as a battering ram destroying objects in its path.

#### Geographic Areas Affected by Tropical Cyclones

Duval County has not been struck directly by a hurricane since 1964, when Hurricane Dora made landfall in the area. Dora was the only hurricane to make a direct hit on the county in the twentieth century. The Atlantic hurricane season of 2004 was quite active, with impacts from several hurricanes, including Charley, Ivan, Frances, and Jeanne within the county. Two recent events, a near miss from Hurricane Matthew (2016), and a blow from the southwest by a weakened Hurricane Irma (2017), served as reminders of the dangers that hurricanes present. Damage estimates from Hurricane Matthew, which skirted the east coast of Florida and produced tropical storm force winds in the county, exceed 55 million dollars. Damage estimates from Hurricane Irma, which travelled across the state before bringing hurricane force wind gusts, ten inches of rain, and nearly six feet of surge to the St. Johns River, exceed 77 million dollars as of December 2019.

#### Historical Occurrences of Tropical Cyclones

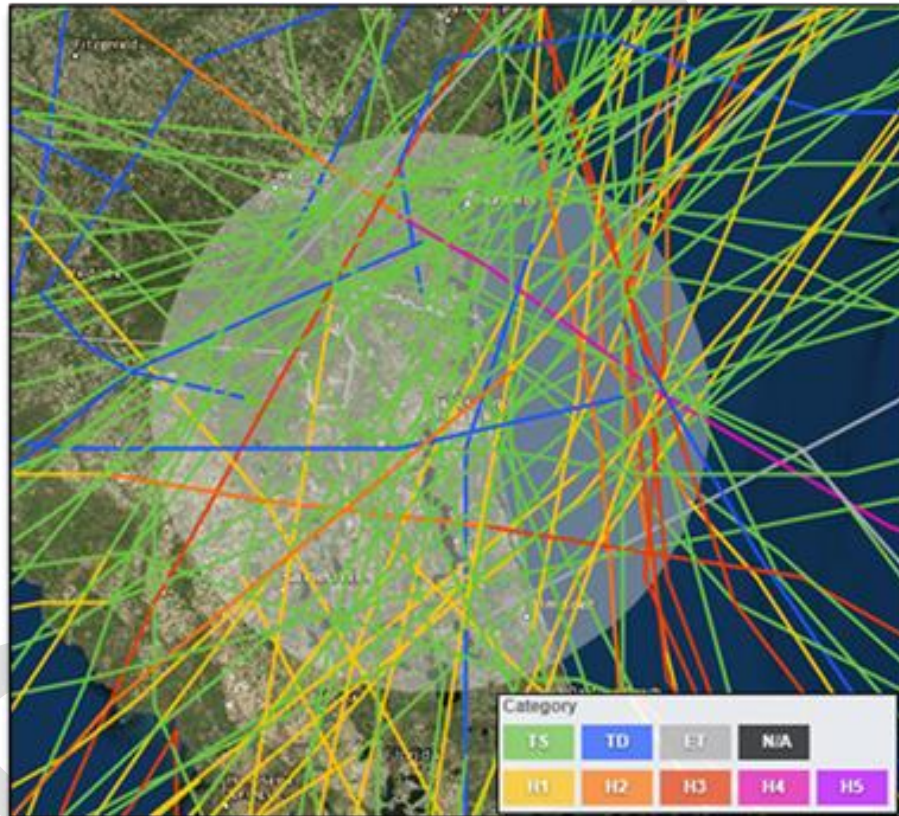
The National Weather Service reported that during the 168 year period from 1851 to 2019, 104 tropical cyclones (79 tropical storms and 25 hurricanes) have passed within 65 nautical miles of Jacksonville. In Duval County, the most expensive disasters related to tropical cyclones have occurred very recently, within the past five years. Historical records and recent data are described below.

Sept. 1964, Hurricane Dora produced significant tidal effects, and caused the highest recorded flooding of the St. Johns River in the twentieth century. High levels of rainfall during the storm and in the four day period following Hurricane Dora, with abnormally high tides sustained by strong offshore winds of long duration combined to produce river flooding causing over 100 million dollars in damages total, and 2 million dollars in damages locally. According to the Geological Survey prepared in cooperation with federal, state, and local agencies, the highest tides from the hurricane were observed in the Saint Augustine Area, where observers reported tides estimated at 12 feet high. There was considerable flooding along the St. Johns River in Jacksonville on September 10th. Strong southerly winds caused the river to overtop its north bank in the area where the river turns east to the Atlantic Ocean. The one fatality in Florida directly attributed to the storm was a drowning at Live Oak. High tides along the Atlantic coast caused extensive beach erosion, inundated most beach communities, and washed out, or undermined, beach roads and beach residences. High winds in Duval County, including metropolitan Jacksonville, caused a massive utilities failure. Numerous trees were uprooted throughout the coastal counties and added to the overall destruction when they fell on buildings or across utility lines. The wind-induced flooding along the St. Johns River at Jacksonville forced the evacuation of a number of riverfront residences (Source: <https://pubs.usgs.gov/wsp/1840c/report.pdf>).

In 2016, Hurricane Mathew brought a high storm surge. The maximum storm surge measured by a tide gauge in the United States was 7.70 feet above normal tide levels at a NOS gauge at Fort Pulaski, Georgia. Matthew also produced storm surges of 6.96 feet at Fernandina Beach, Florida. Several NOS tide gauges from Mayport, Florida as well as along the St. Johns River, measured their highest water levels on record during Matthew. In Florida, the combined effect of the surge and tide produced maximum inundation levels of 5 to 7 feet above ground level along the coasts of Flagler, St. Johns, and Duval Counties. According to the National Weather Service (NWS), Peak Water Levels at CO-OPS stations exceed historical maximum water levels: Mayport (Bar Pilots Dock), FL: 3.28 feet (previous record 2.47 feet during Hurricane Gabrielle, 2001), Dames Point, FL: 2.80 feet (previous record 2.40 feet during Hurricane Sandy, 2012), Red Bay Point, St Johns River, FL: 3.24 feet (previous record 2.93 feet during Hurricane Jeanne, 2004) (Source: [https://www.nhc.noaa.gov/data/tcr/AL142016\\_Matthew.pdf](https://www.nhc.noaa.gov/data/tcr/AL142016_Matthew.pdf)).

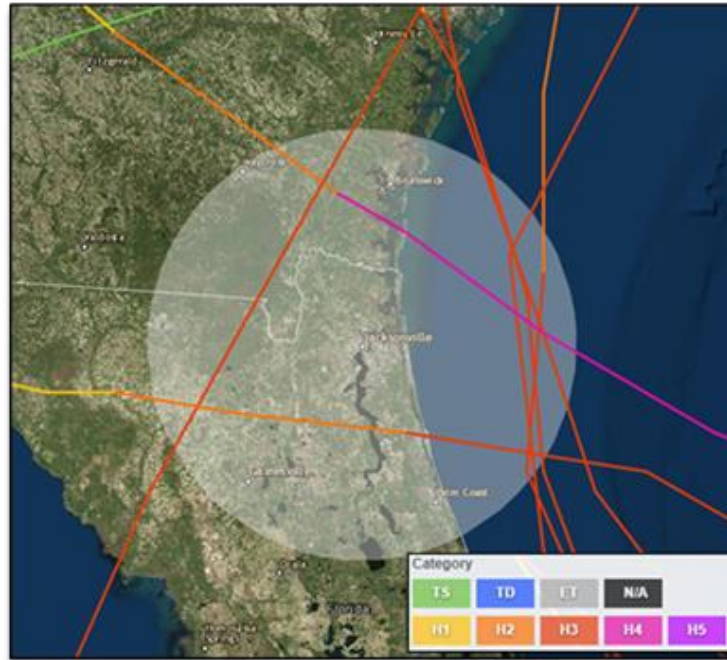
In 2017, Hurricane Irma also brought a high storm surge to the City of Jacksonville. According to the National Weather Service (NWS), Duval County St Johns River at the Buckman Bridge sets record flood stage at 5.63 feet on Sept 11th at 0718 EDT. Major flooding occurs at this level. Pottsborg Creek at Beach Blvd sets record flood stage at 5.84 feet on Sept 11th at 1300 EDT. Major flooding occurs at this level. Pottsborg Creek at Bowden Road sets record flood stage at 10.04 feet on Sept 11th at 0800 EDT. Major flooding occurs at this level. Trout River at Lem Turner Road crested at 4.16 feet on Sept 11th at 0200 EDT. Moderate flooding occurs at this level. 3.3 million Customers were without power in Florida following Hurricane Irma.

**Figure 15: All Hurricanes within 65 nm of the City of Jacksonville 1851-2019**



*Source: National Weather Service, 2019*

**Figure 16: Major Hurricanes within 65 nm of the City of Jacksonville 1851-2019**



Source: National Weather Service, 2019

The Hurricane Evacuation Zone Map for the City of Jacksonville County was last updated in 2014, taking into consideration the Hurricane Evacuation Study and National Weather Service data on wind, storm surge, and flooding.

**Table 24: Potential Storm Height Tide**

Volume 9-4 Northeast Florida

Statewide Regional Evacuation Study Program

### Potential Storm Tide Height (s) by County

(In Feet above NAVD88)

*Storm Strength	Clay	Duval	Flagler	Nassau	Putnam	St. Johns
Category 1	Up to 3.6'	Up to 6.6'	Up to 6.3'	Up to 6.8'	Up to 4.3'	Up to 6.5'
Category 2	Up to 5.6'	Up to 11.0'	Up to 12.6'	Up to 12.2'	Up to 6.7'	Up to 11.9'
Category 3	Up to 9.5'	Up to 19.9'	Up to 18.8'	Up to 16.7'	Up to 9.3'	Up to 19.9'
Category 4	Up to 13.5'	Up to 22.2'	Up to 24.2'	Up to 21.2'	Up to 12.4'	Up to 24.9'
Category 5	Up to 16.3'	Up to 28.2'	Up to 27.3'	Up to 27.7'	Up to 14.4'	Up to 29.6'

\*Based on the category of storm on the Saffir-Simpson Hurricane Wind Scale

\*\* Surge heights represent the maximum values from SLOSH MOMs

The 2013 Hurricane Evacuation Study provided maps in the Storm Tide Atlas to depict SLOSH-modeled surge depth and extent of flood inundation for hurricanes with five different intensities. As indicated in

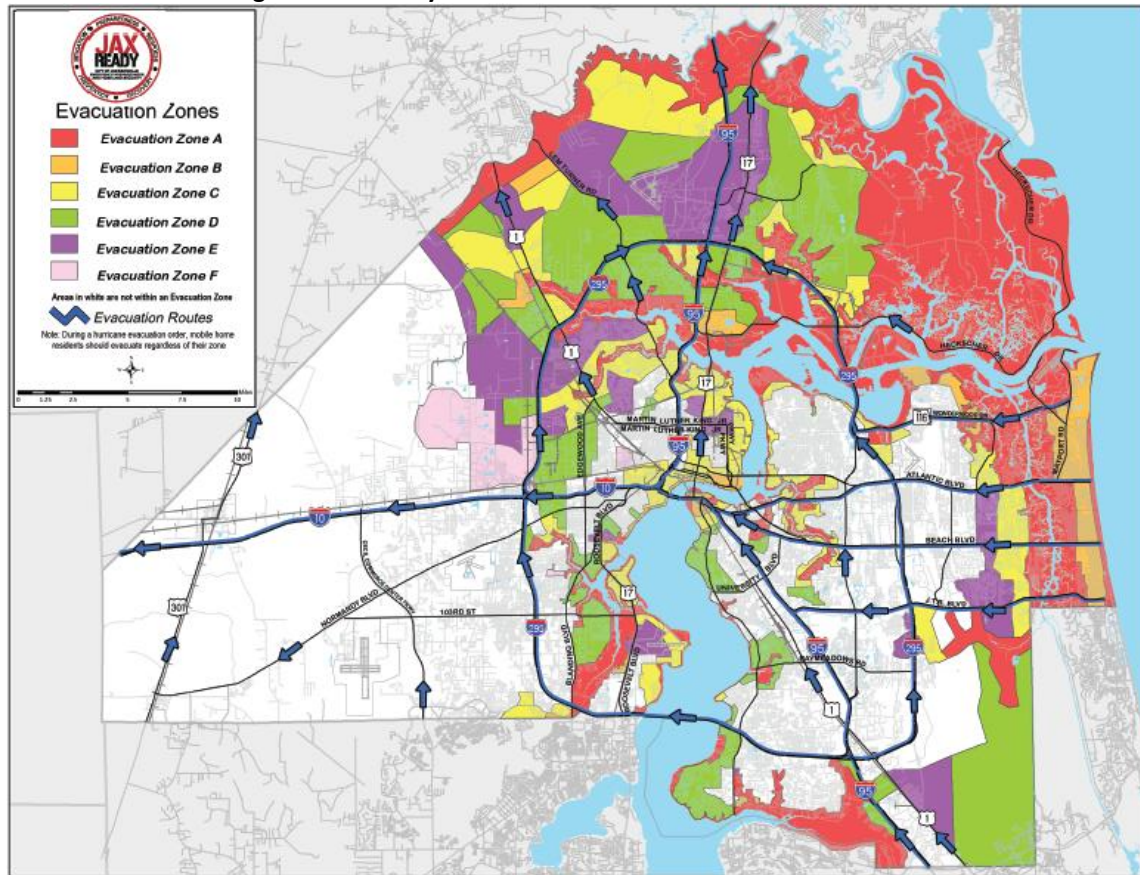
the graph above, surge depth was modeled using the Maximum of Maximums (MOMs) representing the total flooding from the five categories of storm intensity of the Saffir/Simpson Hurricane Wind Scale. *(Source: Hurricane Evacuation Study, Vol. 9, pg. 11).*

Secondary destructive forces resulting from storm surge include beach erosion and inlet formation. Studies have shown that the impact of storm surge can be expected along the entire St. Johns River and its tributaries within the borders of the City of Jacksonville. Storm surge and wind emanating from hurricanes can destroy or heavily damage beachfront homes and commercial establishments, piers, seawalls, boardwalks, etc. With a larger, higher intensity storm, it is expected to cause massive destruction on coastal barrier islands, and particularly in coastal municipalities including the cities of Atlantic Beach, Neptune Beach, and Jacksonville Beach. In addition, the Mayport Naval Station is expected to encounter such destruction.

Based on past history, beach erosion, usually the result of the stress placed on the shore from the storm surge, is a problem in the Northeast region that is increasing due to impacts being categorized as climate change and subsequent risks that accompany this hazard.



Figure 17: The City of Jacksonville Hurricane Evacuation Zones



Source: <https://www.JaxReady.com>, retrieved February 2019

### Probability of Future Tropical Cyclones

Raw frequency counts do not provide a specific probability in a given year for the occurrence of a hurricane. Such events do not occur evenly throughout time. Global climatological patterns give rise to periods of more frequent and severe hurricanes, as well as periods in which such storms are less frequent or less severe on average. The 1970's and 1980's were periods of lesser hurricane activity for the southern Atlantic and the Caribbean, and the last decade has been a period of greater activity.

The City of Jacksonville will be impacted by a tropical cyclone in the future, although the probability of a major hurricane hitting the county directly is low in any given year. The return period for a tropical cyclone is approximately 13 years, and the return period for a major hurricane is approximately 40 years (see figures 18 and 19 below). Based on historical data and NHC risk analysis, tropical cyclones are most likely to affect the county; however, major hurricanes remain a possibility. The National Weather Service reported that during the 168 year period from 1851 to 2019, 104 tropical cyclones (79 tropical storms and 25 hurricanes) have passed within 65 nautical miles of Jacksonville. This presents an average of approximately one tropical cyclone coming within 65 nautical miles every 1.6 years. There is a very high probability that a future tropical cyclone / hurricane event will create a scenario that could lead to injuries, potential deaths and property damages in the county. Because of the high level of risk and vulnerability of the City of Jacksonville as a coastal community with exposure to tropical cyclonic winds, this is rated as a hazard with a very high degree of probability of occurrence.

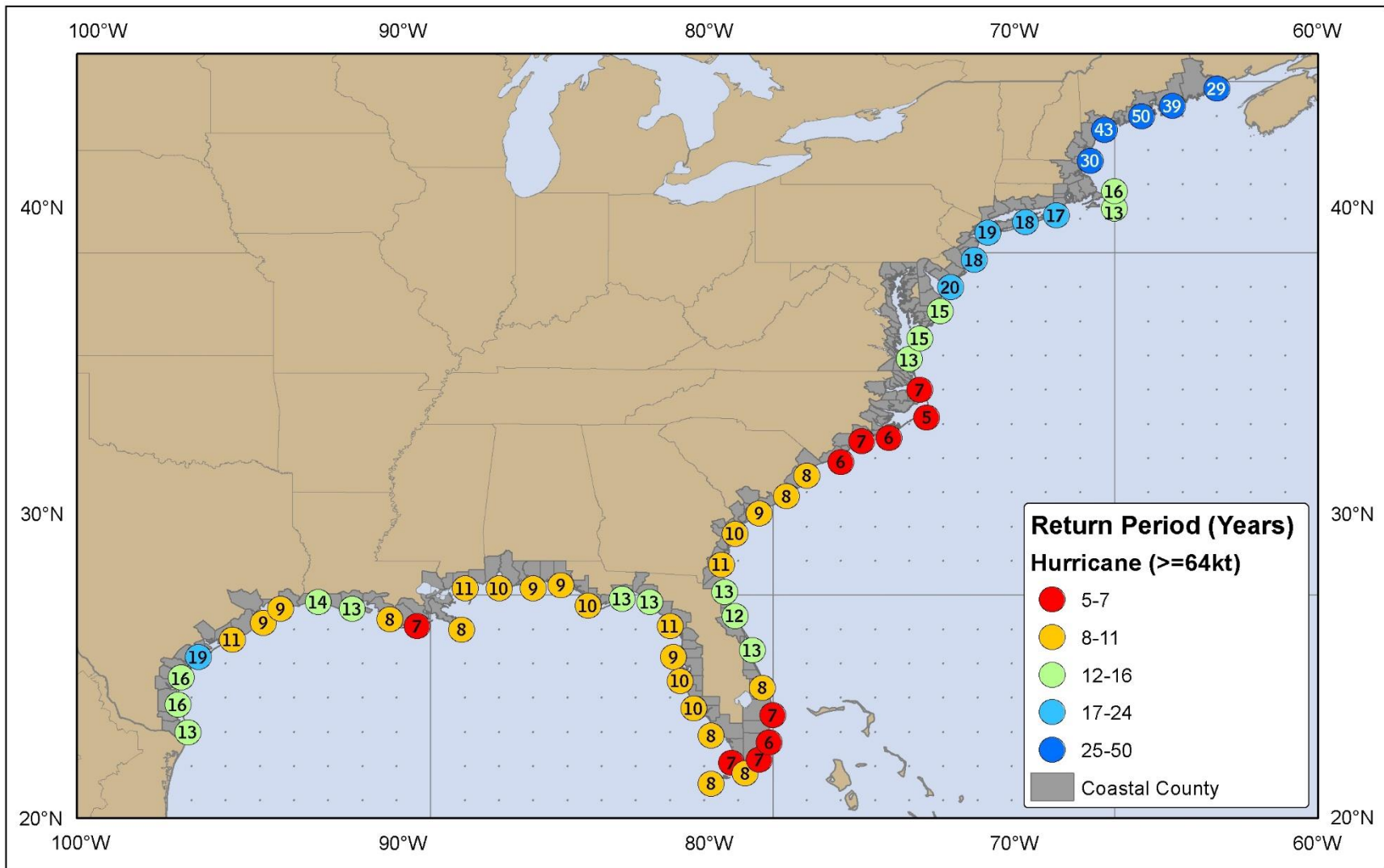
All of the City of Jacksonville is at risk from high winds; however, the threat is exacerbated by the large number of residents who reside in coastal areas. The Florida Building Code of 2017 eliminated the wind

speed velocity zones formerly established to categorize wind speed across the county. The Building Code currently requires strength design and higher wind load factors. The 2017 Building Code has been adopted by the jurisdictions in the City of Jacksonville. The Florida building code is one of the strongest building codes in the United States. The kinds of facilities in each jurisdiction of the City of Jacksonville impacted by hurricane wind hazard events include residential, commercial, industrial, public facilities, agricultural, recreational, and historic preservation sites.

The National Weather Service (NWS) provided updates for the estimated frequencies of tropical cyclone/hurricane hazards (winds and storm surge) using their ARC Mapping/GIS systems. System improvements since the 2015 LMS Update enable them to draw more precise shape files. The data is based on a 65 nautical mile (nm) configuration. The NWS used a reference point for the City of Jacksonville at Latitude 30.330227 Longitude - 81.673974, placing the center of county just west of downtown Jacksonville near McCoy's Creek. The NWS drew a series of range rings in Nautical Miles (nm) around the centroid until they best approximated the City of Jacksonville boundary. The range ring is about 15 nm from the centroid.

The National Weather Service provides data for tropical cyclones which have passed within 65 nm of the City of Jacksonville. A centroid buffer, used for measurement purposes, was devised by adding the distance from the centroid to the range ring (15 nm) and the search buffer around the county (65nm) to create a centroid buffer (points of reference within a boundary for measurement purposes). A 15nm range ring distance + 65nm area of interest = 80nm was used to search all storms with 65nm of the City of Jacksonville. Emergency Preparedness Division staff used the Coastal Services Center Hurricane Tracks webpage for the period of 1851 to 2019 and searched the storm events where the center line/best track passed within 80nm of 30.330227 -81.673974, or approximately within 65nm of the City of Jacksonville boundaries.

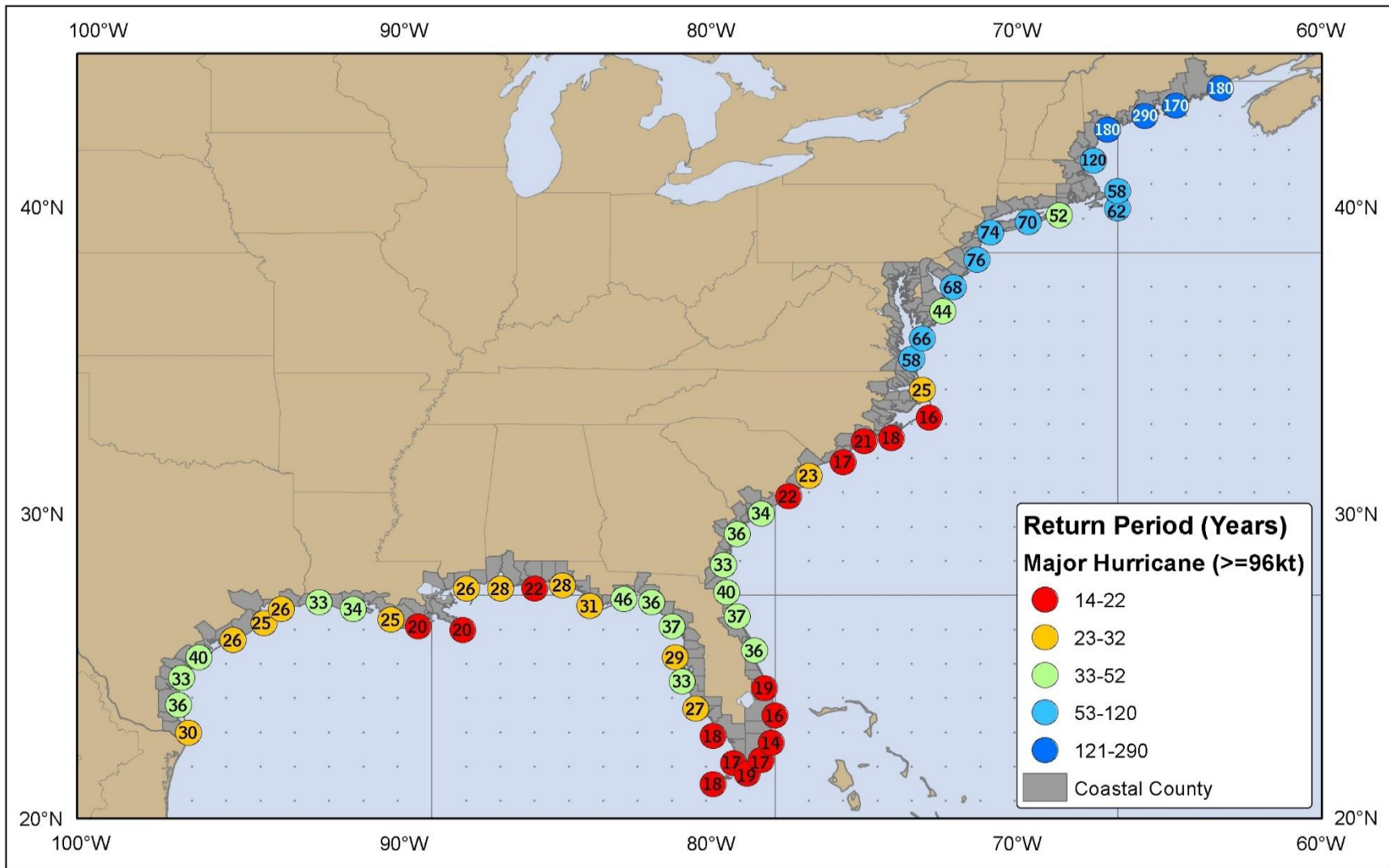
Figure 18: Estimated return period for hurricanes within 50 nautical miles of the U.S. Coast



Source: NHC, NHC Risk Analysis Program (HURISK); <https://www.nhc.noaa.gov/climo/>



Figure 19: Estimated return period for major hurricanes within 50 nautical miles of the U.S. Coast



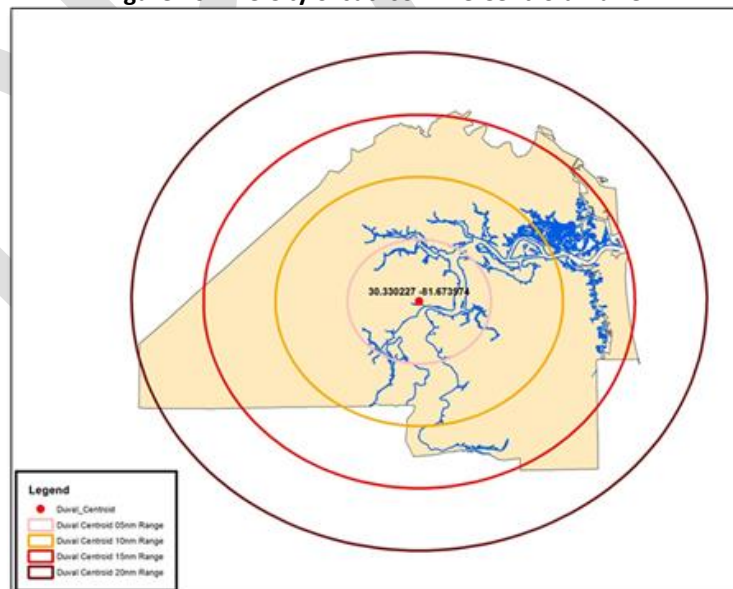
Source: NHC, NHC Risk Analysis Program (HURISK); <https://www.nhc.noaa.gov/climo/>

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**Figure 20: The City of Jacksonville Centroid Buffer**



*Source: National Weather Service*

## Tropical Cyclones Impact Analysis

In contrast to the effects of the storm surge, the high winds associated with a strong tropical storm or hurricane will have an impact on inland as well as coastal areas countywide. Inland and coastal areas will experience downed trees and power lines, which result in obstructions to roadways and loss of power, and structural damage from the winds and wind-borne debris. Wind from tropical cyclones may impact all construction in the county, including residential, commercial, healthcare facilities, education facilities, public infrastructure, and historical and cultural sites. Manufactured and older housing infrastructure throughout the county is particularly vulnerable to winds emanating from strong tropical storms and hurricanes.

A great concern with a hurricane hitting the City of Jacksonville is the severity of the wind. Wind damage from a strong hurricane can cause widespread devastation far beyond the coastal areas. There are no geographic features within the county that would mitigate wind effects; therefore, wind damage, including that from tornados spawned by a hurricane, is likely to be a significant risk factor. The vulnerability of manufactured housing and homes built during a period in which construction codes were significantly less sufficient to insure the integrity of buildings against sustained high winds are two significant wind-risk factors in hurricanes. The extensive tree canopy in the City of Jacksonville will create large amounts of vegetative debris following even a strong tropical storm or weak hurricane event.

Strong winds can damage or destroy vehicles, buildings, bridges, trees, personal property and other outside objects, turning loose debris into deadly flying projectiles. Tropical cyclones / hurricanes can knock out power to tens or hundreds of thousands of people within the county, preventing vital communication and obstructing rescue efforts. Tropical cyclones can damage or destroy key bridges, overpasses, and roads, complicating efforts to transport food, clean water, and medicine to the areas that need it. Further, the damage caused by tropical cyclones to buildings and dwellings may result in economic damage to a region, and to a diaspora of the population of the region. Some general impacts from Tropical cyclone events include:

### **Public**

- Injury/death
  - Car accidents because of flood waters, high winds, panic, traffic jams because of evacuations, no power after storm
  - Becoming isolated from emergency responders during storm
  - Delayed emergency response because of blocked roads, etc.
  - Drowning in flood waters
  - Being hit or crushed by debris
  - Stranding on roof because of flooding
  - Exposure to hazardous materials
  - Illness from contaminated water
  - Pet and other animal deaths from above factors
- Damage to home or property
  - Power loss or damage to power connections on home
  - Mold damage causing the need for expensive mold remediation actions
  - Cost to replace damaged and destroyed items, such as furniture, flooring, etc.
  - Cost and labor to repair damaged homes and other structures to make the house inhabitable
  - If the property was uninsured, the cost falls upon the property owner
  - Hotel room fees or having to live in a shelter until damage is repaired or home is replaced

- Damaged or washed-away vehicles
- Lost wages because no way to get to work if roads are blocked or if car was damaged in storm or if employer experienced damage
- Possible forced to evacuate
- Cost to travel
- Cost to stay at hotel
- Loss of wages if out of town
- Loss of food and other perishable items

### **Responders**

- Injury/death
  - Responding during tropical cyclones is unsafe
  - Responding immediately after tropical storms may be unsafe because of debris, unstable transportation infrastructure, unstable structures
  - Rescuing people from unstable buildings or by boat
  - Exposure to hazardous materials
- Stress caused by severity of tasks such as rescuing people
- Feelings of guilt for not being able to save people
- Witnessing gruesome scenes of injured or dead

### **Continuity of Operations (including continued delivery of services)**

- Loss of revenue if businesses cannot operate during or after event
- Loss of wages if your employer's organization is damaged or destroyed and you cannot work
- Utility failures such as electric or gas may prevent businesses from opening even if there is no damage
- Utility failures may impede or prevent government offices from continuing daily services
- Severe damage and interruption to transportation systems and infrastructure like roads and bridges; communication systems; power; water; wastewater; etc.

### **Property, Facilities, Infrastructure**

- Damaged or destroyed property, such as homes and other buildings
- Roofing is particularly susceptible to damage from high winds
- The first floor of many buildings, plus all the items on that floor, are susceptible to severe damage from flooding

### **Cost of repairing damage to property such as buildings**

- Cost of replacing items damaged such as furniture on the first floor of a flooded home
- Crop damage or loss
- Damage to transportation infrastructure, like a road being washed out or a bridge collapsing and/or closure of major transportation networks
- Inability to get clean water
- Inability to control wastewater
- Release of hazardous materials

### **Environment**

- Beach and dune erosion
- Downed trees
- Eroded river banks
- Release of hazardous materials can contaminate or damage the environment

- Loss or damage to habitat for animals because of flooding or high winds
- Crop damage or loss
- Event generated marine debris impacting waterway navigation and submerged wetland habitats

#### **Economic Condition**

- Damaged and destroyed businesses leading to long-term closures and possibly permanent closures
- Delayed re-opening of businesses because of utility issues, road blockages, etc.
- Crop damage or loss from flooding and high winds
- Absenteeism from work
- Loss of tourism because of eroded beaches or damaged attractions

#### **Public Confidence in Jurisdiction's Governance**

- Evacuations not ordered in time lead to decrease in public confidence
- Shelters not opened or having little information
- Warnings not communicated effectively
- Communicating too much
- Over exaggeration of possible storm impacts, especially if the storm doesn't have expected impacts

#### **Potential Effects of Climate Change on Tropical Cyclones**

According to the State of Florida Enhanced Hazard Mitigation Plan (2018), a warmer atmosphere due to climate change could influence multiple factors that affect the generation and strength of tropical cyclones. A warmer atmosphere will lead to increased thermal energy resulting from higher sea surface temperatures. Additionally, higher temperatures will lead to increased vertical wind shear. Tropical cyclone tracks and consequently, the number of systems that make landfall in Florida, could be influenced by atmospheric steering currents and climate phenomena such as the El Niño-Southern Oscillation, North Atlantic Oscillation, Atlantic Meridional Mode, and Madden-Julian Oscillation. As stated in the Flood Hazard Profile, higher rainfall intensity is likely as atmospheric moisture increases. Sea Level Rise attributed to climate change may produce more dramatic flooding effects related to inland and coastal flooding, which would be further exacerbated by storm surge

#### **Vulnerability Analysis and Loss Estimation**

The risk of death, injury and property losses resulting from wind and storm surge elements of a category 1 or 2 hurricane is greatest at the three Beaches Municipalities extending from Ponte Vedra on the south up to and including Mayport Naval Station on the north and including land  $\frac{3}{4}$  of a mile west of the Intracoastal Waterway. Four areas will experience category 2 force winds in addition to the Beaches; 1) lands south of the St. Johns River from Mill Cove to the Charter Point area, north of Fort Caroline Road; 2) lands on the north bank of the St. Johns River from the intersection of Hecksher Drive and Imeson Park Boulevard west to I-95 and south to 27<sup>th</sup> street; 3) lands on the north bank of the river in the eastern quadrant of the downtown core from State Street on the north west to Main Street; 4) lands on the western bank of the St. Johns River from the intersection of King Street and the river bank in Riverside west to Cassat Avenue and south to Wilson Boulevard near Ortega; continuing all lands east of Roosevelt Boulevard as far south as the I-295 and the County line. All of these areas are primarily residential land use with densities in the three to four dwelling units per acre range. Preliminary indications from storm surge calculations are that for a category two storm, water up to about ten feet of depth above the surface can be expected in a worst-case scenario over nearly all the land between Third Avenue and the Ocean in all three Beach communities. Water 3 to 4 feet above the surface is projected to cover nearly all of the

City of Atlantic Beach. Land on both sides of the Intracoastal Waterway from Beach Boulevard on the north, San Pablo Road on the west and Butler Boulevard on the south is expected to be below 3 to 4 feet of water. The next largest area adversely affected by storm surge, are lands north and south of the Trout River and Ribault River basins in northwest Jacksonville's Riverview neighborhood. Most of the rest of affected lands are relatively small in size and include the north end of University Boulevard, lands on each side of the Arlington River, parts of San Marco, Riverside and Ortega neighborhoods along the river's edge.

Significant segments of population in the City of Jacksonville are vulnerable to the effects of wind from tropical cyclones / hurricanes. Areas with the highest level of risk include coastal barrier islands, particularly in the coastal municipalities of the cities of Atlantic Beach, Jacksonville Beach and Neptune Beach. In addition, the Mayport Naval Air Station also has significant exposure. There are additionally approximately Based on the recently updated storm surge data, and also due to planned bridge closures at onset of tropical storm force winds (40 mph) and the anticipated inundation of low-lying roads, most all land east of the Intracoastal Waterway is included in the Evacuation Zone A and B, for a Category 2 or higher rated hurricane event.

Further, vulnerable populations such as the elderly, people with special needs, and children under the age of five are most susceptible to the impacts of wind from tropical cyclone and require additional assistance in times of evacuation. These populations are dispersed throughout the county. Additionally, inland communities with residents who live in low-lying or flood-prone areas, mobile or manufactured housing, and structures built to older, less robust building code standards, are also vulnerable to the winds emanating from tropical cyclones and hurricanes.

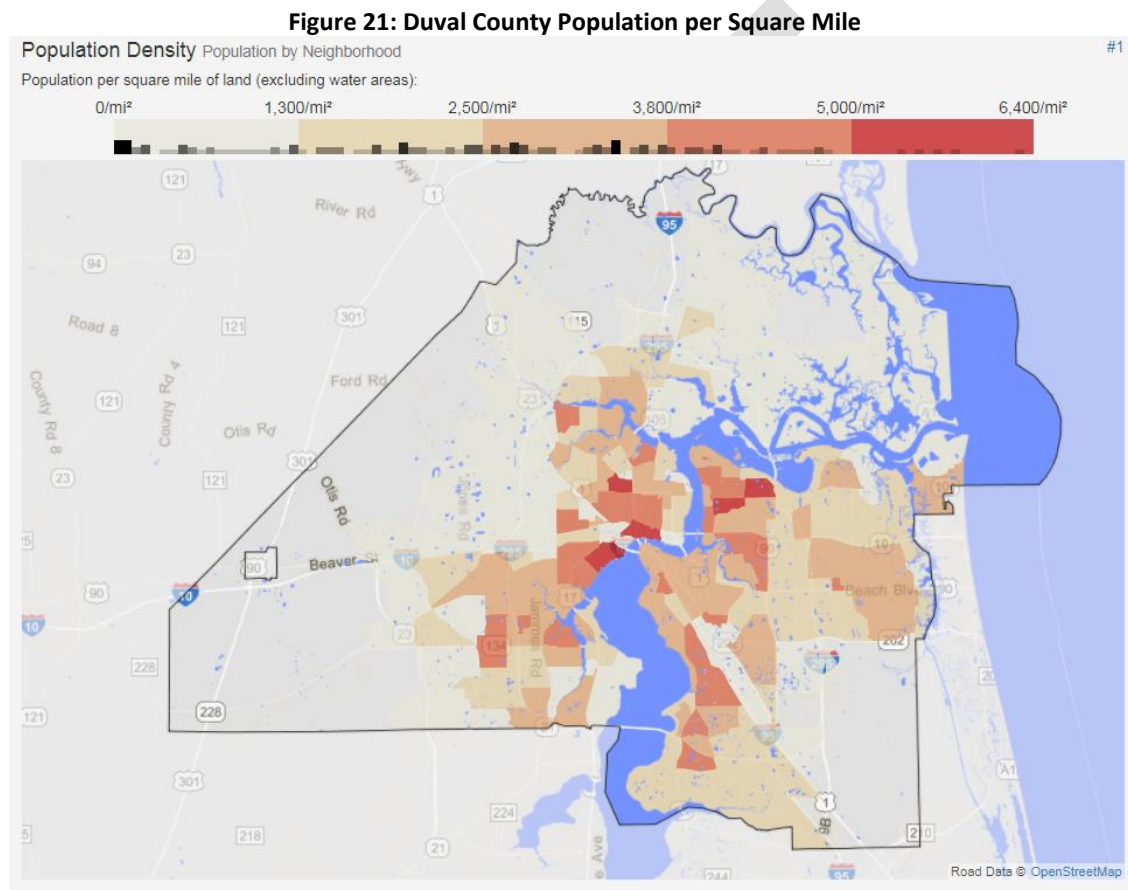
In addition to residents living in low-lying or flood-prone areas, residents who live in manufactured housing and structures built to older, less robust building code standards are also vulnerable to hurricanes and tropical storms. According to the Northeast Florida Regional Council, manufactured housing makes up 11,013 units out of 329,778 units, or 3.33 percent of the City of Jacksonville housing; these structures are more vulnerable to high winds than other structures. Federal law, passed after Hurricane Andrew of 1992, requires that manufactured housing must now be constructed with two inch by six-inch lumber, have tie-downs and be able to withstand winds of 110 miles per hour on the coast and 100 miles per hour inland. However, approximately 90 percent of the 849,000 Florida manufactured housing (source: Census of Housing, U.S. Census Bureau, revised October 31, 2011), were built before that law was enacted. Those manufactured homes built after 1976 were built to withstand 90 mile per hour winds; those built before 1976 had no wind requirements (*Source: The Tornado Project*).

The 2013 Hurricane Evacuation Study identified populations vulnerable to the effects of hurricanes and analyzed the behavioral patterns of those people. New data that incorporates the storm's angle of approach, direction and intensity, as well as the risks of isolation of elevated areas due to flooded or destroyed roads, indicate much larger areas of impact from all levels of storm surge and wind-driven water than what was previously recorded. Therefore, more extensive evacuation clearance time for hurricanes will be required. Based on the recent storm surge data, and also due to planned bridge closures at onset of tropical storm force winds (40 mph) and the anticipated inundation of low-lying roads, most all land east of the Intracoastal Waterway is included in the Evacuation Zone A and B, for a Category 2 or higher rated hurricane event.

Areas most at risk from storm surge are those located in Evacuation Zones A through E, as established through the 2014 City of Jacksonville evacuation zones update process, once the SLOSH modeling was made available through the 2013 Hurricane Evacuation Study. The areas that would flood first are Evacuation Zones A and B and a new category established at the discretion of the local government emergency management included fresh water flooding, Zone F. The City of Jacksonville GIS Division

estimates the expected numbers of people evacuating Zones A through E is approximately 722,000 persons. (Source: Jacksonville JaxGIS, 2019) .

The flooding hazard associated with storm surge and wind-driven water likely emanating from a Category 1 or Category 2 hurricane can destroy or heavily damage beachfront homes and commercial establishments, piers, seawalls, boardwalks, etc. Storm surge and wind associated with a Category 3 or higher storms are expected to cause extensive destruction on coastal barrier islands, particularly in coastal municipalities including the cities of Atlantic Beach, Jacksonville Beach and Neptune Beach. In addition, the Mayport Naval Air Station would be expected to sustain significant destruction.



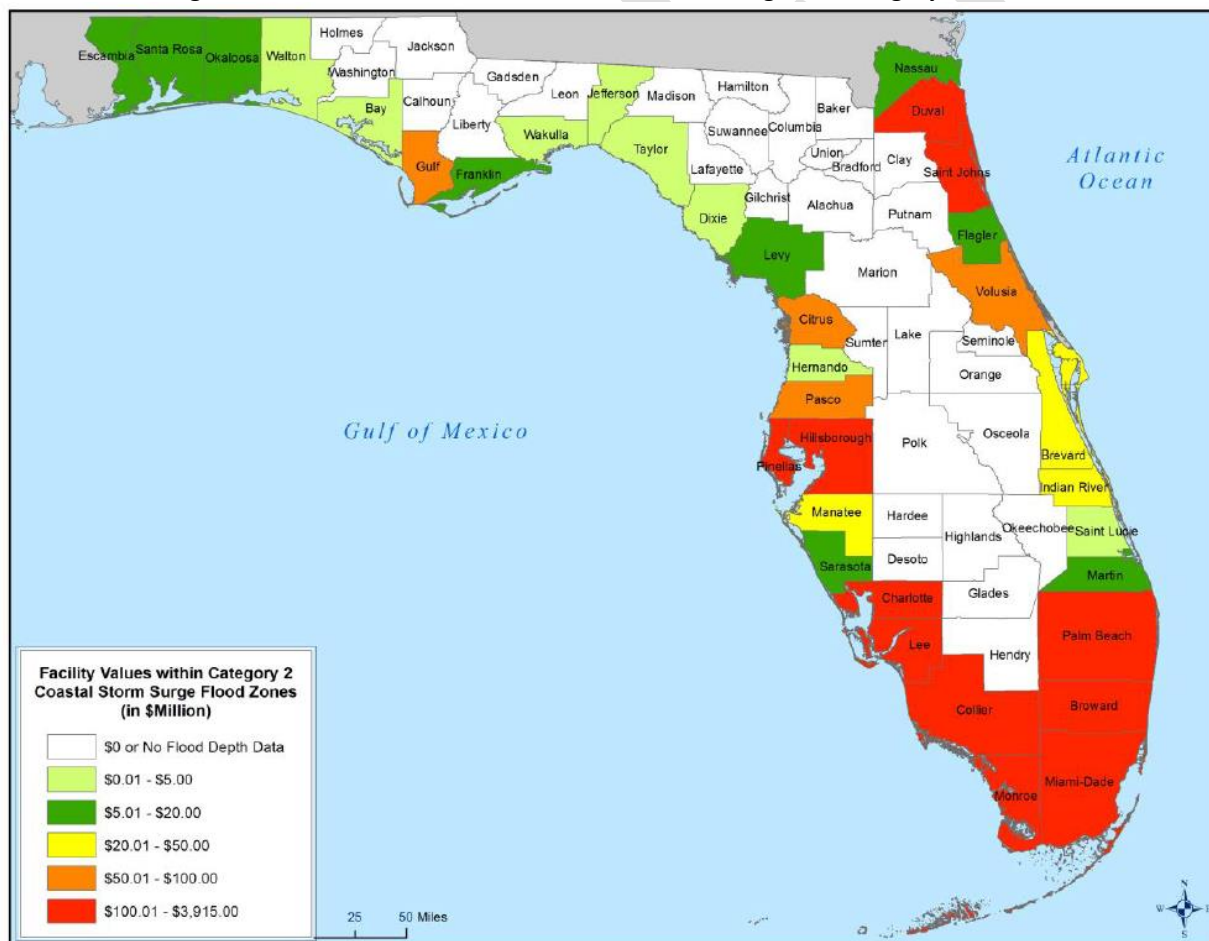
Source: <https://statisticalatlas.com/place/Florida/Jacksonville/Population> Accessed February 2019



Although a total evacuation of 912,043 residents (2017 estimates from the US Census American Fact Finder and Quick Facts, February 2019) and a variable number of visitors is achievable, the clearance times for a fast moving Category 4 or 5 hurricane could require evacuation start times which are beyond the current ability to accurately predict a storm's actual landfall and intensity. The clearance time requirements increase if the magnitude of the storm, or its predicted landfall, requires the evacuation of adjacent counties. The problems that arise from merging the evacuees from Duval and neighboring counties may extend clearance times beyond reasonable limits. As a result, residents of the City of Jacksonville are encouraged to shelter in place as a last resort unless they are utilizing air transportation, or evacuate when instructed to do so. The threat from storm surge represents a serious hazard to barrier island communities. In addition, flooding due to torrential rainfall (inundation) could pose a serious threat in portions of the City of Jacksonville.

According to the Florida State Risk Assessment, for a category 2 hurricane, Duval County has 51 facilities types that could be affected by some level of surge with a total value of 307.7 million dollars. For a category 5 hurricane, Duval County has 236 total facilities with a total value of 952.51 million dollars. (Source: <https://www.floridadisaster.org/contentassets/d493c8a71f1d46a2a69045fea878c9c8/section20320state20risk20assessment20final.pdf>)

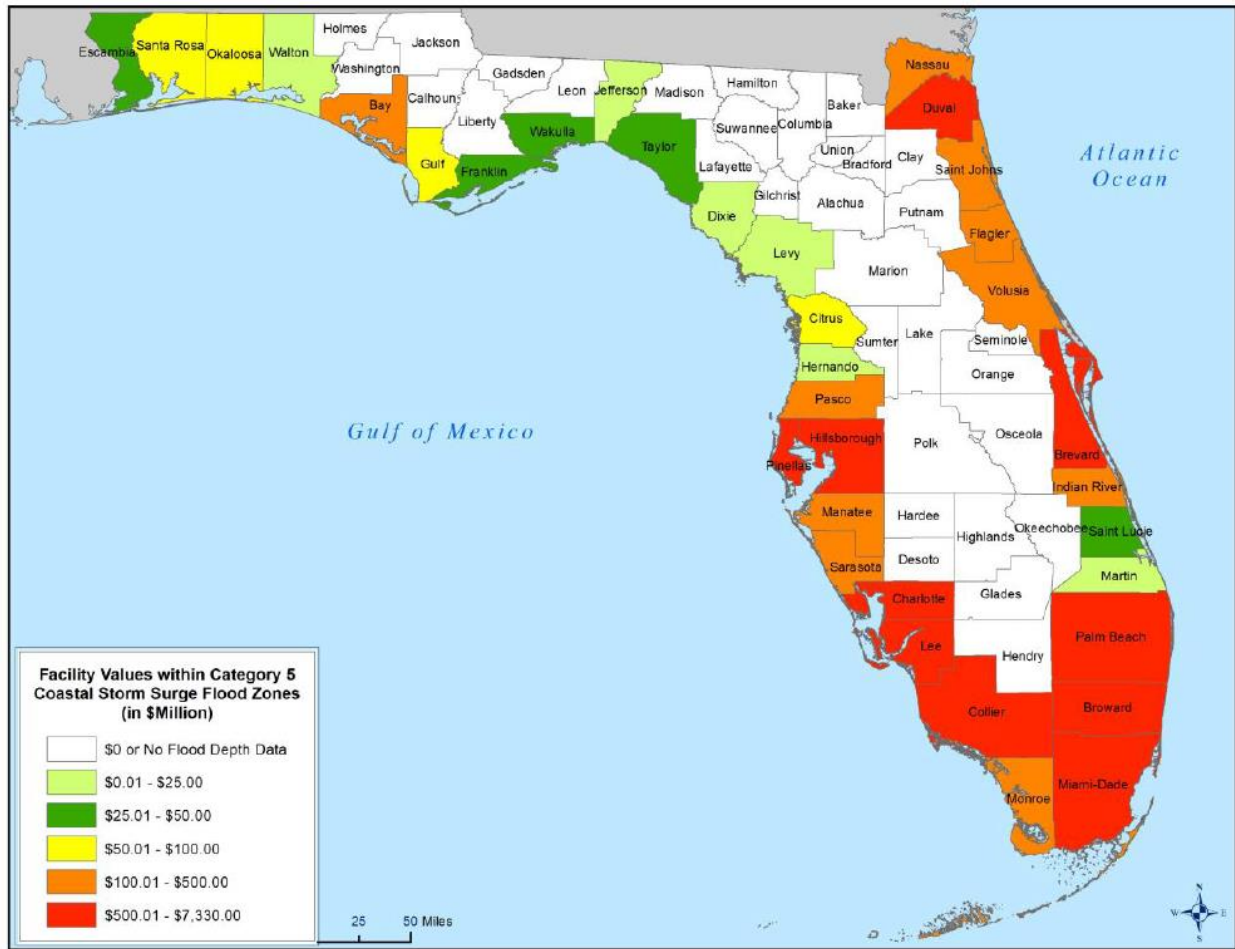
**Figure 22: Values of Facilities Vulnerable to Storm Surge in a Category 2 Hurricane**



Source: State of Florida Enhanced Hazard Mitigation Plan, pg. 3.62



**Figure 23: Values of Facilities Vulnerable to Storm Surge in a Category 5 Hurricane**



Source: State of Florida Enhanced Hazard Mitigation Plan, pg. 3.63

Overall Vulnerability: Winds with Tropical Cyclones

Winds With Tropical Cyclones					Overall Vulnerability
Overview					Very High
A tropical cyclone is a rotating, organized system of clouds and thunderstorms that originates over tropical or subtropical waters and has a closed low-level circulation. These storms are further classified as tropical storms and hurricanes based on the speed of the winds generated by the system. Duval County is at risk of experiencing tropical cyclones of various magnitudes due to its tropical climate and vicinity to the Atlantic Ocean. Winds from tropical cyclones are capable of affecting all areas of the county, with higher impacts expected along the coast. Damage from tropical cyclone events varies from minor damage to structures, to catastrophic damage leading to large parts of the county becoming uninhabitable.					
Frequency	Probability	Potential Magnitude			
Very High	Very High	Injuries/Deaths	Infrastructure	Environment	
		Moderate	Very High	High	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30. Based on the Frequency, Probability, and Magnitude summary, the Overall Vulnerability of this hazard was determined to be Very High, with a score of 27.

# Overall Vulnerability: Storm Surge with Tropical Cyclones

Storm Surge					Overall Vulnerability
Overview					Very High
Storm surge is the abnormal rise in seawater level during a storm, measured as the height of the water above the normal predicted astronomical tide. The surge is caused primarily by a storm’s winds pushing water onshore. The amplitude of the storm surge at any given location depends on the orientation of the coast line with the storm track; the intensity, size, and speed of the storm; and the local bathymetry.					
Frequency	Probability	Potential Magnitude			
Very High	High	Injuries/Deaths	Infrastructure	Environment	
		Moderate	Very High	High	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30. Based on the Frequency, Probability, and Magnitude summary, the Overall Vulnerability of this hazard was determined to be Very High, with a score of 25.

## Severe Weather Hazard Profile

### Severe Weather (Thunderstorms, Tornadoes, Hail) Description

As ratified in the 2015 LMS Update, thunderstorms, lightning, hail, and tornadoes are combined into one hazard profile: Severe Weather. Severe weather risk categories are utilized by the Storm Prediction Center to describe the potential extent of the impacts from severe weather events.

A thunderstorm is a local storm produced by a cumulonimbus cloud and accompanied by lightning and thunder. Lightning is a giant spark of electricity in the atmosphere between clouds, the air, or the ground. Energy from a lightning channel heats the air to around 18,000 degrees Fahrenheit. This causes the air to rapidly expand, creating a sound wave known as thunder. Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. Because wind is invisible, it is hard to see a tornado unless it forms a condensation funnel made up of water droplets, dust and debris. Below are the advisories that the NWS issues regarding severe weather:

- Severe Thunderstorm Watch: Issued when severe thunderstorms are possible in and near the watch area. It does not mean that they will occur. It only means they are possible.
- Severe Thunderstorm Warning: Issued when severe thunderstorms are occurring or imminent in the warning area.
- Tornado Watch: Issued when severe thunderstorms and tornadoes are possible in and near the watch area. It does not mean that they will occur. It only means they are possible.
- Tornado Warning: Issued when a tornado is imminent. When a tornado warning is issued, seek safe shelter immediately.
- Flash Flood Watch: Issued when conditions are favorable for flooding. It does not mean flooding will occur, but it is possible.
- Flash Flood Warning: Issued when flooding is imminent or occurring.

The Severe Weather Risks categorized by the National Weather Service Storm Prediction Center are:

**TSTM (light green)** - General or non-severe thunderstorms - Delineates, to the right of a line, where a 10% or greater probability of thunderstorms is forecast during the valid period.

**1-MRGL (dark green)** - Marginal risk - An area of severe storms of either limited organization and longevity, or very low coverage and marginal intensity.

**2-SLGT (yellow)** - Slight risk - An area of organized severe storms, which is not widespread in coverage with varying levels of intensity.

**3-ENH (orange)** - Enhanced risk - An area of greater (relative to Slight risk) severe storm coverage with varying levels of intensity.

**4-MDT (red)** - Moderate risk - An area where widespread severe weather with several tornadoes and/or numerous severe thunderstorms is likely, some of which should be intense. This risk is usually reserved for days with several supercells producing intense tornadoes and/or very large hail, or an intense squall line with widespread damaging winds.

**5-HIGH (magenta)** - High risk - An area where a severe weather outbreak is expected from either numerous intense and long-tracked tornadoes or a long-lived derecho-producing thunderstorm complex that produces hurricane-force wind gusts and widespread damage. This risk is reserved for when high

confidence exists in widespread coverage of severe weather with embedded instances of extreme severe (i.e., violent tornadoes or very damaging convective wind events).

#### Geographic Areas Affected by Severe Storms

All geographic areas of the City of Jacksonville are affected by the effects of severe thunderstorms. Effects include flooding, power outages, lightning-generated fires, and widespread storm-generated debris. Localized flooding, in particular, creates a common inconvenience and occasionally results in severe flooding. Severe flooding and wind damage from severe thunderstorms have both initiated Presidential Declarations of Natural Disaster. All of the County and its jurisdictions are vulnerable to tornados, although the risk for any given parameter or sector of the County is low. For more specific information related to flooding risk, see the Flood Hazard Profile section.

#### Historical Occurrences of Severe Weather

According to the National Weather Service, the City of Jacksonville experienced 586 severe thunderstorm wind events from 1950 through 2019 averaging 8.49 events per year. Since 1950, 11 injuries, no deaths, and 14.85 million in property damages have been associated with these events.

Additionally, during the 2004 Hurricane Season, the City of Jacksonville was included in four presidential disaster declarations: Hurricane Charley and Tropical Storm Bonnie (FEMA-1539-DR-FL), Hurricane Frances (FEMA-1545-DR-FL), Hurricane Ivan (FEMA-1551-DR-FL), and Hurricane Jeanne (FEMA-1561-DR-FL). While no hurricane directly hit the City of Jacksonville, thunderstorms and wind from each event caused enough damage for the county to be designated as Tier One for FEMA post disaster grants.

One example of a non-tropical severe storm occurred on 5/27/1997. During this event, a downburst that originated over Downtown Jacksonville spread south along the St. Johns River to NAS Jacksonville. Scores of large trees and power lines toppled onto houses and cars. Power outages occurred in Riverside, Avondale, Ortega, San Jose, and Mandarin. Portions of I-10 East were closed temporary between Cassat Ave. and I-95. A wind gust of 94kts (106mph) was recorded at NAS Jacksonville where a parked patrol aircraft was blown into a hanger and a small private plane was flipped over, 2 million in property damages. (Source: National Weather Service Storm Event Database, 2019). The Storm Events database table was divided into two reporting periods, which were 1950-1993 and 1993-2019, due to a maximum search result limit of 500 records.

**Table 25: Historical Disaster Declarations for Severe Weather in Duval County include**

Year	Incident Name	Disaster Number
1992	Florida Flooding, Severe Storm, Tornadoes	DR-966
1996	Florida Severe Storms/Flooding	DR-1141
1998	Florida Tornadoes	DR-1195
2008	Florida Tropical Storm Fay	DR-1785, EM3288
2012	Florida Tropical Storm Debby	DR-4068

*Source: FEMA Open Datasets*

**Figure 24: Storm Events Database Duval County Thunderstorm Wind**

<b>Storm Events Database</b>	
<b>Search Results for Duval County, Florida</b>	
Event Types: <b>Thunderstorm Wind</b>	
90 events were reported between 01/01/1950 and 01/01/1993 (15707 days)	
<b>Summary Info:</b>	
Number of County/Zone areas affected:	1
Number of Days with Event:	81
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	3
Number of Days with Event and Property Damage:	0
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

<b>Storm Events Database</b>	
<b>Search Results for Duval County, Florida</b>	
Event Types: <b>Thunderstorm Wind</b>	
496 events were reported between 01/01/1993 and 12/01/2019 (9831 days)	
<b>Summary Info:</b>	
Number of County/Zone areas affected:	1
Number of Days with Event:	278
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	8
Number of Days with Event and Property Damage:	126
Number of Days with Event and Crop Damage:	1
Number of Event Types reported:	1

According to the National Weather Service, the City of Jacksonville experienced 96 lightning events from 1950 through 2019 averaging 0.72 events per year. Since 1950, 21 injuries, 4 deaths, and 1.65 million in property damages have been associated with these events. Below are a few of the NOAA tracked event incidents for reference.

08/18/2017: A lightning strike caused an apartment fire along Gate Parkway. Five people were displaced.

06/13/2018: A lightning strike causes an apartment fire in the 8500 block of Touchton Rd.

04/19/2019: Lightning hit a building along New Kings Rd and caused a structure fire. Lightning also caused a transformer fire along Sawpit Rd.

05/28/2019: Lightning strikes caused a fire in a hangar at Naval Air Station Jacksonville.

05/28/2019: Lightning caused as structure fire at 2304 N Myrtle Ave.

**Figure 25 Storm Events Database Duval County Lighting**

<b>Storm Events Database</b>	
<b>Search Results for Duval County, Florida</b>	
Event Types: <b>Lightning</b>	
96 events were reported between 01/01/1950 and 12/01/2019 (25537 days)	
<b>Summary Info:</b>	
Number of County/Zone areas affected:	1
Number of Days with Event:	78
Number of Days with Event and Death:	4
Number of Days with Event and Death or Injury:	21
Number of Days with Event and Property Damage:	54
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

According to the National Weather Service, the City of Jacksonville experienced 259 hail events from 1950 through 2019 averaging 3.75 events per year. No injuries or deaths have been associated with these events; however, there is minor property damage reported

**Figure 26 Storm Events Database Duval County Hail**

<b>Storm Events Database</b>	
<b>Search Results for Duval County, Florida</b>	
Event Types: <b>Hail</b>	
259 events were reported between 01/01/1950 and 12/01/2019 (25537 days)	
<b>Summary Info:</b>	
Number of County/Zone areas affected:	1
Number of Days with Event:	166
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	1
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

According to the National Weather Service, the City of Jacksonville experienced 68 tornado events from 1950 through 2019 averaging .99 events per year. Since 1950, 6 injuries, 1 death, and 15.89 million in damages have been associated with these events. Below are two notable occurrences of tornadoes in Duval County.

On 2/02/1996, an EF2 tornado touched-down at Park Street and Cassat Ave. and moved to just north of I-10/I-95. Sixty one homes reported minor damage, three with major damage. Four businesses reported major damage. 12 RVs overturned valued up to 70K. Trees, power lines and traffic lights were blown down along the path.

On 8/01/2013, an EF-1 tornado touched down in the Arlington area, ENE of downtown Jacksonville around 4:20 p.m. EDT along Monument Rd. and Derringer Rd. The tornado briefly reached EF-1 intensity just south of Willowood Drive; there it damaged an apartment complex. The Jacksonville Sheriff's office

reported 5-6 homes were damaged and 15-20 structures were damaged. There was 1 injury associated with wind damage about 1 mile SW of the Fort Caroline area.

**Figure 27 Storm Events Database Duval County Tornado**

<b>Storm Events Database</b>	
<b>Search Results for Duval County, Florida</b>	
Event Types: <b>Tornado</b>	
68 events were reported between 01/01/1950 and 12/01/2019 (25537 days)	
<b>Summary Info:</b>	
Number of County/Zone areas affected:	1
Number of Days with Event:	60
Number of Days with Event and Death:	1
Number of Days with Event and Death or Injury:	6
Number of Days with Event and Property Damage:	41
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

#### Probability of Future Occurrences of Severe Storms

In averaging the City of Jacksonville's 1,009 severe weather events (all associated hazards combined) over a period of 69 years of data, there is a 14.62 percent probability each year that a severe weather event could create a scenario that would lead to injuries, death, and/or property damages. The largest single non-tropical severe weather disaster claim was for \$12 million-plus from a 2008 thunderstorm which contributed to the loss of two cranes at Jacksonville Port Authority's Blount Island facility. The entire population of the City of Jacksonville is at risk for severe weather hazards based on past occurrence.

#### Severe Storm Impact Analysis

The impact of a tornado event is comparable to that of the hurricane hazard, given the exposure and vulnerability of the City of Jacksonville's older housing stock. Unlike a hurricane, a tornado tends have a specific track, and the damage is localized to specific areas of impact.

#### Public

- Injury or death from being struck by lightning
- Injury or death from hail
- Injury or death from flying debris
- Injury or death from tornadoes and not having adequate shelter
- Car accident
- Indirect death
- Survivor's guilt



#### Responders

- Responding during a severe storm can be very dangerous because of heavy rains, strong winds, hail, lightning, tornadoes

#### Continuity of Operations (including continued delivery of services)

- Responding during a severe storm can be very dangerous because of heavy rains, strong winds, hail, lightning, tornadoes

#### Property, Facilities, Infrastructure

- Damage to property, including homes and businesses can occur from strong winds, flooding, or tornadoes. The damage can range from minor roof damage to total structure loss.
- Damage to critical facilities, such as transformer stations, etc. from fallen trees and limbs, causing a power outage

#### Environment

- Damage to environment, from strong winds, flooding, and tornadoes
- There may be severe damage to vegetation in localized areas from a tornado

#### Economic Condition

- Power outages cause lost revenue and lost wages for businesses and employees

#### Public Confidence in Jurisdiction's Governance

- Power outages for extended periods give the appearance that the jurisdiction does not know how to restore power

#### Potential Effects of Climate Change on Severe Storms

According to the Florida Enhanced State Hazard Mitigation Plan (2018), temperatures and humidity may increase atmospheric instability, which typically leads to the generation of severe storms. Vertical wind shear may also decrease, resulting in fewer or weaker severe thunderstorms and tornadoes. Decreases in vertical wind shear are most likely to occur when convective available potential energy (CAPE) is high in spring and summer months, which could result in more frequent severe storms. Furthermore, days with high CAPE are also likely to occur during times of the year with strong low-level wind shear, increasing the likelihood of the most severe storm events, including tornadoes. There has been an increase in the number of severe storm and tornado reports over the last 50 years. However, it is believed that this increase is attributed to the technology improvements that allow for better identification and reporting of such storms.

#### Vulnerability Analysis and Loss Estimation

All the City of Jacksonville is vulnerable to the effects of severe weather. This may include rain, hail, high winds, tornados, and flooding due to rain, power outages, lightning, lightning-generated fires, and widespread storm-generated debris. Localized flooding, in particular, creates a common inconvenience and occasionally results in severe flooding. Severe flooding and wind damage from severe thunderstorms have initiated Presidential Declarations for natural disasters. The kinds of facilities in each jurisdiction of the City of Jacksonville impacted by severe weather events include residential, commercial, industrial, public facilities, agricultural, recreational, and historic preservation sites.

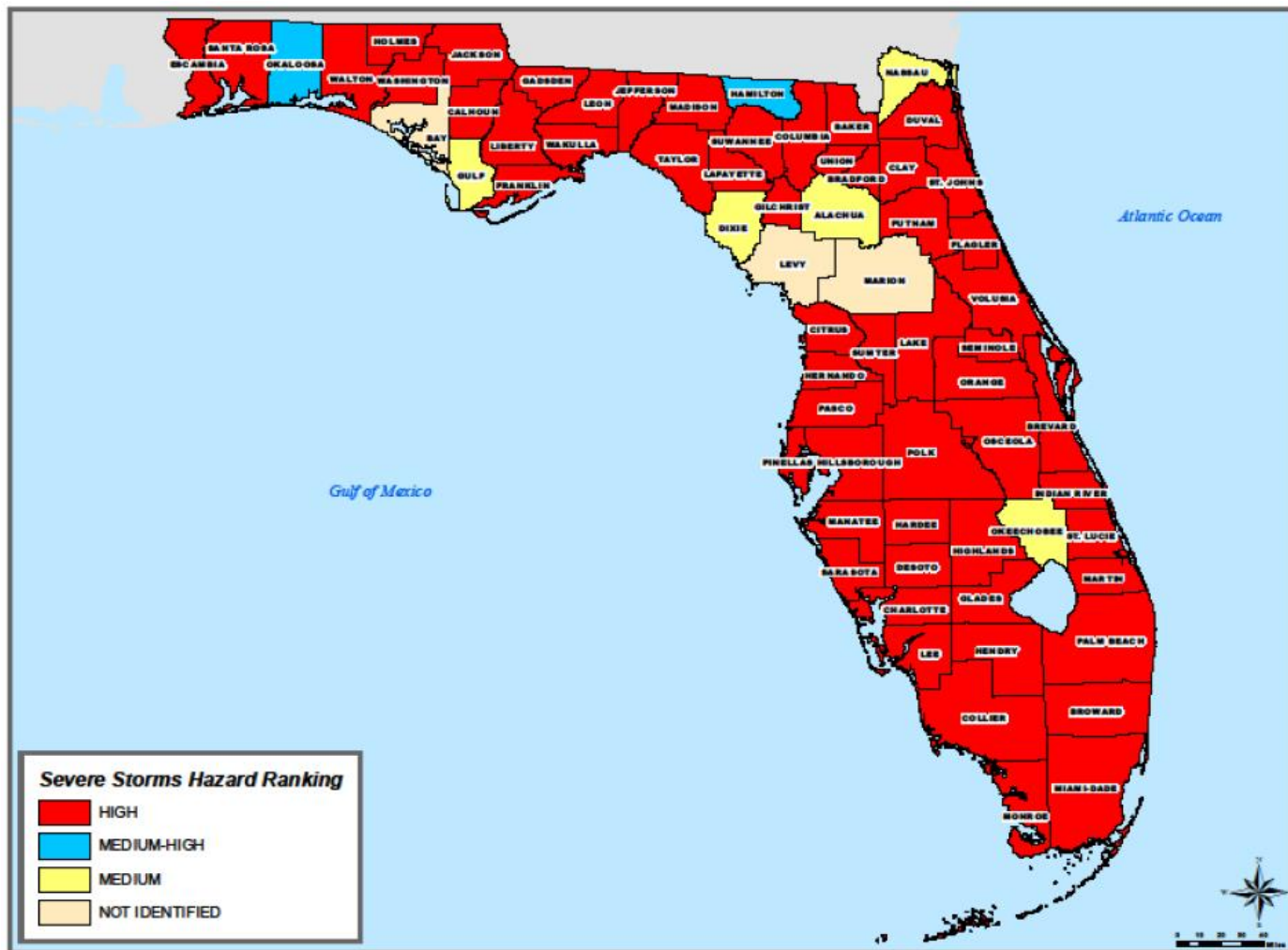
The vulnerability of the City of Jacksonville's extensive tree canopy to destruction by high wind is significant. The vulnerability of this urban forest in turn directly affects the electrical distribution grid of the city, particularly in areas away from downtown Jacksonville. The uprooting of old-growth trees pulls down electric and other utility lines, at the same time blocking the roads over which repair crews must travel to restore services. Also, trees are the major contributor to storm-generated debris, contributing

to the largest dollar volume item in clean-up costs. The trees themselves are both economic and aesthetic assets, which must be counted not only as part of the costs of damage but also as a loss of quality of life to any community. The City of Jacksonville has an especially extensive tree canopy, which is highly vulnerable (*Source: City of Jacksonville debris management records from 2016 hurricane season including TS Hermine and Hurricane Matthew, 2017 Hurricane Irma, submittals to the FEMA Public Assistance Program*).

All of the City of Jacksonville is vulnerable to the impacts of tornado-induced damages, due to the frequency and unpredictable pattern of tornados. The probability of occurrence is low; however, the damage potential is high due to population concentrations, and the location of manufactured housing throughout the county. According to the Northeast Florida Regional Council, manufactured housing makes up 11,013 units out of 329,778 units, or 3.33 percent of the City of Jacksonville housing. Manufactured homes are located throughout the City of Jacksonville, with highest concentrations towards the west. In recent years, the majority of manufactured housing developments in the eastern part of the county and within the Beaches have been converted to other land uses. These structures are more vulnerable to high winds than other structures. Federal law, passed after Hurricane Andrew of 1992, requires that manufactured housing must now be constructed with two inch by six-inch lumber, have tie-downs, and be able to withstand winds of 110 miles per hour on the coast and 100 miles per hour inland. However, approximately 90 percent of the 849,000 Florida manufactured homes were built before that law was enacted (source: Census of Housing, U.S. Census Bureau, and revised October 31, 2011). Those manufactured homes built after 1976 were built to withstand 90 mile per hour winds; those built before 1976 had no wind requirements (Source: The Tornado Project). The total number of non-compliant residential structures in the City of Jacksonville is not known. Building inspections are done within the local municipal jurisdictions. Building regulations vary in policy, permitting procedures, and enforcement. Due to the low probability associated with the tornado hazard, there are no formal tornado safe rooms identified in the City of Jacksonville according to the City of Jacksonville Public Buildings Division and the Risk Management Office of the Duval County Public Schools. Mitigation for impacts is achieved through a robust community education and outreach program as to the risks and preventive measures that all residents can practice to avoid injury and death.

The population impacts depend upon the location and intensity of the severe weather. All of the county and its population are equally susceptible to the severe weather hazard. The City of Jacksonville protects citizens via the implementation of the Severe Weather Hazard Specific Plan, the Tornado Hazard Specific Plan and the Alert Warning Notifications Systems utilized by the Emergency Preparedness Division (NAWAS, IPAWS, EverBridge, all print and electronic media, social media such as Facebook and Twitter, and the City's mobile application for smartphones and tablets, and the City of Jacksonville alert program, JaxReady). According to the Florida Enhanced State Hazard Mitigation Plan (2018), nearly every county in Florida shares a High Risk for severe storms. Conversely, Duval County is among only six counties that share a Low Risk for tornados. A statewide ranking is depicted in Figures 28 and 29, illustrating relative risk for Duval compared with the rest of Florida.

Figure 28: Florida Severe Storm Ranking



Source: State of Florida 2018 Enhanced Hazard Mitigation Plan, pg. 198

**Tornado Hazard Ranking**

- HIGH
- MEDIUM-HIGH
- MEDIUM
- LOW
- NOT IDENTIFIED

135

### Overall Vulnerability: Severe Weather

Severe Weather					Overall Vulnerability
Overview					Very High
Thunderstorms, lightning, hail, and tornados are combined into one severe weather hazard. A thunderstorm is a local storm produced by a cumulonimbus cloud and accompanied by lightning and thunder. Lightning is a giant spark of electricity in the atmosphere between clouds, the air, or the ground. Energy from a lightning channel heats the air to around 18,000 degrees Fahrenheit. This causes the air to rapidly expand, creating a sound wave known as thunder. Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. Because wind is invisible, it is hard to see a tornado unless it forms a condensation funnel made up of water droplets, dust and debris.					
Frequency	Probability	Potential Magnitude			
Very Likely	Very Likely	Injuries/Deaths	Infrastructure	Environment	
		Moderate	Moderate	Moderate	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30. Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Very High, with a score of 26.

## Wildfire Hazard Profile

### Wildfire Description

Wildfire is defined by the Florida Forest Service (FFS) as any fire that does not meet management objectives or is out of control. According to the 2018 Florida Enhanced Mitigation Plan, wildfires occur throughout all of Florida every year and are part of the natural cycle of Florida's fire-adapted ecosystems. Many of these fires are quickly suppressed before they can damage or destroy property, homes and lives. There are four types of wildfires:

**Surface Fires:** Burn along the forest floor consuming the litter layer and small branches on or near the ground.

**Ground Fires:** Smolder or creep slowly underground. These fires usually occur during periods of prolonged drought and may burn for weeks or months until sufficient rainfall extinguishes the fire, or it runs out of fuel.

**Crown Fires:** Spread rapidly by the wind, moving through the tops of the trees.

**Wildland/Urban Interface Fires (WUI):** Fires occurring within the WUI in areas where structures and other human developments meet or intermingle with wildlands or vegetative fuels. Homes and other flammable structures can become fuel for WUI fires. This is type of fire emphasized and addressed by the Duval County Local Mitigation Strategy. For the Duval County project area, it is estimated that 722,375 people or 83.6 % percent of the total project area population (863,863) live within the WUI. (Southern Wildfire Risk Assessment, SouthWRAP Summary Report 2019) The key measure utilized by the Florida Forest Service, WUI Risk Index, reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the Wildland Urban Interface and rural areas is key information for defining potential wildfire impacts to people and homes.

Prescribed or controlled fires are used on both public and private lands across the state to replace the natural benefits provided by wildfires can provide. Prescribed burns help to reduce the amount of flammable vegetation in an area which in turn lessens the intensity of a wildfire that may occur in that same area. Firefighters then have an opportunity to suppress the fire while it is small and easier to control. Approximately 70 percent to 80 percent of all wildfires in Florida are caused by humans. Wildfire prevention and public awareness campaigns have helped to greatly reduce the number of human-caused wildfires in Florida. Other measures used to help reduce the number and severity of wildfires includes red flag warnings issued by the NWS and burn bans. Duval County enforces a year-round burn ban and requires permits for any prescribed burns and open burning activity.

Environmental short-term loss caused by a wildland fire can include the destruction of wildlife habitat and watersheds. Long-term effects include reduced access to affected recreational areas, destruction of cultural and economic resources and community infrastructure, and vulnerability to flooding due to the destruction of watersheds. The type and amount of fuel, as well as its burning qualities and level of moisture, affect wildfire potential and behavior. The continuity of fuels, expressed in both horizontal and vertical components, is also a factor because it expresses the pattern of vegetative growth and open areas. Topography is important because it affects the movement of air (and thus the fire) over the ground

surface. The slope and shape of terrain can change the rate of speed at which the fire travels. Temperature, humidity, and wind (both short- and long-term) affect the severity and duration of wildfires. The extent of wildfire is described in the following sections through the measurement of acres burned.

Buildings ignite during wildfires as a result of one or more of the three basic wildfire exposures, which include:

- Embers (also called firebrands)
- Radiant heat
- Direct flame contact.

Embers are light enough to be blown through the air, and can result in the rapid spread of wildfire. Should these embers land on or near your house, they could easily ignite nearby vegetation or accumulated debris or enter the home or attic through openings or vents, igniting furnishing or combustible debris in those locations.

If the fire is close enough to a combustible material, or the radiant heat is high enough, an ignition will result. Even if the radiant exposure is not large enough or long enough to result in ignition, it can preheat surfaces and thus make them more vulnerable to ignition from a flame contact exposure. With any one of these exposures, if no one is available to extinguish the fire and adequate fuel is available, the initially small fire will grow into a large one.

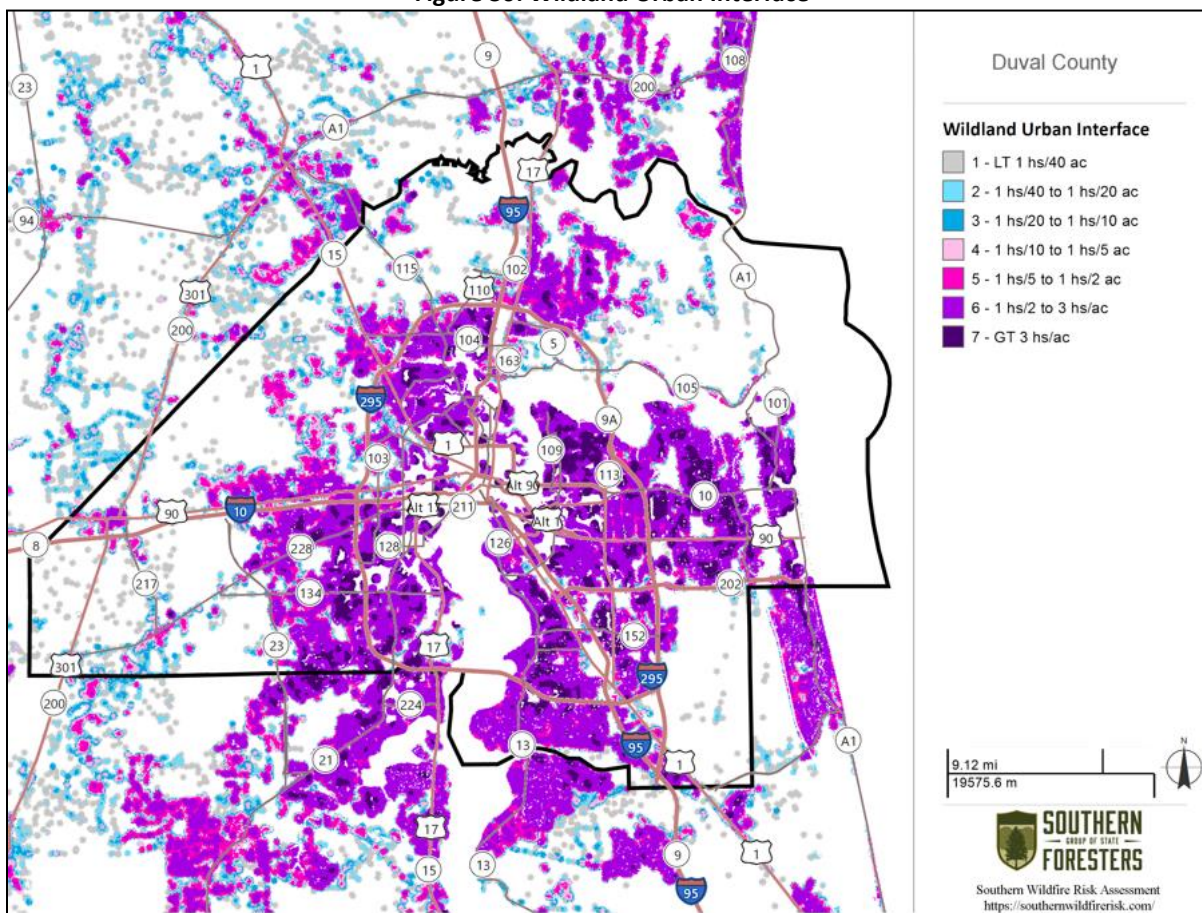
One of the misconceptions about home loss during wildfires is that the loss occurs as the main body of the fire passes. Research and on-the-ground observation during wildfires have both shown that the main flame front moves through an area in a very short time: anywhere from 1 to 10 minutes, depending on the vegetation type (*Source: Landscape and Building Design for Bushfire Areas. Butler et al. 2003; Ramsay and Rudolph 2003*). Homes do not spontaneously ignite—they are lost as a result of the growth of initially small fires, either in or around the home or building.

#### Geographic Areas Affected by Wildfire

Population growth has primarily occurred and is expected to continue in the undeveloped and rural areas of Duval County. Developed parcels surrounding undeveloped and heavily forested areas are vulnerable because wildfires often spread through vegetative fuels such as shrubs, grasslands, forests, or organic litter on the surface. They can often cross over gaps in vegetation, such as roadways or rivers, resulting in unpredictable spreading. As wildfires spread uncontrollably they may expose or possibly consume entire structures and impose a threat to human life before they are able to be fully contained. Generally, all the developed land outside I-295/9A loop is vulnerable to the wildfire hazard. Mostly west of Kernan Road reaching from Beach Boulevard northward nearly to Monument Road are also vulnerable. Fire protection from sixty-two fire stations in the County are near most developed land throughout the county. The few hundreds of homes and businesses that are isolated from other development and in the areas subject to wildfire are at great risk in the event of drought.



**Figure 30: Wildland Urban Interface**



Source: Southern Wildfire Risk Assessment, [www.southernwildfirerisk.com](https://southernwildfirerisk.com)

The wildland/urban interface (WUI) is "The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels". In simpler terms, wildland/urban interface areas are locations where human structures and forests or wildlands meet or intermingle. Some examples are:

- Where the edge of a community transitions to forest land
- Individual farms or vacation homes surrounded by woodlands
- Homes around the edge of a (wooded) city park or preserve

#### Historical Occurrences of Wildfire

Wildfires are common (87 times per year consuming 1,170 acres annually) in Duval County, but events are typically not large in scope (average 13 acres) (Source: Florida Forest Service, 2019). The City of Jacksonville is experiencing increased development, with the accompanying influx of residents living in urban interface zones with forests. The rapid western development of the City of Jacksonville increases the vulnerability of that population to wildfires. Development trends in the north side of the county are increasing population pressures in that area. Fires can spread rapidly from traditionally rural and unpopulated regions of west and north areas of the City of Jacksonville into new high-density residential neighborhoods. More details on this hazard can be found in the 2013 Southern Wildfire Risk Assessment

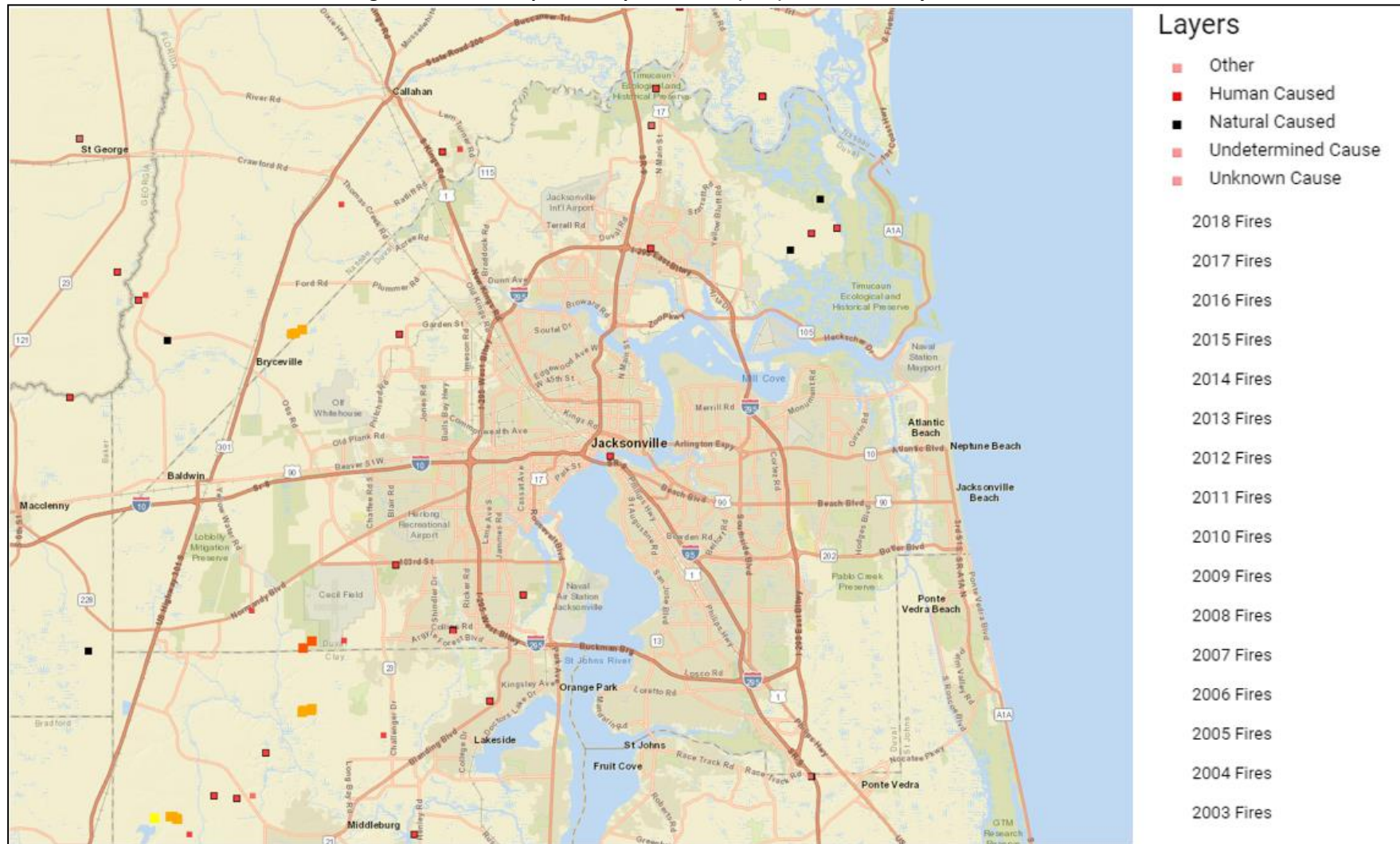


Summary Report. This report was generated through a web mapping portal called SouthWRAP, sponsored by the Southern Group of State Foresters and produced by the FSS, for wildfire risk assessment.

Florida is a fire-dependent ecosystem that has a very long growing season and typically receives large amounts of rainfall contributing to massive accumulations of flammable native vegetation. Since the early 1950s when Floridians actively began to suppress all fires to protect newly planted forest and keep newly built dwellings safe, vegetative fuel has become dense and thick. Natural fires have given way to dangerous wildfires, which often damage rather than benefit natural surroundings. On an average year, Florida will experience annually 3,711 wildfires burning nearly 177,501 acres. Years with a higher number of hard freezes followed by windy springs also contribute to increased wildfire activity. The probability of wildfire events is high for the City of Jacksonville. The Florida Forest Service reports no “Significant Wildfires” for Duval County between 1981 and 2018 (Source: <https://www.fdacs.gov/Divisions-Offices/Florida-Forest-Service/Wildland-Fire/Significant-Wildfires-in-Florida-1981-2018>).

Significant wildfire events were recorded in the City of Jacksonville during 1998 when 400 wildfires burned 8,730 acres; in 1989 when 154 wildfires burned 2,353 acres; 1990 when 193 wildfires burned 2,031 acres; and in 1999 when 149 wildfires burned 3,316 acres. These active wildfire years tend to coincide with periods of drought, particularly the years of 1985 and 1998. 1998 was a particularly active wildfire year for the State of Florida. From June 1 through July 2, half a million acres burned statewide. Wildfires were reported burning in all of Florida’s 67 counties. The City of Jacksonville escaped with only 140 wildfires, no loss of life and no homes were destroyed. The areas most severely impacted were close to Baldwin near Yellow Water Road and areas in the extreme southeast corner of the County south of J.T. Butler Boulevard.

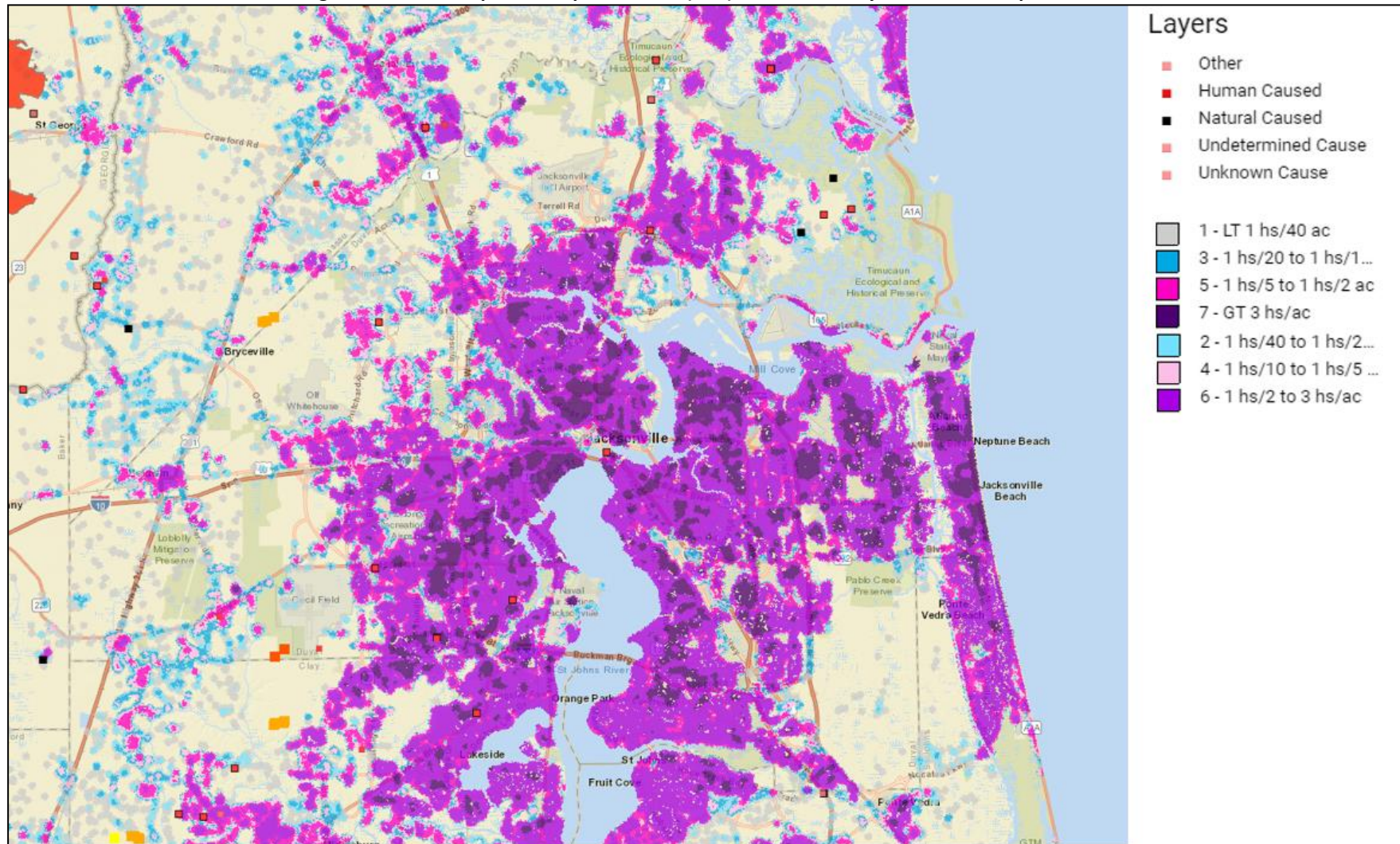
Figure 31: Fire Enterprise Geospatial Portal (EGP) Wildfire History 2003 - 2018



Source: Fire Enterprise Geospatial Portal (EGP); <https://famit.nwcg.gov/applications/EGP>



Figure 32: Fire Enterprise Geospatial Portal (EGP) Wildfire History and Where People Live



Source: Fire Enterprise Geospatial Portal (EGP); <https://famit.nwcg.gov/applications/EGP>

In 2000 the Normandy Road Fire burned 2,258 acres north of Normandy Blvd and east of US 301 in Maxville. A trailer dragging a chain lit more than 30 fires along the road, which all burned together and spread rapidly to the north. The Marsh Fire burned 422 acres in an isolated section of marsh off Yellow Bluff Road on the north side in 2006. Firefighters were unable to reach the fire and were forced to allow it to burn itself out. In 2010, dry conditions assisted the growth of a brush fire (Normandy Fire) in the southwest part of the City of Jacksonville. The Baldwin Bay Fire in 2012 burned 953 acres off CR 121, north of U.S. 90. Dry conditions caused this swampy area to smolder for three months. The Pumpkin Hill Fire burned 363 acres off Cedar Point Road on the north side in 2013. No lives were lost or injuries to responders or to citizens were documented. From 2010 through 2014, the Florida Forest Service reported two residences and three out buildings were damaged by wildfire. They were able to rebuild. Another two out buildings were lost to wildfire, but no residences were lost. In 2017, the Garfield Road Fire occurred along the Nassau/Duval County border. Nearly 700 acres burned, 150 residents were temporarily displaced, two homes were destroyed, and 8 homes were otherwise affected. In May of 2019, the Yellow Bluff Road Fire caused Interstate 95 to be completely shut down along the Nassau/Duval County border for several days due to unsafe road conditions. (Source: Incident Situation Reports, EPD After Action Reports).

As the City of Jacksonville's growth continues to push into areas that were previously agricultural, more homes will be threatened by wildfires every year. According to the Florida Forest Service, the areas of the County most susceptible to wild-land fires are west of I-295 near Cecil Commerce Center and the Argyle Forest area, on the north side in the Tisonia area and around the International Airport, and on the south side around Bayard, east of US1 and along Hodges and Kernan Boulevards. The City of Jacksonville is very susceptible to wildfires starting from escaped yard debris burns and lightning strikes particularly during north Florida's dry season from March through June and during extended periods of drought. Since 2000, lightning has caused approximately 25% of total fires in the City of Jacksonville. The remaining 75% were caused by arson (40%), accident (30%), or of unknown origin (5%) according to the Florida Forest Service.

Figure 33: Duval County Wildfires 1995 to 2019

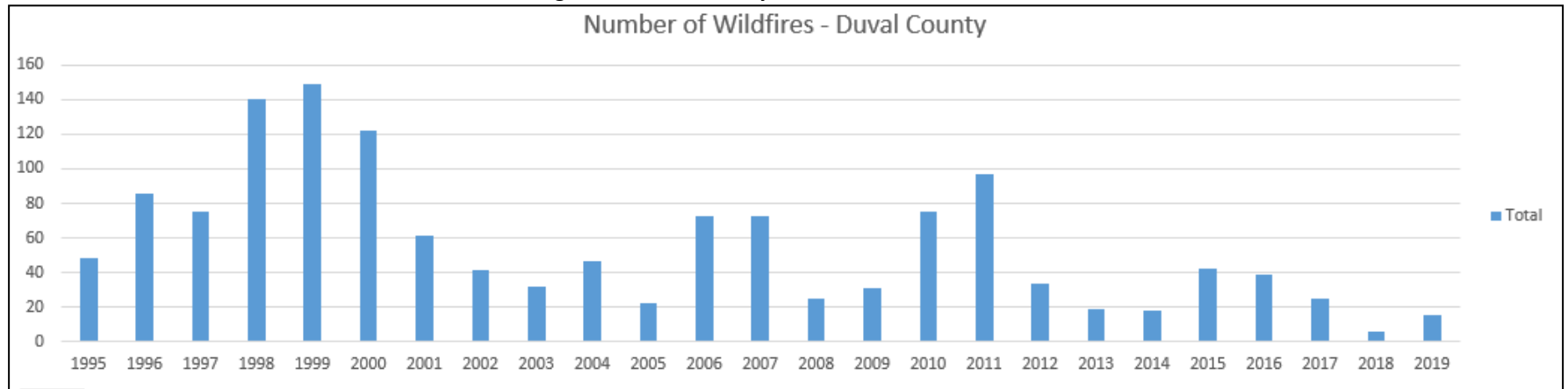
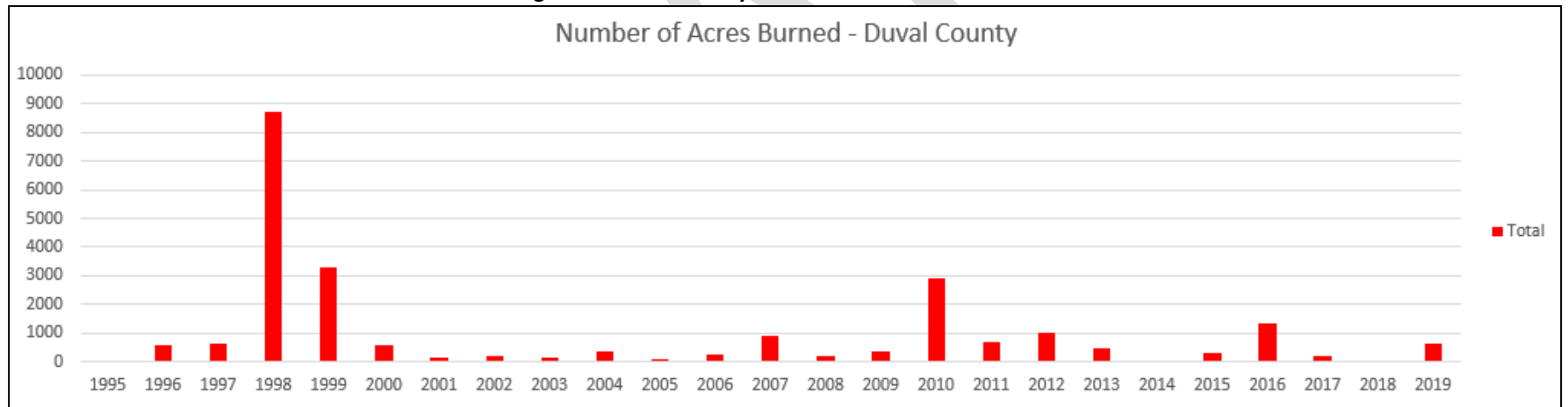
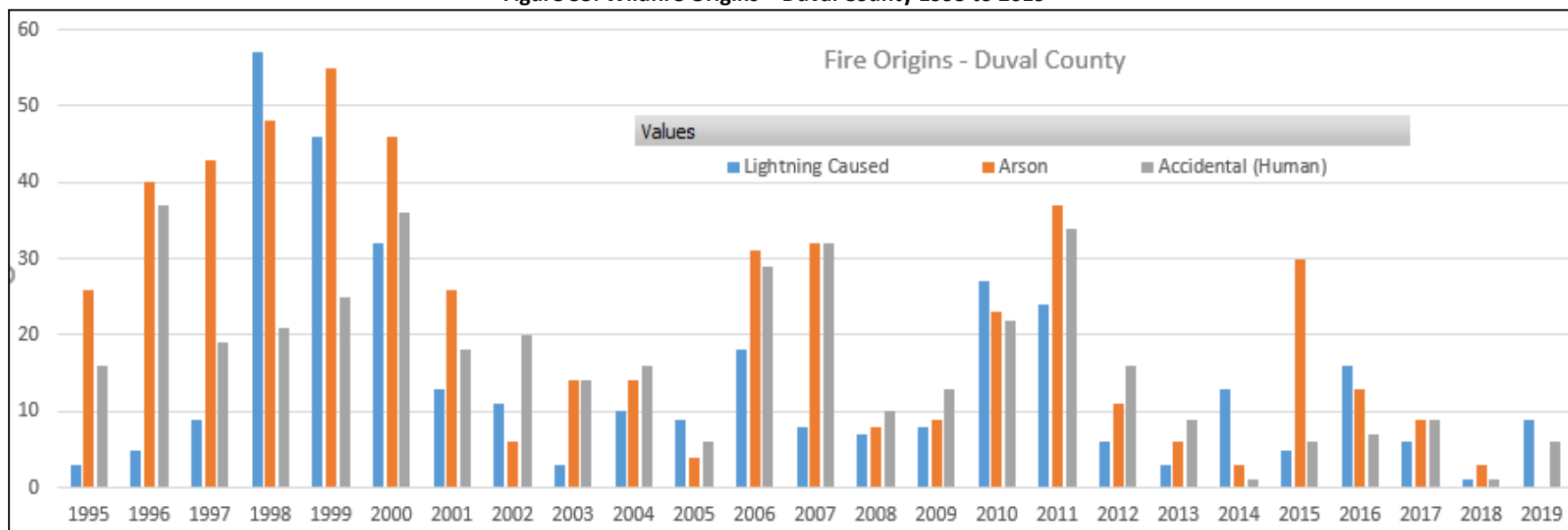


Figure 34: Duval County Acres Burned 1995 to 2019



Source: Florida Forest Service, Jacksonville District Office

Figure 35: Wildfire Origins – Duval County 1995 to 2019



Source: Florida Forest Service, Jacksonville District Office

### Probability of Future Occurrences of Wildfire

Approximately 80 percent of all wildfires in Florida occur within one mile of the WUI. Florida has a year round fire season with the most active part taking place from April to July. According to the Florida Forest Service Report System, the majority of wildfires in Florida (approximately 65 percent) are caused by humans with arson and escaped debris burning being the top two causes. The largest number of lightning-caused fires occurs in July. The drier months tend to be January, February and March but this is not always the case depending on drought conditions and frequency of frontal passages. Dry months, combined with low humidity and high wind have the highest number of fires reported.

The Southern Group of State Foresters, in partnership with agencies such as the US Forest Service, Florida Forest Service, and US Fish and Wildlife Service, have developed a web-based Geographic Information System (GIS) mapping application called the Southern Wildfire Risk Assessment (SWRA). This system provides statewide risk data that assists in determining high-risk areas and can be accessed at <https://southernwildfirerisk.com/>.

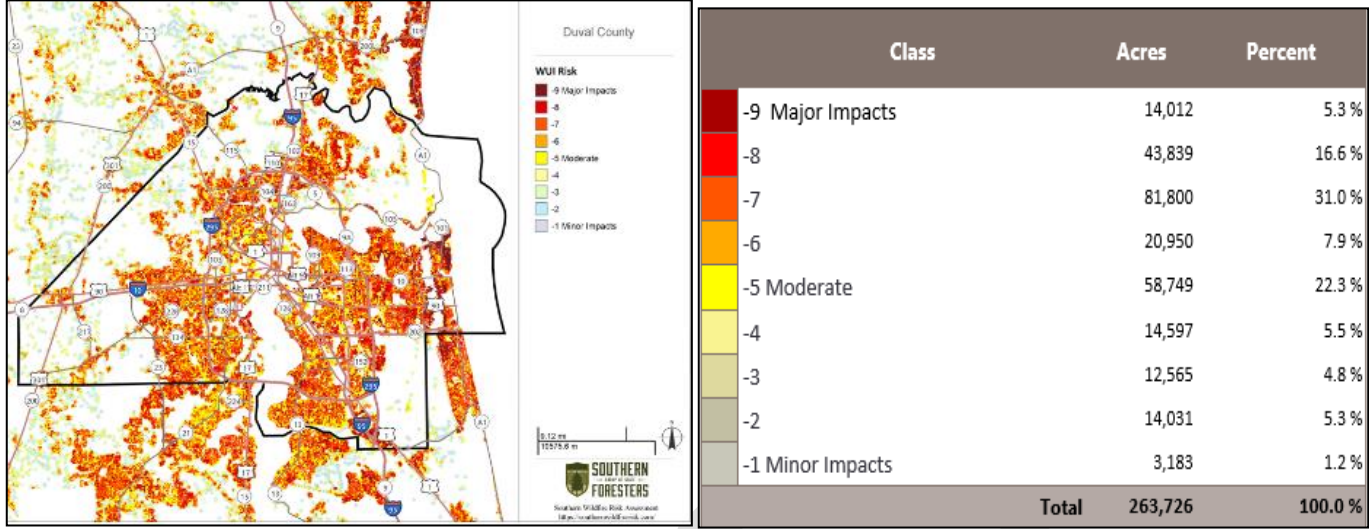
Per the SWRA, the Wildland Urban Interface (WUI) Risk Index layer is a rating of the potential impact of a wildfire on people and their homes. The key input, WUI, reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the Wildland Urban Interface and rural areas is key information for defining potential wildfire impacts to people and homes.

The WUI Risk Index is derived using a Response Function modeling approach. Response functions are a method of assigning a net change in the value to a resource or asset based on susceptibility to fire at different intensity levels, such as flame length. The WUI Risk Index range of values is from -1 to -9, with -1 representing the least negative impact and -9 representing the most negative impact. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1. To calculate the WUI Risk Index, the WUI housing density data was combined with Flame Length data and response functions were applied to represent potential impacts for all unique conditions of WUI housing density and flame length. The response functions were defined by a team of experts based on values defined by the SWRA Update technical team. By combining flame length with the WUI housing density data, it is possible to determine where the greatest potential impact to homes and people is likely to occur.

The risk output maps are derived at a 30 meter resolution. This scale of data was chosen to be consistent with the accuracy of the primary surface fuels dataset used in the assessment.



**Figure 36: Wildland Urban Interface Risk Index for Duval County**

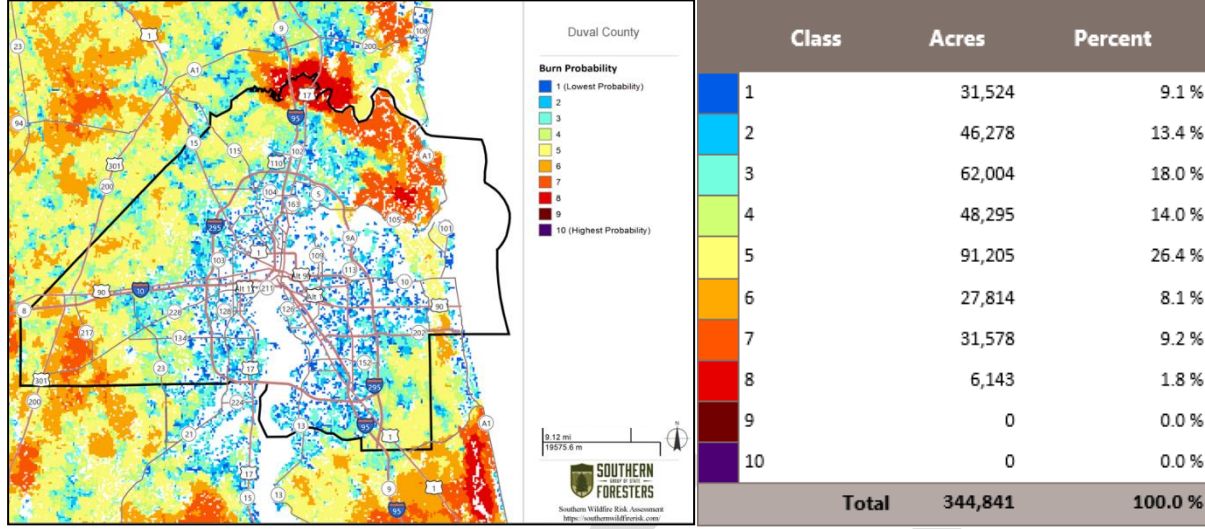


Source: Southern Wildfire Risk Assessment 2019 ([www.southernwildfirerisk.com](http://www.southernwildfirerisk.com))

In addition to the Risk Index, the Risk Assessment Portal also provides a dataset that depicts the Burn Probability of a given area. The Burn Probability (BP) layer depicts the probability of an area burning given current landscape conditions, percentile weather, historical ignition patterns and historical fire prevention and suppression efforts. The fire growth simulations, when run repeatedly with different ignition locations and weather streams, generate burn probabilities and fire behavior distributions at each landscape location (i.e., cell or pixel). Results are objectively evaluated through comparison with historical fire patterns and statistics, including the mean annual burn probability and fire size distribution, for each FPU. This evaluation is part of the FSim calibration process for each FPU, whereby simulation inputs are adjusted until the slopes of the historical and modeled fire size distributions are similar and the modeled average burn probability falls within an acceptable range of the historical reference value (i.e., the 95% confidence interval for the mean).



**Figure 37: Burn Probability Index for Duval County**



Source: Southern Wildfire Risk Assessment 2019 ([www.southernwildfirerisk.com](http://www.southernwildfirerisk.com))

### Wildfire Impact Analysis

Wildfires will negatively affect the Duval County with a variety of impacts. Potential risks include destruction of land, property, and structures, as well as injuries and loss of life. Although rare, deaths and injuries usually occur at the beginning stages of wildfires when sudden flare-ups result from high wind conditions. In most situations, however, people have the opportunity to evacuate the area and avoid bodily harm. Responders are most at risk during the process of fire suppression. Responders put themselves in harm's way to contain the fire and save lives and property. Firefighters may become trapped by fires that either grow or suddenly change directions. Wildfires are usually small and quickly contained in Duval County, and are not expected to result in the loss of the ability to deliver essential services or continue day-to-day government functions. Major fires have the ability to disrupt transportation, particularly along wooded corridors of the interstate.

Specific impacts may include:

#### Public

- Injury or death from fire
- Injury or death from smoke inhalation
- Injury or death while evacuating
- Vehicle accidents due to decreased visibility due to smoke

#### Responders

- Injury or death during wildfire suppression, especially during high wind conditions
- Injury or death from vehicle accidents due to decreased visibility
- Injury or death from evacuation and rescue missions
- Injury or death from smoke inhalation

#### Continuity of Operations (including continued delivery of services)

- Inability to operate businesses if evacuations are ordered, leading to lost wages and revenue
- Employee absenteeism if employees are evacuated
- Blocked transportation routes because of decreased visibility

#### Property, Facilities, Infrastructure

- Damage or loss to personal structures and businesses
- Damage or loss to critical infrastructure such as schools, hospitals, government buildings, utilities, etc.
- Damage or loss of agricultural crops and timber, which leads to loss of income and loss of revenue

#### Environment

- Damage or loss to large forested areas
- Damage or loss to habitats

#### Economic Condition

- Closure of businesses if in evacuee area leading to lost wages and revenue
- Employee absenteeism leading to forced business closure which results in lost wages and lost revenue
- Damage or loss to agricultural crops and timber, which leads to loss of income and loss of revenue
- Loss of tourism if wildfires are in popular tourist areas

#### Public Confidence in Jurisdiction's Governance

- Lost confidence if evacuations not ordered, messaged, and coordinated effectively
- Lost confidence if many deaths from wildfires from those that did not evacuate

#### Potential Effects of Climate Change on Wildfire

As reported in the Florida Enhanced State Hazard Mitigation Plan (2018), “the increased frequency or intensity of extreme heat or drought events, due to the augmenting of existing fuel flammability, could affect wildfire behavior. Changes in vegetation types could also alter fuel mixtures. Reducing moisture of living vegetation, soils, and decomposing organic matter during drought or extreme heat events is associated with increased incidence of wildfires. Furthermore, changes over time in vegetation types could change the mixture and flammability of fuels. As these transitions occur, wildfire occurrences and severity could increase with the introduction of more flammable vegetation types or decrease with the introduction of more fire resistant species. As the flood hazard profile discussed that arid areas may become drier and moist areas to become wetter. Florida has weather patterns that lead to both dry and wet periods each year. Climate change may cause one or the other, or both to increase in occurrences and magnitude (*Florida SHMP 2018*).”

### Vulnerability Analysis and Loss Estimation

The City of Jacksonville encompasses 545,174.2 acres of land with a mixture of industrial, residential, agricultural, commercial and other miscellaneous land uses. The current land use classifications for the City of Jacksonville are listed below. The land uses marked with an asterisk indicate a higher risk from wildland fires. Of the half million acres of land in the City of Jacksonville, 319, 350.7 acres or 58 percent could be classified as having a moderate to high wildfire risk. These high-risk areas are primarily located in the rural areas of the city, outside of the I-295 loop.

**Table 26: Duval County Acreage at Risk from Wildfire**

<b>Duval County Land Use</b>	<b>Acres</b>
Total Residential	114,156.7
Low Density (2 dwellings per acre)	30,382.8
Medium Density (2-5 Dwellings per acre)	55,353.3
High Density (6 or more dwellings per acre)	28,420.6
Commercial	21,775.5
Industrial	6,781.1
Institutional (military and other)	10,456.7
Recreation	6,554.8
Agricultural (pastures and cropland)	15,775.1
Total Upland, Non-forest	19,472.1
Herbaceous uplands	8,131.4
Shrub and brushland	6,362.8
Mixed upland, nonforested	4,988.0
Upland Forest	129,428.9
Wetland Forest	79,234.8
Wetland non-forest	51,909.4
Transportation and Utilities	23,007.3
Barren and Disturbed Land	7,318.8
Water	58,070.8
Other (no data) [Open Land]	1,232.2
Total	589,627.36
Total at Risk from Wildfire	263,726

*Source: Florida Forest Service, 2019*

## Overall Vulnerability

Wildfires					Overall Vulnerability
Overview					Moderate
A wildfire is defined as any free burning uncontrollable wildland fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment. Wildfires occur throughout all of Florida every year and are part of the natural cycle of Florida’s fire-adapted ecosystems. Many of these fires are quickly suppressed before they can damage or destroy property, homes and lives. Environmental short-term loss caused by a wildland fire can include the destruction of wildlife habitat and watersheds. Long-term effects include reduced access to affected recreational areas, destruction of cultural and economic resources and community infrastructure, and vulnerability to flooding due to the destruction of watersheds. The type and amount of fuel, as well as its burning qualities and level of moisture, affect wildfire potential and behavior.					
Frequency	Probability	Potential Magnitude			
High	Moderate – High	Injuries/Deaths	Infrastructure	Environment	
		Moderate	Moderate (Localized)	Low (Localized)	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30.

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Moderate, with a score of 16. Data from the SGSF Wildfire Risk Assessment Portal provided a geo-spatial visualization of Wildland Urban Interface, Community Protection Zones, Wildfire Ignition Density, and produced an overall wildfire Risk Index that was cross-referenced with local data to arrive at the figures incorporated into the LMS Vulnerability Assessment.

## Environmental Degradation Hazard Profile

### Hazard Description

#### a. Coastal Erosion

Coastal erosion is the wearing away of land or the removal of beach or dune sediments over time. According to NOAA's definition glossary, Erosion In hydrologic terms, is thewearing away of the lands by running water, winds, and waves, can be subdivided into three processes: Corrosion, Corrosion, and Transportation. Weathering, although sometimes included here, is a distant process which does not imply removal of any material. (<https://forecast.weather.gov/glossary.php?letter=i>). Land use and resource extraction may also lead to coastal erosion through direct removal of material or exacerbation of natural processes. Construction of jetties, sea walls, piers, and other structures can also result in coastal erosion. Coastal Duval County experiences smaller-scale (short-term) hazard events, such as storms, regular wave action, tides and winds with regular frequency. During tropical cyclone events in particular, wind, waves, and currents easily move the unconsolidated sand and soils in the coastal area, resulting in rapid changes in the position of the shoreline.

#### b. Saltwater Intrusion

The United States Geological Survey defines saltwater intrusion as the movement of saline water into freshwater aquifers, which can lead to groundwater quality degradation, including drinking water sources, and other consequences. Saltwater intrusion can naturally occur in coastal aquifers, owing to the hydraulic connection between groundwater and seawater. Saltwater intrusion can be very problematic to coastal communities such as Duval County that rely on fresh groundwater supplies for the livelihood. The USGS studies how excessive groundwater pumping, sea level rise, and other factors contribute to the encroachment of seawater into fresh groundwater supplies.

According to the City of Jacksonville's Environmental Quality Division, in the 1880s, Jacksonville was one of the first municipalities to utilize the Floridan Aquifer as a public water supply source. According to the USGS, an estimated 3 billion gallons of water per day are withdrawn from the Floridan Aquifer for public, residential, industrial and agricultural uses. In 1995, Duval County withdrew over 140 million gallons of water per day from the Floridan Aquifer (Source:<https://www.coj.net/departments/neighborhoods/environmental-quality/groundwater-resources/wellhead-protection/ground-water-basic-facts>).

Under natural conditions, the seaward movement of freshwater prevents saltwater from encroaching on freshwater coastal aquifers. This interface between freshwater and saltwater is maintained near the coast or far below the land surface. The interface actually is a diffuse zone where freshwater and saltwater mix. This zone is referred to as the zone of dispersion or the zone of transition. Groundwater pumping can reduce freshwater flow toward coastal areas and cause saltwater to be drawn toward the freshwater zones of the aquifer.

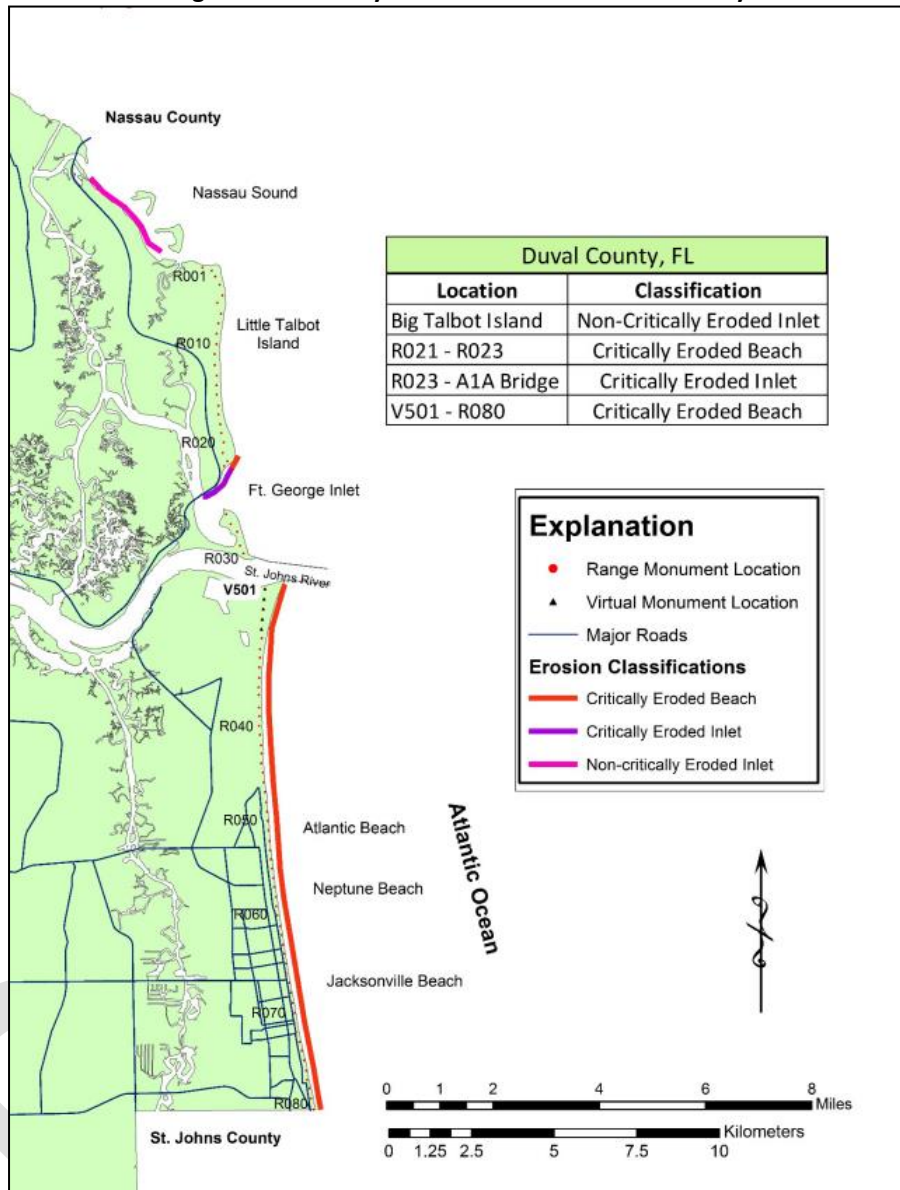
### Geographic Areas Affected by Coastal Erosion and Saltwater Intrusion

Duval County contains over 15 miles of coastline. The cities of Neptune Beach, Atlantic Beach and Jacksonville Beach are all located along the shoreline.

The Florida Department of Environmental Protection identified critically eroded beached in Florida in a June 2019 report. According to the report, there are two critically eroded beach areas (10.4 miles), one critically eroded inlet shoreline area (0.7mile) and one non-critically eroded inlet shoreline area (2.0 miles) in Duval County (Figure 38).

The non-critically eroded inlet shoreline area extends 2.0 miles along the Big Talbot Island shoreline of Nassau Sound. Although significantly eroding a portion of Big Talbot Island State Park, this area is still considered non-critical. The southern 0.3 mile of Atlantic Ocean fronting beach on Little Talbot Island (R21 – R23) is critically eroded, as is the 0.7 mile along Ft. George Inlet (R23 – AIA Bridge). These critically eroded beach and inlet shoreline areas, resulting from the northward migration of Fort George Inlet, are experiencing a threat to recreational interests at Little Talbot Island State Park and State Road AIA. The southern 10.1 miles of Atlantic Ocean fronting beaches in Duval County (V501 – R80) are designated as critically eroded due to past threats to development and recreational interests. This area is part of a beach restoration project, which is continually maintained.

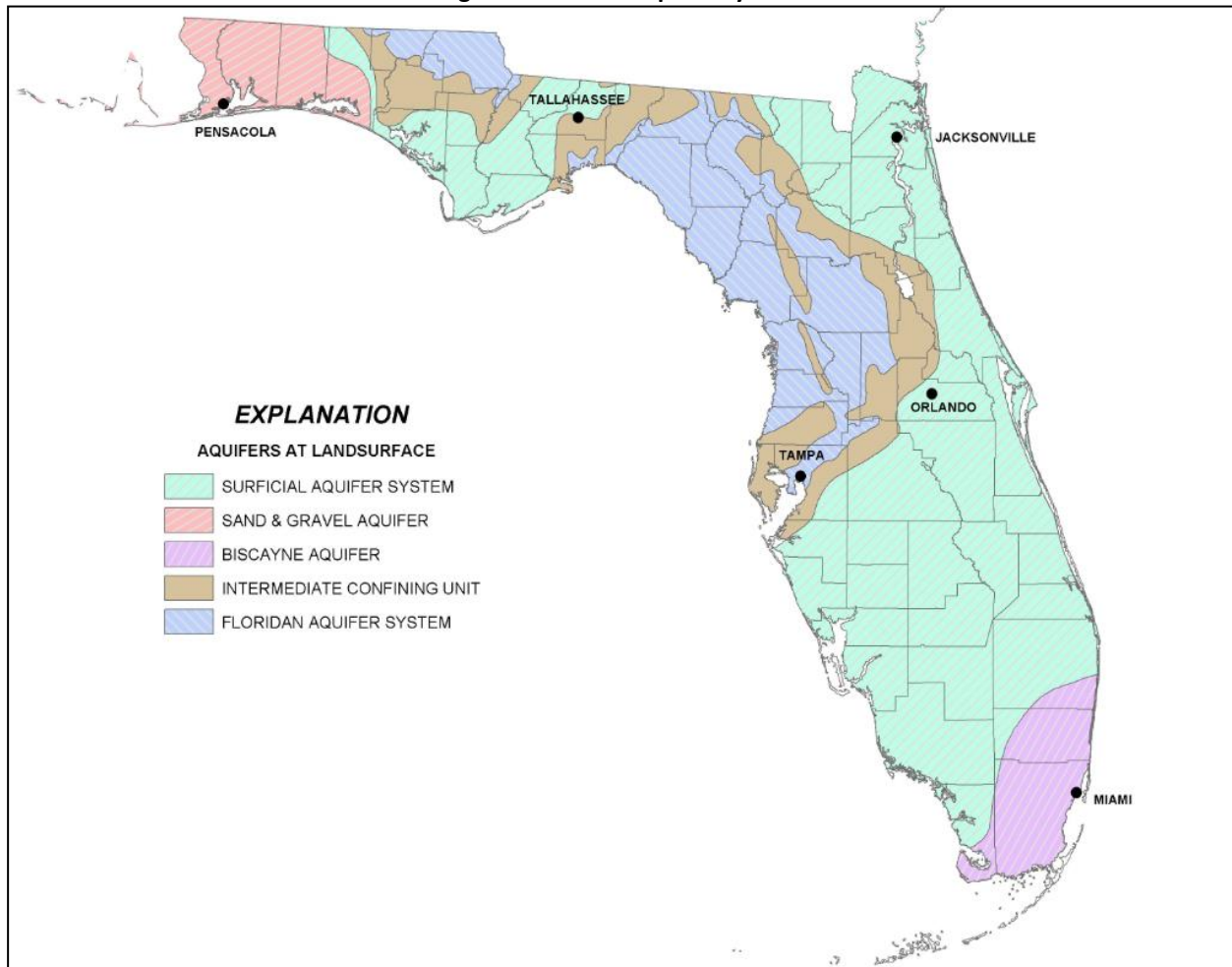
**Figure 38: Critically Eroded Beaches in Duval County**



Source: Florida Department of Environmental Protection, *Critically Eroded Beaches in Florida* (2019)

The entire Florida Aquifer is interconnected, and is one of the highest producing aquifers in the world. It is found throughout Florida and extends into the southern portions of Alabama, Georgia, and South Carolina. This aquifer system is comprised of a sequence of limestone and dolomite, which thickens from about 250 feet in Georgia to about 3000 feet in south Florida. The Floridan aquifer system has been divided into an upper and lower aquifer separated by a unit of lower permeability. The upper Floridan aquifer is the principal source of water supply in Duval County (Source: FDEP, <https://fldep.dep.state.fl.us/swapp/Aquifer.asp>).

Figure 39: Florida Aquifer System



Source, Florida Department of Environmental Protection, <https://fldep.dep.state.fl.us/swapp/Aquifer.asp#>

#### Historical Occurrences of Coastal Erosion

Coastal Erosion as a result of natural geological process has been underway for millennia. Some notable events have occurred in recent history that lead to widespread erosion. Hurricane Matthew in 2016 and Hurricane Irma in 2017 both lead to widespread erosion and destruction of sand dunes along nearly all 15 miles of coastal Duval County. The USACE was contracted to re-nourish the beaches with sand following these events at a cost of over \$11 million dollars (Source: City of Jacksonville, FEMA Public Assistance Program Project Worksheets DR4283 and DR4337).

#### Historical Occurrences of Salt Water Intrusion

There are no specific incidents to cite but the U.S. Geologic Survey has estimated that water levels within the Floridan Aquifer system in Duval County have gradually declined at the rate of 0.3 to 0.75-feet per year due to the increased demand. Lower water levels in the Floridan Aquifer increase the risk of contamination by surface and subsurface pollution. Additionally, the lower water levels increase the potential for saltwater intrusion into the Floridan Aquifer.



### Probability of Future Occurrences of Coastal Erosion

While both coastal erosion and saltwater intrusion are natural processes and are expected to occur to some degree with storm events, there are activities being undertaken by humans that may intensify the effects and result in an increased probability of harmful effects.

Human activities within Duval County that contribute to erosion and saltwater intrusion include port development, river catchments and watersheds, river damming, and offshore dredging or sand mining. These human activities in combination with natural forces often exacerbate erosion. Oceanfront development and attendant seawall construction, inlet improvements, and similar projects are also contributing factors that may lead to increased coastal erosion. The Jacksonville Port Authority signed a 25-year agreement with Seattle-based port operator SSA Marine in 2019 to expand a container terminal on Blount Island to accommodate additional large ships. The City of Jacksonville is occupied by many catchments and watersheds, many of which lead water to the St. Johns River. Jacksonville has a Dam located at Guana River that separates Lake Ponte Vedra and the Intercostal Waterway. The U.S. Army Corps of Engineers (USACE) has proposed dredging a 13-mile reach of the St. Johns River navigation channel in Jacksonville, deepening it to depths between 50 and 54 feet below North American Vertical Datum of 1988. The dredging operation will remove about 10 feet of sediments from the surficial aquifer system, including limestone in some locations. A potential impact of deepening the navigation channel is saltwater intrusion in the surficial aquifer system.

### Coastal Erosion Impact Analysis

According to the USGS, groundwater pumping can reduce freshwater flow toward coastal areas and cause saltwater to be drawn toward the freshwater zones of the aquifer. Saltwater intrusion decreases freshwater storage in the aquifers, and, in extreme cases, can result in the abandonment of wells. Saltwater intrusion occurs by many ways, including lateral encroachment from coastal waters and vertical movement of saltwater near discharging wells. The intrusion of saltwater caused by withdrawals of freshwater from the groundwater system can make the resource unsuitable for use.

#### Public

- May lose property
- May lose sandy beaches, dunes or mangroves, which could lead to storm surge flooding
- Sandy beaches may have to close

#### Responders

- N/A

#### Continuity of Operations (including continued delivery of services)

- Businesses, critical infrastructure, government buildings, etc. may have operations hindered if erosion leads to damage to the structure
- Operations may be hindered if roads to the structures are damaged from erosion
- Continuity of transportation network may be interrupted because of erosion damage to roads

#### Property, Facilities, Infrastructure

- Structures may be damaged when coastal erosion damages the ground

#### Environment

- Coastal areas, marshes, mangroves, sandy beaches etc. may be severely damaged from coastal erosion which is a habitat for many species of plants and animals
- If large portions of coastal areas and dunes are washed away from coastal erosion, storm surge from the next storm could reach homes, businesses, roads, etc.

#### Economic Condition

- N/A

#### Public's Confidence in Jurisdiction's Governance

- If damage from coastal erosion, such as damage to roads, is not quickly repaired, then the public may be frustrated with the jurisdiction's governance

#### Saltwater Intrusion Impact Analysis

Saltwater intrusion is a potential threat to the quality of ground water in northeastern Florida. According to USGS Water-Resources Investigations Report 92-4174 (Spechler, 1994), "elevated chloride concentrations have been observed in more than 70 wells tapping the Upper Floridan and the upper zone of the Lower Floridan aquifers. In Duval and northern St. Johns County, increased chloride concentrations in water from some wells along the coast and up to 14 miles inland indicate that saline water is gradually intruding into the freshwater zones of the Floridan aquifer system."

#### Public

- Contamination of drinking water can lead to health concerns
- Higher costs for utility companies and their customers

#### Responders

- N/A

#### Continuity of Operations (including continued delivery of services)

- Utility service costs may increase due to increased strain on municipal water supplies

#### Property, Facilities, Infrastructure

- Wells may become abandoned if tainted by saltwater

#### Environment

- Floridan Aquifer is at risk of saltwater intrusion

#### Economic Condition

- Increased costs for municipal water
- Increased costs for agriculture and farming

#### Public's Confidence in Jurisdiction's Governance

- Increased costs and health concerns from tainted drinking water will reduce confidence in the Jurisdiction's Governance

### Potential Effects of Climate Change on Coastal Erosion and Saltwater Intrusion

Climate Change and sea level rise contribute to ongoing coastal erosion. The clearing of coastal forests and trees due to cyclonic storms has increased the vulnerability of coastal erosion. As noted in the Tropical Cyclone Hazard Profile, warmer temperatures and higher sea levels will lead to an increase in frequency and intensity of tropical cyclones. These events will lead to more coastal erosion. In addition, as sea levels rise, the location of the freshwater-saltwater interface may progress further upstream. This encroachment would be further exacerbated by drought, reduced rainfall, and changes in water use and demand, which are all anticipated impacts of warmer global temperatures associated with climate change.

### Vulnerability Analysis and Loss Estimation

Duval County contains over 15 miles of coastline. The cities of Neptune Beach, Atlantic Beach and Jacksonville Beach are all located along the shoreline. Of the total coastline, there are two critically eroded beach areas (10.4 miles), one critically eroded inlet shoreline area (0.7 mile) and one non-critically eroded inlet shoreline area (2.0 miles). Property along the coastal waterfront is vulnerable to secondary effects of coastal erosion, which include increased exposure to wave run-up and storm surge from tropical cyclone events. Losses in property value or direct damage costs due to coastal erosion cannot be predicted directly. Coastal erosion may deepen financial losses caused by coastal storms and tropical cyclones. Many critically endangered species that inhabit the natural coastal environment are further at risk due to erosion. However, over the past decade, impacts have been diminished through the mitigation strategy used by Army Corps of Engineers to periodically re-nourish the shoreline.

According to the City of Jacksonville's Environmental Quality Division, current trends in development within Northeast Florida have increased the demand placed on the Floridan aquifer system. In order to meet the needs of the public, increasing amounts of water are being withdrawn from the aquifer. The USGS has estimated that water levels within the Floridan Aquifer system in Duval County have gradually declined at the rate of 0.3 to 0.75-feet per year due to the increased demand. Lower water levels in the Floridan Aquifer increase the risk of contamination by surface and subsurface pollution. Additionally, the lower water levels increase the potential for saltwater intrusion into the Floridan Aquifer.

When an aquifer or well becomes contaminated it poses a threat to human health and the environment. Additionally, ground water contamination can jeopardize the economic welfare of a community. Cleaning up an aquifer or providing alternative sources of drinking water are expensive and difficult propositions, and costs can exceed \$100 million per incident.

## Overall Vulnerability

Environmental Degradation (Coastal Erosion)					Overall Vulnerability
Overview					Moderate
Erosion and saltwater intrusion are natural processes that takes place over a range of time scales. Erosion and/or leads to saltwater intrusion can be accelerated by human activities. The city of Jacksonville is vulnerable to erosion caused by natural and man-made events. Jacksonville experiences smaller-scale (short-term) hazard events, such as storms, regular wave action, tides and winds. Wind, waves and currents are natural forces that easily move the unconsolidated sand and soils in the coastal area, resulting in rapid changes in the position of the shoreline. Climate Change and sea level rise contribute to ongoing costal erosion. The clearing of coastal forests and trees due to cyclonic storms has increased the vulnerability of coastal erosion. Jacksonville has 15 miles of coastline, which suffers erosion mainly from northeasters and seasonal tropical storms.					
Frequency	Probability	Potential Magnitude			
Very Likely	Very Likely	Injuries/Deaths	Infrastructure	Environment	
		Low	Minimal	Minimal	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30.

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Moderate, with a score of 18.

Environmental Degradation (Saltwater Intrusion)					Overall Vulnerability
Overview					Moderate
Erosion and saltwater intrusion are natural processes that takes place over a range of time scales. Saltwater intrusion occurs by many mechanisms, including lateral encroachment from coastal waters and vertical upcoming near discharging wells. Saltwater intrusion can naturally occur in coastal aquifers, owing to the hydraulic connection between groundwater and seawater. Saltwater intrusion can be very problematic to coastal communities such as Duval County that rely on fresh groundwater supplies for the livelihood.					
Frequency	Probability	Potential Magnitude			
Very Likely	Very Likely	Injuries/Deaths	Infrastructure	Environment	
		Minimal	Minimal	Minimal	

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Moderate, with a score of 17.

## Extreme Heat Hazard Profile

### Extreme Heat Description

Extreme heat is defined as an extended period where the temperature and relative humidity combine for a dangerous heat index. The National Weather Service's excessive heat criteria is either 1) heat index of at least 108°F for more than 3 hours per day for 2 consecutive days, or 2) heat index more than 115°F for any period of time. Extreme heat can occur any time in Duval County, but typically occurs in the summer between the months of June and September. The CDC reports that extreme heat events can be dangerous to health – even fatal. Extreme temperature events result in increased hospital admissions for heat-related illness, as well as cardiovascular and respiratory disorder complications.

Heat Warnings are issued by the NWS by county when any location within that county is expected to reach criteria. A heat warning means that some people can be seriously affected by heat if precautions are not taken. Studies in Canada, Europe, and the U.S. have indicated that mortality begins to increase exponentially as the heat increases or stays above a heat index of 104°F. In addition to raising public awareness, the issuance of a heat warning will alert hospitals and officials to take certain actions to prepare and respond to an increase in emergency calls, and activate programs to check on elderly and the home-bound. In some cases cooling centers can be open or designated and donation programs activated for fans and air conditioners. As in the case of an advisory, certain regulations may change such as turning off people's electricity, evictions, and outside work requirements.

NOAA's heat alert procedures are based mainly on Heat Index Values. The Heat Index, sometimes referred to as the apparent temperature is given in degrees Fahrenheit. The Heat Index is a measure of how hot it really feels when relative humidity is factored in with the actual air temperature.

Heat related illnesses are defined risks associated with extreme temperatures. Heat-related illnesses listed in order of severity are:

Heat Rash – presents as skin irritation from excessive sweating. It is more common in young children.

Heat Cramps – muscle pain and spasms normally in the abdomen, arms, and legs. Sweating depletes the body's salt and moisture levels. Low salt levels in muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion.

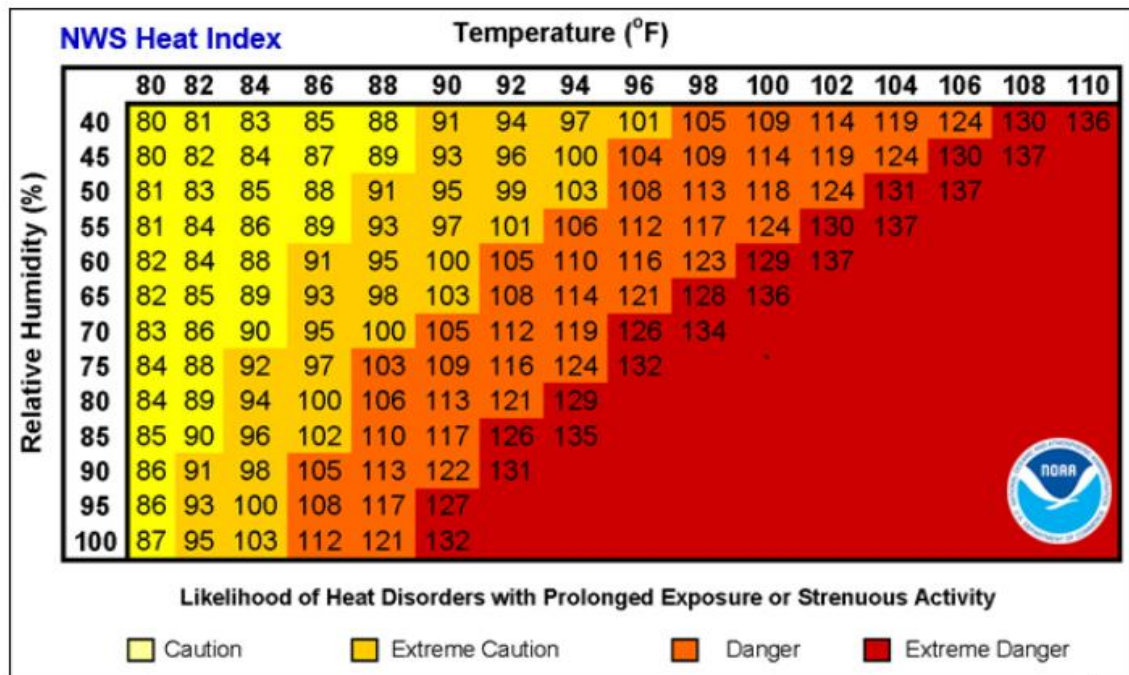
Heat Exhaustion - heat exhaustion is the body's response to an excessive loss of the water and salt, usually through excessive sweating. Symptoms of heat exhaustion include: headache, nausea, dizziness, weakness, irritability, thirst, heavy sweating, elevated body temperature, and decreased urine output. Heat exhaustion can happen after several days of exposure to high temperatures and not enough fluids. If heat exhaustion is not treated, it can turn into heat stroke.

Heat Stroke - a life-threatening illness in which body temperature may rise above 106° F in minutes. Heat stroke occurs when the body becomes unable to control its temperature. Body temperature rises rapidly, the sweating mechanism fails, and the body cannot cool down. Symptoms of heat stroke include: confusion, altered mental status, slurred speech, loss of consciousness (coma), hot, dry skin or profuse

sweating, seizures, very high body temperature. This condition can cause death or permanent disability if emergency treatment is not given.

Rhabdomyolysis - Rhabdomyolysis is a medical condition associated with heat stress and prolonged physical exertion, resulting in the rapid breakdown, rupture, and death of muscle. When muscle tissue dies, electrolytes and large proteins are released into the bloodstream that can cause irregular heartbeats.

Figure 40: NOAA Heat Index Value Scale



Source: <https://www.weather.gov/bgm/heat>

#### Geographic Areas Affected by Extreme Heat

All of the City of Jacksonville and its jurisdictions are uniformly susceptible to the effects of extreme temperatures. Some locations may be more susceptible due to specific geographic or man-made features, such as the City of Jacksonville Downtown Urban Core. The downtown area may experience temperatures higher than surrounding rural areas due to the “Urban Heat Island Effect.” Atmospheric conditions such as the coastal sea breeze may result in varying temperatures between coastal and inland Duval.

### Historical Occurrences of Extreme Heat

According to the National Climate Data Center, the warmest days on record are as follows:

**Table 27: Warmest days on record**

Date	Temperature
June 27, 1950	103.3°F
June 28, 2954	103.3°F
July 18, 2981	102.9°F
July 20, 2000	102.9°F
July 14, 2951	102.4°F

Source: <https://www.ncdc.noaa.gov/cdo-web/>

Listed are the heat advisories issued for Jacksonville Florida over the past 10 years.

**Table 28: heat advisories issued for the past 10 years.**

Year	Advisories
2019	8 heat advisories issued.
2018	1 heat advisory issued
2017	None issued
2016	4 issued
2015	6 issued
2014	6 issued
2013	None issued
2012	7 issued
2011	7 issued
2010	2 issued
2009	1 issued

Source: <https://www.ncdc.noaa.gov/cdo-web/>



### Probability of Future Occurrences of Extreme Heat

Heat advisories and dangerously high temperatures are certain to occur on a near-yearly basis. Temperature trends indicate that historic highs are being recorded multiple times per year in Duval County, with 2019 being the hottest year on record. Twenty-four record highs without a single cold record in 2019 made 2019 the warmest year on record for Jacksonville with an average temperature of 71.3, based on NOAA temperatures (WJCT 2019, <https://news.wjct.org/post/2019-was-warmest-year-record-jacksonville>). Average highs do not necessarily translate to instances of extreme heat, but extreme heat becomes more likely and more frequent as average temperatures increase over time.

### Extreme Heat Impact Analysis

Extreme heat can create impacts to various sectors of the population and economy. Some notable impacts are listed below.

**Agriculture:** Various sectors of the agriculture community are affected by extreme heat. Livestock, such as rabbits and poultry, are severely impacted by heat waves. Millions of birds have been lost during heat waves. Milk production and cattle reproduction also decreases during heat waves. Pigs are also adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields. Wheat, rice, maize, potato, and soybean crop yields can all be significantly reduced by extreme high temperatures at key development stages.

**Energy:** The electric transmission system is impacted when power lines sag in high temperatures. Sagging transmission lines can short out. The combination of extreme heat and the added demand for electricity to run air conditioning causes transmission line temperatures to rise. When the demand for electricity is above normal, the supply becomes outstripped causing electric companies to have rolling black outs.

**Water Resources:** The demand for water increases during periods of hot weather reducing water supply and pressure in many areas. This can significantly contribute to fire suppression problems for both urban and rural fire departments. The rise in water temperature during heat waves contributes to the degradation of water quality and negatively impacts fish populations. It can also lead to the death of many other organisms in the water ecosystem. High temperatures are also linked to rampant algae growth, causing fish kills in rivers and lakes.

**Disease Outbreaks:** Prolonged high temperature climate conditions increase susceptibility for tropical-disease transmission by the *Aedes aegypti* mosquito. Duval County has a modern mosquito control program that has been active since 1957, the Jacksonville Mosquito Control Division. Requests for Mosquito Control can be made by phone at 630-CITY (2489) or online at <https://myjax.custhelp.com/>. Jacksonville Mosquito Control Division routinely coordinates with the Duval County Health Department regarding viruses and responds quickly with surveillance and appropriate treatments when warranted.

**Urban Homeless:** High concentrations of buildings in urban areas cause urban heat island effect, generation and absorbing heat, making the urban center several degrees warmer than surrounding areas. The City of Jacksonville has a large homeless population that does not have access to air conditioning, many of which are located in the downtown area putting them at a higher risk for heat illness. According to the National Alliance to End Homelessness, Duval County has 1,794 people that are homeless.

#### Public

- Injury or death from overexposure, especially to infants, children, the elderly, those who are overweight, those with chronic illnesses, those who take certain medications

#### Responders

- Injury or death from over exertion in heat

#### Continuity of Operations (including continued delivery of services)

- Not likely to impact continuity of operations

#### Property, Facilities, Infrastructure

- Less efficient cooling systems or systems that must run constantly to effectively cool a building

#### Environment

- Faster evaporation
- Damage to green spaces and agricultural lands
- Death of plants and animals

#### Economic Condition

- Crop damage or loss

#### Public Confidence in Jurisdiction's Governance

- If people become ill or die from exposure to extreme heat, public may believe the government is not doing all that it can to help those in need, whether or not a cooling shelter was opened

#### Potential Effects of Climate Change on Extreme Heat

Various climatological reports indicate that average global temperatures are expected to increase by the end of the 21st century. A 2016 report from Climate Central states that Florida faces the single greatest increase in the dangerous combination of heat and humidity over the next several decades of all states in the US. The top 13 metro areas in the U.S. projected to see the greatest increase in days with Heat Indices exceeding 105°F by the year 2050 are located in Florida. Jacksonville ranks #18 on the list of 25. Jacksonville is expected to see an additional 97 days where when the heat index is more than 104°F by that time (Source: <https://www.climatecentral.org/news/sizzling-summer-20515>).

### Vulnerability Analysis and Loss Estimation

Extreme heat events can trigger a variety of heat stress conditions. Small children, the elderly, certain other groups including people with chronic diseases, those who are sick or overweight, low-income populations, and outdoor workers are at higher risk for heat-related illness. Taking certain medicines or drinking alcohol can also raise risk. Both type I and type II diabetes are chronic conditions which may impair an individual's ability to properly maintain thermal equilibrium due to inadequate dilatation of blood vessels in the skin leading to poor heat dispersion. Higher temperatures also contribute to respiratory disorders due to the build-up of harmful air pollutants. The City of Jacksonville maintains a special needs database that includes at-risk populations.

There is no economic data available regarding the impacts of this hazard in Duval County. The probability of economic impact from extreme heat is low.

According to the CDC, Hurricane Irma (2017) attributed to Seventeen (13.2%) heat-related deaths that were associated with lack of air conditioning. Fourteen (10.9%) of the heat-related deaths occurred among geriatric patients with existing chronic diseases who resided in an assisted-living facility in Florida that was without power for several days during a period of hot weather after the hurricane's landfall (Source: <https://www.cdc.gov/mmwr/volumes/67/wr/mm6730a5.htm>).

**Table 29: Social Vulnerabilities Demographics**

<b>Social Vulnerability</b>		
<b>Social Vulnerability Category</b>	<b>% of Population</b>	<b>Population (2019 est.)</b>
Over 65 years old	13	118,566
Under 5 years old	6.8	61,883
Language other than English spoke at home	13.9	126,774
Disabled	9.8	89,380
Poverty Level	16	145,927

*Source: United States Census Bureau Table Survey/Program: 2017 American Community Survey 5-Year Estimates*

Heat emergencies are often slower to develop, taking several days of continuous oppressive heat before significant or quantifiable impacts are seen. Heat waves may not strike victims immediately; rather, their cumulative effects can slowly take the lives of vulnerable populations.

The elderly and economically disadvantaged populations tend to be concentrated in the north and northwest sector of Duval County. The remainder of the vulnerable population is distributed throughout the County.

Overall Vulnerability: Extreme Heat

Extreme Heat					Overall Vulnerability
Overview					High
Extreme heat is defined as an extended period where the temperature and relative humidity combine for a dangerous heat index. The National Weather Service’s excessive heat criteria: heat index of at least 105°F for more than 3 hours per day for 2 consecutive days, or heat index more than 115°F for any period of time. Extreme heat can occur in the City of Jacksonville but typically occurs in the summer between the months of June and September. The CDC reports, extreme heat events can be dangerous to health – even fatal. Extreme temperature events result in increased hospital admissions for heat-related illness, as well as cardiovascular and respiratory disorder complications.					
Frequency	Probability	Potential Magnitude			
Very Likely	Very Likely	Injuries/Deaths	Infrastructure	Environment	
		High	Low	Low	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30.

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be High, with a score of 20.

## Winter Storm and Freezing Temperatures Hazard Profile

### Winter Storm and Freezing Temperature Hazard Description

NOAA defines a winter storm as an event in which the main types of precipitation are Snow, Sleet or Freezing Rain. A winter storm is a combination of heavy snow, blowing snow and/or dangerous wind chills. A winter storm can be life-threatening.

Three basic ingredients are necessary to make a winter storm: Cold Air below freezing temperatures in the clouds and near the ground is necessary to make snow and/or ice. Lift is something to raise the moist air to form the clouds and cause precipitation. An example of lift is warm air colliding with cold air and being forced to rise over the cold dome. The boundary between the warm and cold air masses is called a front. Another example of lift is air flowing up a mountainside. Moisture forms clouds and precipitation. Air blowing across a body of water, such as a large lake or the ocean, is an excellent source of moisture.

**Snow:** Most precipitation that forms in wintertime clouds start out as snow because the top layer of the storm is usually cold enough to create snowflakes. Snowflakes are just collections of ice crystals that cling to each other as they fall toward the ground. Precipitation continues to fall as snow when the temperature remains at or below 0 degrees Celsius from the cloud base to the ground. Snow that reaches ground level is rare in Duval County, and occurs only once every few decades.

**Sleet:** Sleet occurs when snowflakes only partially melt when they fall through a shallow layer of warm air. These slushy drops refreeze as they next fall through a deep layer of freezing air above the surface, and eventually reach the ground as frozen rain drops that bounce on impact.

**Freezing Rain:** Freezing rain occurs when snowflakes descend into a warmer layer of air and melt completely. When these liquid water drops fall through another thin layer of freezing air just above the surface, they don't have enough time to refreeze before reaching the ground. Because they are "supercooled," they instantly refreeze upon contact with anything that is at or below 0 degrees C, creating a glaze of ice on the ground, trees, power lines, or other objects. A significant accumulation of freezing rain lasting several hours or more is called an ice storm.

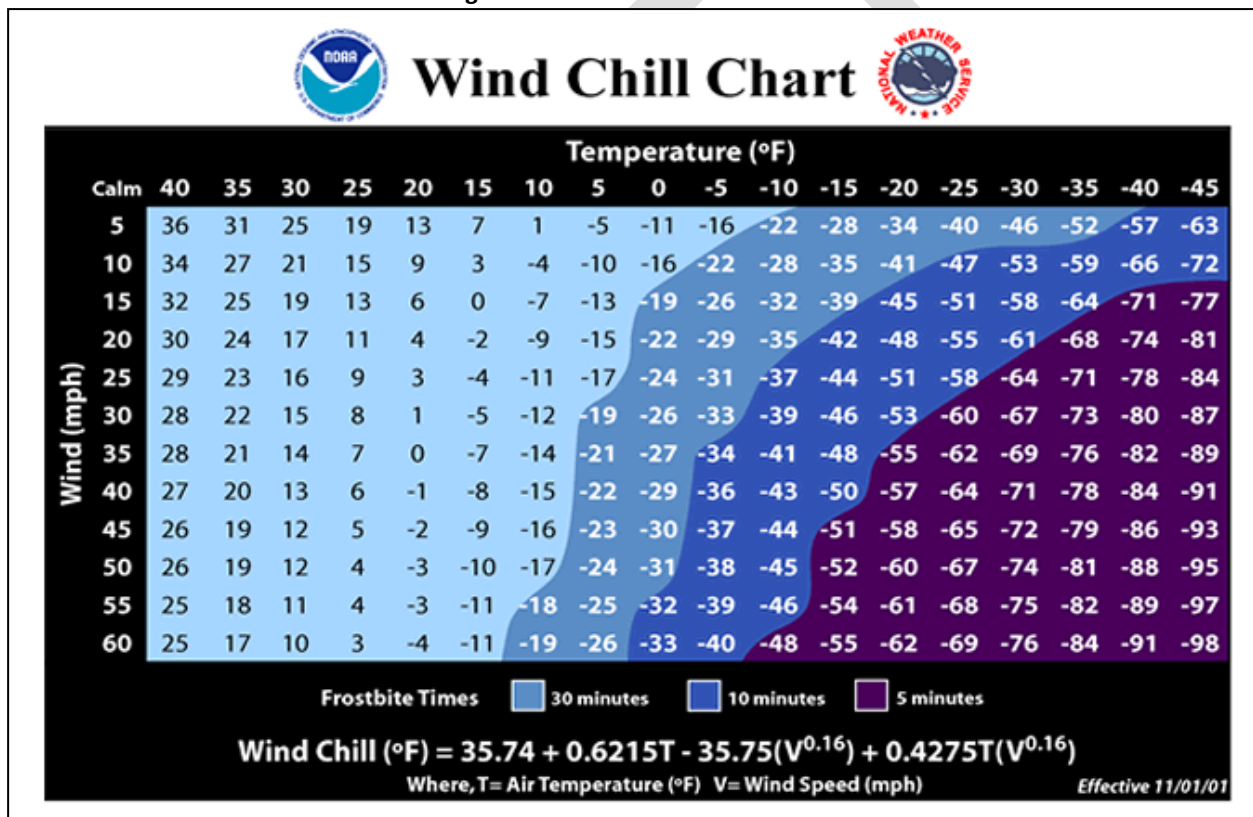
Northeast Florida is susceptible to a type of winter storm known as a Nor'easter. The official definition by NOAA is a strong low pressure system that affects the Mid-Atlantic and New England states. These systems can form over the land of the eastern U.S. or over the Atlantic coastal waters. These events are notorious for producing heavy snow, rain, and tremendous waves that crash onto Atlantic beaches, often causing beach erosion and structural damage. Wind gusts associated with these storms can reach hurricane strength on the Saffir-Simpson scale. A nor'easter gets its name from the continuously strong northeasterly winds blowing in from the ocean ahead of the storm and over the coastal areas. Warm and moist air from the Atlantic feeds these systems, which causes them to grow explosively.

One measure of the extent of cold temperatures is Wind Chill. Wind Chill is a quantity expressing the effective lowering of the air temperature caused by the wind, especially as affecting the rate of heat loss from an object or human body or as perceived by an exposed person.

The NWS Wind Chill Temperature (WCT) index uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. The index does the following:

- Calculates wind speed at an average height of 5 feet, the typical height of an adult human face,
- Utilizes readings from the national standard height of 33 feet, which is the typical height of an anemometer,
- Is based on a human face model,
- Incorporates heat transfer theory based on heat loss from the body to its surroundings, during cold and breezy/windy days,
- Lowers the calm wind threshold to 3 mph,
- Uses a consistent standard for skin tissue resistance, and
- Assumes no impact from the sun, i.e., clear night sky.

Figure 41: NOAA Wind Chill Chart



### Geographic Areas Affected by Winter Storms and Freezes

All of the City of Jacksonville and its jurisdictions are uniformly susceptible to the effects of extreme temperatures and winter storms. Some locations may be more susceptible to stronger impacts due to specific geographic or man-made features. Atmospheric conditions such as the coastal sea breeze may result in varying temperatures between coastal and inland Duval. Nor'easters will produce stronger impacts along coastal Duval, while inland Duval is more susceptible to winter storms that may originate from the Arctic, such as Arctic Blasts, an unstable Polar Vortex (NWS).

### Historical Occurrences of Winter Storms and Freezes

Some notable occurrences of winter storms are listed below:

February 8, 1835: The temperature in Jacksonville was recorded at 8 degrees F.

February 12th 1899: According to the Jacksonville Historical Society, the rain changed to sleet and then later to snow. Jacksonville received two inches of snow overnight and the temperature stood around 10 degrees. The snow remained in some places for up to five days and the vegetable crops, fruit trees, and some forest trees were destroyed beyond recovery. The plumbing of the city was badly damaged resulting in two months of repairs throughout the city. (<http://www.jaxhistory.org/portfolio-items/the-big-freeze-of-1899/>)

January 21, 1985: The lowest temperature ever recorded in Jacksonville, Florida was when the temperature fell to 7 degrees.

February 20, 2015: A low of 24 degrees was recorded at Jacksonville International Airport. According to the NWS, temperatures were even lower in some spots stations such as Cecil Commerce Center, where it was 19 degrees. A hard freeze warning was issued for all of Northeast Florida.

January 3, 2018: The NWS issued a winter storm warning along with a wind chill advisory for Jacksonville. Wind chill advisories are issued in this part of Florida when wind chill value drops below 35 degrees, a threshold much different than in other parts of the United States. The Emergency Operations Center activated in response to the potential for widespread black ice on county roadways.

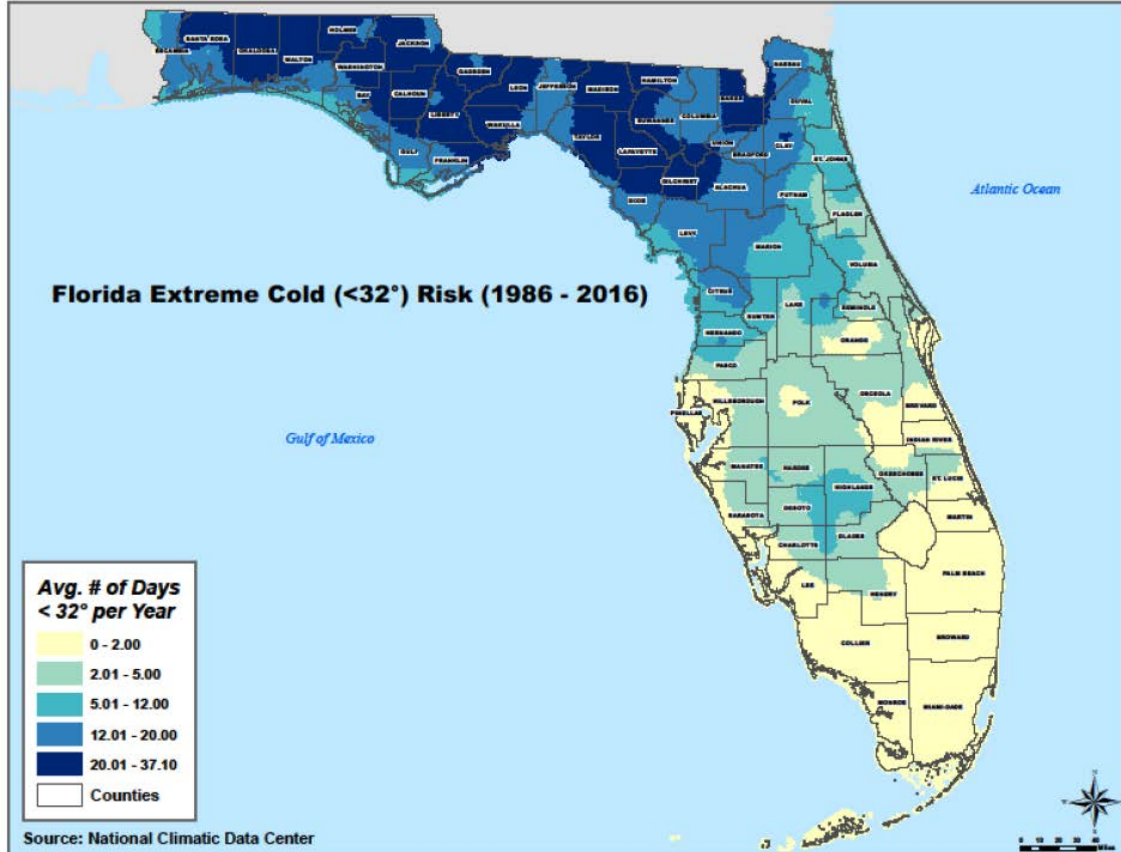
November 21, 2019: A hard freeze warning was issued for Northeast Florida to include the City of Jacksonville. Rain from the previous day froze overnight creating icy conditions.

According to History of Jacksonville, by T. Frederick Davis, extreme cold spells (known as cold waves) usually last two days and then give way to more moderate temperature. Snow (mostly light flurries) has occurred at Jacksonville on an average of once every seven years. The average first frost comes in the first week of November and the last in the third week of March.

### Probability of Future Occurrences of Winter Storms and Freezes

Although freezing temperatures are expected each year in Duval County, extreme cold that presents a threat to life and property is exceedingly rare. According to the National Climate Data Center, Duval County will experience between two and twelve days of below-freezing temperatures a year on average.

Figure 42: Florida Extreme Cold (<32 degrees) Risk, 1986-2016



Source: State of Florida Enhanced Hazard Mitigation Plan, pg. 268

### Winter Storms and Freezing Temperature Impact Analysis

According to NOAA, recent observations show that most deaths from winter storms are not directly related to the storm itself. Deaths and property damage result from traffic accidents on icy roads. All humans will experience hypothermia from prolonged exposure to cold if not wearing adequate protective clothing. Additionally, the U.S Consumer Product Safety Commission estimates that more than 25,000 residential fires every year are associated with the use of space heaters, causing more than 300 deaths. The most extreme impacts of winter storms are not seen in Duval County, but anyone may be potentially at risk of bodily harm during winter storms without proper protection.

With regard to injuries related to exposure to cold, nearly 50% of injuries are sustained by people over 60 years old, over 75% of victims are males, and about 20% occur in the home. (Source: <https://www.nssl.noaa.gov/education/svrwx101/winter/>)

Outdoor pipes and plants are susceptible to damage from freezing. To prevent freezing and possible bursting of outdoor water pipes, pipes should be wrapped, drained, or allowed to drip slowly. In-ground sprinkler systems should be covered along with any above-ground pipes to protect from freezing. Pets are also susceptible to the extreme cold if they do not have access to an heated area. Economic impacts from winter storms and freezes are low to minimal in Duval County. Specific impacts include:



#### Public

- Injury or death, as well as possible property damage from car accidents because of ice on roads and bridges.
- Injury or death from exposure to cold weather, either because of being stranded outside, or inside without proper heating systems.
- Deaths and injuries have resulted from accidents including automobile collisions due to poor driving conditions.
- Emergency medical response can be severely hindered from the effects of a winter storm event. This is because Floridians are not accustomed to driving in winter weather conditions.

#### Responders

- First responders are increasingly at risk as they respond to traffic incidents and calls for medical attention. They are vulnerable to the same transportation dangers as other citizens, but often have to go out in hazardous conditions when ordinary citizens would not.

#### Continuity of Operations (including continued delivery of services)

- During a winter storm and the days that follow, many people do not travel due to the road conditions. The absenteeism of workers affects the overall continuity of operations of the government.

#### Property, Facilities, Infrastructure

- Loss or damage of crops and agricultural revenue because of frost/freeze events.
- Roads and highways are most vulnerable to the effects of winter storms. Roads frequently become iced over, resulting in accidents, injuries, deaths, and traffic congestion. Roads can be heavily damaged due to winter weather events. Potholes and cracks can be found on roadways after a winter weather event, resulting in the need for repairs, causing further economic losses to the local area.
- Electrical transmission lines are highly vulnerable to severe winter weather. Trees frequently fall due to the extra weight of ice accumulating on branches.
- Other impacts resulting from winter storms include damage to plumbing, sewers, and waterlines, as well as minor roof damage and house fires resulting from portable heaters.

#### Environment

- Loss or damage to environment, including green spaces, habitats, species because of cold weather, winter weather, and/or frost/freeze events.

#### Economic Condition

- Loss or damage to crops because of freezes result in the loss of capital
- During a winter storm and the days that follow, many people do not travel due to the road conditions. The absenteeism of workers affects the economy.

#### Public Confidence in Jurisdiction's Governance

- A high number of motor vehicle accidents, school closures, power outages, or injuries and deaths may cause the public to believe that the government did not adequately prepare for the incident.

#### Potential Effects of Climate Change on Winter Storms and Freezing Temperatures

Climate change may result in increased occurrences or magnitude of winter storms and freezes in Florida. Climate variability will continue to influence daily temperature variability, so isolated and prolonged winter storms and freeze events are not unlikely. Severe winter storms will not disappear if global average temperatures increase, as temperature instability will also result in more occurrences of extreme cold weather. Warmer-than-average ocean surface temperatures in the Atlantic can lead to exceptionally high amounts of moisture flowing into a winter storm, and contribute to greater intensification of the storm. Isolated or prolonged winter freeze events in Florida may still occur.

The National Climate Data Center reports that increasing surface temperatures and reductions in Arctic sea ice may counterintuitively produce atmospheric circulation patterns that are favorable for winter storm development in the eastern United States. A greater prevalence of high pressure blocking patterns over the North Atlantic that result in cold outbreaks in the eastern United States along with slower moving systems can further exacerbate the persistence and severity of a storm (Source: <https://www.ncdc.noaa.gov/news/climate-change-and-extreme-snow-us>).

#### Vulnerability Analysis and Loss Estimation

The City of Jacksonville has a large homeless population that does not have access to heated areas/heating units, putting them at a higher risk for cold exposure. According to the National Alliance to End Homelessness, Duval County has 1,794 people that are homeless. People exposed to extreme cold are susceptible to frostbite in a matter of minutes. Areas of the body most prone to frostbite are uncovered skin and the extremities, such as hands and feet. Hypothermia is another threat during extreme cold. Hypothermia occurs when the body loses heat faster than it can produce. Cold weather can also affect crops. In late spring or early fall, cold air outbreaks can damage or kill produce for farmers, as well as residential plants and flowers. A freeze occurs when the temperature drops below 32°F. Bring potted plants indoors. Also, if possible, cover tender vegetation outdoors.

Jacksonville's elderly population, those 65 years and over, are at high a risk for suffering from the effects of extreme cold temperatures. Frequent checks on the elderly to ensure their heaters are working and heating the house properly can prevent injury and death to that demographic. As of July 1, 2018, the City of Jacksonville's elderly population was 114,794, which is 12.7% of the total population for the city. Cases of frostbite and hypothermia are also common for elderly people who are stuck in their homes without access to heat.

## Overall Vulnerability

Winter Storm and Freezing Temperatures					Overall Vulnerability
Overview					Low
Winter storms create a higher risk of car accidents, hypothermia, frostbite, carbon monoxide poisoning, and heart attacks from overexertion. Winter storms can bring extreme cold, freezing rain, snow, ice, and high winds. Although freezing temperatures are expected each year in Duval County, extreme cold that presents a threat to life and property is exceedingly rare. The lowest temperatures ever recorded in Jacksonville were on February 8, 1835 when it fell to 8° F, and January 21, 1985 when the temperature fell to 7° F. Light snow is expected approximately every seven year. The last significant snowfall occurred during “The Big Freeze of 1899,” where approximately two inches of snow fell and temperatures hovered around 10° F for several days.					
Frequency	Probability	Potential Magnitude			
Low	Low	Injuries/Deaths	Infrastructure	Environment	
		Low	Very Low	Low	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30.

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Low, with a score of 6.

## Drought Hazard Profile

### Drought Description

According to the 2018 Florida Enhanced Mitigation Plan, drought originates from a deficiency of precipitation over an extended period of time, resulting in a water shortage for some activity, group, or environmental sector. Drought should be considered relative to some long-term average condition of balance between precipitation and “evapotranspiration” (i.e., evaporation + transpiration) in a particular area, a condition often perceived as “normal.” It is also related to the timing (i.e., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness (i.e., rainfall intensity, number of rainfall events) of the rains. Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with it in many regions of the world and can significantly intensify its severity. When drought begins, the agricultural sector is usually the first to be impacted because of its heavy dependence on stored soil water. Those who rely on surface water (i.e., reservoirs and lakes) and subsurface water (i.e., ground water), for example, are usually the last to be affected.

A short-term drought that persists for three to six months may have little impact on these sectors, depending on the characteristics of the hydrologic system and water use requirements. In 1965, W.C. Palmer developed an index to measure the departure of the moisture supply. Palmer based his index on the supply-and-demand concept of the water balance equation, taking into account more than just the precipitation deficit at specific locations. The objective of the Palmer Drought Severity Index (PDSI), shown below, was to provide measurements of moisture conditions that were standardized so that comparisons using the index could be made between locations and between months.

**Table 30: Palmer Drought Severity Index (PDSI)**

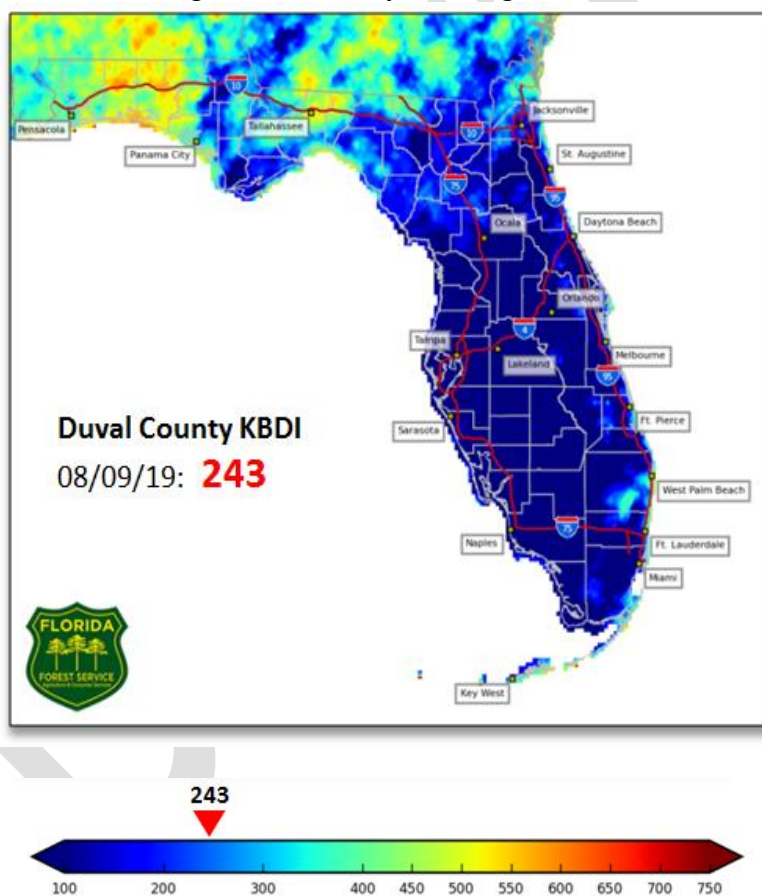
PDSI Value	Classification
4.00 or more	Extremely Wet
3.00 to 3.99	Very Wet
2.00 to 2.99	Moderately Wet
1.00 to 1.99	Slightly Wet
0.50 to 0.99	Incipient Wet Spell
0.49 to -0.49	Near Normal
-0.50 to -0.99	Incipient Dry Spell
-1.00 to -1.99	Mild Drought
-2.00 to -2.99	Moderate Drought
-3.00 to -3.99	Severe Drought
-4 or less	Extreme Drought

*Source: National Climate Data Center*

The PDSI is most effective in determining long-term drought, a matter of several months, and is not as reliable with short-term forecasts, a matter of weeks. It uses a 0 as normal, and drought is shown in terms of minus numbers; for example, minus 2 is moderate drought, minus 3 is severe drought, and minus 4 is

extreme drought. The advantage of the PDSI is that it is standardized to local climate, so it can be applied to any part of the country to demonstrate relative drought or rainfall conditions. The Keetch-Byram Drought Index (KBDI) is another method to examine the extent of drought and provides a continuous reference scale for estimating the dryness of the soil and duff layers. The index increases for each day without rain (the amount of increase depends on the daily high temperature) and decreases when it rains. The scale ranges from 0 (no moisture deficit) to 800. The range of the index is determined by assuming that there are 8 inches of moisture in saturated soil that is readily available to the vegetation. For different soil types, the depth of soil required to hold 8 inches of moisture varies (loam 30 inches, clay 25 inches, and sand 80 inches). A prolonged drought (high KBDI) influences fire intensity largely because more fuel is available for combustion (i.e., fuels have a lower moisture content). In addition, the drying of organic material in the soil can lead to increased difficulty in fire suppression.

**Figure 43: Keetch Byram Drought Index**



*Source: Florida Forest Service, incorporated into the COJ EPD Daily Situation Report*

#### Geographic Areas Affected by Drought

Drought is a deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable area. While the City of Jacksonville, including the Town of Baldwin, and the cities of Atlantic Beach, Neptune Beach, Jacksonville Beach, and Jacksonville do not have a large agricultural product base susceptible to drought, this condition does affect the urban areas particularly dependent on water storage

areas. Decreased water levels due to insufficient rain have led to the restriction of water use to certain amounts and types of uses throughout the county. Also, the increased pumping of groundwater and surface irrigation occurring in drought periods might result in land subsidence problems. These manifest as failures of construction materials such as slopes or grades on roadways that appear to be “sinking,” or actual collapse of a section of road or sidewalk, or development of depressions in the soil, which are sometimes interpreted incorrectly as sinkholes. The impacts of subsidence such as infrastructure repairs can be costly.

#### Historical Occurrences of Drought

The impact of droughts in the City of Jacksonville has been relatively indirect. When a drought is combined with a lowered water supply and with another common hazard to Florida, lightning strikes, events similar to the urban wildfires of June 1998 can occur and intensify the difficulty in responding to the fires. The NWS reported that a rate of return for a major drought period in excess of six months without rain could be experienced once every 15 years.

The last drought emergency was declared in the City of Jacksonville during April 15-29, 1999, when the county received a Disaster Declaration for “Fire and Drought for Emergency Protective Measures” through FEMA Public Assistance Category B. No particular area or population in the county is especially at risk from this hazard. According to the National Integrated Drought Information System (NDIS), since 2000, the longest duration of drought (D1-D4) in Florida lasted 124 weeks beginning on April 11, 2006 and ending on August 19, 2008. No deaths or injuries from drought are on record through the National Climatic Data Center during the period of 2010 through 2014. The kinds of facilities in each jurisdiction of the City of Jacksonville to be potentially impacted by drought events include residential, commercial, industrial, public facilities, agricultural, recreational, and historic preservation sites.

#### Probability of Future Occurrences of Drought

There are no specific probability trends posted for north Florida and Duval County with regard to drought. The City of Jacksonville has significant amounts of acreage designated for conservation and public lands and a diminishing amount of agricultural land, as the county continues to experience urbanization. The 2018 Florida Hazard Mitigation Plan states that based on the previous occurrences of drought conditions, the probability of future drought events occurring over the long term with some frequency remains high. As the state overall continues to develop with higher populations, higher water demands, and more demands related to agriculture and livestock, these drought conditions and drier trends may begin to have a profound impact on the state and its residents.

The St. Johns Water Management District (SJWMD), which includes Duval County within its boundaries, has a Water Shortage Plan (WSP) which is codified in its respective chapter of the Florida Administrative Code. Each Florida Water Management District has a WSP, and definitions of water shortage vary slightly by district.

St. Johns River Water Management District’s WSP defines water shortage as meaning a “situation within all or a specifically defined geographic area of the District when insufficient water is available to meet the needs of the users, or when conditions are such as to require temporary reduction in total use within a

particular area to protect water resources from serious harm. A water shortage usually occurs due to drought.” (SJRWMD WSP; Chapter 40C-21.051 F.A.C.)

### Drought Impact Analysis

The direct physical effects of drought typically include poor crops and foliage, increased fire danger, less water in the soil, streams and reservoirs, and less water available for livestock and wildlife. These lead to indirect effects such as less farm income, foreclosures, and reduced revenues for vendors and retailers who serve agricultural producers. Recent drought conditions have caused some trees to become unstable. Should the City experience a wind or rain event, structures will be in danger from falling trees. The extent of danger from falling trees is unknown. The extent of social effects of extreme drought and heat waves includes brown outs, potential loss of life in the elderly and other at risk populations, and possible water restrictions. There are small-family agricultural and farming properties in addition to tree farms in the City of Jacksonville. The City has experienced a number of dry periods in the past twenty years. The City of Jacksonville experienced prolonged drought conditions between 1998 and 2008 which resulted in drought declarations through the U.S. Small Business Administration (SBA) and ecological impacts to businesses in 2007. The probability of economic impact is selective, based upon the above considerations, and considered low due to the number of people impacted. Some specific impacts include:

#### Public

- Lack of water or water restrictions for personal use
- Damage to property, such as grass and other vegetation dying from lack of water

#### Responders

- Lack of water to extinguish fires

#### Continuity of Operations (including continued delivery of services)

- Lack of water or water restrictions may impact the public use of water and wastewater utilities; the public may have to restrict their showering time and other water use in the restroom, restrict their water usage for cooking and drinking, and restrict from watering their gardens or lawns

#### Property, Facilities, Infrastructure

- Facilities and infrastructure should not be directly affected by drought
- Property, such as green spaces, gardens, crops, etc. may be damaged from lack of water

#### Environment

- Areas such as green spaces, gardens, and forests may be damaged from drought

#### Economic Condition

- Crop damage or loss from drought can severely impact farmers and the agricultural economy, which can in turn affect the economy of an area if it is dependent upon the sales of the crops, like how Florida relies upon the sales of citrus

- Employment loss due to lower demand for services such as landscaping, lawn care, car wash, etc.

#### Public Confidence in Jurisdiction's Governance

- The public may lose confidence in the jurisdiction's governance if there is not a plan in place to deal with lack of water or water restrictions

#### Potential Effects of Climate Change on Drought

As stated in the flood hazard profile, the expected global pattern is for arid areas to become drier, meaning that droughts may occur more frequently and be more severe. This assertion is reinforced by NASA's recent article *Earth's Freshwater Future: Extremes of Flood and Drought*, which concludes that some areas are projected to get wetter over time, and others will become much drier. Warming temperatures and changing precipitation patterns may lead to frequent and severe droughts. Additionally, NASA's research shows that humans have already been influencing global patterns of drought for nearly a century. A drying and wetting pattern predicted to occur in response to greenhouse gas emissions was visible as far back as the early 1900s. The research indicated that the Southwest U.S. was at higher risk to climate change induced drought, but did not make direct predictions for the Southeast or Florida specifically (*Source: Gray and Merzdorf, 2019, <https://climate.nasa.gov/news/2881/earths-freshwater-future-extremes-of-flood-and-drought/>*).

#### Vulnerability Analysis and Loss Estimation

Drought is often associated with periods of long and intense heat. Drought does not typically affect humans directly, but extreme heat can cause injury and even death, particularly with children, elderly citizens, and other vulnerable populations. Injuries and potential deaths are most likely to impact rural, poor areas that lack air conditioning and immediate medical care. The largest impact of prolonged drought is the financial impact to farmers with crops and livestock. Florida, and Duval County to a lesser extent, has an agriculture industry. The USDA 2017 Census of Agriculture, Duval County profile, reported that there were approximately \$9 million dollars in agricultural products sold in 2017, comprised of \$6.5 million in crops and \$2.5 million in livestock, poultry, and animal products. A serious drought would damage or possibly destroy annual crops and limit the number of livestock that could be properly cared for (*Source: USDA, 2017, <https://www.nass.usda.gov/Publications/AqCensus/2017/>*).

Drought and extreme heat alone have historically had no observable effect on houses, facilities, or local infrastructure. Rationing water supplies would most likely be the worst-case scenario impact for drought. The City of Jacksonville has promulgated spring and summer watering restrictions for over a decade. Prolonged drought over a number of years could have long-term environmental impacts on the area, including species endangerment and necessary changes to the local agricultural makeup.



## Overall Vulnerability

Drought					Overall Vulnerability
Overview					Moderate
Drought is a deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable area. A drought originates from a deficiency of precipitation over an extended period of time, resulting in water shortages. Climatic factors such as high temperature, high wind, and low relative humidity can significantly intensify the severity. Drought is often associated with periods of long and intense heat. Extreme heat can cause injury and even death, particularly with children, elderly citizens, and other special needs populations. The largest impact of prolonged drought is the financial impact to farmers with crops and livestock. Drought over a number of years could have long-term environmental impacts on the area, including species endangerment and changes to the local agricultural makeup.					
Frequency	Probability	Potential Magnitude			
Likely	Likely	Injuries/Deaths	Infrastructure	Environment	
		Low	Minimal	Minimal	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30.

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Moderate, with a score of 18.

## Flooding Hazard Profile

### Flooding Description

Flooding is any high flow, overflow, or inundation by water which causes or threatens damage. The 2018 Florida Hazard Mitigation Plan defines flooding as to the general or temporary conditions of partial or complete inundation of normally dry land areas from the overflow of inland or tidal water and of surface water runoff from any source. Floodplains are defined as any land areas susceptible to being inundated by water from any flooding source.

Flooding may result from a variety of conditions, including severe weather or from failure of man-made structures such as dams or levees. The types of flooding recognized by Duval are either inland (riverine and flash floods) or coastal (tidal flooding). Tropical Storms may exacerbate flooding by producing storm surge. Storm Surge increases water levels inland, particularly along the St. Johns River, in the Intracoastal Waterway, and along the coast. Duval County is not at risk for flooding due to dam or levee failure.

Riverine flooding which occurs when water levels rise over the top of river banks due to excessive rain from tropical systems making landfall, persistent thunderstorms over the same area for extended periods of time. Coastal flooding, or the inundation of land areas along the coast which is caused by higher than average high tide and worsened by heavy rainfall and onshore winds (i.e., wind blowing landward from the ocean). Storm surge is an abnormal rise in water level in coastal areas, over and above the regular astronomical tide, caused by forces generated from a severe storm's wind, waves, and low atmospheric pressure. Storm surge is extremely dangerous, because it is capable of flooding large coastal areas. Extreme flooding can occur in coastal areas particularly when storm surge coincides with normal high tide, resulting in storm tides reaching up to 20 feet or more in some cases. Along the coast, storm surge is often the greatest threat to life and property from a hurricane. The Tropical cyclone Hazard Profile contains greater detail regarding storm surge.

A study conducted from 1970 to 1999 by the National Hurricane Center found that freshwater flooding accounted for more than half (59 percent) of the tropical cyclone deaths in the United States. FEMA estimates that about 41 percent of Florida is flood prone, which is the highest percentage of all 50 states. Because of the potential for flood damage, Florida has the most flood insurance policies required by the National Flood Insurance Program than any other state.

Once a river reaches flood stage, the flood severity categories used by the NWS include minor flooding, moderate flooding, and major flooding. Each category has a definition based on property damage and public threat. The following are the recognized measures of the extent of flooding:

**Minor Flooding:** Minimal or no property damage, but possibly some public threat or inconvenience.

**Moderate Flooding:** Some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations are necessary.

**Major Flooding:** Extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.

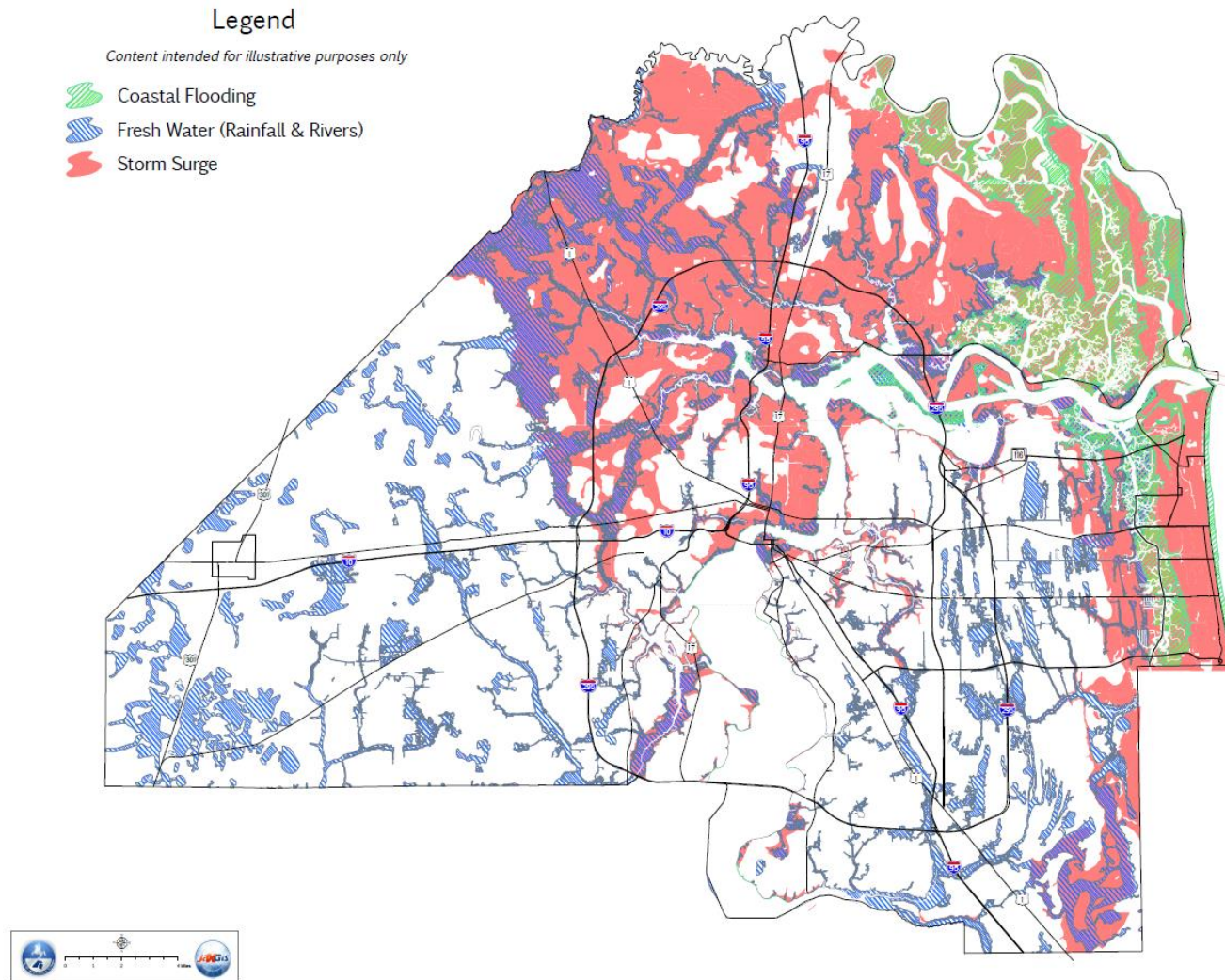
### Geographic Areas Affected by Flooding

The City of Jacksonville has more than 120,000 in population living within the 100-year flood zones and another 31,000 living in the 500-year floodplain (*Source: Hurricane Evacuation Study, Vol. 6-4, pg. 9*). The majority of these properties are adjacent to the St. Johns River, creeks and/or storm water retention facilities that developers describe as lakes or other water bodies. Nearly every major water basin in the county is lined with waterfront development. A large number of properties that are vulnerable to flooding are along both sides of the Intracoastal Waterway and the three Beaches Communities. FEMA has identified more than 20 residential properties as Severe Repetitive Loss, which is defined in common terms as four (4) or more incidents of damage resulting in at least \$5,000 worth of damage for each claim, or two (2) claims exceeding the value of the insured structure. The demand for waterfront access development is high, leaving the most logical course of mitigation action being strict enforcement of construction standards for building in such areas with elevated finished floor elevations and elevation of the foundation a minimum of 12 inches above Base Flood Elevation (BFE), according to the City of Jacksonville freeboard requirement, to minimize or eliminate damage due to flooding. In contrast with the Beaches Communities, the City of Jacksonville has areas that are low-lying with poor drainage that are susceptible to urban or neighborhood localized flooding caused by heavy rain. **Figure 44** depicts areas that are prone to fresh water flooding, flooding from storm surge, and coastal flooding.

Rains from hurricanes rank third in the order of a hurricane's destructive force. During the average 24-hour period that it normally takes a hurricane to pass over an area, an average rainfall of between 5 and 10 inches may occur. Normally, this happens concurrently with the arrival of gale force winds. However, in Florida, there have been hurricane-related rainfalls ranging from 12 to 20 inches.

The greatest concentration of repetitive loss properties historically were located along a single body of water called Wills Branch Creek. A long awaited drainage improvement project under the U.S. Army Corps of Engineers was completed in 2001 to resolve flooding issues. The City of Jacksonville is now responsible for ongoing dredging of the creek to curtail this type of flooding vulnerability. Several flood prone homes along Wills Branch were spared serious flooding damage during Tropical Storm Fay in 2008 due to the dredging project immediately preceding the storm. The remaining flood prone properties will benefit from improved maintenance of existing drainage improvements. The City is sustaining a long-term mitigation strategy that consists of acquisition and demolition of structures in the area through voluntary residential participation. To date, over a dozen homes adjacent to the creek have been acquired and returned to open space.

**Figure 44: Flood Prone Areas in Duval County**



*Source: City of Jacksonville Emergency Preparedness Division, NOAA Slosh Modeling, FEMA FIRM data 2018 (1% annual chance of flooding)*

### Historical Occurrences of Flooding

FEMA reports that there are 5,541 historical flood insurance claims paid since 1978, totaling \$200,168,173 paid in damages. The NWS Storm Events Database records at least 130 different flooding events, recorded in Figure 45 as one of the following categories: Coastal Flood, Flash Flood, Flood, and Storm Surge.

**Figure 45: Storm Events Database for Flooding**

<b>Storm Events Database</b>				
<b>Search Results for Duval County, Florida</b>				
<b>Event Types: Coastal Flood (C) Flash Flood (FL), Flood (F), Storm Surge (S)</b>				
C: 25 events were reported between 09/01/1950 and 09/30/2019 (25232 days)				
FL: 40 events were reported between 09/01/1950 and 09/30/2019 (25232 days)				
F: 63 events were reported between 09/01/1950 and 09/30/2019 (25232 days)				
S: 2 events were reported between 09/01/1950 and 09/30/2019 (25232 days)				
<b>Summary Info:</b>				
	<b>C</b>	<b>FL</b>	<b>F</b>	<b>S</b>
Number of County/Zone areas affected:	2	1	2	1
Number of Days with Event:	21	30	52	2
Number of Days with Event and Death:	0	0	0	0
Number of Days with Event and Death or Injury:	0	0	0	0
Number of Days with Event and Property Damage:	0	15	13	0
Number of Days with Event and Crop Damage:	0	0	1	0
Number of Event Types reported:	1	1	1	1

*Source: National Weather Service Storm Events Database, Accessed 12/20/2019*

### Probability of Future Occurrences of Flooding

Based upon historical observations, minor flooding is all but certain on a yearly basis within many parts of Duval County. Floods that present a danger to life or property are rarer, and may occur during a severe storm or in conjunction with a tropical cyclone event. FEMA provides a standard methodology to determine the probability of flooding impacts for purposes of determining flood insurance premiums through the National Flood Insurance Program. Their product, known as the Flood Insurance Rate Map, depicts a probabilistic representation of flood risk on an annual basis across all of the United States. Two types of flood events, known as the 100 year flood (there is a 1% chance annually to observe flooding of this magnitude) and the 500 year flood (there is a 0.2% chance annually to observe flooding of this magnitude), are represented and used as the benchmark to assign flood insurance premium rates. See Figure 46: 100-Year Floodplain Map for a depiction of the flood zones within Duval County.

### Flooding Impact Analysis

Impacts from flooding, including, but not limited to, loss of life and property, injuries related to drowning and electrocution, interruption of life activities, incapacitate vehicles by rising water, increase commute and/or evacuation clearance times due to inaccessible roads, and agricultural and economic disruption and loss. Floodwaters present an additional hazard as a public health problem when waters inundate

drinking water facilities, chemical and waste storage facilities, wastewater treatment facilities, and solid waste disposal sites.

The flood hazard associated with storm surge and wind-driven water emanating from a Category 1 or Category 2 hurricane can destroy or heavily damage beachfront homes and commercial establishments, piers, seawalls, boardwalks, etc. Storm surge and wind from Category 3 or higher storms are expected to cause massive destruction on coastal barrier islands, particularly in coastal municipalities including the cities of Atlantic Beach, Jacksonville Beach, Neptune Beach, and communities close to the St. John's River and its tributaries. In addition, the Mayport Naval Air Station is expected to sustain significant damages.

Of particular concern within Duval County's population are those with special needs and limited resources for post-disaster recovery due to age, disability, poverty level, and language spoken other than English.

**Table 31: Social Vulnerabilities Demographics**

Social Vulnerability Category	% of Population	Population (2019)
Over 65 years old	13	118,566
Under 5 years old	6.8	61,883
Language other than English spoke at home	13.9	126,774
Disabled	9.8	89,380
Poverty Level	16	145,927

*Source: United States Census Bureau Table Survey/Program: 2017 American Community Survey 5-Year Estimates*

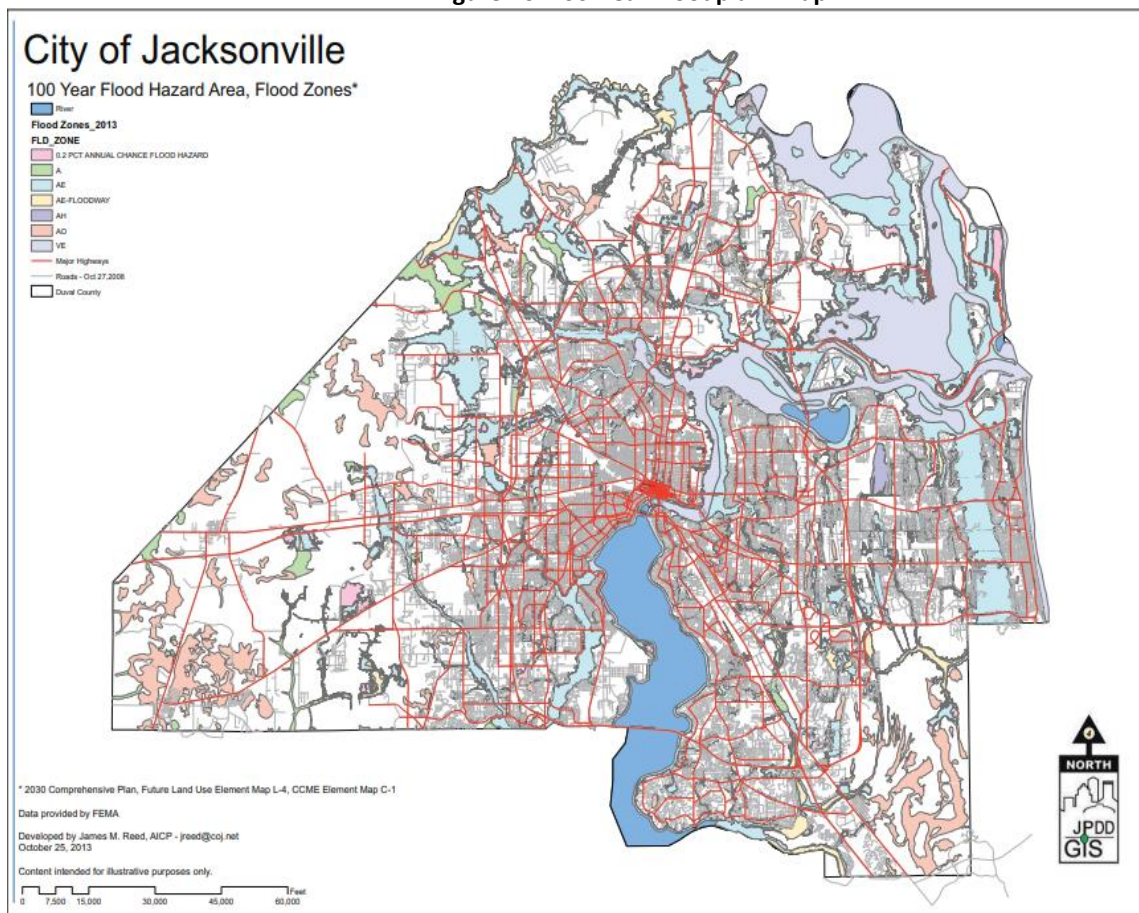
Socially vulnerable demographics are accounted for along with Jacksonville's flood hazard zones for transportation analysis to support evacuation clearance times. There is added risk to isolated populations, even in elevated areas of Jacksonville, due to flooded out and destroyed roads which would prevent emergency service and utility access to residents. These considerations indicate a much larger area of impact which will require more extensive evacuation clearance times.

Also of particular import, is the percentage of vulnerable population exposed to the flood hazard by living in housing built within the 100-year and 500-year floodplain before the FEMA flood maps were drawn to quantify this hazard. In addition, inland communities with residents who live in low-lying or flood-prone areas, mobile or manufactured housing, and structures built to older, less robust building code standards, are also vulnerable to the storm surge derived from hurricanes and tropical storms. According to the Northeast Florida Regional Council, manufactured homes make up 11,013 units out of 329,778 units, or 3.33 percent of the City of Jacksonville housing.

The following series of maps depict the 100-year floodplain and the major drainage basins in the City of Jacksonville to highlight the probability of flood impact upon all inhabitants. The Coastal High Hazard Area (CHHA) is outlined, with a description of the Legislative developments within the past decade to better define the CHHA. It is adopted in the COJ Comprehensive Plan.

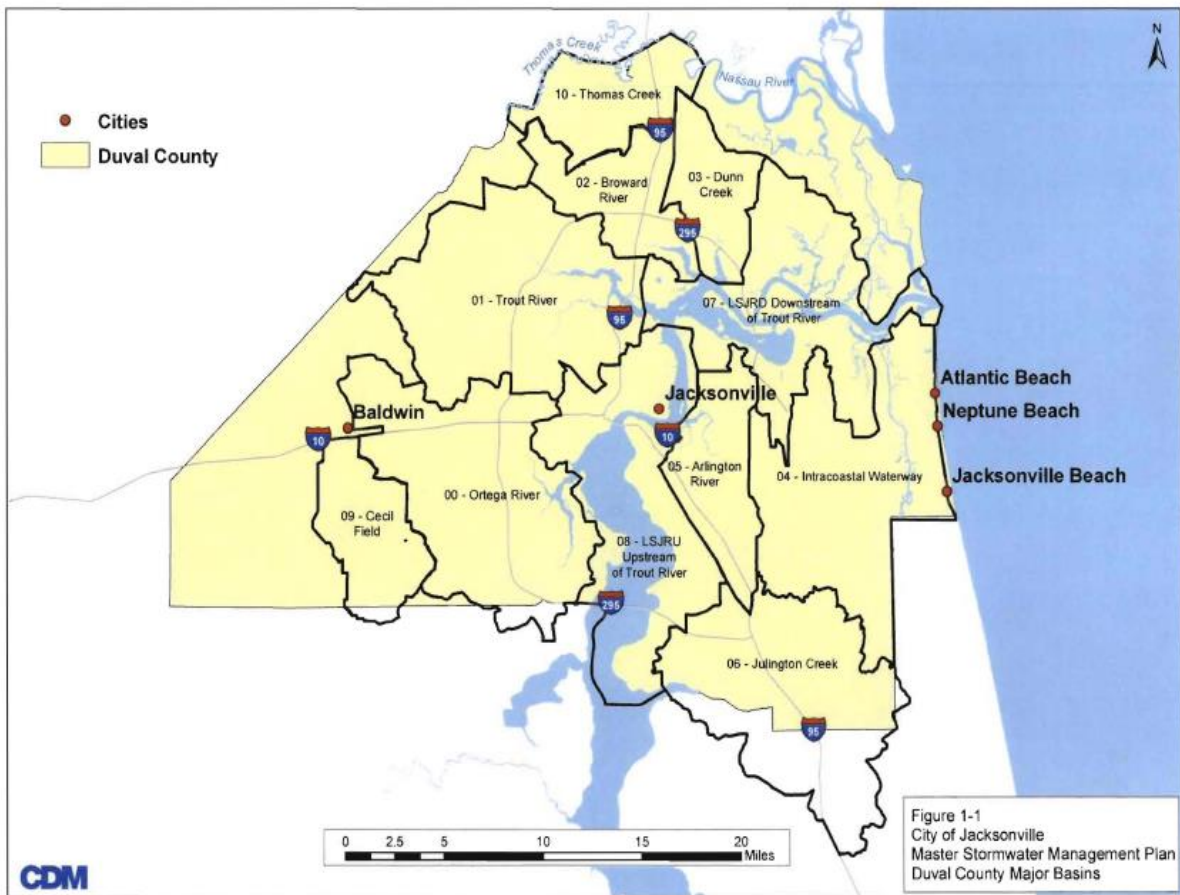


Figure 46: 100-Year Floodplain Map



Source: City of Jacksonville Comprehensive Plan, Future Land Use Element, Updated June 2018

**Figure 47: Duval County Major Drainage Basins**

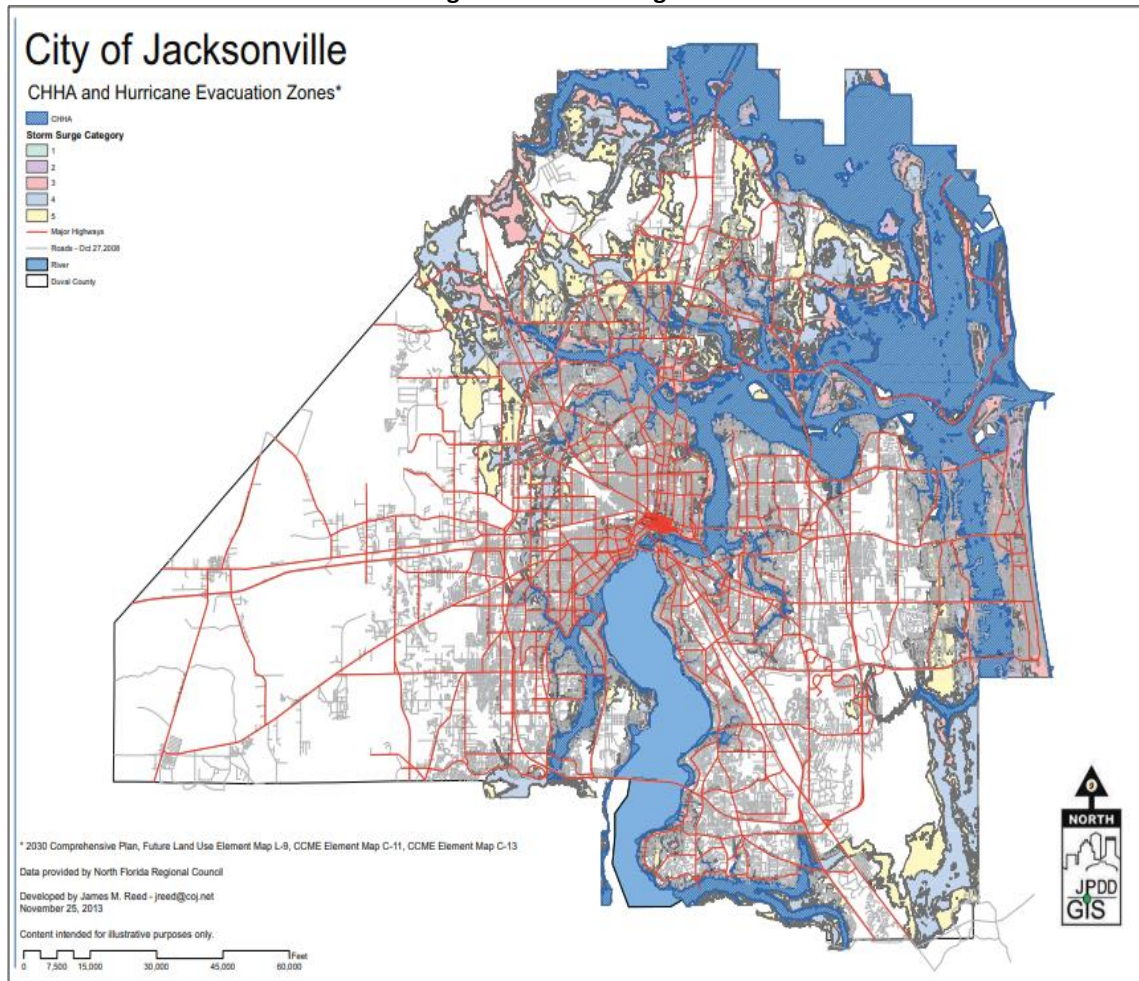


Source: City of Jacksonville Planning and Development Department, *Master Stormwater Management Plan*, 2014

Florida House Bill 1359, enacted in 2006, re-established the definition of the Coastal High Hazard Area (CHHA) to refer to 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" (Source: *City of Jacksonville Comprehensive Plan, Conservation Coastal Management Element, Map C-18, pg. 74*).



Figure 48: Coastal High Hazard Areas



Source: City of Jacksonville Comprehensive Plan, Future Land Use Element, Updated June 2018

Some general impacts that may occur due flooding are as follows:

Public

- Injury/Death
  - Drowning
  - Vehicle accidents
  - Extended wait for emergency response
  - Become stranded on rooftop, or trapped inside building or car
  - Exposure to hazardous materials or wastewater
- Traffic
  - Panic to evacuation
  - Accidents from driving through flooded roads – car washed away, water deeper than expected
- Damage to property
  - Mold infestation

- Need to replace property damaged, furniture, clothes, etc.
- Repairing damaged property
- Issues with damage to uninsured property

#### Responders

- Injury/Death
- Responding to calls during flooding, traversing flooded roads
- Drowning
- Dangerous rescue missions, from roofs, unstable buildings, stranded cars
- Exposure to hazardous materials or wastewater
- Power outage dangers, such as being electrocuted by live downed wires

#### Continuity of Operations (including continued delivery of services)

- Floodwaters may damage buildings, electrical systems, paperwork, etc. making continued operations difficult or impossible
- Floodwaters may hinder access to buildings (roads or sidewalks) preventing employees and the public from entering a building

#### Property, Facilities, Infrastructure

- Property damage
  - Floodwaters can damage property or carry heavy debris that could cause damage
- Infrastructure damage
  - If water overwhelms the drainage systems it can backup and cause damage to drains or even result in wastewater release

#### Environment

- Release of wastewater could damage environment
- Damage to habitat for plants and animals
- Inundation of agricultural areas could destroy crops
- Event generated debris impacting waterway navigation and submerged wetland habitats

#### Economic Condition

- Damage from floodwaters will likely require time and resources to repair, which causes loss of income on a potentially massive scale
- FEMA reports that almost 40 percent of small businesses never reopen their doors following a flood because just a few inches of water can cause tens of thousands of dollars in damage
- Floodwaters may hinder access to buildings, creating further lost profits

#### Public Confidence in Jurisdiction's Governance

- If flood response operations are not successful (leading to injury or death), public confidence in local governments will drop
- Victims of flooding rely upon the local government to coordinate resources

### Potential Effects of Climate Change on Flooding

Properties located along the banks of the St. Johns River and its tributaries are subject to river flooding, particularly flooding which is related to severe tropical storms and hurricanes which strike the coastline from the ocean at any angle ranging from 30 degrees to 150 degrees, relative to the coastline. Global climatological patterns give rise to periods of more frequent and severe hurricanes. As such, flooding due to hurricanes is expected to become more frequent and severe. Sea Level rise as a component of climate change will have drastic effects on flooding, and potentially lead to entire areas of Duval County becoming uninhabitable. For more information, see the Sea Level Rise Hazard Profile.

### Vulnerability Analysis and Loss Estimation

The emphasis placed on the danger of hurricanes overshadows the danger of tropical storms, which affect the City of Jacksonville more often than hurricanes. In 2008, Tropical Storm Fay resulted in an estimated \$50 million in damages to public infrastructure [Source: EPD After Action report], an estimated \$100 million in business disruption [First Coast Manufactures Council], and a presidential disaster declaration [FEMA-1785-DR-FL], primarily from flood and wind exposure. The Tropical Storm Debby declared disaster of 2012 [FEMA-4068-DR-FL] generated another \$1.9 million in debris management and public assistance claims (Source: Florida Public Assistance records, [www.floridapa.org](http://www.floridapa.org), 2015). However, hurricanes are still extremely costly when they do hit, even indirectly. In 2017, Hurricane Irma resulted in widespread flooding throughout the county due to storm surge, coastal flooding, and freshwater flooding from rainfall. Based on a report by the Florida Office of Insurance Regulation, as of November 14, 2018, Irma resulted in 37,279 insurance claims in Duval County. Less than one percent of those claims were for private flood (0.18%).

The City of Jacksonville has more than \$3.5 million dollars worth of residential property within the 100-year flood zones (Source: JPPD). Countywide, FEMA reports that there are currently over 36,000 flood insurance policies in force, covering \$10.6 million dollars worth of property (Source: FEMA NFIP Insurance Report, Dec. 2019). By far the majority of these properties are river and creek front properties. Nearly every major water basin in the county is improved with waterfront development. A large number of properties that are vulnerable to flooding are along both sides of the Intracoastal Waterway and the three beach communities. FEMA has identified more than 20 residential properties as Severe Repetitive Loss, which is defined as 4 or more incidents of damage resulting in at least \$5,000 worth of damage for each claim. The demand for this type development is great, leaving the most logical course of mitigation action being strict enforcement of construction standards for building in such areas with elevated finish floor elevations adequate to minimize or eliminate damage due to flooding. By far the greatest number of repetitive loss properties is along a single body of water called Wills Branch Creek. The City of Jacksonville is responsible for ongoing dredging and maintenance of the creek to curtail flooding vulnerability.

**Figure 49: Flood Insurance Detail Reports, Duval County**

<b>Federal Emergency Management Agency Disaster Report - FLORIDA Flood Insurance - Detail</b>									
CID	Community	CRS Class Rating	Policies	Insurance In Force	Total Paid Losses	Total Paid Amount	Repetitive Loss Buildings	Repetitive Loss Payment	Target Rep. Loss Buildings
<b>** DUVAL COUNTY **</b>									
120075B	ATLANTIC BEACH, CITY OF	7	2,735	847,932,800	213	1,933,601	5	151,779	0
120076#	BALDWIN, TOWN OF		9	2,880,000	1	59,460	0	0	0
120078B	JACKSONVILLE BEACH, CITY OF	6	6,542	1,789,949,000	620	15,144,237	40	4,337,317	3
120077B	JACKSONVILLE, CITY OF	6	25,347	7,559,235,400	4,606	182,615,295	474	56,498,547	61
120079B	NEPTUNE BEACH, CITY OF	7	1,398	472,148,100	101	415,580	2	47,621	0
<b>County Total :</b>			<b>36,031</b>	<b>10,672,145,300</b>	<b>5,541</b>	<b>200,168,173</b>	<b>521</b>	<b>61,035,263</b>	<b>64</b>
<b>Grand Total :</b>			<b>36,031</b>	<b>10,672,145,300</b>	<b>5,541</b>	<b>200,168,173</b>	<b>521</b>	<b>61,035,263</b>	<b>64</b>

Source: FEMA NFIP Office of Floodplain Management, December 2019; Source:

<https://nfipservices.floodsmart.gov/reports/FinancialLossesbyState.xlsx>, & Source: FEMA Policy & Claim Statistics for Flood Insurance, <https://www.fema.gov/policy-claim-statistics-flood-insurance>

Several flood prone homes along Wills Branch were spared serious flooding damage during Tropical Storm Fay in 2008 due to the successful dredging project. The remaining flood prone properties have benefitted from the maintenance of existing drainage improvements and the City's ongoing initiative to educate flood-insured property owners about alternatives to mitigate the flood hazard attendant to their property. Over thirty properties in Jacksonville have received assistance through the NFIP and FEMA repetitive loss grant programs for a variety of mitigation alternatives, such as, acquisition and demolition of structures, standard elevation, minor flood control, hardening of critical infrastructure, mitigation reconstruction, and code-plus construction. The probability of future flood damage to jurisdictions within the City of Jacksonville is high, based on flood event probability summarized below.

## Overall Vulnerability

Flooding					Overall Vulnerability
Overview					High
Flooding is any high flow, overflow, or inundation by water which causes or threatens damage. All of the City of Jacksonville is vulnerable to damage from wind driven rain and flooding from rain, as well as riverine flooding, storm surge, and flooding attributable to tropical storms and hurricanes. The most common flooding in the city occurs during the rainy season from June to November. Areas of the county have experienced flooding from tributaries and creeks of the St. Johns River. Current statistics contribute concerns for flooding in low-lying coastal and riverine areas driven by climate-linked sea level rise. Impacts from flooding, including, but not limited to, loss of life and property, injuries related to drowning and electrocution, interruption of life activities, incapacitate vehicles by rising water, increased commute and/or evacuation clearance times due to inaccessible roads, agricultural loss, and economic disruption.					
Frequency	Probability	Potential Magnitude			
Very Likely	Very Likely	Injuries/Deaths	Infrastructure	Environment	
		Low	Minimal	Minimal	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30.

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be High, with a score of 19.

## Infectious Disease (Human & Animal) Hazard Profile

### Infectious Disease (Human & Animal) Description

Infectious disease transmission is disease-specific – it may be food or waterborne, it may be in the air or in the ground, and it may be spread through close human-to-human or animal-to-human contact. Diseases may be naturally occurring or they may be intentionally released. Diseases spread through person-to-person contact have the potential to directly impact Jacksonville due to the existing transportation infrastructure.

The City of Jacksonville has the potential to be effected by outbreaks of diseases in animals and humans. Humans and animals can become ill and possibly die from Viral mosquito-borne Diseases: eastern equine encephalomyelitis (EEE), western equine encephalomyelitis (WEE), Saint Louis encephalitis (SLE); Bacterial Disease: leptospirosis, anthrax, botulism; and Parasitic Disease: cryptosporidiosis, giardiasis and hoof rot.

Natural disasters can exemplify naturally occurring weather that is favorable for virial, bacterial, and parasitic diseases. One possible outcome of natural disasters is alteration of ecosystems that harbor pathogens for infectious diseases of animals and humans, as well as vectors of these pathogens.

Ruminants and pigs are the most commonly disease affected food production animals. Rodents are known to spread as many as 35 different diseases to humans worldwide. These diseases can be spread through direct contact with rodents or their feces, urine, or saliva, or through rodent bites. Being bitten by ticks mites, or fleas that have been feeding on sick rodents can also spread diseases. The extent of the disease occurrence is measured by the number of “reported cases” and “confirmed cases.”

### Geographic Areas Affected by Infectious Disease (Human & Animal)

The primary habitats for EEE viruses are swamps located in Florida. Viral mosquito born disease outbreaks usually are observed during periods of hot, rainy weather; these conditions are ideal for expansion of mosquito populations. Endemic EEE sources are lowlands, agricultural water, domestic water, industrial water, municipal water, natural streams/rivers and lakes, and recreational waters. In humans, SLE is the leading cause of epidemic flaviviral encephalitis in the south east United States.

Communicable diseases associated with natural disasters are: water-related communicable diseases, diseases associated with crowding, and vector borne diseases. The availability of safe water and sanitation facilities, the degree of crowding, the underlying health status of the population, and the availability of healthcare services all interact within the context of the local disease ecology to influence the risk for communicable diseases and death in the affected population.

Ticks are common in The City of Jacksonville, specifically rural wooded areas or areas with tall standing grass. The most common diseases that come from species of ticks in Florida are ehrlichiosis, Lyme disease, Rocky Mountain spotted fever and other spotted fever illnesses. Symptoms of tick-borne diseases usually start within two weeks of being bitten. Disease-specific symptoms such as the bull’s eye rash can be seen in some cases; most common symptoms for tick-borne diseases are fever, headache, and muscle pain.

### Historical Occurrences of Infectious Disease (Human & Animal)

Some diseases may spread globally in waves and have historically affected Duval County, with an incident lasting up to a year or more. In this century, the following global diseases have been of concern: H1N1 (Influenza), H5N1 (Influenza), Seasonal Influenza, SARS (Severe Acute Respiratory Syndrome), MERS-CoV (Middle East Respiratory Syndrome Coronavirus), Ebola Hemorrhagic Fever, and EV-D68 (Enterovirus D68). A Tuberculosis outbreak was observed within Duval County in 2012.

### Probability of Future Occurrences of Infectious Disease (Human & Animal)

All diseases, and strains of diseases, have different morbidity and mortality rates. The probability of less severe infectious diseases such as the Influenza Virus affecting Duval County is near 100%, as this virus is observed and studied each year within the County (FDOH Influenza Report, Annual Reports 2015-2019). Diseases transmitted by animals (including insects) can appear seasonally and are tied in many instances to proliferation of certain species, for instance the populations of *Aedes Aegypti* and *Aedes Albopictus* species of mosquito were observed in 2018 as these particular species are a vector for the Zika Virus (Source: Center for Disease Control, <https://www.cdc.gov/zika/prevention/transmission-methods.html>).

Less common and mildly severe diseases such as Tuberculosis appear on a scale of decades, with the most recent outbreak occurring in 2012. Within Duval County, there have been no other notable widespread outbreaks in recent history. Despite this, due to increasingly globalized patterns of commerce and the presence of an international airport within the County, transmissible diseases in humans or animals may be transported into the county from travelers or through imported goods.

### Infectious Disease (Human & Animal) Impact Analysis

Forecasted impacts are dependent upon the threat, risk groups, transmission method(s), incubation periods, and treatment protocols and availability. Impacts from outbreaks can cause economic and social disruption due to travel bans, closing of schools and businesses, and cancellations of events. Impacts will affect communities, residents, and businesses. Some general impacts that might be observed are as follows:

#### Public

- Fear throughout the affected community
- Direct physical harm caused by symptoms of infectious diseases
- Unsanitary conditions may result from widespread illness

#### Responders

- Harm from symptoms of disease if there is contact with infected patients or animals
- Reduced quality of care for patients

#### Continuity of Operations (including continued delivery of services)

- Widespread outbreaks may require workers to avoid places of work or the general public, creating disruption of services



- Public transportation may become inaccessible due to quarantine or voluntary avoidance

#### Property, Facilities, Infrastructure

- Physical property will not likely be directly affected
- Healthcare facilities may become understaffed and require additional space, or “field” operations in cases of extreme outbreaks

#### Environment

- Animals may become affected by certain diseases to which they are susceptible
- Large scale die-offs of livestock or wild animals may create a biological hazard

#### Economic Condition

- Tourism would be directly affected by disease outbreaks due to avoidance or quarantine
- Livestock and agriculture may suffer losses

#### Public Confidence in Jurisdiction’s Governance

- Public confidence will suffer if the local government cannot adequately provide guidance and control of the spread of outbreak within reason
- If healthcare facilities are understaffed or crowded, the public may look to the local government to provide resources

#### Potential Effects of Climate Change on Infectious Disease (Human & Animal)

Certain impacts of climate change, such as mass migration from newly uninhabitable areas, are likely to create environments conducive for the spread of disease. Hotter temperatures and wet conditions are also conducive for the proliferation of many insect species, including disease vectors such as mosquitos.

#### Vulnerability Analysis and Loss Estimation

The Florida Department of Health receives reports of influenza associated pediatric deaths each season. Most deaths are reported in unvaccinated children. Influenza vaccination has been shown to reduce a child’s likelihood of dying from influenza by up to 60% (Source: Center for Disease Control, <https://www.cdc.gov/flu/vaccines-work/effectivenessqa.htm>).

According to the Department of Health, Influenza is five times more likely to cause severe illness in pregnant women (even those who are generally healthy) compared to women who are not pregnant. Pregnant women with certain underlying medical conditions (such as asthma or heart disease) are at even great risk for severe complications from influenza (Source: FDOH 2019).

Adults ≥65 years old are at higher risk for severe complications from influenza infection, including hospitalization and death. While influenza seasons vary in intensity, adults in this age group bear the greatest burden of severe influenza disease. In Florida, an average of 80 % of seasonal pneumonia and influenza deaths occurred in adults aged ≥65 years over the last five influenza seasons (2013-2018).



Overall Vulnerability: Human and Animal Disease

Human and Animal Disease					Overall Vulnerability
Overview					High
Infectious disease transmission is disease-specific – it may be food or waterborne, it may be in the air or in the ground, and it may be spread through close human-to-human or animal-to-human contact. Diseases may be naturally occurring or they may be intentionally released. Diseases spread through person-to-person contact have the potential to directly impact Jacksonville due to the existing transportation infrastructure.					
Frequency	Probability	Potential Magnitude			
Very Likely	Very Likely	Injuries/Deaths	Infrastructure	Environment	
		High	Low	Low	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30.

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be High, with a score of 19.

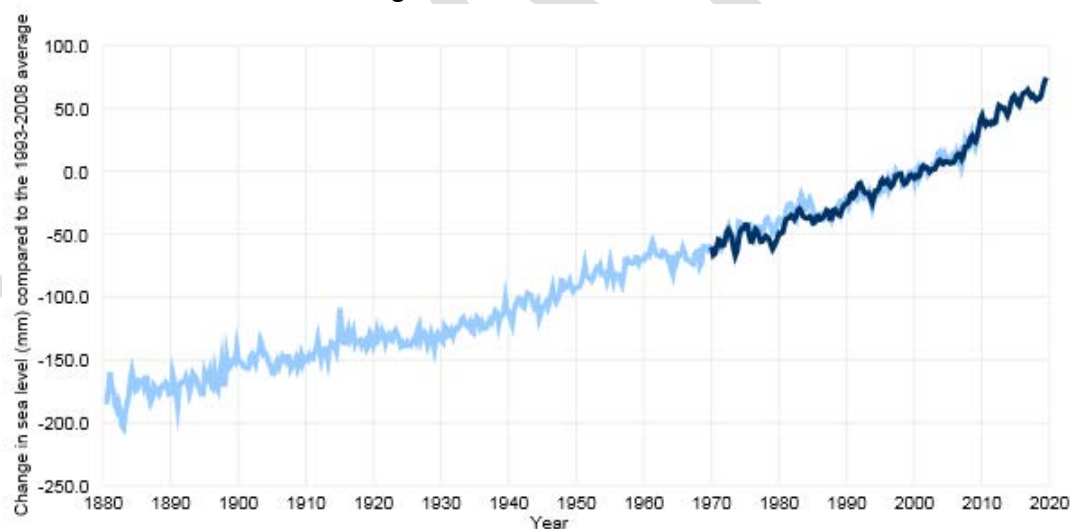
## Sea Level Rise Hazard Profile

### Sea Level Rise Description

Just as the surface of the Earth is not flat, the surface of the oceans is also not flat, and this sea surface is not changing at the same rate globally. According to the National Oceanic and Atmospheric Administration (NOAA), Global Sea Level refers to the average height of all the Earth's oceans. Global Sea Level Rise refers to the increase currently observed in the average Global Sea Level Trend (Source: <https://tidesandcurrents.noaa.gov/sltrends/faq.shtml>).

The extent of sea level rise is measured in “feet,” or “feet by X year.” According to NOAA Climate.gov, Sea level has risen 8–9 inches (21–24 centimeters) since 1880. In 2018, global sea level was 3.2 inches (81 mm) above the 1993 average—the highest annual average in the satellite record (1993-present). The rate of sea level rise is accelerating: it has more than doubled from 0.06 inches (1.4 millimeters) per year throughout most of the twentieth century to 0.14 inches (3.6 millimeters) per year from 2006–2015. Even if the world follows a low greenhouse gas pathway, global sea level will likely rise at least 12 inches (0.3 meters) above 2000 levels by 2100. If humans follow a pathway with high emissions, a worst-case scenario of as much as 8.2 feet (2.5 meters) above 2000 levels by 2100 cannot be ruled out. (Source: NOAA, <https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level>)

Figure 50: Sea level since 1880



Source: NOAA, *Climate Change: Global Sea Level*, Author: [Rebecca Lindsey](#), November 19, 2019

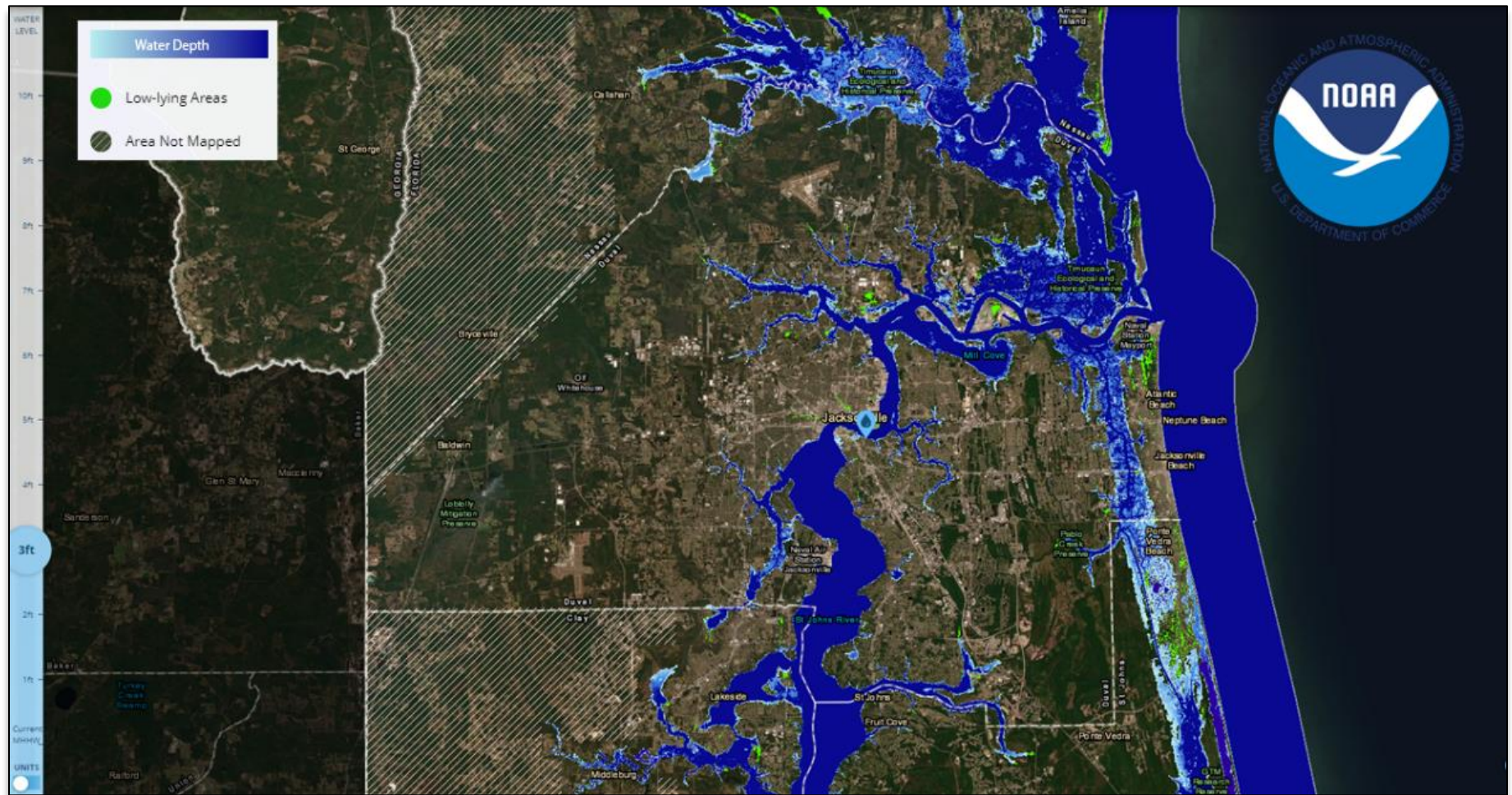
### Geographic Areas Affected by Sea Level Rise

The effects of sea level rise are able to be predicted and displayed through the use of computer modeling and GIS software. NOAA's Climate Change Viewer tool was utilized to produce several maps depicting multiple scenarios of sea level rise, between the baseline (current levels, assuming no rise in sea levels) and ten feet of sea level rise.

This map displays the coastal region of Jacksonville, Florida, highlighting water depths and low-lying areas. The legend indicates that green areas represent low-lying regions, while the blue areas represent water depths ranging from 0 to 10 feet. The map includes labels for various locations such as Jacksonville, Duval County, St. Johns River, and several parks and preserves. The map is overlaid with a grid showing latitude and longitude coordinates.



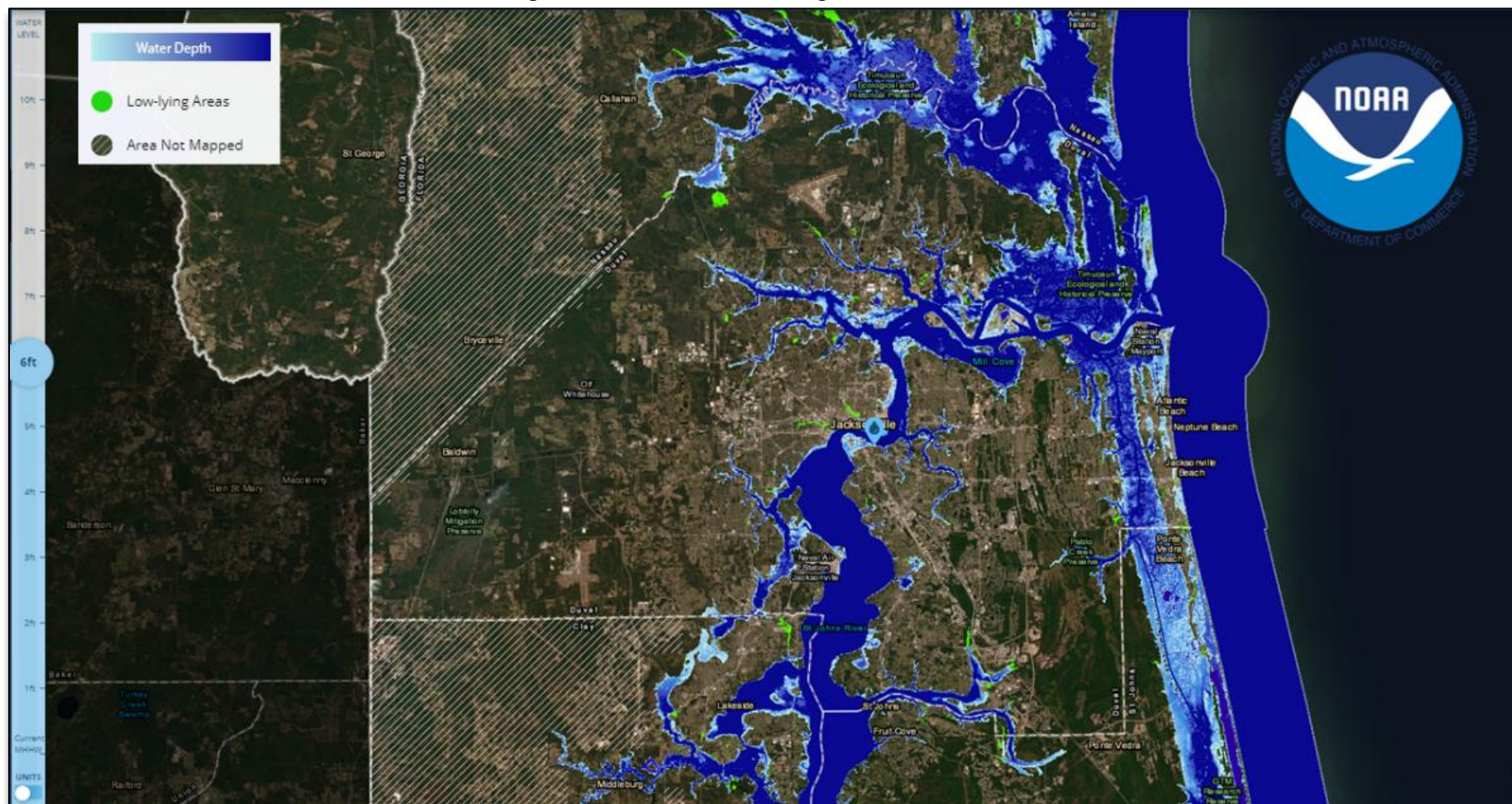
Figure 52: Sea Level Rise Modeling, Three Foot Prediction



Source: NOAA Coastal Flood Exposure Mapper, NOAA Office for Coastal Management. Retrieved August 2, 2019.



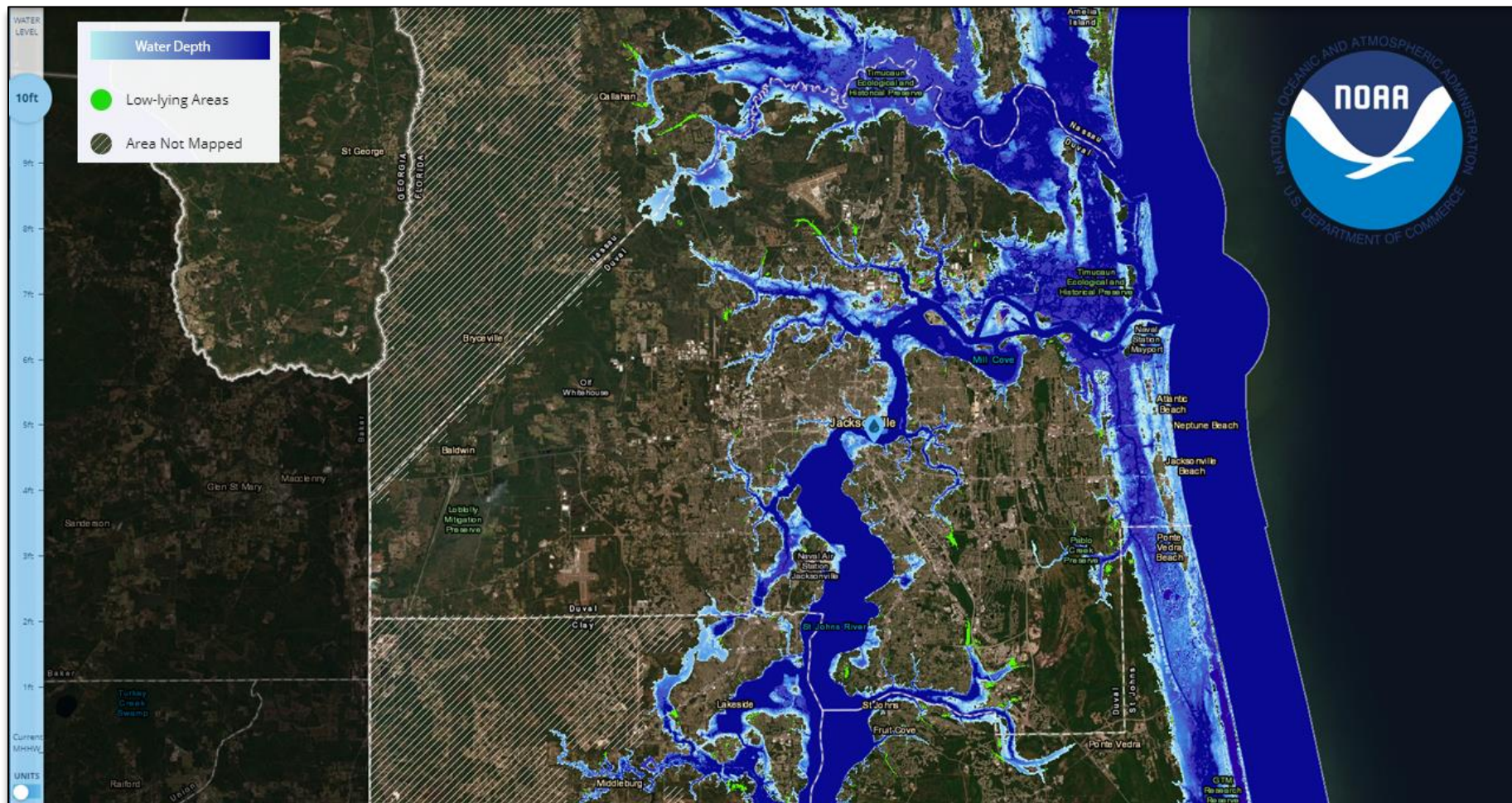
Figure 53: Sea Level Rise Modeling, Six Foot Prediction



Source: NOAA Coastal Flood Exposure Mapper, NOAA Office for Coastal Management. Retrieved August 2, 2019.



Figure 54: Sea Level Rise Modeling, Ten Foot Prediction



Source: NOAA Coastal Flood Exposure Mapper, NOAA Office for Coastal Management. Retrieved August 2, 2019.

### Historical Occurrences of Sea Level Rise

According to the National Oceanic and Atmospheric Administration (NOAA), the major causes of global sea level rise are due to two factors: Ice Melt and Thermal Expansion. Ice Melt is the melting of glaciers and continental ice masses, such as the Greenland ice sheet, which are linked to changes in atmospheric temperature, can contribute significant amounts of freshwater input to the Earth's oceans. Thermal Expansion, a steady increase in global atmospheric temperature creates an expansion of saline sea water (i.e., salt water) molecules (called thermal expansion), thereby increasing ocean volume. The oceans are absorbing more than 90 percent of the increased atmospheric heat associated with emissions from human activity. According to NOAA, sea level has risen 8–9 inches (21–24 centimeters) since 1880.

With continued ocean and atmospheric warming, sea levels will likely rise for many centuries at rates higher than that of the current century. Higher sea levels mean that deadly and destructive storm surges push farther inland than they once did, which also means more frequent nuisance flooding. Disruptive and expensive, nuisance flooding is estimated to be from 300 percent to 900 percent more frequent within U.S. coastal communities than it was just 50 years ago. According to the Fourth National Climate Assessment (2017), an intermediate sea level rise scenario projects 3.8 feet of rise in the City of Jacksonville by 2100. The extreme scenario results projects 10.8 feet of rise in the City of Jacksonville by 2100.

### Probability of Future Occurrences of Sea Level Rise

With continued ocean and atmospheric warming, sea levels will likely rise for many centuries at rates higher than that of the current century. Higher sea levels mean that deadly and destructive storm surges push farther inland than they once did, which also means more frequent nuisance flooding. Disruptive and expensive, nuisance flooding is estimated to be from 300 percent to 900 percent more frequent within U.S. coastal communities than it was just 50 years ago. According to the Fourth National Climate Assessment (2017), an intermediate sea level rise scenario projects 3.8 feet of rise in the City of Jacksonville by 2100. The extreme scenario results projects 10.8 feet of rise in the City of Jacksonville by 2100.

The biggest hazard associated with sea level rise is the increased risk for flooding. Climate Central has estimated risk by combining local sea level rise projections with historic flood statistics from the NOAA water level station at Fernandina Beach, FL, 26 miles from the center of Jacksonville. Extreme values analysis indicates that the "100-year" flood height is 3.1 feet above local Mean Higher High Water (high tide line). According to NOAA's Office for Coastal Management, many predictive models do not take the increasing population numbers in low-lying coastal areas into consideration, which means projected risk could be higher than what is often reported.

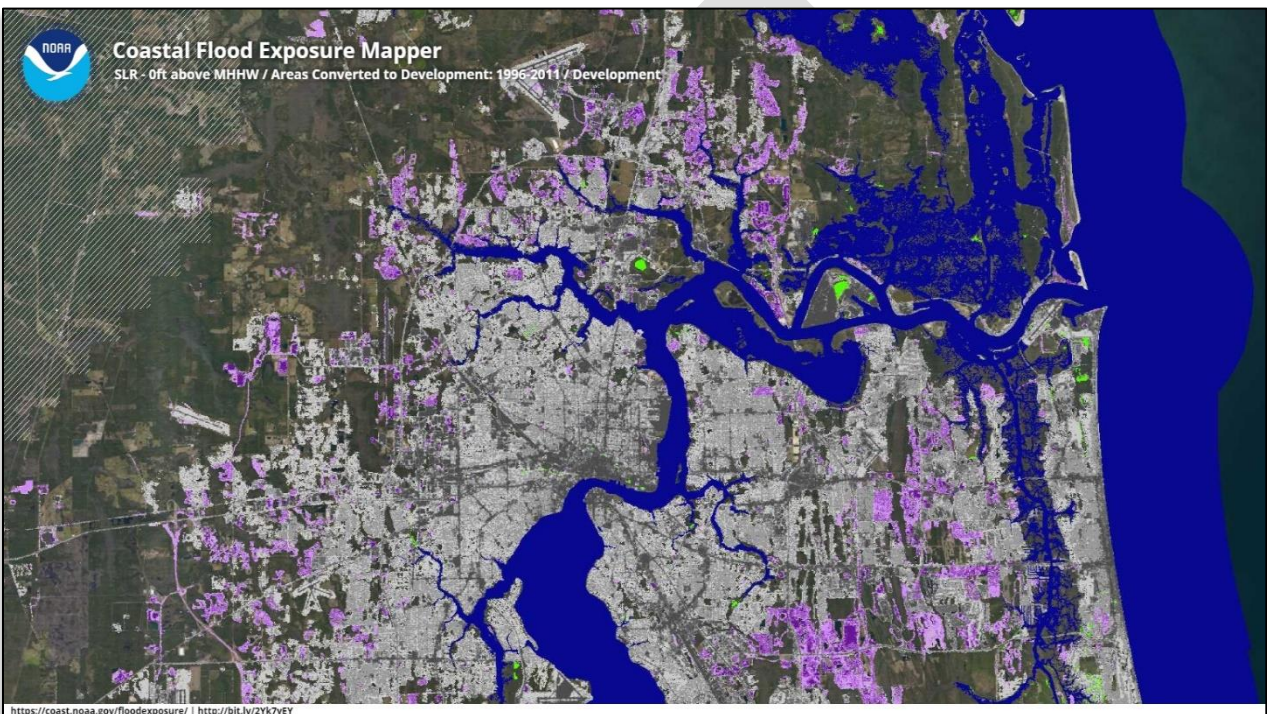
Analysis translates this to a 2% multi-year risk of at least one flood exceeding 4 feet from 2019 to 2030, a 21% risk by from 2019 to midcentury, and a 100% risk by 2100. Under the Assessment's highest scenario, these chances increase to 3%, 71%, and 100%, respectively, and a 100% risk of at least one flood exceeding 7 feet by the end of the century. This analysis does not account for future erosion, marsh migration, coastal development, coastal defense, or other dynamic factors that may affect exposure.



### Sea Level Rise Impact Analysis

The National Oceanic and Atmospheric Administration Sea Level Rise Viewer v 3.0.0 tool allows for visualization of various inundation levels. Additionally, the NOAA Coastal Flood Exposure Mapper incorporates GIS data to illustrate the possible impacts of sea level rise on existing infrastructure, critical facilities, and vulnerable populations. Images captured from these visualization tools have been incorporated into the plan to give context to the preceding analysis and the figures estimated by Climate Central. Figure 55 illustrates the areas converted to development in Duval County and the current MHHW for context. Figure 56 illustrates the effects of various levels of water rise at a local landmark, the TIAA Bank Field.

**Figure 55: NOAA Coastal Flood Exposure Map: 0 ft. Rise in MHHW (Baseline)**



*Source: NOAA Coastal Flood Exposure Mapper, NOAA Office for Coastal Management. Retrieved August 2, 2019.*



**Figure 56: Sea Level Rise Impacts at TIAA Bank Field (Downtown Jacksonville)**



*Source: NOAA Coastal Flood Exposure Mapper, NOAA Office for Coastal Management. Retrieved August 2, 2019.*

Through computer modeling and GIS software, it is possible to predict what some general impacts of sea level rise in terms of existing populations and infrastructure. These predictions, available in Table 32: Sea Level Rise And Coastal Flood Exposure In Jacksonville, FL On Land Below 1-10 Ft, assume uniform rise and do not account for additional factors such as freshwater rainfall or storm surge, which would occur in addition to the increase in baseline sea level. Additionally, some general impacts may include the following:

**Public**

- May lose property
- May lose sandy beaches, dunes or mangroves, which could lead to storm surge flooding
- Sandy beaches may have to close

**Responders**

- No direct impacts expected
- Water rescues during flooding events may increase over time

**Continuity of Operations (including continued delivery of services)**

- Businesses, critical infrastructure, government buildings, etc. may have operations hindered if Sea Level Rise leads to damage to the structure
- Operations may be hindered if roads to the structures are damaged from Sea Level Rise
- Continuity of transportation network may be interrupted because of Sea Level Rise damage to roads

**Property, Facilities, Infrastructure**

- Structures may be damaged

**Environment**

- Coastal areas, marshes, mangroves, sandy beaches etc. may be severely damaged from Sea Level Rise which is a habitat for many species of plants and animals
- If large portions of coastal areas and dunes are covered over from Sea Level Rise the next storm could reach homes, businesses, roads, etc.

#### Economic Condition

- Closure or delay of businesses because of Sea Level Rise or water damage, leads to loss in revenue
- Crop damage or loss leads to decline in agricultural revenues

#### Public Confidence in Jurisdiction's Governance

- If damage from Sea Level Rise, such as damage to roads, is not quickly repaired, then the public may be frustrated with the jurisdiction's governance

#### Potential Effects of Climate Change on Sea Level Rise

Sea level rise and fall has occurred due to natural (chemical and geological processes). A relevant example discovered in the geologic record is the Western Interior Seaway (also called the North American Inland Sea), which was a large inland sea that existed during the mid- to late Cretaceous period approximately 100 million years ago. This waterway split the continent of North America into two landmasses and completely submerged the state of Florida; some saltwater from this seaway is still believed to be present in the Floridan Aquifer.

Current scientific consensus predicts that a warming atmosphere (caused in part by human activity), will lead to rising seawater levels in the extreme near future, in comparison to the ancient processes that have shaped the planet over millions of years. NOAA reports that The rate of sea level rise is accelerating: it has more than doubled from 0.06 inches (1.4 millimeters) per year throughout most of the twentieth century to 0.14 inches (3.6 millimeters) per year from 2006–2015 (Rebecca Lindsey, 2019; <https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level>). Most reports indicate that greenhouse gas emissions, specifically, lead to sea level rise on human timescales. NASA reports that in addition to carbon dioxide, short-lived compounds — greenhouse gases such as methane and chlorofluorocarbons, that linger in the atmosphere for just a year to a few decades — can cause sea levels to rise for hundreds of years after the pollutants have been cleared from the atmosphere (Source: Jennifer Chu, 2017; <https://climate.nasa.gov/news/2533/short-lived-greenhouse-gases-cause-centuries-of-sea-level-rise/>).

#### Vulnerability Analysis and Loss Estimation

Impacts of sea level rise would directly affect low lying land by coastal, intercostal, rivers, tributaries and marshes. As sea levels increase, some marshes may migrate into neighboring low-lying areas, while other sections of marsh will change type or be lost to open water. Further impacts will displace populations. Socially vulnerable populations are will be disproportionately affected. Migration will result in social and economic disruption from loss of business and residential real estate, roadways, and schools. Infrastructure and the natural environment may be destroyed or rendered unusable. Findings from Surging Seas (SurgingSeas.org), a project of Climate Central (climatecentral.org), are included in Table 32: Sea Level Rise And Coastal Flood Exposure In Duval County, FL On Land Below 1-10 Ft. These figures are provided for informational purposes only and are provided "AS-IS."

Table 32: Sea Level Rise And Coastal Flood Exposure In Duval County, FL On Land Below 1-10 Ft.

Elevation relative to local high tide line (Mean Higher High Water)											
Affected Populations and Infrastructure	Unit	< 1ft	< 2ft	< 3ft	< 4ft	< 5ft	< 6ft	< 7ft	< 8ft	< 9ft	< 10ft
BY TOTALS											
High social vulnerability population	Count	242	525	1,214	2,223	3,274	4,669	6,225	7,468	9,262	11,132
Medium social vulnerability population	Count	991	2,011	3,591	6,000	9,232	12,97	17,30	22,236	27,773	33,806
Low social vulnerability population	Count	3,034	5,069	8,016	12,19	17,29	22,34	26,92	31,885	37,232	42,773
Property value	\$Millio	794	1,409	2,362	3,791	5,516	7,334	9,064	10,740	12,481	14,272
Population	Count	4,267	7,604	12,82	20,42	29,80	39,98	50,45	61,589	74,267	87,710
Caucasian population	Count	2,866	5,083	8,676	13,93	20,46	27,41	34,14	41,276	49,362	58,042
Population of color	Count	1,502	2,697	4,420	6,917	9,962	13,39	17,33	21,567	26,418	31,455
African-American population	Count	11,91	2,182	3,618	5,692	8,205	11,07	14,43	17,995	22,086	26,280
Asian population	Count	165	279	441	682	989	1,316	1,641	2,023	2,455	2,941
Hispanic population	Count	336	537	823	1,248	1,779	2,338	2,906	3,538	4,245	5,031
Native American population	Count	89	142	215	314	430	554	686	8,40	1,015	1,200
Homes	Count	13,16	27,13	5,135	8,710	13,23	17,86	22,44	27,340	32,798	38,865
Hospitals	Count	0	0	0	0	0	1	4	7	8	8
Schools	Count	0	0	1	1	1	3	10	15	17	21
Colleges and Universities	Count	0	0	0	0	0	0	0	0	0	1
Libraries	Count	0	0	0	0	0	0	3	3	5	5
Museums	Count	0	0	0	0	0	1	1	2	2	3
Houses of worship	Count	0	0	2	4	10	15	16	28	38	43
Government buildings	Count	0	0	1	5	9	10	15	17	19	21
City Halls	Count	0	0	0	0	0	0	1	1	1	1
Roads	Miles	4	14	43	98	158	225	294	370	449	535
County roads	Miles	0	0	0	0	0	1	1	2	2	3
Federal roads	Miles	1	1	1	3	5	7	12	15	21	27
Local roads	Miles	3	12	38	84	138	196	256	323	392	465
Primary roads	Miles	0	1	1	1	1	2	3	5	8	13

Elevation relative to local high tide line (Mean Higher High Water)											
Affected Populations and Infrastructure	Unit	< 1ft	< 2ft	< 3ft	< 4ft	< 5ft	< 6ft	< 7ft	< 8ft	< 9ft	< 10ft
Secondary roads	Miles	1	2	4	13	19	27	35	43	50	58
State roads	Miles	1	1	3	11	15	21	25	30	35	40
Railroads	Miles	0	0	1	2	3	4	5	6	7	9
Mainline rail	Miles	0	0	0	0	1	1	1	1	1	1
Non-mainline rail	Miles	0	0	0	1	2	3	4	5	6	8
Intermodal freight terminals	Count	0	0	1	1	2	3	5	5	5	8
Airports	COT	0	0	0	0	0	0	0	0	0	1
Military airports	COT	0	0	0	0	0	0	0	0	0	1
Heliports	Count	2	2	3	3	3	4	5	5	6	7
Power plants	Count	0	0	0	0	0	1	1	2	2	2
Major power plants	Count	0	0	0	0	0	0	0	1	1	1
Minor power plants	Count	0	0	0	0	0	1	1	1	1	1
Utility power plants	Count	0	0	0	0	0	1	1	2	2	2
TV transmitter sites	Count	0	0	0	0	0	0	0	0	3	3
FM radio transmitter sites	Count	0	0	0	4	4	4	7	7	9	10
Brownfields	Count	0	0	0	2	2	2	3	4	5	9
EPA listed sites	Count	24	32	49	90	132	191	236	291	332	384
ACRES sites	Count	0	0	0	2	2	2	3	4	5	9
Biennial Reporters	Count	0	0	0	0	0	2	3	3	4	6
Superfund (CERCLIS) sites	Count	0	0	0	1	2	2	2	4	6	7
NPDES sites	Count	14	21	34	49	62	80	101	123	142	160
OIL sites	Count	0	0	0	1	4	5	7	8	8	8
OTAQREG sites	Count	0	0	0	0	0	0	0	1	1	1
RADINFO sites	Count	10	11	15	33	57	90	110	135	151	174
RMP sites	Count	0	1	1	2	2	5	5	7	7	7
SSTS sites	Count	0	0	0	1	1	1	1	1	1	3
TRI sites	Count	0	0	0	2	2	2	2	3	3	4

Elevation relative to local high tide line (Mean Higher High Water)											
Affected Populations and Infrastructure	Unit	< 1ft	< 2ft	< 3ft	< 4ft	< 5ft	< 6ft	< 7ft	< 8ft	< 9ft	< 10ft
TSCA sites	Count	0	0	0	0	0	1	1	1	1	1
Hazardous materials facilities	Count	0	1	1	6	9	14	16	19	19	22
Extreme hazmat facilities	Count	0	1	1	2	2	5	5	7	7	7
Oil facilities	Count	0	0	0	1	4	5	7	9	9	9
Pesticide facilities	Count	0	0	0	1	1	1	1	1	1	3
Hazardous waste sites	Count	10	11	15	34	59	92	112	139	157	181
Major hazwaste source sites	Count	0	0	0	0	1	2	2	3	3	3
Minor hazwaste source sites	Count	6	7	9	20	31	46	57	72	80	94
Unspecified hazardous waste sites	Count	4	4	6	13	25	40	49	57	65	74
Landfills	Count	0	0	0	0	0	0	0	1	1	1
Wastewater sites	Count	14	21	34	49	62	80	101	123	144	162
Major wastewater sites	Count	0	1	1	1	1	1	3	3	3	3
Nonmajor wastewater sites	Count	14	20	33	48	61	79	98	120	139	157
Sewage plants	Count	0	2	2	2	3	5	6	6	6	7
Land	Acres	7,728	11,77	16,23	21,08	26,37	32,04	38,01	44,150	50,559	57,484
Protected land	Acres	3,017	4,358	5,881	7,286	8,581	9,763	10,95	12,134	13,259	14,353
Federal protected land	Acres	64	90	128	176	216	249	280	310	336	354
Local protected land	Acres	413	634	946	1,258	1,549	1,813	2,045	2,162	2,225	2,269
State protected land	Acres	264	395	633	972	1,355	1,755	2,175	2,572	2,926	3,247
BY PERCENTAGE											
High social vulnerability population		0.2%	0.4%	0.9%	1.7%	2.5%	3.6%	4.8%	5.7%	7.1%	8.5%
Medium social vulnerability population		0.3%	0.7%	1.2%	2.0%	3.0%	4.2%	5.7%	7.3%	9.1%	11.1%
Low social vulnerability population		0.8%	1.3%	2.1%	3.2%	4.5%	5.8%	7.0%	8.3%	9.7%	11.2%
Property value		0.9%	1.6%	2.7%	4.3%	6.3%	8.4%	10.4%	12.3%	14.3%	16.3%
Population		0.5%	0.9%	1.6%	2.5%	3.6%	4.9%	6.2%	7.5%	9.1%	10.7%
Caucasian population		0.6%	1.0%	1.7%	2.8%	4.0%	5.4%	6.7%	8.2%	9.7%	11.5%
Population of color		0.5%	0.8%	1.3%	2.1%	3.0%	4.0%	5.2%	6.5%	8.0%	9.5%

Elevation relative to local high tide line (Mean Higher High Water)											
Affected Populations and Infrastructure	Unit	< 1ft	< 2ft	< 3ft	< 4ft	< 5ft	< 6ft	< 7ft	< 8ft	< 9ft	< 10ft
African-American population		0.5%	0.8%	1.4%	2.2%	3.1%	4.2%	5.5%	6.9%	8.4%	10.0%
Asian population		0.4%	0.7%	1.0%	1.6%	2.3%	3.1%	3.8%	4.7%	5.7%	6.9%
Hispanic population		0.5%	0.8%	1.3%	2.0%	2.8%	3.7%	4.6%	5.6%	6.7%	7.9%
Native American population		0.8%	1.4%	2.1%	3.0%	4.1%	5.3%	6.6%	8.1%	9.7%	11.5%
Homes		0.4%	0.7%	1.4%	2.4%	3.6%	4.9%	6.2%	7.5%	9.0%	10.7%
Hospitals		0.0%	0.0%	0.0%	0.0%	0.0%	3.6%	14.3%	25.0%	28.6%	28.6%
Schools		0.0%	0.0%	0.3%	0.3%	0.3%	0.9%	3.0%	4.5%	5.1%	6.3%
Colleges and Universities		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%
Libraries		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.8%	5.8%	9.6%	9.6%
Museums		0.0%	0.0%	0.0%	0.0%	0.0%	11.1%	11.1%	22.2%	22.2%	33.3%
Houses of worship		0.0%	0.0%	0.2%	0.5%	1.2%	1.8%	1.9%	3.3%	4.5%	5.1%
Government buildings		0.0%	0.0%	0.6%	2.8%	5.1%	5.6%	8.4%	9.6%	10.7%	11.8%
City Halls		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	50.0%	50.0%
Roads		0.1%	0.3%	0.9%	2.0%	3.2%	4.6%	6.0%	7.5%	9.2%	10.9%
County roads		0.4%	0.4%	0.8%	1.2%	2.1%	4.1%	6.6%	11.8%	14.3%	18.8%
Federal roads		0.2%	0.3%	0.4%	0.7%	1.2%	1.8%	3.0%	3.9%	5.2%	6.9%
Local roads		0.1%	0.3%	0.9%	2.0%	3.2%	4.6%	6.0%	7.6%	9.2%	10.9%
Primary roads		0.2%	0.3%	0.3%	0.5%	0.6%	0.9%	1.4%	2.1%	3.6%	5.7%
Secondary roads		0.3%	0.4%	1.0%	3.2%	4.7%	6.8%	8.8%	10.7%	12.5%	14.4%
State roads		0.3%	0.5%	1.4%	4.7%	6.6%	9.2%	11.0%	13.1%	15.2%	17.5%
Railroads		0.4%	0.9%	2.0%	5.0%	8.1%	11.6%	13.8%	16.8%	19.7%	23.4%
Mainline rail		0.1%	0.4%	1.3%	1.8%	3.2%	4.6%	5.5%	5.7%	6.1%	6.2%
Non-mainline rail		0.7%	1.5%	2.9%	8.8%	14.0%	20.0%	24.0%	30.1%	36.2%	44.1%
Intermodal freight terminals		0.0%	0.0%	4.8%	4.8%	9.5%	14.3%	23.8%	23.8%	23.8%	38.1%
Airports		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5%
Military airports		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%
Heliports		9.5%	9.5%	14.3%	14.3%	14.3%	19.0%	23.8%	23.8%	28.6%	33.3%

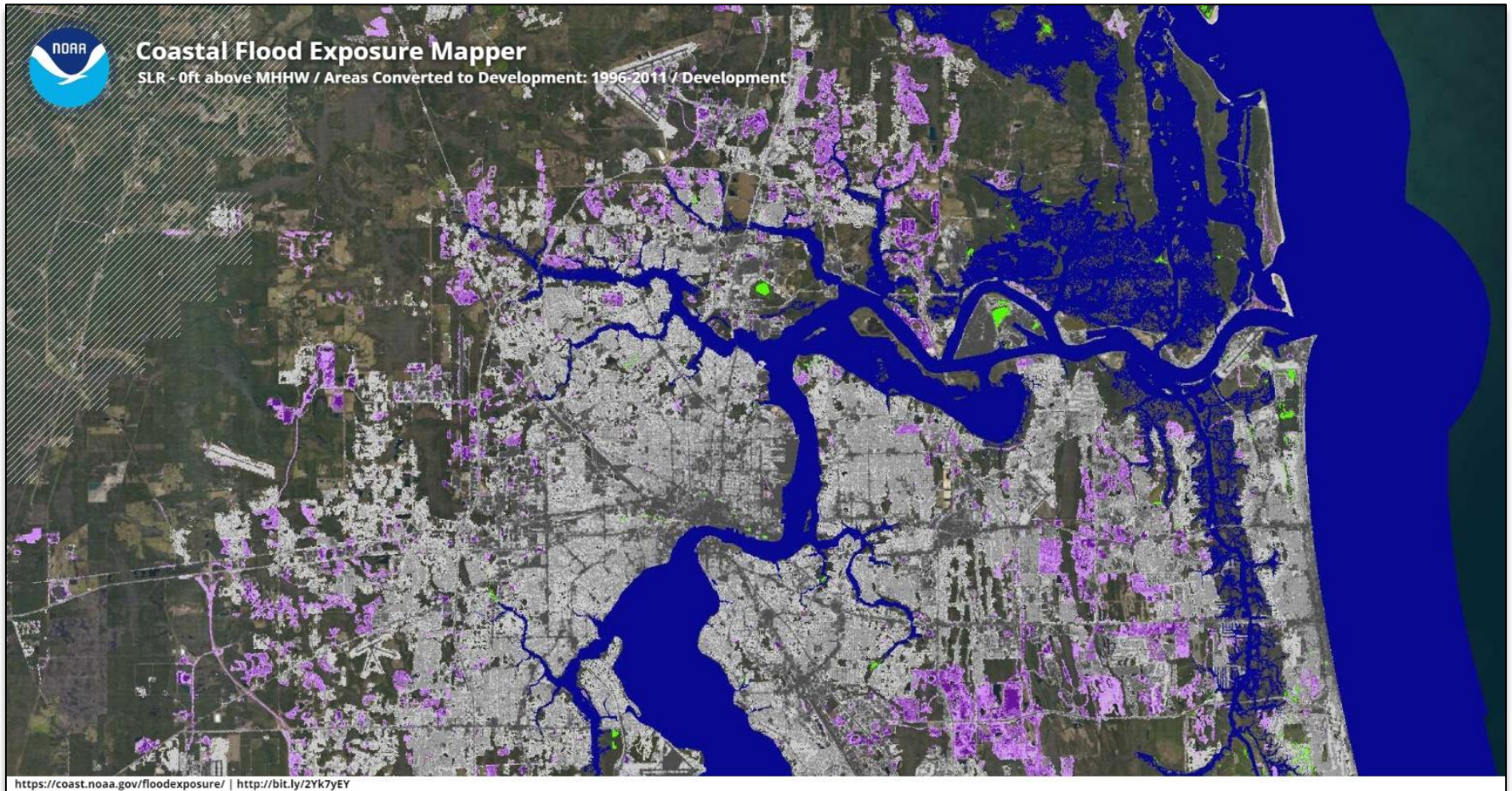
Elevation relative to local high tide line (Mean Higher High Water)											
Affected Populations and Infrastructure	Unit	< 1ft	< 2ft	< 3ft	< 4ft	< 5ft	< 6ft	< 7ft	< 8ft	< 9ft	< 10ft
Power plants		0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	14.3%	28.6%	28.6%	28.6%
Utility power plants		0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	20.0%	40.0%	40.0%	40.0%
Minor power plants		0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Major power plants		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	50.0%
TV transmitter sites		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	37.5%	37.5%
FM radio transmitter sites		0.0%	0.0%	0.0%	21.1%	21.1%	21.1%	36.8%	36.8%	47.4%	52.6%
Hazardous materials facilities		0.0%	0.9%	0.9%	5.1%	7.7%	12.0%	13.7%	16.2%	16.2%	18.8%
Oil facilities		0.0%	0.0%	0.0%	7.7%	30.8%	38.5%	53.8%	69.2%	69.2%	69.2%
Pesticide facilities		0.0%	0.0%	0.0%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	10.3%
Extreme hazmat facilities		0.0%	2.3%	2.3%	4.7%	4.7%	11.6%	11.6%	16.3%	16.3%	16.3%
Hazardous waste sites		0.7%	0.8%	1.0%	2.4%	4.1%	6.4%	7.8%	9.6%	10.9%	12.6%
Unspecified hazardous waste sites		0.6%	0.6%	0.9%	2.0%	3.8%	6.1%	7.4%	8.6%	9.9%	11.2%
Minor hazwaste source sites		0.8%	1.0%	1.2%	2.7%	4.3%	6.3%	7.8%	9.9%	11.0%	12.9%
Major hazwaste source sites		0.0%	0.0%	0.0%	0.0%	10.0%	20.0%	20.0%	30.0%	30.0%	30.0%
Brownfields		0.0%	0.0%	0.0%	1.7%	1.7%	1.7%	2.5%	3.3%	4.2%	7.5%
Landfills		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.3%	8.3%	8.3%
Wastewater sites		1.2%	1.8%	2.8%	4.1%	5.2%	6.7%	8.4%	10.3%	12.0%	13.5%
Nonmajor wastewater sites		1.2%	1.7%	2.8%	4.0%	5.1%	6.6%	8.2%	10.1%	11.7%	13.2%
Major wastewater sites		0.0%	20.0%	20.0%	20.0%	20.0%	20.0%	60.0%	60.0%	60.0%	60.0%
Sewage plants		0.0%	7.7%	7.7%	7.7%	11.5%	19.2%	23.1%	23.1%	23.1%	26.9%
EPA listed sites		0.8%	1.1%	1.7%	3.1%	4.5%	6.6%	8.1%	10.0%	11.4%	13.2%
SSTS sites		0.0%	0.0%	0.0%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	10.3%
ACRES sites		0.0%	0.0%	0.0%	1.7%	1.7%	1.7%	2.5%	3.3%	4.2%	7.5%
OIL sites		0.0%	0.0%	0.0%	8.3%	33.3%	41.7%	58.3%	66.7%	66.7%	66.7%
OTAQREG sites		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0	100.0	100.0
TRI sites		0.0%	0.0%	0.0%	6.7%	6.7%	6.7%	6.7%	10.0%	10.0%	13.3%
TSCA sites		0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	20.0%	20.0%	20.0%	20.0%

Elevation relative to local high tide line (Mean Higher High Water)											
Affected Populations and Infrastructure	Unit	< 1ft	< 2ft	< 3ft	< 4ft	< 5ft	< 6ft	< 7ft	< 8ft	< 9ft	< 10ft
RMP sites		0.0%	2.3%	2.3%	4.7%	4.7%	11.6%	11.6%	16.3%	16.3%	16.3%
Biennial Reporters		0.0%	0.0%	0.0%	0.0%	0.0%	13.3%	20.0%	20.0%	26.7%	40.0%
Superfund (CERCLIS) sites		0.0%	0.0%	0.0%	2.9%	5.9%	5.9%	5.9%	11.8%	17.6%	20.6%
RADINFO sites		0.7%	0.8%	1.1%	2.3%	4.1%	6.4%	7.8%	9.6%	10.7%	12.4%
NPDES sites		1.2%	1.8%	2.8%	4.1%	5.2%	6.7%	8.5%	10.3%	11.9%	13.4%
Land		1.7%	2.6%	3.6%	4.7%	5.8%	7.1%	8.4%	9.8%	11.2%	12.7%
Protected land		5.0%	7.3%	9.8%	12.1%	14.3%	16.3%	18.2%	20.2%	22.1%	23.9%
Federal protected land		10.3	14.4%	20.6%	28.3%	34.8%	40.1%	45.2%	50.1%	54.2%	57.1%
State protected land		1.4%	2.1%	3.4%	5.3%	7.4%	9.5%	11.8%	14.0%	15.9%	17.6%
Local protected land		2.1%	3.3%	4.9%	6.5%	8.0%	9.3%	10.5%	11.1%	11.4%	11.7%

Source: SurgingSeas.org Risk Finder; [https://riskfinder.climatecentral.org/county/duval-county.fl.us?comparisonType=county&forecastType=NOAA2017\\_int\\_p50&level=4&unit=ft&zillowPlaceType=postal-code](https://riskfinder.climatecentral.org/county/duval-county.fl.us?comparisonType=county&forecastType=NOAA2017_int_p50&level=4&unit=ft&zillowPlaceType=postal-code)



Figure 57: NOAA Coastal Flood Exposure Map: 0 ft. Rise in MHHW (Baseline)



Source: NOAA Coastal Flood Exposure Mapper, NOAA Office for Coastal Management. Retrieved August 2, 2019.

#### Overall Vulnerability: Sea Level Rise

Sea Level Rise				Overall Vulnerability
Overview				
Sea level rise is a result of earth’s climate changing due to heat-trapping pollution. Even small amounts of sea level rise make rare floods more common by adding to tides and storm surge. Based on the National Climate Assessment, an intermediate sea level rise scenario projects 3.8 feet of rise in the City of Jacksonville by 2100. The extreme scenario results projects 10.8 feet of rise in the City of Jacksonville by 2100.				
Frequency	Probability	Potential Magnitude		
Likely	Likely	Injuries/Deaths	Infrastructure	Environment
		High	High	High
High				

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30.

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be High, with a score of 20. As the impacts of Sea Level Rise are cumulative, the Frequency calculation was performed differently than other hazards. The score is cumulative, assuming at least minimal impacts by 2050 and at least moderate impacts by 2100.

## Cyber Attack Hazard Profile

### Cyber Attack Description

A Cyber-attack threat is real and has become more common, dangerous and sophisticated for Federal, State and local governments and critical nongovernmental entities. Because of this, Cyber-attacks will be profiled in the Duval County LMS. A cyber-attack is an attempt to gain illegal access to a computer or computer system for the purpose of causing damage or harm. Cybersecurity threats come in three broad categories of intent.

Attackers seek to accomplish one of the following end goals:

- Financial gain
- Disruption
- Espionage (including corporate espionage – the theft of patents or state espionage)

Virtually every cyber threat falls into one of these three modes. In terms of attack techniques, malicious actors have an abundance of options. The extent of cyber threats is measured in “attacks per year;” some types are able to be measured as “cost of damages/ransom.”

There are ten common types of cyber threats:

- Malware. Software that performs a malicious task on a target device or network, e.g. corrupting data or taking over a system.
- Phishing. An email-borne attack that involves tricking the email recipient into disclosing confidential information or downloading malware by clicking on a hyperlink in the message.
- Spear Phishing. A more sophisticated form of phishing where the attacker learns about the victim and impersonates someone he or she knows and trusts.
- “Man in the Middle” (MitM) attack. Where an attacker establishes a position between the sender and recipient of electronic messages and intercepts them, perhaps changing them in transit. The sender and recipient believe they are communicating directly with one another. A MitM attack might be used in the military to confuse an enemy.
- Trojans. Named after the Trojan Horse of ancient Greek history, the Trojan is a type of malware that enters a target system looking like one thing, e.g. a standard piece of software, but then lets out the malicious code once inside the host system.
- Ransomware. An attack that involves encrypting data on the target system and demanding a ransom in exchange for letting the user have access to the data again. These attacks range from low-level nuisances to serious incidents like the locking down of the entire city of Atlanta’s municipal government data in 2018.
- Denial of Service attack or Distributed Denial of Service Attack (DDoS). Where an attacker takes over many (perhaps thousands) of devices and uses them to invoke the functions of a target system, e.g. a website, causing it to crash from an overload of demand.
- Attacks on IoT Devices. IoT devices like industrial sensors are vulnerable to multiple types of cyber threats. These include hackers taking over the device to make it part of a DDoS attack and unauthorized access to data being collected by the device. Given their numbers, geographic

distribution and frequently out-of-date operating systems, IoT devices are a prime target for malicious actors.

- Data Breaches. A data breach is a theft of data by a malicious actor. Motives for data breaches include crime (i.e. identity theft), a desire to embarrass an institution (e.g. Edward Snowden or the DNC hack) and espionage.
- Malware on Mobile Apps. Mobile devices are vulnerable to malware attacks just like other computing hardware. Attackers may embed malware in app downloads, mobile websites or phishing emails and text messages. Once compromised, a mobile device can give the malicious actor access to personal information, location data, financial accounts and more.

(Source: <https://preyproject.com/blog/en/what-are-cyber-threats-how-they-affect-you-what-to-do-about-them/>; Source: <https://www.fema.gov/cybersecurity> )

#### Geographic Areas Affected by Cyber Attack

A cyber-attack could happen anywhere and to anyone with an electronic device connected to the internet: individuals, businesses, or government agencies. Cyber incidents may cause physical disruptions in critical infrastructure, which could affect a jurisdiction or a power grid. It is important to note that power grids are vast, sometimes crossing state lines, meaning that a cyber incident at one facility at one location could cause disruptions at other locations hundreds of miles away.

#### Historical Occurrences of Cyber Attack

Below is a sample of reported significant cyber incidents within the United States from 2010 to present. For a complete list of worldwide reported cyber incidents from 2006 to present visit the below link, [https://csis-prod.s3.amazonaws.com/s3fs-public/191122\\_Significant\\_Cyber\\_Events\\_List.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/191122_Significant_Cyber_Events_List.pdf)

January 2010. Google announced that a sophisticated attack had penetrated its networks, along with the networks of more than 30 other US companies. The goal of the penetrations, which Google ascribed to China, was to collect technology, gain access to activist Gmail accounts and to Google's Gaea password management system.

October 2010. Public facing networks run by NASDAQ, as well as an information sharing application called Directors Desk, are compromised by an unknown external group. NASDAQ says it is unsure how far hackers might have penetrated into their network.

March-April 2011. Between March 2010 and April 2011, the FBI identified twenty incidents in which the online banking credentials of small-to-medium sized U.S. businesses were compromised and used to initiate wire transfers to Chinese economic and trade companies. As of April 2011, the total attempted fraud amounts to approximately \$20 million; the actual victim losses are \$11 million.

June 2011. Citibank reported that credit card data for 360,000 of its customers were ex-filtrated using a relatively simple manipulation of URLs.

July 2011. In a speech unveiling the Department of Defense's cyber strategy, the Deputy Secretary of Defense mentioned that a defense contractor was hacked and 24,000 files from the DOD were stolen.



September 2011. A computer virus from an unknown source introduced “keylogger” malware onto ground control stations for US Air Force UAVs and, according to press reports, infected both classified and unclassified networks at Creech Air Force Base in Nevada. The US did not lose control of any drone nor does it appear that any data was ex-filtrated, but the malware was persistent and took several attempts to remove.

March 2012. NASA’s Inspector General reported that 13 APT attacks successfully compromised NASA computers in 2011. In one attack, intruders stole 150 user credentials that could be used to gain unauthorized access to NASA systems. Another attack at the Joint Propulsion Laboratory involving China-based IP let the intruders gain full access to key JPL systems and sensitive user accounts.

June 2012. A phishing campaign targets the U.S. aerospace industry experts attending the 2013 IEEE Aerospace Conference.

July 2012. NSA Director General Keith Alexander said that there had been a 17-fold increase in cyber incident at American infrastructure companies between 2009 and 2011.

December 2012. Two power plants in the U.S. were infected through unprotected USB drives.

February 2013. DHS says that between December 2011 and June 2012, cyber criminals targeted 23 gas pipeline companies and stole information that could be used for sabotage purposes. Forensic data suggests the probes originated in China.

May 2013. The U.S. identified a gang of eight hackers who extracted \$45 million from banks in the UAE and Oman. The attacks eliminated the withdrawal limits on prepaid debit cards, permitting the hackers to withdraw massive amounts.

May 2013. DHS reports that the U.S. electrical grid is constantly being probed by multiple actors, including Iran.

June 2013. The FBI charged five Ukrainian and Russian hackers with stealing over 160 million credit card numbers and causing hundreds of millions in losses.

March 2014. Cybercriminals steal 40 million credit card numbers from Target, with an additional 70 million accounts compromised.

July 2014. U.S. Office of Personnel Management networks that contain information on thousands of applicants for top secret clearances are breached.

October 2014. U.S. Postal Service servers are hacked, exposing employees' names, addresses, and Social Security numbers.

November 2014. Sony Pictures Entertainment is hacked with the malware deleting data and the hackers posting online employees’ personal information and unreleased films. An FBI investigation revealed North Korea to be behind the attack.

February 2015. Anthem, a U.S. health insurance company, is hacked, resulting in the theft of 80 million customers’ personally identifiable information. The information was taken from an unencrypted database. This may have been part of a larger campaign that included the OPM hack.

April 2015. U.S. officials report that hackers gained access to White House networks and sensitive information, such as “real-time non-public details of the president’s schedule,” through the State Department’s network, which has had continued trouble in ousting attackers.

July 2015. A spear phishing attack on the Joint Chiefs of Staff unclassified email servers resulted in the system being shut down for 11 days while cyber experts rebuilt the network, affecting the work of roughly 4,000 military and civilian personnel. Officials believe that Russia is responsible for the intrusion, which occurred sometime around July 25, although China has not been ruled out as the perpetrator.

November 2015. Iran’s Revolutionary Guard hacked the email and social media accounts of a number of Obama administration officials in attacked believed to be related to the arrest of an Iranian-American businessman in Tehran.

February 2016. Hackers breached the U.S. Department of Justice’s database, stealing and releasing the names, phone numbers, and email addresses of 30,000 DHS and FBI employees.

April 2016. Microsoft researchers discover a highly skilled hack group that has targeted government agencies (including intelligence agencies), defense research centers and telecommunication service providers in South and Southeast Asia since 2009.

October 2016. The U.S. Director of National Intelligence and Department of Homeland Security jointly identified Russia as responsible for hacking the Democratic National Committee and using WikiLeaks to dump emails obtained in the hack.

November 2016. An indiscriminate attack compromised systems at the San Francisco Municipal Transportation Agency (the Muni), locking operators out of computers and customers out of kiosks. As a result, the Muni offered customers free rides for two days, until administrators restored its systems without paying the demanded \$73,000 ransom.

February 2017. A suspected Russian hacker breaches at least 60 universities and US government organizations using SQL injections, including HUD, NOAA, Cornell University, and NYU, among many others. This follows up a hack by the same actor against the U.S. Electoral Assistance Commission in December 2016.

April 2017. Cybersecurity researchers revealed a growing cyber-espionage campaign originating in China and targeting construction, engineering, aerospace and telecom companies, as well as government agencies, in the U.S., Europe, and Japan.

July 2017. The FBI and DHS announced that hackers had been targeting US energy facilities including the Wolf Creek Nuclear Operating Corporation in a campaign bearing resemblance to the operations of a known Russian hacking group

November 2017. Uber discloses that it paid hackers \$100,000 to delete the stolen data of 57 million of its customers and drivers, including names, phone numbers, email addresses, and license plate numbers.

February 2018. Officials at the Department of Homeland Security confirmed that Russian hackers successfully penetrated the voter registration rolls of several US states prior to the 2016 election.

March 2018. The FBI and Department of Homeland Security issued a joint technical alert to warn of Russian cyber-attacks against US critical infrastructure. Targets included energy, nuclear, water, aviation, and manufacturing facilities.

October 2019. A state-sponsored hacking campaign knocked offline more than 2,000 websites across Georgia, including government and court websites containing case materials and personal data.

#### Probability of Future Occurrences of Cyber Attack

The probability of cyber incidents occurring is increasing every day. Cybersecurity experts predicts that cybercrime damages will cost the world \$6 trillion annually by 2021, exponentially more than the damage inflicted from natural disasters in a year, and more profitable than the global trade of all major illegal drugs combined. Ransomware damage costs are predicted to be 57X more in 2021 than they were in 2015. This makes ransomware the fastest growing type of cybercrime. Global ransomware damage costs are predicted to hit \$20 billion in 2021, up from \$11.5 billion in 2019, \$5 billion in 2017, and just \$325 million in 2015 (Source: <https://www.informationsecuritybuzz.com/expert-comments/2020-cybersecurity-predictions-experts-comments/> ).

#### Cyber Attack Impact Analysis

##### Public

- Release of sensitive information including bank accounts and social security numbers.
- Financial loss
  - Possible loss of wages if organization is forced to close.

##### Responders

- Long hours outside of regular work hours to stop and/or remediate attack.
- First responders may not be able to respond properly if a cyber-attack targets emergency or public safety systems.

#### Continuity of Operations (including continued delivery of services)

- Incident could take operations offline for any amount of time and/or make information inaccessible or distribute false information.
- Interrupt public safety, etc. services.
- Loss of productivity.
- Loss of critical systems or data.
- May disable emergency or public safety systems.

#### Property, Facilities, Infrastructure

- Incident could lead to damage of equipment for infrastructure.
- Organization may lose revenue and may have significant costs for remediation, legal fees, and public relations.
- Organization may lose customer confidence, or may sustain damage to their reputation or to their market share.

#### Environment

- An incident could cause a release of some material, which could damage the environment.

#### Economic Condition

- Incidents cost millions of dollars to consumers and organizations, in the form of lost wages, lost revenue, and recovery and remediation costs.

#### Public Confidence in Jurisdiction's Governance

- Lost confidence in ability to keep services operational and safe.
- Private organization: Loss of public or consumer confidence in an organization leading to loss of market share and possibly loss of future sales.

#### Potential effects of Climate Change on Cyber Attack

Climate change will not directly affect cyber-attacks. Social unrest, which may be increased due to the effects of climate change, may result on increased hostility between individuals or nations, leading to conflict.

#### Vulnerability Analysis and Loss Estimation

It is reasonable to assume that agencies within Duval County will continue to be vulnerable to cyber incidents. Any county that utilizes computers and the internet for major utilities, transportation routes, or data storage is vulnerable to a cyber-incident. It is not possible to determine exact estimates for losses due to the varied nature and extent of cyberattacks. Previous ransomware attacks against local governments have requested hundreds of thousands of dollars as ransom.



## Overall Vulnerability

Cyber-Attack					Overall Vulnerability
Overview					Moderate
A Cyber-attack threat is real and attacks have become more common, dangerous and sophisticated for Federal, State and local governments, and critical nongovernmental entities. There are multiple types of attacks that seek to accomplish various goals ranging from financial gain to espionage.					
Frequency	Probability	Potential Magnitude			
Very High	Very High	Injuries/Deaths	Infrastructure	Environment	
		Very Low	Low	Very Low	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30.

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Moderate, with a score of 17. Data from the [https://csis-prod.s3.amazonaws.com/s3fs-public/191122\\_Significant\\_Cyber\\_Events\\_List.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/191122_Significant_Cyber_Events_List.pdf) webpage was cross-referenced with local data to arrive at the figures incorporated into the LMS Vulnerability Assessment.

## Hazardous Materials Accident Profile

### Hazardous Materials Incident Description

Hazardous materials are defined and regulated in the United States primarily by laws and regulations administered by the U.S. Environmental Protection Agency (EPA), the U.S. Occupational Safety and Health Administration (OSHA), the U.S. Department of Transportation (DOT), and the U.S. Nuclear Regulatory Commission (NRC). Each has its own definition of a "hazardous material."

A hazardous material is any item or agent (biological, chemical, radiological, and/or physical), which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.

OSHA's definition includes any substance or chemical which is a "health hazard" or "physical hazard," including: chemicals which are carcinogens, toxic agents, irritants, corrosives, sensitizers; agents which act on the hematopoietic system; agents which damage the lungs, skin, eyes, or mucous membranes; chemicals which are combustible, explosive, flammable, oxidizers, pyrophorics, unstable-reactive or water-reactive; and chemicals which in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists or smoke which may have any of the previously mentioned characteristics (*Full definitions can be found at 29 Code of Federal Regulations (CFR) 1910.1200.*).

EPA incorporates the OSHA definition, and adds any item or chemical which can cause harm to people, plants, or animals when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment. (40 CFR 355 contains a list of over 350 hazardous and extremely hazardous substances). The extent of these releases are measured using standard units of measurement related to the specific chemical (i.e., gallons for liquid releases).

DOT defines a hazardous material as any item or chemical which, when being transported or moved in commerce, is a risk to public safety or the environment, and is regulated as such under its Pipeline and Hazardous Materials Safety Administration regulations (49 CFR 100-199), which includes the Hazardous Materials Regulations (49 CFR 171-180). In addition, hazardous materials in transport are regulated by the International Maritime Dangerous Goods Code; Dangerous Goods Regulations of the International Air Transport Association; Technical Instructions of the International Civil Aviation Organization; and U.S. Air Force Joint Manual, Preparing Hazardous Materials for Military Air Shipments.

The NRC regulates materials that are considered hazardous because they produce ionizing radiation, which means those materials that produce alpha particles, beta particles, gamma rays, x-rays, neutrons, high-speed electrons, high-speed protons, and other particles capable of producing ions. This includes "special nuclear material," by-product material, and radioactive substances. (*See 10 CFR 20; Source: <https://www.ihmm.org/about-ihmm/what-are-hazardous-materials>*).

Hazardous waste is waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludge's. They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes (*Source: <https://www.calpaclab.com/epa-definition-of-hazardous-waste/#>*).

The Resource Conservation and Recovery Act (RCRA) regulations establish basic hazardous waste management standards for persons who produce hazardous waste, called hazardous waste generators. These standards are found in title 40 of the Code of Federal Regulations (CFR) in part 262. The generator regulations ensure that hazardous waste is appropriately identified and handled safely to protect human health and the environment, while minimizing interference with daily business operations. The amount of hazardous waste generated per month determines how a generator is categorized and what regulations must be complied with. The extent of hazardous material release generators are defined below.

Very Small Quantity Generators (VSQGs) generate 100 kilograms or less per month of hazardous waste or one kilogram or less per month of acutely hazardous waste. Requirements for VSQGs include:

- VSQGs must identify all the hazardous waste generated.
- VSQGs may not accumulate more than 1,000 kilograms of hazardous waste at any time.
- VSQGs must ensure that hazardous waste is delivered to a person or facility that is authorized to manage it.

Small Quantity Generators (SQGs) generate more than 100 kilograms, but less than 1,000 kilograms of hazardous waste per month. Major requirements for SQGs include:

- SQGs may accumulate hazardous waste on-site for 180 days without a permit (or 270 days if shipping a distance greater than 200 miles).
- The quantity of hazardous on-site waste must never exceed 6,000 kilograms.
- SQGs must comply with the hazardous waste manifest requirements at 40 CFR part 262, subpart B and the pre-transport requirements at 40 CFR sections 262.30 through 262.33.
- SQGs must manage hazardous waste in tanks or containers subject to the requirements found at 40 CFR sections 262.16(b)(2) and (3).
- SQGs must comply with the preparedness and prevention requirements at 40 CFR sections 262.16(b)(8) and (9), and the land disposal restriction requirements at 40 CFR part 268.
- There must always be at least one employee available to respond to an emergency. This employee is the emergency coordinator responsible for coordinating all emergency response measures. SQGs are not required to have detailed, written contingency plans.

Large Quantity Generators (LQGs) generate 1,000 kilograms per month or more of hazardous waste or more than one kilogram per month of acutely hazardous waste. Major requirements for LQGs include:

- LQGs may only accumulate waste on-site for 90 days. Certain exceptions apply.
- LQGs do not have a limit on the amount of hazardous waste accumulated on-site.
- Hazardous waste generated must be managed in tanks, containers, drip pads or containment buildings subject to the requirements found at 40 CFR sections 262.17(a)(1)-(4) and, specifically for drip pads and containment buildings, 40 CFR part 265, subparts W and DD, respectively.
- LQGs must comply with the hazardous waste manifest requirements at 40 CFR part 262 subpart B and the pre-transport requirements at 40 CFR sections 262.30 through 262.33.
- LQGs must comply with the preparedness, prevention and emergency procedure requirements at 40 CFR part 262 subpart M and the land disposal restriction requirements at 40 CFR part 268.
- LQGs must submit a biennial hazardous waste report.
- See 40 CFR part 262 for a complete description of the LQG regulations.

Additionally, most states are authorized to implement the RCRA program. The quantity limits for state generation categories can be different than the federal limits. Please see the differences in hazardous waste generator categories table (Source: <https://www.epa.gov/hwgenerators/categories-hazardous-waste-generators>).

#### Geographic Areas Affected by Hazmat Incidents

Hazardous material incidents can occur during the production, transportation, use, and storage of those hazardous materials and can happen anywhere within the State of Florida. As these materials are processed and stored, those in the immediate vicinity are at risk of toxic fumes, soil contamination, and water contamination. Roadways, railways, pipelines, and waterways are potentially at risk.

All properties within 2000 feet of I-95, I-10, I-295, the channel of the St. Johns River, the JAXPORT facilities, and the major rail corridors are frequently in the proximity of Hazardous Materials that are in transit. Additionally, there are hundreds of facilities scattered throughout the County that contain moderate to large quantities of various classes of hazardous materials.

The most vulnerable population with regards to hazardous materials accidents are residents of the downtown area reaching as far north as the Trout River. A relatively dense network of rail lines places this area at risk. It is characterized with older homes correlated with a low income population demographics. About one third of the recorded river spills have also taken place in the St. Johns River adjacent to this same area. Although mostly industrial land uses lay along the northern reaches of the I-10/ rail corridor, there are several pockets of residential areas at increased risk from this type of hazard. There is an interstate/rail corridor which traverses the County from north to south along its entire length and many residential properties lie within the 2000-foot highest danger zone. The variable with this hazard is the weather condition factor at the time of the accident/incident. The plumes from such events vary greatly depending on wind speed and precipitation.

#### Historical Occurrences of Hazmat Incidents

In the last three years Duval County has had 866 reported Hazmat incidents that required some type of cleanup crew(s). The below chart has the top 55 Hazmat incidents that had over 200 gallons of hazard materiel spilled.

**Table 33: Hazmat incidents that had over 200 gallons in Duval County**

<b>Date</b>	<b>Location</b>	<b>Pollutant</b>	<b>Volume</b>
1/19/17	1944 Beach Blvd	wastewater	10000 gals
1/29/17	Avenues Mall	wastewater	1000 gal
2/24/17	101 W. 48th St	bio-waste	500 lbs
3/9/17	9774 Florida Mining	Acid / solvent	300 gals
3/28/17	Wills Branch	Raw Sewage	100,000,000gals
4/3/17	Atlantic Ocean at the Jetties	Diesel	500 gals
4/13/17	Herschel	fertilizer	250 gals
4/22/17	4801 Reid St	roundup	300 gals
5/26/17	I-10 WB mm 341	Gasoline	700 gals
6/22/17	I-75 near MM 399	Diesel	200 gals
6/28/17	2051 Lane Ave.	Glacial Acetic Acid	200 gals
7/17/17	205 E US 90	Diesel	800 gals
8/12/17	1281 Newell Rd.	Diesel	400 glas
8/13/17	2978 Coral Ct.	Meth Lab Chemical	Unknown
8/28/17	I-295 NB Exit 52	Diesel	250 gals
8/30/17	7500 Centurion Parkway N.	Transformer Oil	470 gals
10/10/17	3750 CR-220	Diesel Fuel	500 gals
10/11/17	5222 Treat Rd	Number 6 Fuel Oil	465 gals
10/14/17	6850 Energy Center Drive	Sodium Hypochlorite	8500 gals
11/24/17	1023 Highway 17	treated effluent	500 gals
1/15/18	22796 NW CR 200 A	Hydraulic Oil	400 gals
1/19/18	8580 Die Hard Lane	Gasoline/ Used Oil	700 gallons

Date	Location	Pollutant	Volume
3/7/18	I-295 SB MM 52	Desiel	200 gals
3/26/18	703 N. State St.	Diesel	800 gals
4/6/18	I-75 NB MM 399	Diesel / Milk	200 gals
4/21/18	624 Hannah St.	Oil	400 gals
5/12/18	733 Shaw St.	Transformer Oil	1500 gals
5/16/18	3581 St Johns Ave	Heating Oil	250 Gallons
5/16/18	14770 Old St Augustine Road	Sodium Hypochlorite	7000 gallons
6/15/18	103rd St.	Used Oil	225 gals
8/5/18	I-75 MM396S	Diesel Fuel	200 Gals
8/22/18	St Johns River at Blount Island Pier 30	Motor Oil	2700 gals
9/7/18	2400 Palm Valley Rd	Non-PCB Transformer Oil	400 gals
9/21/18	4263 Losco Rd	Asphalt Sealant	200 gallons
10/9/18	I-95 MM353N	Jet A Fuel	8000 gals
10/26/18	6500 Roosevelt Blvd (FRCSE)	Lube Oil	90 gallons
11/1/18	893 FL-19	Diesel	3700 gals
12/10/18	2027 Rental Car Lane	Motor Oil	400 gals
1/15/19	7075 W 12th St	Used Motor Oil	200 gals
1/20/19	Main St. - CSX Train	Denatured Alcohol	60000 gals
2/5/19	St. Johns River across from Fort Caroline	Abandoned Container	250 gals
2/15/19	4377 Hecksher Dr	Non-PCB Transformer Fluid	250 gals
4/25/19	10 Van Dyke Rd	Polymer Water mix	1000 gals
5/3/19	St. Johns River @ NAS Jax runway 10	Jet Fuel	200 gals
5/18/19	1151 Talleyrand Ave	Asphalt Flux	24,000 gals

Date	Location	Pollutant	Volume
7/16/19	220 Davis Pond Blvd	Sodium Hypochlorite	400 gals
7/20/19	Ortega Forest Drive and Ivanhoe Rd	Diesel	200 gals
7/28/19	NAS Mayport Bldg 2078	Gasoline	200 gals
9/6/19	2500 Zoo Parkway	Diesel Fuel	550 gals
9/17/19	I-75 414S Mile Marker	Diesel Fuel	200 gallons
10/27/19	Northwest 16th Boulevard and 43rd ST	Gasoline	3,000 gallons
11/12/19	6235 Greenland Road	Used oil	2,900 gallons
11/18/19	601 Crestwood Street	Alpha-Pinene	400 gals
11/26/19	NW 13th Street at NW 74th Place	Diesel	1500 gallons
12/3/19	4378 Ocean St #3/ Safe Harbor Mayport	Diesel	1800 gallons

*Source: Florida Department of Environmental Protection*

#### Probability of Future Occurrences of Hazmat Incidents

Jacksonville has a deep-water port of entry and functions as the state's foremost transportation and commercial center. The city is the hub of regional road and rail networks, and its international airport is one of the busiest in the state. Due to this extensive ship, rail and road transportation network hazardous material spills and releases are becoming commonplace. As the data shows, hazardous material spills in Jacksonville occur daily and at any time and could impact the community.

#### Hazmat Incident Impact Analysis

##### Public

- Loss of life or injury from contamination.
- Diseases may be exacerbated.

##### Responders

- Loss of life or injury from contamination, explosions, cleanup and destruction.
- Diseases.
- Cleanup and destruction at waste sites and incident sites.

##### Continuity of Operations (including continued delivery of services)

- Lost material, such as gas, is unusable and could lead to shortages and price increases.
- HazMat releases may directly destroy facilities or result in evacuations

#### Property, Facilities, Infrastructure

- Damage due to excavation and removal of soil and water.
- Inability to rebuild in affected areas.
- Services could be closed or blocked due to the contaminant.
  - Roads
  - Trains
  - Airplanes
  - Bridges
  - Waterways
- Long term contamination at hazardous waste sites.

#### Environment

- Death or illness to pets or wildlife near the spill.
- Damage to plants and wildlife.
- Airborne issues such as toxic fumes, gases or vapors caused by chemicals.
- Water contamination.
- Soil contamination.
- Loss of critical or endangered species.
- Pollution.

#### Economic Condition

- Business closures may lead to lost revenue and wages.
- Loss of tourism and income.
- Loss of product.
- Cost of cleanup and restoration.

#### Public Confidence in Jurisdiction's Governance

- If the government doesn't communicate with the public, fear could ensue, leading to a fear of the government.
- If cleanup is slow, the public could believe the government doesn't know how to properly clean it up or that the accident was malicious.

#### Potential Effects of Climate Change on Hazmat Incidents

The potential for chemicals to react and undergo changes increases as the temperature of the material increases. In addition, materials with greater volatility may produce higher levels of dangerous vapors at elevated temperatures (Source: <https://www.fireengineering.com/2010/06/20/276860/hazmat-summer-incidents/#gref>).



### Vulnerability Analysis and Loss Estimation

Major Hazmat incidents can occur at any facility that produces, uses, or stores hazardous materials. These include chemical manifesting plants, laboratories, shipyards, railroad yards, warehouses, or chemical disposal areas. Illegal dumpsites can appear anywhere. Accidents involving the transportation of hazardous materials can occur at any time and severely impact the affected community. All of Duval County is vulnerable to Hazmat Incidents due to the need to transport materials to private residences and businesses using public roadways. Incidents could cause direct damages, economic damages, or additional force account labor costs for personnel required to respond to the incident. Estimates for losses range from thousands of dollars for smaller incidents to millions of dollars if a large quantity generator were to create a major release. Some of the largest While there are no offshore oil refineries along the First Coast at this time, one may look to the BP Oil Spill incident for an example of a worst-case scenario in terms of cost, which exceeded \$60B, and environmental impact (*Source: <https://www.noaa.gov/explainers/deepwater-horizon-oil-spill-settlements-where-money-went>*).

### Overall Vulnerability

Hazardous Material					Overall Vulnerability
Overview					High
A hazardous material is any item or agent (biological, chemical, radiological, and/or physical), which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.					
Frequency	Probability	Potential Magnitude			
Very High	Very High	Injuries/Deaths	Infrastructure	Environment	
		Low	Low	Increased	

Each category was given a number and when all 5 categories are added together, the overall vulnerability is a number between 0 and 30.

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be high, with a score of 19. Data from the Emergency Response Specialist Florida Department of Environmental Protection was cross-referenced with local data to arrive at the figures incorporated into the LMS Vulnerability Assessment.

## Critical Infrastructure Disruption Hazard Profile

### Critical Infrastructure Disruption Description

Critical infrastructure describes the physical and cyber systems and assets that are so vital to the United States that their incapacity or destruction would have a debilitating impact on our physical or economic security or public health or safety. There are 16 critical infrastructure sectors whose assets, systems, and networks, whether physical or virtual, are considered vital to the United States (Source: <https://www.dhs.gov/topic/critical-infrastructure-security>).

- 1)** Chemical Sector: Composed of several hundred thousand U.S. chemical facilities in a complex; global supply chain converts various raw materials into more than 70,000 diverse products that are essential to modern life. Based on the end product produced, the sector can be divided into five main segments, each of which has distinct characteristics, growth dynamics, markets, new developments, and issues: Basic chemicals, Specialty chemicals, Agricultural chemicals, Pharmaceuticals, Consumer products
- 2)** Commercial Facilities Sector: Includes a diverse range of sites that draw large crowds of people for shopping, business, entertainment, or lodging. Facilities within the sector operate on the principle of open public access, meaning that the general public can move freely without the deterrent of highly visible security barriers.
- 3)** Communications Sector: Is an integral component of the U.S. economy, underlying the operations of all businesses, public safety organizations, and government. Presidential Policy Directive 21 identifies the Communications Sector as critical because it provides an “enabling function” across all critical infrastructure sectors.
- 4)** Critical Manufacturing Sector: Is crucial to the economic prosperity and continuity of the United States. A direct attack on or disruption of certain elements of the manufacturing industry could disrupt essential functions at the national level and across multiple critical infrastructure sectors.
- 5)** Dams Sector: Delivers critical water retention and control services in the United States, including hydroelectric power generation, municipal and industrial water supplies, agricultural irrigation, sediment and flood control, river navigation for inland bulk shipping, industrial waste management, and recreation
- 6)** Defense Industrial Base Sector: Is the worldwide industrial complex that enables research and development, as well as design, production, delivery, and maintenance of military weapons systems, subsystems, and components or parts, to meet U.S. military requirements.
- 7)** Emergency Services Sector: Is a community of millions of highly-skilled, trained personnel, along with the physical and cyber resources that provide a wide range of prevention, preparedness, response, and recovery services during both day-to-day operations and incident response.
- 8)** Energy Infrastructure Sector: Fuels the economy of the 21st century. Without a stable energy supply, health and welfare are threatened, and the U.S. economy cannot function.
- 9)** Financial Services Sector: Represents a vital component of our nation's critical infrastructure. Large-scale power outages, recent natural disasters, and an increase in the number and sophistication of cyberattacks demonstrate the wide range of potential risks facing the sector.
- 10)** Food and Agriculture Sector: Is almost entirely under private ownership and is composed of an estimated 2.1 million farms, 935,000 restaurants, and more than 200,000 registered food manufacturing,

processing, and storage facilities. This sector accounts for roughly one-fifth of the nation's economic activity.

**11)** Government Facilities Sector: Includes a wide variety of buildings, located in the United States and overseas, that are owned or leased by federal, state, local, and tribal governments.

**12)** Healthcare and Public Health Sector: Protects all sectors of the economy from hazards such as terrorism, infectious disease outbreaks, and natural disasters.

**13)** Information Technology Sector: Is central to the nation's security, economy, and public health and safety as businesses, governments, academia, and private citizens are increasingly dependent upon Information Technology Sector functions.

**14)** Nuclear Reactors, Materials, and Waste Sector: From the power reactors that provide electricity to millions of Americans, to the medical isotopes used to treat cancer patients, the Nuclear Reactors, Materials, and Waste Sector covers most aspects of America's civilian nuclear infrastructure.

**15)** Transportation Sector: The Department of Homeland Security and the Department of Transportation are designated as the Co-Sector-Specific Agencies for the Transportation Systems Sector. The nation's transportation system quickly, safely, and securely moves people and goods through the country and overseas.

**16)** Water Wastewater System Sector: Safe drinking water is a prerequisite for protecting public health and all human activity. Properly treated wastewater is vital for preventing disease and protecting the environment. Thus, ensuring the supply of drinking water and wastewater treatment and service is essential to modern life and the Nation's economy.

#### Geographic Areas Affected by Critical Infrastructure Disruption

Critical infrastructure is located throughout the County, with larger clusters in densely populated areas such as Downtown Jacksonville.

#### Historical Occurrences of Critical Infrastructure Disruption

To date, the majority of disruptions have occurred during tropical cyclone events. See the Tropical cyclone Hazard Profile for any mention of notable power outages.

#### Probability of Future Occurrences of Critical Infrastructure Disruption

Critical infrastructure may be disrupted as a result of any number of hazards, and is contingent upon the impacts of those specific hazards. For probability of targeted attacks on critical infrastructure, see the Terrorism/Targeted Violence Hazard Profile.

#### Critical Infrastructure Disruption Impact Analysis

##### Public

- Critical infrastructure failures impact those living within the hazard area
- Roadways may be obstructed or inaccessible to the public, challenging transportation requirements

##### Responders

- Critical infrastructure failure may cause roadway to be closed.

- Communications system failure would impact the responders' ability to communicate their status or identify areas that require response.

#### Continuity of Operations (including continued delivery of services)

- Disrupt communications systems
- Disrupt operations of the facility that is being blocked
- COJ EPD maintains a Continuity of Operations Plan (COOP). In the event of Infrastructure failure that affects the County's operations, the EPD will enact the COOP appropriately to the situation. To date, there have been few or no major incidents that have shut down state, county, or municipal governmental operations. While expectation is minimal, this threat may impact EPD's ability to implement their COOP based on the hazard's potential to cause power outages and transportation difficulties.
- Computer/network and other communication access may be impacted due to power outages. Delivery of services will be disrupted due to critical infrastructure failure. Transit systems may face closures due to public safety concerns due to inability to operate transportation vehicles such as trains and buses. The ability to deliver food, drinking-water, and services will be impacted locally, regionally, and statewide due to problems with accessibility and transport abilities.

#### Property, Facilities, Infrastructure

- Potential damage to infrastructure and public transportation programs
- Shutting down affected highways, railways, airports, etc.
- Roads and bridges may be impacted and water and sewer systems may be damaged, leading to the issue of sanitation and waste collection. Property of homes and businesses may be completely destroyed if situated close to the failure point.

#### Environment

- The impacts on the environment of critical infrastructure would vary based on the event and impacts. Failure of waste water plants would result in spreading pollution and hazardous materials throughout the environment including large bodies of water. Ecosystems and natural habitats may be destroyed, causing migration.

#### Economic Condition

- Blocked roads could lead to an inability for businesses to open or employees to get to work, causing economic impacts.

#### Public Confidence in Jurisdiction's Governance

- Tourists may reconsider visiting Duval County.

Further impacts to Economic Condition: Critical infrastructure failure would have a direct and considerable fiscal impact on the local government, even after some of the costs have been paid through federal disaster declarations. Additionally, infrastructure failure in every sector has the potential to impact the ability of businesses to operate. If the private sector is not able to maintain operability, there would be continued revenue loss until operability is restored. One possible impact can be examined in the Economic Vulnerability Figure 44, page 141, for the property values of businesses and residential

properties within the footprint of an incident. Areas where power lines are buried are less susceptible to disruption during severe weather events. During Hurricane Irma, over 350,000 customers of the various electric companies within the County lost power.

Further impacts to Public Confidence in Jurisdiction's Governance: Critical infrastructure failure would have a direct and immediate impact on the state's ability to provide governance, maintain order, and ensure the continuity of public services. If there were delays in restoring infrastructure, and any services contingent on this infrastructure, the public would become increasingly distrustful of the government's ability to restore services and ensure public safety and wellbeing. Direct, immediate, and effective actions must be taken in order to maintain public confidence. Response activities must include all levels of government

#### Potential Effects of Climate Change on Critical Infrastructure Disruption

Extreme weather events are the main cause of power outages and a constant hazard to the nation's energy system. Due to climate change, future extreme events that can cause power outages are projected to be more frequent and last longer. Equipment and infrastructure used in the production, generation, transmission, and distribution of energy resources are constantly exposed to the elements. High winds threaten damage to power lines. Flooding from extreme precipitation can undermine the foundations of energy infrastructure, and inundate energy facilities that are commonly located along rivers. When energy assets fail, power outages can evolve into widespread energy disruption that can take weeks to resolve—at significant cost to utilities—and potentially affect the nation's economic and national security (Source: <https://toolkit.climate.gov/topics/energy-supply-and-use>).

Global climate change can cause structural damage to roads in three ways.

First, the increase in temperatures and the intensity of extreme weather can create a climate which old roads and bridges were not built to withstand, causing the pavement from roads to soften and expand. This expansion of the road due to high temperatures creates depressions and potholes, which have become common in high-traffic areas around the country. Expansion of pavement can also cause significant structural damage to bridges.

A second way that global climate change can cause damage to roads is through climate change-related natural disasters, such as heavy rains that can cause flooding and wash away soil supporting the roads. Specifically, floods brought by hurricanes can cause catastrophic damage to roads and bridges not built to withstand such extreme weather. For example, tropical storm Isaac released an historic fifteen inches of rain in just a few hours, causing a portion of the Florida state road in Fort Lauderdale to be washed away.

A third way that global climate change can affect the transportation sector is through rising sea levels, resulting from thermal expansion of the world's oceans and the loss of land-based ice due to increased polar and glacial melting. The Intergovernmental Panel on Climate Change (IPCC), in a study of the consequences of climate change, found that sea levels are rising around twice the rate as that recorded in the twentieth century. These rising sea levels can affect the integrity of roadways and other structures. For example, an evaluation of the vulnerabilities Palm Beach County roadways estimated that a two-foot rise in sea level would affect thirteen miles of roads, while a three-foot sea level rise would affected

forty-one miles of Florida's roadway. Furthermore, the rise in sea levels has threatened to flood the Virginia Military Institute and its naval base (Source: <https://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1482&context=jss>).

#### Vulnerability Analysis and Loss Estimation

Due to large volume of mass transportation venues and military bases, Duval County is susceptible to impacts to critical infrastructure from all natural and manmade hazards. Loss estimates are included in each hazard profile that incorporate damage to critical infrastructure. Losses may be incurred from direct damages, economic damages, damages stemming from loss of use, and costs of labor of response personnel.

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## Overall Vulnerability

Critical Infrastructure Disruption					Overall Vulnerability
Overview					High
Critical infrastructure describes the physical and cyber systems and assets that are so vital to the United States that their incapacity or destruction would have a debilitating impact on our physical or economic security or public health or safety.					
Frequency	Probability	Potential Magnitude			
Very High	Very High	Injuries/Deaths	Infrastructure	Environment	
		Increased	Increased	Low	

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Moderate, with a score of 20. Data from the <https://teammicrotech.com/most-damaging-jacksonville-hurricanes-and-tropical-storms/> was cross-referenced with local data to arrive at the figures incorporated into the LMS Vulnerability Assessment.



## Terrorism/Targeted Violence Hazard Profile

### Terrorism/Targeted Violence Description

Agencies such as the FBI, the US Department of Defense and the US Department of State realize the need to define terrorism. While each definition is a bit different, they do have constant themes. These themes include involving premeditation terrorist acts which are motivated by some political or social agenda; terrorists generally target non-combatants or civilians and are generally sub-national or clandestine groups. The configuration of terrorist groups is generally dependent on one's environment, relationship with the state, motivation and/or goals.

International terrorism: Violent, criminal acts committed by individuals and/or groups who are inspired by, or associated with, designated foreign terrorist organizations or nations, i.e. state-sponsored (*Source: <https://www.fbi.gov/investigate/terrorism>*).

Domestic terrorism: Violent, criminal acts committed by individuals and/or groups to further ideological goals stemming from domestic influences, such as those of a political, religious, social, racial, or environmental nature (*Source: <https://www.fbi.gov/investigate/terrorism>*).

Our Nation faces a growing threat from domestic terrorism and other threats, including the targeted violence attacks on houses of worship, schools, workplaces, festivals, and shopping spaces. Many of the perpetrators of these targeted violence attacks do not appear to fit the definition of terrorists because they lack a clear ideological motive. They may often be responding to a perceived grievance, whether domestic, workplace, or of some other nature. This targeted violence is a persistent problem and a grave concern. Targeted violence includes, but is not limited to, mass attacks and hate crimes but Gang-related shootings are not typically included in statistics to track and account for mass attacks, as defined by the Department of Homeland Security. The extent of damages from these incidents is typically measured by the count of injured or deceased victims.

The following could be considered types of Mass Attacks:

- Active shooter: Individuals using firearms to cause mass casualties.
- Biological: The intentional release of toxic biological agents to harm and terrorize civilians.
- Chemical: The deliberate release of chemicals that could poison people, animals, plants, or the environment.
- Bombing (IED): Individuals using homemade bombs to cause mass casualties.

Active Shooter: An Active Shooter is an individual actively engaged in killing or attempting to kill people in a confined and populated area; in most cases, active shooters use firearms(s) and there is no pattern or method to their selection of victims. Active shooter situations are unpredictable and evolve quickly. Typically, the immediate deployment of law enforcement is required to stop the shooting and mitigate harm to victims. Because active shooter situations are often over within 10 to 15 minutes, before law enforcement arrives on the scene, individuals must be prepared both mentally and physically to deal with an active shooter situation (*Source: [https://www.dhs.gov/xlibrary/assets/active\\_shooter\\_booklet.pdf](https://www.dhs.gov/xlibrary/assets/active_shooter_booklet.pdf)*).

The Department of Homeland Security defines certain characteristics of an active shooter as the following:

- Active shooters are likely to engage more than one target. They may target particular individuals or they may be intent on killing as many randomly chosen people as possible.
- Active Shooters often go to locations with high concentrations of people, such as schools, theaters, shopping centers, or other places of business.
- Active shooters often, but not always, are suicidal and may attempt suicide by police. Escape from the police is usually not a priority of an active shooter. Most active shooters do not attempt to hide their identity.

Indicators of Potential Violence by an Employee Employees typically do not just “snap,” but display indicators of potentially violent behavior over time. If these behaviors are recognized, they can often be managed and treated. Potentially violent behaviors by an employee may include one or more of the following (this list of behaviors is not comprehensive, nor is it intended as a mechanism for diagnosing violent tendencies):

- Increased use of alcohol and/or illegal drugs
- Unexplained increase in absenteeism; vague physical complaints
- Noticeable decrease in attention to appearance and hygiene
- Depression / withdrawal
- Resistance and overreaction to changes in policy and procedures
- Repeated violations of company policies
- Increased severe mood swings
- Noticeably unstable, emotional responses
- Explosive outbursts of anger or rage without provocation
- Suicidal; comments about “putting things in order”
- Behavior which is suspect of paranoia, (“everybody is against me”)
- Increasingly talks of problems at home
- Escalation of domestic problems into the workplace; talk of severe financial problems
- Talk of previous incidents of violence
- Empathy with individuals committing violence
- Increase in unsolicited comments about firearms, other dangerous weapons and violent crimes

(Source: [https://www.dhs.gov/xlibrary/assets/active\\_shooter\\_booklet.pdf](https://www.dhs.gov/xlibrary/assets/active_shooter_booklet.pdf) ).

**Biological:** Biological warfare agents are bacteria and viruses that infect humans, animals, and crops resulting in an incapacitating or fatal disease or crop destruction. Symptoms may not appear for days to weeks. Often the bacteria or virus is weaponized, and the changes will affect a broader segment of humans, animals, or crops than the normal pathogen. In a biological warfare terror event, healthcare providers must deal with uncommon pathogens that rarely affect humans. Healthcare facilities will be inundated with victims. The arrival of one or more victims with an odd presentation may be the initial indication that an act of terrorism has occurred. Biologic agents may be dispersed by several techniques including contaminated water and aerosol sprays. They can also infect individuals and place them on

airplanes, buses, or large events that will disperse the virus quickly (Source: <https://www.ncbi.nlm.nih.gov/books/NBK493217/>).

The Center for Disease Control has identified 30 organisms that might be weaponized and has grouped them into three categories. Classification is based on ease of dissemination, morbidity and mortality, panic potential, and level of public health requirements.

**Category A:** Highest priority diseases that pose a risk to national security are easily transmitted, have high morbidity and mortality, would have a major public health impact and cause panic, and require special public health preparedness. Category A. Biological Diseases are:

- Anthrax (*Bacillus anthracis*)
- Botulism (*Clostridium botulinum* toxin)
- The Plague (*Yersinia pestis*)
- Smallpox (*Variola major*)
- Tularemia (*Francisella tularensis*)
- Hemorrhagic Fever
- Ebola Virus

**Category B:** Moderate priority diseases with lower morbidity and mortality and more difficult to disseminate.

**Category C:** High priority diseases that have the potential to cause significant morbidity and mortality and are emerging pathogens that could be engineered for mass dispersion.

**Chemical:** Chemical agents are extremely toxic synthetic chemicals that can be dispersed as a gas, liquid or aerosol or as agents adsorbed to particles to become a powder. These Chemical agents have either lethal or incapacitating effects on humans. Thousands of toxic substances are known, but only some of them are considered as chemical warfare agents based on their characteristics, high toxicity, imperceptibility to senses and rapidity of action after dissemination and persistency, and are listed as scheduled chemicals in the Chemical Weapons Convention (CWC). According to the CWC, chemical weapons are defined as toxic chemicals and their precursors, munitions and devices, and any equipment specifically designed for use directly in connection with such weapons (Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3148621/>).

Scientists often categorize hazardous chemicals by the type of chemical or by the effects a chemical would have on people exposed to it. The categories/types used by the Centers for Disease Control and Prevention are as follows:

- Anticoagulants – cause uncontrolled bleeding
- Biotoxins – come from plants or animals
- Blister Agents – blister the eyes, skin, or throat and lungs
- Blood Agents – absorbed into the blood
- Caustics – burn on contact

- Choking, Lung and Pulmonary Agents
- Incapacitating Agents – alter consciousness or thinking
- Metallic Poisons
- Nerve Agents – prevent the nervous system from functioning properly
- Organic Solvents – damage living tissue by dissolving fats and oils
- Tear gas and riot control agents
- Toxic Alcohols
- Vomiting Agents

**Bombing:** The easiest to obtain and use of all weapons is still a conventional explosive device, or improvised explosive device (IED), which may be used to cause massive local destruction or to disperse chemical, biological, or radiological agents. Improvised explosive devices are among the world's oldest types of weapons. IED attacks deliberately target concentrations of civilians to achieve a maximum effect of lethality, terror and societal disruption; and they currently occur globally on a scale of hundreds per month. The components are readily available, as are detailed instructions to construct such a device. Large, powerful devices can be outfitted with timed or remotely triggered detonators and can be designed to be activated by light, pressure, movement, or radio transmission. The potential exists for single or multiple bombing incidents in single or multiple municipalities. Explosive materials can be employed covertly with little signature and are not readily detectable. Secondary explosive devices may also be used as weapons against responders and the public in coincident acts (Source: <https://www.fema.gov/pdf/plan/managingemerconseq.pdf>; <https://www.un.org/disarmament/convarms/ieds-a-growing-threat/>).

#### Geographic Areas Affected by Terrorism/Targeted violence

It is almost impossible to predict where and when an attack could occur. Generally, densely populated or high profile areas are targeted. In most cases, the assailants use weapons to attack crowds, target less protected indoor or outdoor spaces. They intend to harm or kill multiple victims, use the attack(s) to intimidate, and in some cases use makeshift or modern weapons rather than conventional weapons.

#### Historical Occurrences of Terrorism/Targeted Violence

According to the U.S. Secret Service, 27 mass attacks were carried out in public spaces in the United States in 2018, killing 91 people. In 2017, 28 mass attacks claimed 147 lives. In the past three years, the Nation witnessed the two deadliest mass attacks in its modern history, including a 2017 shooting at an outdoor concert in Las Vegas that killed 58 and injured 869.

#### Active Shooter Incidents

Previous occurrences of active shooters in Florida between 1982 and 2019 are detailed in Table 34.

**Table 34: Florida Historical Occurrences, Active Shooter Events, 1982-2019**

<b>Incident</b>	<b>Location</b>	<b>Date</b>	<b>Fatalities</b>	<b>Injuries</b>	<b>Location</b>	<b>Shooter Age</b>	<b>Prior Mental Health History</b>
Pensacola Naval base shooting	Pensacola, Florida	12/6/2019	3	8	Military	-	Unclear
SunTrust Bank Shooting	Sebring, Florida	1/23/2019	5	0	Workplace	21	Yes
Jacksonville Landing Shooting	Jacksonville, Florida	8/26/2018	4	11	Other	30	
Marjory Stoneman Douglas HS	Parkland, Florida	2/14/2018	17	17	School	19	Yes
Florida Awning Manufacturer Shooting	Orlando, Florida	6/5/2017	5	0	Workplace	45	Unclear
Fort Lauderdale Airport Shooting	Fort Lauderdale, Florida	1/6/2017	5	6	Airport	26	Yes
Orlando, nightclub Shooting	Orlando, Florida	06/12/2016	50	53	Night Club		Unclear
Hialeah Apartment Shooting	Hialeah, Florida	7/26/2013	7	0	Other	42	Unclear
Hotel Shooting	Tampa, Florida	12/30/1999	5	3	Workplace	36	Yes

Incident	Location	Date	Fatalities	Injuries	Location	Shooter Age	Prior Mental Health History
Fort Lauderdale Revenge shooting	Fort Lauderdale, Florida	2/9/1996	6	1	Workplace	41	Yes
GMAC massacre	Jacksonville, Florida	6/18/1990	10	4	Other	42	No
Shopping Centers Spree Killings	Palm Bay, Florida	4/23/1987	6	14	Other	59	Yes
Welding Shop Shooting	Miami, Florida	8/20/1982	8	3	Other	51	Yes

Source: <https://www.fbi.gov/file-repository/active-shooter-incidents-2000-2018.pdf/viewBiological/>

Source: <https://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data/>

### Biological Attacks

Oregon followers of Indian guru Bhagwan Shree Rajneesh mounted an attack that sickened nearly 800 people with typhoid fever in 1984. Cult members introduced bacteria into salad bars and other restaurant food receptacles after their attempts to contaminate the local water supply failed. They hoped to influence local election results by preventing residents from voting. Though 43 people were hospitalized, no one was killed, and the wrongdoers were prosecuted.

A more recent U.S. biological attack occurred just after the Al Qaeda attacks of September 11, 2001, on the World Trade Center and the Pentagon. An unknown actor mailed a powder containing infectious anthrax spores to two U.S. senators and several media outlets. Five people died from anthrax after exposure to the material in the letters, and 17 became ill. Medical personnel offered the anthrax vaccine as post-exposure prophylaxis (PEP) to 1,727 potentially exposed people who were also taking antibiotics to counter anthrax. Of those people, 199 agreed to take the vaccine and received all doses of it.

The anthrax attacks of 2001 have increased concerns that "weapons grade" biological agents can be obtained or manufactured and disseminated by terrorists. In order to assist in planning for future attacks, bioterrorist attack scenarios have been envisioned that involve the use of aerosol-delivery technologies to target large civilian populations by air, inside buildings, or in mass transit systems. However, there is relatively little unclassified data on which biodefense planners can base their understanding of the potential consequences of a large-scale bioterrorist attack. A 1970 World Health Organization (WHO) study estimated that 50 kg of *Bacillus anthracis* released over an urban population of 5 million would sicken 250,000 and kill 100,000 people (Source:

<https://www.historyofvaccines.org/content/articles/biological-weapons-bioterrorism-and-vaccines>;  
[https://www.medscape.com/viewarticle/452339\\_1](https://www.medscape.com/viewarticle/452339_1) ).

### Chemical Attacks

On October 2001, an editor at the Florida-based tabloid The Sun died of anthrax traced to a letter. A newsroom employee also contracted anthrax but recovered. Meanwhile, anthrax-laden letters turned up at the offices of ABC, CBS, and NBC in New York. Several employees, as well as a New Jersey mail handler and a child that was in the ABC offices, developed cutaneous anthrax. Anthrax also is found in the New York office of Gov. George Pataki. In the same month, letters containing anthrax arrived at the Senate mailroom. Overall, 19 people developed anthrax infections; five died. Some 10,000 U.S. residents took two-month courses of antibiotics after possible anthrax exposures. The perpetrator(s) of these attacks has not yet been identified. Because the anthrax was of weapons grade or near-weapons grade, it appears to have come from a sophisticated laboratory (Source: <https://www.webmd.com/a-to-z-guides/features/biological-chemical-terror-history#1> ).

## Bombing Attacks

Previous occurrences of bomb incidents in Florida between 2001 and 2019 are detailed in **Table 35**.

**Table 35: Bomb related incidents in Florida**

Date	Information
2001	Richard Reid unsuccessfully attempted to blow up an American Airlines Paris-to-Miami flight by placing explosives in his shoes.
2006	In Sanibel, Florida, a small bomb was found in a parking lot located among three restaurants. Authorities said the eight inch-by two inch-by three inch bomb was connected to a cell phone. It was rigged so that if the phone was called, the device would explode. The Lee County bomb squad responded to the scene and dismantled the device. Two other restaurants and a nearby road were closed for about four hours.
2010	The Federal Bureau of Investigation (FBI) investigated a pipe bomb found at the scene of the May 10, 2010 attack at the Islamic Center of Northeast Florida (ICNEF) in Jacksonville, Florida. There were 60 people in the building at the time of the attack.
2011	The FBI arrested three Pakistani-Americans, including father and son imams from South Florida mosques, charging them with providing financing and other material support to the Pakistani Taliban.
2012	Sami Osmakac, an American citizen born in the former Yugoslavia who is a Florida resident, was charged with plotting a terrorist spree around Tampa, including bombing nightclubs, destroying bridges, and shooting police officers in the name of radical Islam.

Source: <https://www.hsd.org/c/timeline/?timeline=any&timeline-category=any>

## Probability of Future Occurrences of Terrorism/Targeted Violence

There is no sure way to predict future mass attack or targeted violence as most events typically occur without warning. The probability of a mass attack of some kind is perceived to be high, and planning must be done. The Florida Division of Law Enforcement (FDLE) plays a large part in providing the state with critical intelligence and serves as a prevention measure to the state.

## Terrorism/Targeted Violence Impact Analysis

### Public

- Witnesses are at risk of PTSD and survivor's guilt following a large scale attack.
- Fear throughout the affected community, and the country, is high causing a hazardous environment.
- Civilians are a target for attacks and are at risk.
- Exposure to Hazardous Materials is a possibility and could affect the nearby population and first responders.



- Lack of clean running water can cause unsanitary conditions and dehydration.

#### Responders

- First responders are at risk of PTSD and other health issues following a violent attack.
- First Responders are a target for second wave attacks and are at risk during rescue operations.
- Exposure to Hazardous Materials is a possibility and could affect the nearby population and first responders.
- Lack of communications and disruption of critical services can delay emergency response times.

#### Continuity of Operations (including continued delivery of services)

- Tourism can decline following an attack and could cause lost revenue to a community and the economy.
- Airports in surrounding areas may close causing delays, leaving travelers stranded.
- Streets blocked with debris or closed due to proximity can cause street congestion and slow down response times and evacuation routes.
- Bridges could be closed causing issues evacuating and responding.
- Train disruptions can cause delays and stranded passengers.
- Communication grid overload can cause the system to crash following a large attack.
- Damage to phone lines can cause issues getting information and calling for emergency services.
- Loss of Internet can affect numerous industries and emergency response.

#### Property, Facilities, Infrastructure

- Bridges could be destroyed or damaged causing issues evacuating a community.
- Train tracks could be damaged or destroyed causing further delay in passengers and cargo being transported.
- Cars in the vicinity could be damaged or destroyed.
- Roads can be damaged or destroyed causing prolonged delays and reduced access for evacuation.
- Damage to buildings can include:
  - Collapse (full/partial), Windows blown out, Fire
- Damage or destruction of government buildings could delay necessary services for the community.
- Damage or destruction to critical infrastructure such as places of travel, banks, and utilities could cause stress and hardship within the community.
- Outages can be widespread.
- Damage to power grid can prolong outages.

#### Environment

- Exposure to Hazardous Materials is a possibility and could affect the environment and wildlife.
- Could contaminate the food and water sources.
- Damage to green spaces.

#### Economic Condition

- Prolonged loss of revenue could cause businesses to close and the economy to suffer.
- Loss of wages could affect citizens' ability to buy necessities and could affect the economy.
- The economy (business, personal, and government) could be affected if banks are closed or not able to access the Internet.

#### Public Confidence in Jurisdiction's Governance

- Lack of communication from leadership to the public.
- Evacuation timeframe
- Response timeframe
- Recovery timeframe
- Not stopping an attack could lead to a loss of respect or confidence.

#### Potential Effects of Climate Change on Terrorism/Targeted Violence

There are no anticipated direct effects from climate change to Terrorist/ Targeted Violence attacks. Climate Change may lead to social unrest due to geographical or sociopolitical tensions, resulting in hostile actions between individuals or nations. Indirect effects leading to terrorism and targeted violence may be expected in such a scenario.

#### Vulnerability, Probability and Risk for Terrorism/Targeted Violence

Duval County recognizes that current facilities are vulnerable to terrorism attacks. Duval County's potential vulnerable locations:

- Schools: 196
- Military Bases: 4
- Airports: 7 (1 International)
- Stadium: Maximum Capacity 67,164
- The Port of Jacksonville: 1
- Jacksonville Cruise Terminal: 1
- Abortion Medical Clinic: 4
- Animal Testing Sites: 1 (Acuvue, Johnson & Johnson)

Duval County is known for its many special events that pull in local and out-of-state crowds such as the Jacksonville's Jazz Fest, the Sea and Sky Air Show, and the Great River Run Marathon to name a few. Such events may be targeted by violent actors.

## Overall Vulnerability

Terrorism/Targeted Violence					Overall Vulnerability
Overview					Moderate
<p>International terrorism: Violent, criminal acts committed by individuals and/or groups who are inspired by, or associated with, designated foreign terrorist organizations or nations (state-sponsored).</p> <p>Domestic terrorism: Violent, criminal acts committed by individuals and/or groups to further ideological goals stemming from domestic influences, such as those of a political, religious, social, racial, or environmental nature.</p> <p>Targeted Violence: Many of the perpetrators of targeted attacks do not appear to fit the definition of terrorists because they lack a clear ideological motive. They may often be responding to a perceived grievance, whether domestic, workplace, or of some other nature. This targeted violence is a persistent problem and a grave concern. Targeted violence includes, but is not limited to, mass attacks and hate crimes but Gang-related shootings are not typically included in statistics to track and account for mass attacks, as defined by the Department of Homeland Security.</p>					
Frequency	Probability	Potential Magnitude			
Moderate	Increased	Injuries/Deaths	Infrastructure	Environment	
		Increased	Increased	Increased	

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Moderate, with a score of 14. Data from the <https://www.fbi.gov/investigate/terrorism> was cross-referenced with local data to arrive at the figures incorporated into the LMS Vulnerability Assessment.

Active Shooter					Overall Vulnerability
Overview					Moderate
An Active Shooter is an individual actively engaged in killing or attempting to kill people in a confined and populated area; in most cases, active shooters use firearms(s).					
Frequency	Probability	Potential Magnitude			
Very High	Very High	Injuries/Deaths	Infrastructure	Environment	
		Increased	Low	Very Low	

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Moderate, with a score of 16. Data from the <https://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data/> was cross-referenced with local data to arrive at the figures incorporated into the LMS Vulnerability Assessment

Biological					Overall Vulnerability
Overview					Moderate
Biological warfare agents are bacteria and viruses that infect humans, animals, and crops resulting in an incapacitating or fatal disease or crop destruction.					
Frequency	Probability	Potential Magnitude			
High	Very High	Injuries/Deaths	Infrastructure	Environment	
		Moderate	Low	Low	

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Moderate, with a score of 18. Data from the [https://www.medscape.com/viewarticle/452339\\_1](https://www.medscape.com/viewarticle/452339_1) was cross-referenced with local data to arrive at the figures incorporated into the LMS Vulnerability Assessment.

Chemical					Overall Vulnerability
Overview					Increased
Chemical warfare is probably one of the most brutal created by mankind. Chemical agents are extremely toxic synthetic chemicals that can be dispersed as a gas, liquid or aerosol or as agents adsorbed to particles to become a powder.					
Frequency	Probability	Potential Magnitude			
Low	High	Injuries/Deaths	Infrastructure	Environment	
		Very Low	Low	Low	

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be increased, with a score of 8. Data from the <https://www.webmd.com/a-to-z-guides/features/biological-chemical-terror-history#1> was cross-referenced with local data to arrive at the figures incorporated into the LMS Vulnerability Assessment.

Improvised Explosive Device					Overall Vulnerability
Overview					High
The easiest to obtain and use of all weapons is still a conventional explosive device, or improvised explosive device (IED), which may be used to cause massive local destruction or to disperse chemical, biological, or radiological agents.					
Frequency	Probability	Potential Magnitude			
Very High	Very High	Injuries/Deaths	Infrastructure	Environment	
		Moderate	Increased	Low	

Based on the Frequency, Probability, and Potential Magnitude summary, the Overall Vulnerability of this hazard was determined to be Moderate, with a score of 16. Data from the SGSF Wildfire Risk Assessment Portal provided a geo-spatial visualization of Wildland Urban Interface, Community Protection Zones, Wildfire Ignition Density, and produced an overall wildfire Risk Index that was cross-referenced with local data to arrive at the figures incorporated into the LMS Vulnerability Assessment

## **SECTION IV- MITIGATION INITIATIVES**

The LMS Advisory Group/Duval Prepares is the body that ensures the maintenance of effective projects and programs already accepted and operational in the community. The LMS Working Group, the SEPPC, is the body that ratifies and accepts the recommendations of the LMS Advisory Group.

### **A. Project Selection**

Mitigation initiatives that were identified as a product of the Local Mitigation Strategy reflect the unique balance of the community's vision, goals and objectives with the risks and vulnerabilities posed by the hazards that threaten it. Potential projects and programs will be based on an all-hazards approach, and will specifically consider: all natural, technological and societal hazards; vulnerable population and property, environmental and economic resources, and a comprehensive risk analysis based on frequency, probability (exposure), and potential impacts.

Development of highly detailed analyses of potential new initiatives requires substantial resources, therefore new projects and programs identified and listed will be evaluated and prioritized based on the information available. Generally, initiatives and projects will document the following:

- why the project is needed;
- how it would effectively reduce disaster damages or save lives (technical merit);
- anticipated cost-effectiveness (benefit – cost analysis);
- degree of acceptability to the public and regulatory agencies if implemented.

Prioritization will involve an in-depth assessment of a project's ability to meet specific criteria as defined by a Prioritization Point Scale. This point scale, included as Table 37: Prioritization Point Scale for Mitigation Initiatives, will determine the greatest opportunity for loss reduction to allow for strategic resource allocation.

### **B. Prioritization Criteria and Process**

The point system will serve as an objective ranking process for mitigation projects and programs for the Local Mitigation Strategy and may be revised and/or adopted as defined in the Evaluation and Enhancement Procedures of the Strategy.

Potential mitigation initiatives will be prioritized based on a point scale value of the following general criteria:

- Urgency/Severity
- Benefit/Cost Justification (quantification of benefits)
- Effectiveness
- Overall Risk Reduction
- Legal authority
- Availability of funds
- Conformity to local mitigation goals and objectives



In addition, in considering urgency, a high priority will be given to those projects which immediately reduce loss of life and damage to property; secondly, initiatives which facilitate a quick return to normalcy from disaster without compromising the goals and principles of this strategy, and lastly, initiatives which address long-term redevelopment. Mitigation initiatives will be prioritized as urgency or availability of funding requires. Examples of project rankings developed during previous funding cycles are available upon request from the Emergency Preparedness Division. These may be used for historical documentation purposes or as a reference during future opportunities for project ranking.

### **C. Project Monitoring Process**

Prior to each quarterly meeting of the LMS Advisory Committee (Duval Prepares), participants are invited to provide updates for ongoing mitigation initiative projects and propose additional projects for inclusion in the LMS. Proposed projects will be reviewed and recommended for adoption by the LMS Advisory Committee. The LMS Working Group (SEPPC) is responsible for making the formal motion to adopt projects. The LMS project list, included here as Table 39: Duval County Local Mitigation Strategy Project List, is maintained by the City of Jacksonville Emergency Preparedness Division separately from the LMS document, which itself is updated on a 5-year cycle. The project list will be updated quarterly with any changes to progress or project status. New projects will be added when adopted. Projects that are completed, deferred, or deleted will be transferred to the appropriate lists, which are included as appendices in to this plan.

**Table 36: Prioritization Point Scale for Mitigation Initiatives**

Categories	Maximum Points Available	Scoring Instructions	Points Awarded
<p>1. <u>Consistency With Existing Comprehensive Growth Management Plan</u></p> <p>Is the project or initiative consistent with or incorporated in the existing Comprehensive Growth Management Plan?</p>	10	<p>If “yes” then award 10 points; if “no” award 0 points. If project or initiative is consistent with <u>recommended changes proposed</u> but not yet adopted to the Comprehensive Growth Management Plan, award 5 points.</p>	
<p>2. <u>Consistency With Existing Emergency Management Plan or Other Functional Plan Developed by an Official Local Governmental Entity</u></p> <p>Has this project or initiative already been proposed as a management initiative or structural improvement in any emergency proposed or adopted by County or local jurisdictions?</p>	10	<p>If the project or initiative has been proposed but not officially adopted, award 5 points. If the project has been adopted, award 10 points.</p>	

Categories	Maximum Points Available	Scoring Instructions	Points Awarded
<p>3. <u>Consistency with Structured Programs and Processes</u></p> <p>Does the project or initiative meet criteria or guidelines within its hazard area, which will provide program credits to the community or citizens? (Ex. Community Rating System, which will reduce flood insurance rates for property owners.)</p>	10	Award 10 points for those measures providing program credits.	
<p>4. <u>Project's Potential to Provide Economic Benefits</u></p> <p>Does the project or initiative provide an economic benefit to the community?</p>	10	Award 10 points for those measures providing an economic benefit.	
<p>5. <u>Community Benefit</u></p> <p>Does the project reduce loss to or significantly benefit a large portion of a community as a whole? How many people are directly and indirectly affected?</p>	10	<p>Award 10 points for those projects that benefit all of the community. Award lesser point scores for those projects which are area or group specific:</p> <p>Benefit 80% of the community = 8 pts.  Benefit 60% of the community = 6 pts.  Benefit 40% of the community = 4 pts.  Benefit 20% of the community = 2 pts.  Benefit 10% or less of the community = 1 pt.</p>	

Categories	Maximum Points Available	Scoring Instructions	Points Awarded
<p>6. <u>Community Exposure</u></p> <p>Does the project mitigate a frequently occurring problem or a problem to which a community is particularly vulnerable, or a hazard that is a high level of risk as identified in the Local Mitigation Strategy Hazard Identification and Vulnerability Assessment?</p>	10	<p>Award up to 10 points for those projects that mitigate a hazard risk to which the community has a high exposure based on the vulnerability analysis. Reduce the points awarded as the risk or frequency of events for which this project or initiative mitigates declines.</p> <p>Multi-Hazards = 2 pts.  High-risk hazards-region-wide impact = 8 pts.  High-risk hazards-localized impact = 6 pts.  Medium risk hazards-region-wide or non-specific location = 4 pts.  Low risk hazards-non-site specific = 2 pts</p>	
<p>7. <u>Cost Effectiveness</u></p> <p>What is the cost effectiveness of the initiative or project, based on conducting a preliminary analysis using a representative sample or BCA software 3.0 or later of the technical feasibility and benefits versus costs? Please include damage and impact costs from both presidentially declared and non-declared events.</p>	10	<p>A total of 10 points will be awarded in this category based on the following:</p> <p>Benefit/cost ratio = 1.0 or greater = 10 pts.  Benefit/cost ratio = &lt;1.0 = 0 pts.</p>	

Categories	Maximum Points Available	Scoring Instructions	Points Awarded
<p>8. <u>Effective Project Useful Life</u></p> <p>How long will the community continue to receive the benefits of a particular mitigation project or initiative?</p>	10	Award 10 points to projects with a useful life greater than 40 years. Award 8 points to projects with a useful life between 20-39 years. Award 6 points to projects with a useful life between 10-19 years. Award 4 points to projects with a useful life between 5-9 years. Award 2 points to projects with a useful life between 1-4 years. Award 0 points to projects with a useful life equal to 0.	
<p>9. <u>Public Support</u></p> <p>Can public support for this project be documented?</p>	10	Award 10 points to projects that have solicited public input.	
<p>10. <u>Sponsorship and Funding Availability</u></p> <p>Does this project have an active sponsor that will take responsibility for its management and implementation?</p>	10	Award 10 points if there is an identified sponsor <u>and</u> the sponsor has 100 percent matching funds committed to the project or initiative. Award 8 pts. If sponsor matches 50percent to 100percent. Award 5 points if there is an identified sponsor for the proposed project or initiative, but no funding match from sponsor; 0 points if no sponsor.	
<p>11. <u>Environmentally Sound</u></p> <p>Does the project impact environmental or historical resources?</p>	10	Award up to 10 points to projects or initiatives that have no negative impact on environmental or historical resources, taking into account appropriate mitigation measures that may be applied. Award 5 points for projects that have a medium impact on those resources; award 0 points for projects or initiatives that have a high impact.	

Categories	Maximum Points Available	Scoring Instructions	Points Awarded
12. <u>Consistency with Local Mitigation Strategy Goals and Objectives</u>	10	<p>A total of 10 points will be awarded in this category based on projects or initiatives that:</p> <p>Meet 5 or more goals/objectives = 10 pts.  Meet 4 or more goals/objectives = 8 pts.  Meet 3 or more goals/objectives = 6 pts.  Meet 2 goals/objectives = 4 pts.  Meet 1 goal/objective = 2 pts.  Meet no goals/objectives = 0 pts.</p>	
14. <u>BONUS CREDITS for Post Disaster Funding</u> Does the project/initiative have urgency due to official declaration of disaster and availability of post-disaster funding?	(10)	A total of 10 points will be awarded if the project has been approved for a post-disaster funding priority of 1. Award 7 points if the project has a post-disaster funding priority of 2, 5 points if a priority of 3.	
TOTAL POINTS	120 (130)		

Table 37: Sample Grading Rubric

Category	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Max Points	10	10	10	10	10	10	10	10	10	10	10	10	10	10	130
Project # 1															
Project # 2															
Project # 2															

## **D. 2020 Mitigation Initiative Prioritization Results**

The Local Mitigation Strategy Advisory Committee (Duval Prepares) members generated more than 120 different potential mitigation projects organized into 7 categories of land use, construction, critical facilities, economic diversification, transportation, natural environment and community resources. Each of the potential initiatives is included so that all jurisdictions in the City of Jacksonville have a standard base of projects to apply towards when funding becomes available. This process is a whole-group consensus-driven exercise. Projects are listed in numeric order, and not in a standing ranked score for each potential initiative.

The LMS Advisory Committee recognizes that there is an administrative burden associated with determining and maintaining a prioritization score for each individual project. The scope of work, costs, and other components of projects may change slightly over time as new needs are identified within the community. As such, the prioritization of a proposed mitigation project will take place when funding becomes available through pre-or post-disaster resources and funding is desired for a particular project or group of projects. Due to the wide variety of funding sources available for these projects, it is not feasible to provide an overall standing ranking to each particular project. Particular projects or project types may better meet the guidelines of various funding sources, and will be ranked objectively from amongst a specific group of projects that are selected for submission (only if prioritization is required). When required, prioritization will take place according to Table 37: Prioritization Point Scale for Mitigation Initiatives. A copy of the mitigation project submission form is attached, to reflect the information requested about projects recommended for inclusion in the Local Mitigation Strategy.

Please note: As the LMS is updated on a five year cycle, and project lists are updated quarterly, a current list of mitigation initiative projects is maintained separately by the Emergency Preparedness Division and is available at any time upon request.



Duval County LMS Project Submission Form

Duval County Local Mitigation Strategy

Project Submission Form

General Information Required



1. Name, address and phone for contact regarding proposed project:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Phone #: (\_\_\_\_) \_\_\_\_\_

Organization: \_\_\_\_\_

Project Name: \_\_\_\_\_

2. Description of the proposed project:

3. Explanation of need for proposed project and overall risk reduction summary:

4. Relation to goals, objectives and policies in the LMS and/or consistency with existing emergency management plan or other functional plan of a local government entity:

5. Hazard that proposed project will mitigate against and the project's effective useful life:

6. Estimated cost of proposed project. Has cost-benefit ratio been established? Please describe how this was determined:

7. Source of funding for proposed project:

8. Estimated percentage of population benefited from proposed project. Is there public support for the project? Please describe how this was determined:

9. Estimated percentage of jurisdiction benefited from proposed project (or project's potential to provide economic benefits):

10. Estimated amount of time to implement proposed project:

11. Party responsible for implementing proposed project:

12. Potential environmental impacts of proposed project:

13. Additional comments or information not inquired for above:

**Please return project information to:**

Emergency Preparedness Division,

Jacksonville Fire and Rescue Department

515 North Julia Street, Suite 400, Jacksonville, FL 32202

**Note – Hazard Abbreviation Key:** SW-Severe-Weather-Thunderstorms-Tornadoes-Hall/TTV-Terrorism-Targeted-Violence-Active-Shooter-Bombing-Bio-Chem-Attacks/ED-Environmental-Degradation-Coastal-Erosion-Saltwater-Intrusion/ID-Infectious Disease-Human-Animal/SS-Tropical Cyclone Storm Surge/CA-Cyber-Attack/F-Flooding/FT-Freezing-Temperature/W-Tropical Cyclone Wind/CID-Critical Infrastructure Disruption/SLR-Sea-Level-Rise/D-Drought/WF-Wildfire/Hazmat-Hazardous-Materials-Accident/WS-Winter-Storm/EH-Extreme-Heat

**Table 38: Duval County Local Mitigation Strategy Project List**

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
1	Camelia Street List Station Generator: Purchase and install a generator at the sewer lift station on 302 Camelia Street	COAB	City of Atlantic Beach - Department of Public Utilities	CID	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$100,000	Submitted to FDEM through HMGP DR4337 (Irma)	6 Months
2	Aquatic Gardens Flood Mitigation: Replacement of insufficient box culvert to alleviate the identified main pinch point and reconstruct adjacent roadway. Property may also be acquired to enlarge the existing retention pond servicing the area	COAB	City of Atlantic Beach - Public Works Department	F/SS	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$2,000,000	Submitted to FDEM through HMGP DR4337 (Irma)	24 Months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
3	Sherman Creek Lagoon Flood Mitigation: Dredging of a portion of Sherman Creek Lagoon (from the City Hall/Police Department building property at Plaza Drive to the Howell Park area) to return the lagoon to its previous depth of 8-10 feet	COAB	City of Atlantic Beach - Public Works Department	F/SS	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$2,000,000 to \$4,000,000	Existing	24 Months
4	Stanley Road Flood Mitigation: Replace all existing drainage piping related to a flood-prone area to redirect storm water to an FDOT-owned retention pond at Mayport Road	COAB	City of Atlantic Beach - Public Works Department	F/SS	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$600,000	Existing	24 Months
5	West Plaza at Gladiola Flood Mitigation: Emplace a filter box and flat gate valve at the intersection of West Plaza Street and Gladiola Street	COAB	City of Atlantic Beach - Public Works Dept. Department	F/SS	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$200,000	Submitted to FDEM through HMGP DR4337 (Irma)	24 Months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
6	Cutlass Drive Box Culvert Replacement: Replacement of existing 4-foot-by-6-foot box culvert in the Hopkins Creek Ditch at Cutlass Drive in the Hopkins Creek Drainage basin with a double -4-foot-by-6-foot box culvert	COAB	City of Atlantic Beach - Public Works Dept.	F/SS	Goal 1: Reduce Risk	HMGP Tier III	Y	\$450,000	Existing	12 Months
7	Mary Street Storm water Improvements: Restoration of an existing storm water infrastructure via replacement of undersized driveway culverts and roadway culverts in the vicinity of Mary Street between Dutton Island Road, Stewart Street and Main Street. The project also consists of the regrading of drainage swales on the south side of Stewart Street	COAB	City of Atlantic Beach - Public Works Dept. Department	F/SS	Goal 1: Reduce Risk	HMGP Tier III	Y	\$450,000	Existing	16 Months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
8	Drainage Master Plan: Town of Baldwin drainage improvement plan	Town of Baldwin	Town of Baldwin Public Works	F/SS	Goal 1: Reduce Risk	Multiple: Local/ State/ Federal (including post disaster funding)	Y	\$100,000	Existing - Ongoing	More than 12 months
9	Beach Renourishment Program: Beach erosion project-program to mitigate storm surge damage. All Beaches municipalities requested reincorporation into the 2020 LMS.	All Beaches, Duval County	US Army Corps of Engineers (US-ACE)	F/SS/ W/AC C	Goal 1: Reduce Risk	Multiple: US-ACE; Capital Improvement Plan (CIP)	Y if PA or HMG P	\$22,000,000 (10+ miles @ \$3-5M per mile)	Existing	36 Months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
10	McCoy's Creek Project - Phase I & II: Floodplain restoration adjacent to McCoy's Creek and improvements to the flow characteristics of the creek. The City of Jacksonville is proposing to alleviate these problems in a combined project that demolishes and reconstructs, and elevates two low lying bridges (Phase 1A- Requesting HMGP/City Funding for King and Stockton Street Bridges) above the 100 yr flood plain, improves the creek water flow with a channel improvement project (Phase 1B-Requesting HMGP/City Funding, From Cherokee Street to the St. John's River), adds in multi-modal trail improvements, (Phase 1C- City/Other Grant Funding, Multi-modal from Leland Street). This application speaks to Phase 1A, 1B and 1C which will cost approximately \$51.7 M in funding with Phase 1A estimated costs of \$15 M, and Phase 1B and the outfall will cost \$28.6 M.	COJ	City of Jacksonville - Public Works	F/SS	Goal 1: Reduce Risk	Multiple: Storm water Managem ent Fund; Bond funds; Federal and State aid, if available	Y- 25%	\$28,600,000	Submitted to FDEM through HMGP DR4337 (Irma)	More than 12 months



#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
11	McCoy's Creek Project - Phase III: Construction of a 40-acre storm water management facility. (Previously McCoy's Creek II) The above scope addresses the channel widening from Cherokee to the St. Johns River.	COJ	City of Jacksonville - Public Works	F/SS	Goal 1: Reduce Risk	Multiple: Storm water Managem ent Fund; Bond funds; Federal and State aid, if available	Y- 25%	\$23,000,000	Existing	More than 12 months
12	Hogan's Creek Drainage Improvement Project: Improved conveyance under the Arlington Street Expressway. Off-line Regional Storm water Facility at the Hart Expressway. In-line Regional Storm water Facility at Liberty Street. Relocation of repetitive loss properties	COJ	City of Jacksonville - Public Works	F/SS	Goal 1: Reduce Risk	Multiple: Storm water Managem ent Fund; Bond funds; Federal and State aid, if available	Y- 25%	\$15,000,000	Existing	More than 12 months

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13	The Emerald Necklace Pond (Hogan's Creek): Flood mitigation for Hogan's Creek and Springfield neighborhoods - wet detection ponds	COJ	City of Jacksonville - Public Works	F/SS	Goal 1: Reduce Risk	Pre- and Post-Disaster Funding	Y	\$2,000,000	Existing - Submitted to FEMA in 2013 PDM. Not implemented.	More than 12 months
14	Pump Station Critical Facility Mitigation: Installation of new pump stations, enclosures and accessories at 7 locations - Hillman Drive, Myrtle Avenue, Hilly Road, Bradley Road, McGirt's Creek Park, Sandalwood Canal, Jessie Street	COJ	City of Jacksonville - Public Works	F/SS/C ID	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$275,000	Submitted to FDEM through HMGP DR4337 (Irma) - Under Review	More than 12 months
15	LaSalle Lift Station & Generator: Installation of a pump station at LaSalle Street in San Marco. Additional Improvements include: 1) new storm inlet rehabilitation and installations along roadways; 2) conveyance pipe rehabilitation and installation to a main trunkline 3) installation of a emergency generator to withstand 500 yr events.	COJ	City of Jacksonville - Public Works	F/SS/C ID	Goal 1: Reduce Risk	Post Disaster Funding	Y	Lift Station Project cost is (\$8,400,000) Emergency generator cost is (\$1,293,050)	Submitted to FDEM through HMGP DR4399 (Michael)	18 - 24 Months

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16	Loest Road Bridge Infrastructure Project Reconstruct the bridge as a triple barrel reinforced concrete bridge raised in elevation to help withstand another 100 yr. flood/storm and reduce the risk of residents being stranded along the road.	COJ	City of Jacksonville - Public Works	F/SS/C ID	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$1,708,961	Submitted to FDEM through HMGP DR4399 (Michael)	18 Months
17	Marsh Hen Road Elevation Project Professional design work to start construction on the existing roadways for Marsh Hen Drive and Harts Road. Public Works is proposing to make adjustments to vertical alignments and raise the vertical profiles of both roads.	COJ	City of Jacksonville - Public Works	F/SS/C ID	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$718,750	Submitted to FDEM through HMGP DR4399 (Michael)	12 Months

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18	Acree Road Bridge Replacement Project Demolition and replacement of three bridges along Acree Road. Acree Road is the primary road providing access to a major highway and connector for Duval and Nassau County.	COJ	City of Jacksonville - Public Works	F/SS/C ID	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$3,300,000	Submitted to FDEM through HMGP DR4399 (Michael)	6 Months
19	Drainage Improvements: Improvements for the interior drainage system of the Jacksonville Zoo and Gardens	COJ	Jacksonville Zoo and Gardens	F/SS	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$50,000	Submitted to FDEM through HMGP DR4337 (Irma)	12 Months
20	Dinsmore Area Drainage Improvements: Correct flooding occurrences in the North Side of Jacksonville	COJ	Jacksonville Zoo and Gardens	F/SS	Goal 1: Reduce Risk	State and Federal	Y	\$4,522,000	Not yet submitted	More than 12 months
21	Main Jail Retrofit: Elevation of generator serving the main jail	COJ	Jacksonville Sheriff's Office (JSO) and City of Jacksonville - Public Works	F/SS	Goal 1: Reduce Risk	HMGP Tier III	Y	\$200,000	Submitted to FDEM through HMGP DR4337 (Irma)	More than 12 months

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22	Bal Harbour Estates Sanitary Sewer Rehabilitation and Restoration: Post disaster drainage project for neighborhood impacted by Tropical Storm Debby - Engineering Study (Phase 1)	CONB	City of Neptune Beach - Public Works	F/SS	Goal 1: Reduce Risk	HMGP Tier I	Y	\$600,000	Existing - Ongoing	36 Months
23	8-inch Sanitary Sewer Force Main: Extension of the Northwest Regional Water Treatment Plant - Florida Blvd	CONB	City of Neptune Beach - Public Works	F/SS	Goal 1: Reduce Risk	HMGP Tier III	Y	\$750,000	Existing - Previously advanced to FDEM; not selected for funding	More than 12 months
24	Sewer Rehabilitation: 400-500 Block	CONB	City of Neptune Beach - Public Works	F/SS	Goal 1: Reduce Risk	HMGP Tier III	Y	\$2,000,000	Existing - Previously advanced to FDEM; not selected for funding	More than 12 months
25	Treatment Plant: Expansion of the Anoxic Tank - Wastewater treatment plant	CONB	City of Neptune Beach - Public Works	F/SS	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$125,000	Existing	More than 12 months
26	Culvert Upgrade: Upgrade of culvert located on Florida Blvd and 5th Street	CONB	City of Neptune Beach - Public Works	F/SS	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$750,000	Existing	More than 12 months

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27	Vulnerability Study Comprehensive vulnerability study (THIRA) for Beaches Municipalities	COJ Beaches - All	Beaches Municipalities	All Hazar ds	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$20,000	Existing	More than 12 months
28	Underground Utility Placement: Pre-disaster plan for post-disaster underground placement	COJ	JEA	F/SS/ W/CID	Goal 1: Reduce Risk	Multiple: HMGP/CIP	Y	Phased, \$1,000,000 per phase.	Existing - Ongoing	Ongoing
29	Drawbridge Program: Replacement program for 35 drawbridges on designated evacuation routes (Hecksher Road bridges and Main Street Bridge maintenance in progress)	COJ	F-DOT/Local Jurisdictions	F/SS/ W	Goal 1: Reduce Risk	Multiple: Local/Stat e/Federal	Y	\$10,000,000	Existing - Ongoing	Ongoing
30	Emergency Generators: Funding assistance for critical facility generators (countywide)	COJ	City of Jacksonville - Emergency Preparedness Division (EPD) - coordinating with local jurisdictions	F/SS/ W	Goal 1: Reduce Risk	Multiple: Local/Stat e/Federal	Y	\$750,000 for Special Needs shelters (as example)	Existing - Ongoing	More than 12 months

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31	Storm water/Drainage Infrastructure: Implementation of Storm water Management Plans/maintenance of drainage infrastructure	COJ	Local jurisdictions	F/SS	Goal 1: Reduce Risk	Multiple: Local/ State/ Federal (including post disaster funding	Y	\$10M +	Existing - Ongoing	More than 12 months
32	Study of Storm water Retention and Basins: Study of regional cumulative impacts of natural storm water retention systems and storm basins	COJ	City of Jacksonville - Public Works	F/SS	Goal 1: Reduce Risk	Multiple: City of Jacksonville CIP and storm water utility fee/State/ Federal	Y	\$5,000,000	Existing	More than 12 months
33	Wildfire Mitigation Projects: Fuel reduction around critical facilities and residential areas (last project implemented - Town of Baldwin Firewise Program)	COJ	Florida Forestry Service/Jacksonville Fire and Rescue	WF	Goal 1: Reduce Risk	State and Federal	Y.	\$50,000 (Master planning)	Existing - Ongoing	More than 12 months

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34	Brooks Bartram Green Houses Emergency Power Project: Installation of new 80KW diesel generator (1-phase 240 volt) to provide a 100-amp emergency circuit to each Green House. The emergency circuit in each Green House would allow emergency power connection to the access control system, kitchen, and one (1) heat pump.	COJ	Brooks Skills Nursing Facility, Inc.	CID	Goal 1: Reduce Risk	HMGP	Y- 25%	\$122,276	Submitted under DR- 4283 - being reviewed	2 Months



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35	Brooks Bartram Lakes Emergency Power Project: Installation of a utility generator tap box for emergency power outlets at the Assisted Living Facility, which is also licensed as an Extended Congregate Care (ECC) facility. The existing emergency circuit would allow emergency power connection to the resident rooms. The new breakers will be interlocked with the existing utility main breakers, so there will be no way to back feed the normal utility power with the temporary generated power.	COJ	Brooks Skills Nursing Facility, Inc.	CID	Goal 1: Reduce Risk	HMGP	Y- 25%	\$85,697	Submitted under DR- 4283 - being reviewed	2 Months

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36	Brooks Corporate Administrative Additional Emergency Power Project: Installation of two (2) emergency duplex receptacles and convert all the existing light fixtures to emergency power in the Brooks Rehabilitation Hospital Corporate Administrative building, which will enable the building to shelter Hospital medical and support staff during an emergency or event. The Brooks Rehabilitation Hospital Corporate Administrative building also houses and is utilized as the Alternate Hospital Command Center. These emergency duplex receptacles and lighting will be connected to an existing emergency power generator.	COJ	Brooks Skills Nursing Facility, Inc.	CID	Goal 1: Reduce Risk	HMGP	Y-25%	\$32,313	Submitted under DR-4283 - being reviewed	2 Months

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37	Brooks Housing Project Emergency Power Project: Installation of a new 180KW diesel generator to provide a 600-amp emergency distribution to a housing project that will support the Brooks Rehabilitation Hospital. This size emergency distribution would allow emergency power connection to the access control system, special needs electric motorized wheelchairs, durable medical equipment, kitchen units on each floor, critical outlet and light fixture in each room, fire alarm panel, water heaters, all A/C climate control equipment and egress lighting.	COJ	Genesis Rehabilitation Hospital, Inc. d/b/a Brooks Rehabilitation Hospital	CID	Goal 1: Reduce Risk	HMGP	Y- 25%	\$616,723	Submitted under DR-4283 - being reviewed	2 Months
38	Brooks Network Command Center & Alternate Hospital Command Center Project	COJ	Genesis Rehabilitation Hospital, Inc. d/b/a Brooks Rehabilitation Hospital	CID	Goal 1: Reduce Risk	HMGP	Y- 25%	\$90,000	Submitted under DR-4283 - being reviewed	2 Months

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39	Brooks Rehabilitation Hospital Command Center Upgrade Project: The upgrade of the existing Hospital Command Center for the purposes of continuity of service and support during an emergency, cyber-attack, or event impacting business operations. These funds will be used to expand existing space, provide additional emergency power, and communications infrastructure available to the Hospital Command Center.	COJ	Genesis Rehabilitation Hospital, Inc. d/b/a Brooks Rehabilitation Hospital	CID	Goal 1: Reduce Risk	HMGP	Y-25%	\$15,000	Submitted under DR-4283 - being reviewed	2 Months
40	Brooks Rehabilitation Hospital Emergency Power Upgrade: Installation of a new 600-amp feeder routed through the connector bridge between Memorial Hospital and Brooks Rehabilitation Hospital to provide emergency power to the Hospital and air conditioning units.	COJ	Genesis Rehabilitation Hospital, Inc. d/b/a Brooks Rehabilitation Hospital	CID	Goal 1: Reduce Risk	HMGP	Y-25%	\$495,836	Submitted under DR-4283 - being reviewed	2 Months

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41	Brooks Rehabilitation Hospital Well with Emergency Power: Drill a new Florida Aquifer well, well pad, permits, pump, water testing, plumbing from Well to building, installation of new 30-amp emergency circuit, new 30-amp breaker to existing emergency power generator, and electrical connections to the new Well pump pressure switch.	COJ	Genesis Rehabilitation Hospital, Inc. d/b/a Brooks Rehabilitation Hospital	CID	Goal 1: Reduce Risk	HMGP	Y- 25%	\$32,621	Submitted under DR-4283 - being reviewed	2 Months

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42	Brooks University Crossing Emergency Power Project: Installation of six (6) emergency duplex receptacles and convert all the existing light fixtures to emergency power in the University Crossing Command Center and maintenance office on the first floor. The University Crossing Conference Room located on the first floor, is also utilized as the University Crossing Command Center. These emergency duplex receptacles will be connected to an existing emergency power generator.	COJ	Brooks Skills Nursing Facility, Inc.	CID	Goal 1: Reduce Risk	HMGP	Y- 25%	\$89,332	Submitted under DR- 4283 - being reviewed	2 Months

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43	Brooks University Crossing Well with Emergency Power: Drill a new Florida Aquifer well, well pad, permits, pump, water testing, plumbing from Well to building, installation of new 30-amp emergency circuit, new 30-amp breaker to existing emergency power generator, and electrical connections to the new Well pump pressure switch.	COJ	Brooks Skills Nursing Facility, Inc.	CID	Goal 1: Reduce Risk	HMGP	Y- 25%	\$32,621	Submitted under DR-4283 - being reviewed	2 Months
44	Brooks Bartram Campus Well with Emergency Power: Drill a new Florida Aquifer well, well pad, permits, pump, water testing, plumbing from Well to building, installation of new 30-amp emergency circuit, new 30-amp breaker to existing emergency power generator, and electrical connections to the new Well pump pressure switch.	COJ	Brooks Skills Nursing Facility, Inc.	CID	Goal 1: Reduce Risk	HMGP	Y- 25%	\$32,621	Submitted under DR-4283 - being reviewed	2 Months

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45	Brooks Bartram Crossing Emergency Power Project: Install six (6) emergency duplex receptacles and convert all the existing light fixtures to emergency power in the Bartram Crossing Command Center and maintenance office on the first floor. The Bartram Crossing Command Center is also utilized as the Bartram Campus Command Center. These emergency duplex receptacles will be connected to an existing emergency power generator.	COJ	Brooks Skills Nursing Facility, Inc.	CID	Goal 1: Reduce Risk	HMGP	Y- 25%	\$12,303	Submitted under DR- 4283 - being reviewed	2 Months



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46	Brooks Rehabilitation Hospital Central Energy Plant and Decontamination Area Project: This project will also provide a secure and sheltered area, in order to decontaminate emergency, ambulance, public safety, and first responder vehicles and personnel, who have been exposed to hazardous materials. This project will also implement protective measures from Chemical, Biological, Nuclear, Radiological, and Explosive (CBNRE) attacks for two (2) hospitals and one (1) Provisional Level II Trauma Center that are collocated.	COJ	Genesis Rehabilitation Hospital, Inc. d/b/a Brooks Rehabilitation Hospital	CID, CBRN E	Goal 1: Reduce Risk	HMGP	Y-25%	\$31,000,000	Submitted under DR-4283 - being reviewed	< 1 Year

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47	Coastal Hardening Project – Storm water Outfall Extensions: Extension of the dune storm water outfalls to 10 feet seaward of the dune system to avoid breaks and breaches in the dunes that cause flooding to occur from hurricane storm surge or nor'easter events. The current outfall locations require low points/breaks in the dune system, making the dunes more vulnerable to breaches and overflows. Extending the outfalls to 10 feet seaward of the dune system will allow the dune system to be built on top of the storm water outfall infrastructure, providing a stronger protection system.	COJB	COJB - Public Works	F/SS	Goal 1: Reduce Risk	HMGP	Y-25%	\$254,610	Submitted under DR-4283 - being reviewed	14 Months

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48	Coastal Hardening Project – Dune Walkovers: Increase the height and length of the 49 dune walkovers along 4.1 miles of beaches, to accommodate a higher and continually growing dune system, and to provide for future dune growth. The walkovers sustained damage from Matthew.	COJB	City of Jacksonville Beach - Public Works	F/SS	Goal 1: Reduce Risk	HMGP	Y- 25%	\$1,293,702	Existing	14 Months
49	Drainage: Improvements for the interior drainage system of the Jacksonville Zoo and Gardens	COJ	Jacksonville Zoo and Gardens	F/SS	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$50,000	Submitted under HMGP DR4337 HMGP	12 Months
50	Nemours Children's Specialty Care Clinic Generator: This project will provide back-up power generation for Nemours Children's Specialty Care, Jacksonville's 736,677 square foot Clinic.	COJ	Nemours Children's Specialty Care Clinic Generator	CID	Goal 1: Reduce Risk	Post Disaster Funding	Y	\$3,000,000	Submitted under PDMG 2018 - Not Found Cost Effective	24 Months
51	Emergency Generator for City Hall: Emergency power support for continuity of government during power outages at City Hall	COAB	City of Atlantic Beach - Public Works Department	F/SS/ W/CID	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$110,000	Submitted under HMGP DR4337 HMGP	More than 12 months

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52	Public Works Operations Building Generator: Purchase and permanently install a generator to service the Public Works Operations Building at 1200 Sandpiper Lane	COAB	City of Atlantic Beach - Public Works Department	CID	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$150,000	Submitted under HMGP DR4337 HMGP	6 Months
53	City Hall and Fire Station 46: Hardening of critical infrastructure	Baldwin	Town of Baldwin	W	Goal 2: Decrease Vulnerability	Multiple: HMGP-4068 Tier I, Landfill tipping fees	Y	\$65,000	Existing	18 Months
54	Critical Infrastructure Hardening: Post Disaster Shelter	Baldwin	Town of Baldwin	W	Goal 2: Decrease Vulnerability	Multiple: HMGP-1785 Tier I, Landfill tipping fees	Y	\$3,000,000	Existing	More than 12 months
55	Water Plant Generator: Osceola Ave. Water Plant emergency power generator	COJB	City of Jacksonville Beach - Utilities	F/SS/CID	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$400,000	Existing	More than 12 months

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56	Power Line Burying: Convert overhead power lines and street crossings in wooded/problem areas to underground.	COJB & CONB	City of Jacksonville Beach dba Beaches Energy Services	F/SS/C ID	Goal 2: Decrease Vulnerability	Pre- and Post- Disaster Funding, PA Program	,	\$10,000,000 , \$1M per year in 10 year phased project	New	Up to 10 years
57	Portable Pump Program: Portable pumps for lift stations (JEA has FLA WARN system serving region)	COJB	JEA/City of Jacksonville - Public Works	F/SS/ACC	Goal 2: Decrease Vulnerability	Multiple: State, Federal, Post Disaster Funding	Y	\$4,000,000	Existing	More than 12 months
58	Wind Retrofit Program Group V: Groups of fire stations grouped into phases 1-6 for wind retrofit	COJ	Jacksonville Fire and Rescue Department	W	Goal 2: Decrease Vulnerability	Multiple: State, Federal	Y	\$150,000	Awarded under HMGP DR-4337 - In Progress	More than 12 months
59	Emergency Generators for Fire Stations: Emergency Generator funding for fire stations at risk to power disruption during severe weather	COJ	Jacksonville Fire and Rescue Department	CID	Goal 2: Decrease Vulnerability	HMGP	Y- 25%	\$1,293,702	Awarded under HMGP DR-4337 - In Progress	12 Months
60	Fire and Rescue Boat Dock Mitigation: Install boat lifts to protect rescue vessels from wave action and storm surge, FS #38, #39, #40	COJ	Jacksonville Fire and Rescue Department	F/SS	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$330,000	Submitted under HMGP Dr4337 HMGP - Undder Review	12 Months

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61	Debris Management: Debris management plan to restore county more quickly after emergency event in disposal of storm-generated debris	COJ	Public Works of each jurisdiction	F/SS/ W	Goal 2: Decrease Vulnerabilit y	Post Disaster Funding	Y	\$13,000,000 to \$75,000,000	Existing - Ongoing	Annual updates with revisions after each disaster event
62	Facilities for Shelter Retrofit: Ongoing review of buildings capable to sustain retrofit	COJ	City of Jacksonville - Parks and Recreation Department	F/SS/ W	Goal 2: Decrease Vulnerabilit y	Post Disaster Funding	Y	\$2,000,000	Existing	More than 12 months
63	Public Buildings Retrofit: A. Fleet Management Central Garage Wind Retrofit	COJ	City of Jacksonville - Public Works	W	Goal 2: Decrease Vulnerabilit y	Post Disaster Funding	Y	\$700,000	Existing	More than 12 months
64	Data Center Hardening: Data center at Ed Ball Bldg.	COJ	City of Jacksonville - Public Works	W/CID	Goal 2: Decrease Vulnerabilit y	Post Disaster Funding	Y	\$300,000	Existing	More than 12 months
65	Home Retrofit Program: Residential Housing Hardening for Low Income Residents	COJ	City of Jacksonville - Housing Division	W	Goal 2: Decrease Vulnerabilit y	RCMP/ HLMP	Y	\$500,000	Ongoing - on funds available through State RCMP, CDBG, etc.	More than 12 months

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66	Facilities for Shelter Retrofit: Ongoing review of buildings capable to sustain retrofit	COJ	City of Jacksonville - Parks and Recreation Department	F/SS/ W	Goal 2: Decrease Vulnerabilit y	Post Disaster Funding	Y	\$2,000,000	Existing	More than 12 months
67	Flood Ditch System Capabilities: Ditch maintenance and clean out projects	COJ	FDOT/Local Governments/City of Jacksonville - Public Works	F/SS	Goal 2: Decrease Vulnerabilit y	Annual Budgets	N	Included in Operations Budget	Existing - Ongoing	Annual
68	Jacksonville Alternate Disaster Warehouse: Hardening of facility serving county EM	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)	W/SS/ F	Goal 2: Decrease Vulnerabilit y	Post Disaster Funding	Y	\$200,000	Existing - Plan to submit for HMGP DR4399.	More than 12 months
69	Emergency Generator Relocation Project: Relocate jail generator & Utilities above BFE	COJ	Jacksonville Sheriff's Office (JSO) and City of Jacksonville - Public Bldgs. Division	F/SS/ ACC	Goal 2: Decrease Vulnerabilit y	Post Disaster Funding	Y	\$901,760	Submitted under HMGP DR4337 - Under Review	More than 12 months
70	Generator Project: Generator for City Hall	CONB	City of Neptune Beach - Public Works	F/SS/C ID	Goal 2: Decrease Vulnerabilit y	Post Disaster Funding	Y	\$100,000	Existing	More than 12 months

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71	Hurricane Risk Sheltering Program: Shelter assessment and retrofit program	COJ	City of Jacksonville/Duval County Public Schools (DCPS)/Universities and State Colleges	F/SS/W	Goal 2: Decrease Vulnerability	Multiple: Local, State, Federal (including Post Disaster Funding)	Y	\$3,500,000	Existing - Ongoing	More than 12 months
72	Critical Infrastructure Hardening Retrofit: Twin Lakes Middle School Shuttering Retrofit	COJ	Duval County Public Schools (DCPS)	W	Goal 2: Decrease Vulnerability	Multiple: Local, State, Federal (including Post Disaster Funding)	Y	\$350,000	Existing	More than 12 months
73	School Infrastructure Improvement: DCPS Wind Retrofit and Wall Support for West Riverside Elementary School #12	COJ	Duval County Public Schools (DCPS)	W	Goal 2: Decrease Vulnerability	Public Shelter Retrofit Funding	Y	\$200,000	Existing	More than 12 months



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74	School Infrastructure Improvement: Replacement of electric panels (lightning protection) and light fixtures, relocation of water meter and water main at Frank Peterson High School	COJ	Duval County Public Schools (DCPS)	F/SS/C ID	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$250,000	Existing	More than 12 months
75	School Infrastructure Improvement: Replacement of electrical and 1200 AMP distribution panel for lightning protection at Lee High School	COJ	Duval County Public Schools (DCPS)	F/SS/C ID	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$250,000	Existing	More than 12 months
76	Relocation and/or retrofit of vulnerable critical facilities: Identification and creation of mitigation plan for specific vulnerable facilities	COJ	Local jurisdictions	F/SS/W/AC C	Goal 2: Decrease Vulnerability	Multiple: Local, State, Federal (including Post Disaster Funding)	Y	\$500,000	Existing	More than 12 months
77	County Debris Management Plan: Pre-positioned contracts for post-disaster debris removal; pre-designation of sites	COJ	City of Jacksonville - Public Works	W	Goal 2: Decrease Vulnerability	Multiple: State/Federal/Post Disaster Funding	Y	\$4,000,000	Existing - Ongoing	Annual updates to plans and FEMA permitted sites

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
78	Critical Infrastructure Hardening: Health College to be used as medical needs hurricane risk shelter; inclusive of generators for special needs	COJ	Florida State College Jacksonville (FSCJ)	W/SS/ F	Goal 2: Decrease Vulnerabilit y	Post Disaster Funding	Y	\$5,000,000	Existing	More than 12 months
79	Wind Retrofit: Buildings on Fairgrounds Retrofit for Emergency Response and Recovery	COJ	Greater Jacksonville Agricultural Fair (GJAF)/ Department of Agriculture	F/SS/ W	Goal 2: Decrease Vulnerabilit y	Post Disaster Funding	Y	\$300,000	Existing	More than 12 months
80	Wind and Safe Room Construction: Design and construct Code Plus facility to support emergency response, recovery and provide tornado shelter for Fair attendees	COJ	Greater Jacksonville Agricultural Fair (GJAF)/ Department of Agriculture	F/SS/ W/T	Goal 2: Decrease Vulnerabilit y	Post Disaster Funding	Y	\$1,000,000	Existing	More than 12 months
81	Hardening Project: Critical Facilities Hardening, Port-Wide	COJ	JAXPORT	W	Goal 2: Decrease Vulnerabilit y	Multiple: Local, State, Federal (including Post Disaster Funding)	Y	\$5,000,000	Existing	More than 12 months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
82	Generator Project: Emergency Energy Source for Port Central Operations Building (PCOB)	COJ	JAXPORT/City of Jacksonville - Emergency Preparedness Division (EPD)	F/SS/C ID	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$200,000	Existing	More than 12 months
83	Structural Enhancement Program for Public Safety/Health and Medical Critical Facilities: Review public and private hospitals, public safety and health and medical facilities for retrofit opportunities to support life safety issues	COJ	City of Jacksonville/ Department of Health- Duval/EPD/Public and Private Hospitals	W	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$5,000,000	Existing	More than 12 months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
84	Pump Station Electrical Reliability: Retrofit and upgrade JEA sewage lift stations to provide an alternate source of electric power and improve ancillary equipment. Expand backup electrical support of lift stations to newly identified critical sites. Supplying generators and ancillary equipment will allow uninterrupted service in the event of primary power source failure.	COJ	JEA/City of Jacksonville - Public Works	F/SS/ACC	Goal 2: Decrease Vulnerability	Multiple: State/Federal/Post Disaster Funding/JEA Capital Budget	Y	\$20,000,000	Existing - Ongoing	Multiple Years - 50 generators per year
85	Electric Substations Floodproofing: Retrofit vulnerable electric substations	COJ	JEA	F/SS/ACC	Goal 2: Decrease Vulnerability	Multiple: State/Federal/Post Disaster Funding	Y	\$18K+ ea.	Existing	More than 12 months
86	JEA Resilience Projects: Bradley Road Pump Station Electrical and Associated Improvements	COJ	JEA	F/SS/ACC	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$2,100,000	Existing	More than 12 months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
87	230 Kv River Crossing Improvement (Alternative #1): Retrofit towers into current NECS code and increase clearance over navigable waterway – 190FT. High-dollar project replacing 50-year old infrastructure	COJ	JEA	F/SS/ W/AC C	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$25,000,000	Existing	More than 12 months
88	230 Kv River Crossing Improvement (Alternative #2): Retrofit towers for current NECS code and increase clearance over navigable waterway – 220FT. High-dollar project replacing 50-year old infrastructure	COJ	JEA	F/SS/ W/AC C	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$55,000,000	Existing	More than 12 months
89	230 Kv River Crossing Improvement (Alternative #3): Replace 1960s era towers , construction of two termination stations and underground 6-transmission circuits over navigable waterway – 220FT. High-dollar project replacing 50-year old infrastructure	COJ	JEA	F/SS/ W/AC C	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$75,000,000	Existing	More than 12 months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
90	Alachua Master Pump Station Improvements: Wet well retrofit and relining to prevent sanitary sewer overflow	COJ	JEA	F/SS/ ACC	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$2,453,000	Existing	More than 12 months
91	Springfield District Energy Plant Backup Power Upgrade: Upgrade of chilled water plant for backup power to chillers and cooling towers serving the regional Shands trauma center. Installation of backup generators.	COJ	JEA	F/SS/ ACC	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$2,100,000	Existing	More than 12 months
92	Northwest Regional Water Treatment Plant: Replace existing water treatment plant which serves the Jacksonville International Airport. Development increasing in this area.	COJ	JEA	F/SS/ ACC	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$9,250,000	Existing	More than 12 months
93	Southeast Water Treatment Plant: Incorporate high service pumps and Metal Bldg. Replacement - primary provider to Mayo Hospital	COJ	JEA	F/SS/ ACC	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$1,250,000	Existing	More than 12 months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
94	PSI – South Shores Second Sub-Aqueous FM Crossing: Provide a 36” force main parallel to existing 42” force main crossing under St. Johns River . High-dollar project replacing 40-year old infrastructure	COJ	JEA	F/SS/ACC	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$8,700,000	Existing	More than 12 months
95	Homeless Shelter and Disaster Food Warehouse Retrofit: Hardening of primary homeless shelter /securing food services for bulk distribution	COJ	The Salvation Army	W	Goal 2: Decrease Vulnerability	HMGP Tier III	Y	\$223,000	Existing - Previously Submitted to FDEM - Not selected	More than 12 months
96	WJCT-TV Emergency Broadcast Capability: Relocation of Emergency Radio Operations	City of Jacksonville	WJCT-TV/City of Jacksonville - Emergency Preparedness Division (EPD)	F/SS/CID	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$300,000	Existing	More than 12 months
97	Generators and Automatic Relay Switches for Selected Facilities: Manatee Life Support System, Emerald Forest Life Support System, Stingray Bay Life Support System, Temple Generator Auto Start, Hospital Auto Start	COJ	Jacksonville Zoo and Gardens	CID	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$90,000	Submitted under HMGP DR4337 - Under Review	12 Months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
98	Retrofit Project: Reduce the medical facility's vulnerability to damage from wind and flood events. Mitigation activities will focus on the building's envelope, as well as harden the building's roof, while also making site and facility improvements to reduce flood risk	COJ	St. Vincent's Medical Center - Riverside	W/SS/ F	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$10,000,000	Submitted under HMGP DR4337 - Under Review	
99	Retrofit Project: Reduce the medical facility's vulnerability to damage from wind and flood events. Mitigation activities will focus on the building's envelope, as well as harden the building's roof, while also making site and facility improvements to reduce flood risk	COJ	St. Vincent's Medical Center - Southside	W/SS/ F	Goal 2: Decrease Vulnerability	Post Disaster Funding	Y	\$10,000,000	Submitted under HMGP DR4337 - Under Review	



#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
100	Awareness of Flood Hazards: A program to require notification to prospective home buyers of potential flood hazard property	COJ	Northeast Florida Board of Realtors /Banking Industry /City of Jacksonville - Planning Department for CRS	All Hazards	Goal 3: Education, Training, Communications Outreach	Multiple: Local, State, Federal (including Post Disaster Funding), Public and Private sources	Y	\$300,000	Existing	More than 12 months
101	Flood Insurance Education Programs: Flood insurance education for at-risk property owners	COJ	Florida Dept. of Business and Insurance Regulation/NFIP/Municipal building officials, City of Jacksonville - Planning and Development Dept. for CRS/ Floodplain Manager for jurisdictions	All Hazards	Goal 3: Education, Training, Communications Outreach	Multiple: Local, State, Federal (including Post Disaster Funding), Public and Private sources	Y	\$300,000	Existing - Ongoing	Annually

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
102	Education/Incentive Programs for Builders: Higher building standards/cost-effective retrofitting	COJ	Northeast Florida Builders Association /Building Officials Organization/Florida Department of Business and Professional Reg./FLASH	F/SS/ W/AC C	Goal 3: Education, Training, Communica tions Outreach	Private Funding, Pre and Post-disaster funding.	Y if Pre/P ost Disas ter	\$500,000	Existing - Ongoing	
103	Fire Education and Risk Reduction Program: Firewise and Community Wildfire Protection Planning	COJ	Fire Departments from individual jurisdictions/Florida Forestry Service		Goal 3: Education, Training, Communica tions Outreach	Multiple: Local, State, Federal (including Post Disaster Funding), Public and Private sources	Y if Post Disas ter	\$25,000	Existing	More than 12 months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
104	Property Owner and Business Education – Impacts to Wetlands: Program for property owners to educate on the impacts of filling wetlands that might affect homes/businesses	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)/City of Jacksonville - Planning and Development Department/CRS Program	F/SS/ ACC	Goal 3: Education, Training, Communica tions Outreach	Multiple: Local, State, Federal (including Post Disaster Funding), Public and Private sources	Y	\$10,000	Existing - Ongoing	Annual
105	Promotional Program – Floodway Maintenance: Environmental benefits of floodway maintenance. Neighborhood information program for all hazards.	COJ	City of Jacksonville - Planning and Development Department/CRS Credits/City of Jacksonville - Public Works	F/SS	Goal 3: Education, Training, Communica tions Outreach	City Operation al Budget	N/A	\$8,000 Annually	Existing - Ongoing	Annual
106	All Hazards Education: Neighborhood information program for all hazards; disaster preparedness plan for neighborhoods; family. (Annual Preparedness Guide)	COJ	City of Jacksonville - Emergency Preparedness Division (EPD); Fire Departments/Volunteer Services/ARC	F/SS/ W/WF /T/AC C	Goal 3: Education, Training, Communica tions Outreach	Operation al budget and public/pri vate financing	N/A	\$75,000 - \$150,000	Existing - Ongoing	Annually

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
107	Evacuation Shelter Education: Hurricane evacuation/shelter education program for homes and businesses – shelter managers training	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)/LEPC/ARC	F/SS/ WF/T/ ACC	Goal 3: Education, Training, Communications Outreach	City Operational Budget, Public/Private financing	N/A	\$8,000 Annually	Existing - Ongoing	Annually
108	Speakers Bureau: All hazard mitigation speaker's bureau	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)/ARC/Media	All Hazards	Goal 3: Education, Training, Communications Outreach	City Operational Budget, Public/Private financing	N/A	\$20,000 Annually	Existing - Ongoing	Annually
109	Training Program: Disaster preparedness training program for small businesses (such as Hurricane Biz or Small Business Development Center [SBDC] annual workshop)	COJ	Small Business Administration/UN F/ Duval Prepares Business Sustainability Committee/Association of Contingency Planners	W/SS/ WF/A CC	Goal 5: Protect Business and Industry	City Operational Budget, Public/Private financing	N/A	\$35,000	Existing - Ongoing	Annually

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
110	Northeast Florida Resilience Collaborative: Funding to support a collaborative initiative to convene stakeholders to develop a unified resilience strategy for the region.	City of Jacksonville / NE FL Region	Northeast Florida Regional Council (NEFRC)	All	Supports all goals, 1-6	Pre, Post Disaster Funding/ Private Financing	Y if Post Disaster	\$50,000	New	More than 12 Months
111	Establishment Business Emergency Operations Center (EOC): Co-locate business oriented EOC within County EOC to provide business information for response / recovery in all hazards environment	COJ	City of Jacksonville - Emergency Preparedness Division (EPD) / Jacksonville Fire and Rescue Department	F/SS/W/WF/T/ACC	Goal 5: Protect Business and Industry	Operational budget and public/private financing	N	\$75,000	Existing	More than 12 months
112	Firewise or Community Wildfire Protection plans: DOF Firewise Program to be adopted throughout Duval County	COJ	Duval Prepares/SEPPC Ratification	WF	Goal 5: Protect Business and Industry	City Operational Budget	N	\$100,000	Existing	12 Months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
113	Elevation, Relocation, Acquisition Program for Repetitive Loss Properties: Focus on properties meeting technical feasibility and cost effectiveness standards set by F-DEM and FEMA	Duval County	Local jurisdictions/City of Jacksonville - Emergency Preparedness Division (EPD)	F/SS/ W/AC C	Goal 6: Prevention of Repetitive Loss	FEMA pre and post disaster grant program	Y	\$5,000,000	Existing - Ongoing	More than 12 months
114	Acquisition: 6734 Bakersfield Drive, Wills Branch Creek acquisition/demolition	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)/Property Owner	F/SS	Goal 6: Prevention of Repetitive Loss	FEMA pre and post disaster grant program	N	\$299,000	Submitted to FY2019 FMA Program - Under Review	24 Months
115	Acquisition: 6934 Bakersfield Drive, Wills Branch Creek acquisition/demolition	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)/Property Owner	F/SS	Goal 6: Prevention of Repetitive Loss	FEMA pre and post disaster grant program	N	\$197,000	Existing - property removed from previous grant - will maintain status on LMS	24 Months
116	Acquisition: 6944 Bakersfield Drive, Wills Branch Creek acquisition/demolition	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)/Property Owner	F/SS	Goal 6: Prevention of Repetitive Loss	FEMA pre and post disaster grant program	Y	\$222,000	Existing - property removed from previous grant - will maintain status on LMS	24 Months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
117	Residential Acquisition and Demolition: Up to 73 Properties in the Reed Subdivision and South Shores Road Area (32207), St. Johns River	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)/Property Owners	F/SS	Goal 6: Prevention of Repetitive Loss	Pre-Disaster Funding; Post Disaster Funding	Y	\$20,000,000	Existing - submitted under HMGP DR-4337	More than 12 months
118	Residential Acquisition and Demolition: 17 properties in the Reed Subdivision and South Shores Road Area (32207), St. Johns River	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)/Property Owners	F/SS	Goal 6: Prevention of Repetitive Loss	Pre-Disaster Funding; Post Disaster Funding	Y	\$4,468,005	Existing - awarded under HMGP DR-4337 - In progress	More than 12 months
119	Residential Acquisition and Demolition: 22 Properties in the Reed Subdivision and South Shores Road Area (32207), St. Johns River	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)/Property Owners	F/SS	Goal 6: Prevention of Repetitive Loss	Pre-Disaster Funding; Post Disaster Funding	Y	\$6,275,143	Existing - submitted under HMGP DR-4337	More than 12 months
120	Residential Acquisition and Demolition: Up to 220 properties located in the SFHA near Ribault River, Northwest Jacksonville	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)/COJ Neighborhoods/Property Owners	F/SS	Goal 6: Prevention of Repetitive Loss	Pre-Disaster Funding; Post Disaster Funding; CDBG-DR Funding	Y	\$15,000,000 - \$1850,0000	Partially submitted under CDBG-DR Irma Home Buyout Program	More than 12 months

#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
121	Residential Acquisition and Demolition: 3640 Sanctuary Way South, Intercostal Waterway	COJB	City of Jacksonville Beach	F/SS	Goal 6: Prevention of Repetitive Loss	Post Disaster Funding	Y	\$415,500	Existing - awarded under HMGP DR-4337 - In progress	More than 12 months
122	Residential Acquisition and Demolition: 6732 Oakwood Drive, Arlington River	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)	F/SS	Goal 6: Prevention of Repetitive Loss	Post Disaster Funding	Y	\$481,000	Existing - awarded under HMGP DR-4337 - In progress	More than 12 months
123	Residential Acquisition and Demolition: 8369 Bascom Road, Pottsburg Creek	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)	F/SS	Goal 6: Prevention of Repetitive Loss	Post Disaster Funding	Y	\$302,000	Existing - awarded under HMGP DR-4337 - In progress	More than 12 months
124	Residential Acquisition and Demolition: 8960 7th Avenue, Ribault River	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)	F/SS	Goal 6: Prevention of Repetitive Loss	Post Disaster Funding	Y	\$114,485	Existing - Awarded under HMGP DR-4337, Property owner sold. Can re-submit.	More than 12 months



#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Match	Estimated Costs	Status: New, Existing or Deferred	Timeframe for Completion
125	Residential Elevation: 13410 Eynon Drive, Julington Creek	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)	F/SS	Goal 6: Prevention of Repetitive Loss	Post Disaster Funding	Y	\$75,000	Existing - submitted under HMGP DR-4337	More than 12 months

## Duval County Completed, Deleted, and Deferred Projects Summary

Progress through the completion of Mitigation Current Initiatives has been made in the following areas:

Hurricane risk shelter capacity increased in the City of Jacksonville to offset the Hurricane Flood/Storm Surge/Wind hazard vulnerability. More than 12,000 hurricane risk shelter spaces have been added since 2007 in the City of Jacksonville to offset a hurricane shelter capacity deficit as recorded by the State of Florida DEM. Through FEMA post-disaster funding in the Hazard Mitigation Grant Program (HMGP), Community Development Block Grant (CDBG) funds and other City of Jacksonville and Duval County Public Schools (DCPS) funding sources, DCPS has hardened new construction, and retrofitted existing schools outside of established evacuation zones, to increase Jacksonville's resiliency in disaster in sheltering our most vulnerable citizens. New shelter partners are emerging with one shelter construction project at the Florida State College at Jacksonville (formerly known as the Florida Community College at Jacksonville) and the construction of a City of Jacksonville Parks and Recreation Department Center, the Legends, in an area of Jacksonville with a high percentage of vulnerable population. The City of Jacksonville remains a shelter-deficient county.

Critical infrastructure through Jacksonville Fire and Rescue Department fire stations and City of Jacksonville, and City of Jacksonville Beach, successfully shuttered critical buildings needed in response to disaster to minimize hazards from wind. JEA continues to make progress in burying underground electrical lines, where feasible. This initiative reaped huge dividends for the City of Jacksonville, after the rare EF2 Tornado event in Arlington in 2013, as JEA damages were assessed to be below \$20,000 for the event, due to the buried power lines in the district. Through mitigation grant funding, the Jacksonville Fire and Rescue Department has successfully funded the wind retrofitting of all fire stations in the County, and installed emergency generators at every fire station in the County.

Stormwater Improvements have been commissioned at City of Jacksonville Beach, City of Atlantic Beach, City of Neptune Beach, JEA, and Town of Baldwin, to improve stormwater runoff conditions and minimize drainage issues from flooding and storm surge hazards. More than 95 percent of the City of Atlantic Beach's drainage system has been replaced through effective use of Hazard Mitigation Program Grant (HMGP) Tier I funding after the disaster declarations of Tropical Storm Fay in 2008 and Tropical Storm Debby in 2012.

Over nearly two decades, the City of Jacksonville has successfully worked with the State of Florida Division of Emergency Management (DEM), the Federal Emergency Management Agency (FEMA) and the National Flood Insurance Program (NFIP) to mitigate flooding hazards through the acquisition, elevation or relocation mitigation alternative. Utilizing such programs as the Flood Mitigation Assistance Program (FMAP), Repetitive Flood Claims (RFC) and Severe Repetitive Loss (SRL), the City has completed numerous projects across different mitigation alternatives, including standard elevations, minor flood control, acquisition and demolition of structures and one code-plus fire station mitigation project. To date, the City of Jacksonville has completed the only mitigation project received by a business in Florida, a popular seafood restaurant. The incorporation of the business community into hardening and elevation strategies would appear to be a promising mitigation approach.

See Appendix G: Completed Project List, Appendix H: Deferred Project List, and Appendix I: Deleted Project List for comprehensive lists of projects that have been completed, deleted, or deferred from the LMS. Deferred projects that have previously been accepted into the LMS by approval of the SEPPC are permitted to be re-incorporated into the main project list upon request by the responsible agency. As the LMS is updated on a 5-year cycle, and project lists are updated quarterly, a current list of mitigation initiative projects is maintained separately by the City of Jacksonville Emergency Preparedness Division and is available at any time upon request.

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## **SECTION V - FUNDING SOURCES**

### **A. Funding Sources**

The following section, Potential Funding Sources, provides current information on sources of available funding that is used for hazard mitigation projects. The section includes the name of the grant, the sponsoring agency, type of assistance available and eligibility requirements as well as the website, if available. As additional or updated information becomes available the list will be amended accordingly.

### **B. Potential Funding Sources**

State and federal agencies provide funds for a variety of local programs that may be used to support development of the Local Mitigation Strategy. The following is a list and description of just a few of the programs available. This list is not exhaustive, and therefore much more effort needs to be put in to examine all of the opportunities that exist. Communities in the City of Jacksonville should be able to apply for many of the funding opportunities.

**Table 39: Mitigation Initiative Potential Funding Sources**

<b>Funding Source</b>	<b>Purpose</b>	<b>Contact</b>	<b>Application Period</b>
Beach Management Funding Assistance (BMFA) Program	The Beach Management Funding Assistance Program (BMFAP) works in concert with local sponsors to achieve protection, preservation, restoration and nourishment of the sandy beaches fronting the Atlantic Ocean, the Gulf of Mexico and the Straits of Florida, and for the management of inlets to replicate the natural drift of sand interrupted by improved, modified or altered inlets. State funding is requested annually through a local government funding request application process. The BMFAP is tasked with executing funding assistance agreements for eligible feasibility, design, construction and monitoring tasks once appropriations are made by the Legislature. For more information visit: <a href="http://www.dep.state.fl.us/Beaches/programs/becp/">http://www.dep.state.fl.us/Beaches/programs/becp/</a>	Northeast District 8800 Baymeadows Way West, Suite 100 Jacksonville, Florida 32256 (904) 256-1700	The application deadline for Fiscal Year 2020-21 was July 31, 2019.
Florida Coastal Management Program	The Florida Coastal Management Program makes funds available as pass-through grants to state agencies, water management districts and local coastal governments for priority projects that protect coastal resources and communities. In some cases, public colleges and universities, regional planning councils, national estuary programs and nonprofit groups may be eligible for grants in partnership with eligible applicants. For more information visit: <a href="https://floridadep.gov/rcp/fcmp/content/about-florida-coastal-management-program">https://floridadep.gov/rcp/fcmp/content/about-florida-coastal-management-program</a>	Department of Environmental Protection 3900 Commonwealth Boulevard Tallahassee, Florida 32399-3000 (850) 245-2094	The FY 2020-2021 Coastal Partnership Initiative (CPI) grant cycle is now closed. The next grant cycle will open in August 2020. Expected Yearly
Florida Division of Emergency Management Preparedness and Assistance Trust Fund (EMPA) Competitive Grant Program	This program provides several grant programs that fund counties to implement and administer county emergency management programs including management and administration, training and operations. For more information visit: <a href="https://www.floridadisaster.org/dem/preparedness/grants-unit/">https://www.floridadisaster.org/dem/preparedness/grants-unit/</a>	Florida Division of Emergency Management 2555 Shumard Oak Blvd Tallahassee, Florida 32399-2100 (850) 815-4000	Varies by grant

Funding Source	Purpose	Contact	Application Period
Florida Forever	<p>Florida Forever is Florida's premier conservation and recreation lands acquisition program, a blueprint for conserving natural resources and renewing Florida's commitment to conserve the state's natural and cultural heritage. Florida Forever replaces Preservation 2000 (P2000), the largest public land acquisition program of its kind in the United States. With approximately 10 million acres managed for conservation in Florida, more than 2.5 million acres were purchased under the Florida Forever and P2000 programs.</p> <p>For more information visit:  <a href="https://floridadep.gov/lands/environmental-services/content/florida-forever">https://floridadep.gov/lands/environmental-services/content/florida-forever</a> </p>	<p>Please contact the  Division of State Lands at  (850)-245-2555</p>	
Florida League of Cities online resource book	<p>Florida League of Cities, Inc., Financial and Technical Assistance for Florida Municipalities contain information on grants, loans, technical assistance and other resources available to Florida municipalities.</p> <p>For more information visit:  <a href="https://www.floridaleagueofcities.com/grants-funding-opportunities">https://www.floridaleagueofcities.com/grants-funding-opportunities</a> </p>	<p>Carol Westmoreland at  (800) 342-8112</p>	<p>Varies by grant</p>
Florida Fish and Wildlife Conservation Commission	<p>Various projects and grants available to restore and protect wildlife management area including coastal habitats. Grants also available for boating infrastructure and abandoned vessel removal. For more information visit:  <a href="https://myfwc.com/">https://myfwc.com/</a> </p>	<p>Shannon Wright,  Regional Director  1239 SW 10th Street  Ocala, FL 34471  (352) 732-1225</p>	<p>Based on available funding.</p>

Funding Source	Purpose	Contact	Application Period
Florida Inland Navigation District (FIND) Waterway Assistance Program & Cooperative Assistance Program	<p>The Waterway (WAP) and Cooperative Assistance Programs (CAP) are grant programs established for the purpose of financially cooperating with local governments to alleviate problems associated with the Atlantic Intracoastal Waterway and associated waterways within the District.</p> <p>The District provides up to 75% for public navigation projects, while all other project categories are eligible for up to 50% funding assistance. Annually the District allocates approximately \$10-\$14 million dollars for the program.</p> <p>For more information visit:  <a href="http://www.aicw.org/grants_and_assistance_programs/index.php">http://www.aicw.org/grants_and_assistance_programs/index.php</a> </p>	Florida Inland Navigation District 1314 Marcinski Rd Jupiter, Florida 33477 (561) 627-3386	Varies by grant
Florida Department of Environmental Protection	<p>Florida Communities Trust (FCT) assists communities in protecting important natural resources, providing recreational opportunities and preserving Florida's traditional working waterfronts through the competitive criteria in the Parks and Open Space Florida Forever Grant Program and the Stan Mayfield Working Waterfronts Florida Forever Grant Program. These local land acquisition grant programs provide funding to local governments and eligible nonprofit organizations to acquire land for parks, open space, greenways and projects supporting Florida's seafood harvesting and aquaculture industries. The source of funding for Florida Communities Trust comes from Florida Forever proceeds. For more information visit:  <a href="https://floridadep.gov/lands/land-and-recreation-grants/content/fct-florida-communities-trust-home">https://floridadep.gov/lands/land-and-recreation-grants/content/fct-florida-communities-trust-home</a> </p>	Linda Reeves, Manager 850-245-2501	Varies by grant

Funding Source	Purpose	Contact	Application Period
Flood Mitigation Assistance Program (FMA)	<p>The FMA program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA provides funding to states, territories, federally-recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. FMA funding is also available for management costs.</p> <p>For more information visit:  <a href="https://www.fema.gov/flood-mitigation-assistance-grant-program">https://www.fema.gov/flood-mitigation-assistance-grant-program</a></p>	<p>FEMA Regional Office  Federal Emergency Management Agency  3003 Chamblee Tucker Road  Atlanta, GA 30341  (770) 220-5200</p>	<p>See Funding Opportunity Announcement (FOA) on <a href="http://www.grants.gov">www.grants.gov</a></p>
Assistance to Firefighters Grant Program	<p>This page contains links to the Assistance to Firefighters Grants programs: Assistance to Firefighters Grants, Fire Prevention &amp; Safety, and Staffing for Adequate Fire and Emergency Response. The intended audiences are AFG stakeholders, which include but are not limited to, award recipients and the communities they serve.</p> <p><a href="https://www.fema.gov/welcome-assistance-firefighters-grant-program">https://www.fema.gov/welcome-assistance-firefighters-grant-program</a></p>	<p>See website for assistance</p>	<p>Closed</p>
Hospital Preparedness Program (HPP)	<p>Provides leadership and funding through grants and cooperative agreements to States, territories, and eligible municipalities to improve surge capacity and enhance community and hospital preparedness for public health emergencies For more information visit:  <a href="https://www.phe.gov/about/amcg/grants/Pages/default.aspx">https://www.phe.gov/about/amcg/grants/Pages/default.aspx</a></p>	<p>U.S. Department of Health and Human Services Office of the Assistant Secretary for Preparedness and Response  200 Independence Avenue, S.W. Room 638G  Washington, D.C. 20201</p>	<p>Varies by grant</p>



Funding Source	Purpose	Contact	Application Period
FEMA National Flood Insurance Program (NFIP)	<p>The National Flood Insurance Program aims to reduce the impact of flooding on private and public structures. It does so by providing affordable insurance to property owners, renters and businesses and by encouraging communities to adopt and enforce floodplain management regulations. These efforts help mitigate the effects of flooding on new and improved structures. Overall, the program reduces the socio-economic impact of disasters by promoting the purchase and retention of general risk insurance, but also of flood insurance, specifically. For more information visit:</p> <p><a href="https://www.fema.gov/national-flood-insurance-program">https://www.fema.gov/national-flood-insurance-program</a></p>	<p>The NFIP Help Center can answer general inquiries about flood insurance, (800) 427-4661</p>	<p>FEMA National Flood Insurance Program (NFIP)</p>
Hazard Mitigation Grant Program (HMGP)	<p>FEMA offers a variety of disaster assistance programs with different eligibility requirements. HMGP provides funds to states, tribes, and local communities after a disaster declaration to protect public or private property through various mitigation measures. Hazard mitigation includes long-term efforts to reduce the impact of future events. HMGP recipients (states, Federally-recognized tribes, or territories) have the primary responsibility for prioritizing, selecting, and administering state and local hazard mitigation projects. Although individuals may not apply directly to the state for assistance, local governments may sponsor an application on their behalf. For more information visit:</p> <p><a href="https://www.fema.gov/hazard-mitigation-grant-program">https://www.fema.gov/hazard-mitigation-grant-program</a></p>	<p>FEMA Regional Office 3003 Chamblee Tucker Road Atlanta, GA 30341 (770) 220-5200</p>	<p>See Funding Opportunity Announcement (FOA) on <a href="http://www.grants.gov">www.grants.gov</a></p>

Funding Source	Purpose	Contact	Application Period
Pre-Disaster Mitigation Program (PDM)	<p>This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis. For more information visit:</p> <p><a href="https://www.fema.gov/pre-disaster-mitigation-grant-program">https://www.fema.gov/pre-disaster-mitigation-grant-program</a></p>	<p>FEMA Regional Office 3003 Chamblee Tucker Road Atlanta, GA 30341 (770) 220-5200</p>	<p>See Funding Opportunity Announcement (FOA) on <a href="http://www.grants.gov">www.grants.gov</a></p>
FEMA's Homeland Security Grant Program (HSGP)	<p>The Homeland Security Grant Program plays an important role in the implementation of the National Preparedness System by supporting the building, sustainment and delivery of core capabilities essential to achieving the National Preparedness Goal of a secure and resilient nation.</p> <p>The HSGP is comprised of three grant programs: State Homeland Security Program, Urban Area Security Initiative and Operation Stone garden</p> <p>Together, these grant programs fund a range of preparedness activities, including planning, organization, equipment purchase, training, exercises, and management and administration across all core capabilities and mission areas.</p> <p>For more information visit: <a href="https://www.fema.gov/homeland-security-grant-program">https://www.fema.gov/homeland-security-grant-program</a></p>	<p>Federal Emergency Management Agency U.S. Department of Homeland Security 500 C Street SW, Washington, DC 20472 (202) 646-2500</p>	<p>Varies by grant</p>
Homeland Security Preparedness (Non-Disaster) Grants and other federal grants	<p>The Department of Homeland Security distributes grant funds to enhance the ability of regional authorities to prepare, prevent and respond to terrorist attacks and other disasters. Localities use grants for planning, equipment, training and exercise needs For more information visit:</p> <p><a href="https://www.dhs.gov/how-do-i/find-and-apply-grants">https://www.dhs.gov/how-do-i/find-and-apply-grants</a></p>	<p>Visit <a href="https://www.dhs.gov/how-do-i/find-and-apply-grants">https://www.dhs.gov/how-do-i/find-and-apply-grants</a> for contact information</p>	<p>Varies by grant</p>

Funding Source	Purpose	Contact	Application Period
Federal grant programs	There are many types of organizations generally eligible to apply for funding opportunities including but not limited to State, County, City or township and Special district governments. Federal grant opportunities can be found at: <a href="http://www.grants.gov/web/grants/home.html">http://www.grants.gov/web/grants/home.html</a>	Varies by agency	Varies by grant
Beta.SAM.gov Formally called the Catalog of Federal Domestic Assistance (CFDA)	The Catalog of Federal Domestic Assistance (CFDA) is a compendium of assistance programs offered by various U.S. government agencies to the American public. Many of the U.S. federal government's 72 agencies and departments offer grants, loans, scholarships, property, counseling, and other kinds of assistance within the U.S. Recipients include individuals, state and local governments (including the District of Columbia), federally recognized Native American tribal governments, companies, and nonprofit organizations. For more information visit: <a href="https://beta.sam.gov/">https://beta.sam.gov/</a>	(866) 606-8220	Varies by grant
Partners for Fish & Wildlife program	One of the primary roles of the U.S. Fish and Wildlife Service is managing federal funds and distributing them to projects that offer the greatest benefits to wildlife and habitats. Every year, more than half of the Service's annual budget in the Southeast Region is reserved for grants for broad conservation objectives. For more information visit: <a href="https://www.fws.gov/southeast/our-services/grants/">https://www.fws.gov/southeast/our-services/grants/</a>	All grant opportunities are posted on Grants.gov.	Varies
Economic Development Administration	EDA's role in disaster recovery is to facilitate the timely and effective delivery of Federal economic development assistance to support long-term community economic recovery planning and project implementation, redevelopment and resiliency. EDA is uniquely positioned to coordinate regional disaster recovery efforts in partnership with its extensive network of Economic Development Districts (EDDs), University Centers, institutions of higher education and other partners in designated impact areas. For more information visit: <a href="https://www.eda.gov/funding-opportunities/">https://www.eda.gov/funding-opportunities/</a>	401 West Peachtree Street, NW Suite 1820 Atlanta, GA 30308-3510 (404) 730-3023	Applications will be accepted on an ongoing basis until the publication of a new PWEAA NOFO.

Funding Source	Purpose	Contact	Application Period
Economic Development Administration Economic Adjustment Assistance Program	The EAA program provides a wide range of technical, planning, and public works and infrastructure assistance in regions experiencing adverse economic changes that may occur suddenly or over time. These adverse economic impacts may result from a steep decline in manufacturing employment following a plant closure, changing trade patterns, catastrophic natural disaster, a military base closure, or environmental changes and regulations. For more information visit: <a href="http://www.eda.gov/contact/">http://www.eda.gov/contact/</a>	H. Philip Paradise, Jr., Regional Director 401 West Peachtree Street, NW Suite 1820 Atlanta, GA 30308-3510 P: 404-730-3002 E: hparadice@eda.gov	Annually
Federal Transit Administration (FTA) Grant Programs	The Federal Transit Administration (FTA) provides financial and technical assistance to local public transit systems, including buses, subways, light rail, commuter rail, trolleys and ferries. FTA also oversees safety measures and helps develop next-generation technology research.  For more information visit: <a href="https://www.transit.dot.gov/about-fta">https://www.transit.dot.gov/about-fta</a>	FTA Region 4 Office 230 Peachtree, NW Suite 1400 Atlanta, GA 30303 (404) 865-5600	Open. FTA opened TrAMS for FY 2020 on Wednesday, November 6, 2019.
Federal Transit Administration (FTA) Urbanized Area Formula Program (5307)	The Urbanized Area Formula Funding program (49 U.S.C. 5307) makes federal resources available to urbanized areas and to governors for transit capital and operating assistance in urbanized areas and for transportation-related planning. An urbanized area is an incorporated area with a population of 50,000 or more that is designated as such by the U.S. Department of Commerce, Bureau of the Census. For more information visit: <a href="https://www.transit.dot.gov/funding/grants/urbanized-area-formula-grants-5307">https://www.transit.dot.gov/funding/grants/urbanized-area-formula-grants-5307</a>	FTA Region 4 Office 230 Peachtree, NW Suite 800 Atlanta, GA 30303 (404) 865-5600	Funds are available the year appropriated plus five years.

Funding Source	Purpose	Contact	Application Period
HUD Community Development Block Grant Entitlement Program	<p>The Community Development Block Grant (CDBG) Entitlement Program provides annual grants on a formula basis to entitled cities and counties to develop viable urban communities by providing decent housing and a suitable living environment, and by expanding economic opportunities, principally for low- and moderate-income persons. The program is authorized under Title 1 of the Housing and Community Development Act of 1974, Public Law 93-383, as amended; 42 U.S.C.-5301 et seq For more information visit:</p> <p><a href="https://www.hudexchange.info/programs/cdbg-entitlement/cdbg-entitlement-program-eligibility-requirements/">https://www.hudexchange.info/programs/cdbg-entitlement/cdbg-entitlement-program-eligibility-requirements/</a></p>	<p>HUD Jacksonville Field Office 400 W Bay St #1015, Jacksonville, FL 32202 (904) 232-1777</p>	Annually
US Department of the Interior/Bureau of Land Management	<p>The Land and Water Conservation Fund (LWCF) Federal program supports the protection of federal public lands and waters – including national parks, forests, wildlife refuges, and recreation areas – and voluntary conservation on private land. LWCF investments secure public access, improve recreational opportunities, and preserve ecosystem benefits for local communities. For more information visit:</p> <p><a href="https://www.doi.gov/lwcf">https://www.doi.gov/lwcf</a></p>	<p>Eastern States State Office 20 M Street SE, Suite 950 Washington, DC 20003 202-912-7700</p>	
US Department of the Interior/Bureau of Land Management	<p>The BLM may purchase or acquire land and interests in land (including access easements, conservation easements, mineral rights, and water rights) if funding is available, acquisition is supported in a land use plan, and there are no title defects, hazardous materials, or other mitigating local issues. For more information visit: <a href="https://www.blm.gov/">https://www.blm.gov/</a></p>	<p>Eastern States State Office 20 M Street SE, Suite 950 Washington, DC 20003 202-912-7700</p>	

Funding Source	Purpose	Contact	Application Period
HUD Community Development Block Grant Disaster Recovery Program	<p>HUD provides flexible grants to help cities, counties, and States recover from Presidentially declared disasters, especially in low-income areas, subject to availability of supplemental appropriations. In response to Presidentially declared disasters, Congress may appropriate additional funding for the Community Development Block Grant (CDBG) Program as Disaster Recovery grants to rebuild the affected areas and provide crucial seed money to start the recovery process. Since CDBG Disaster Recovery (CDBG-DR) assistance may fund a broad range of recovery activities, HUD can help communities and neighborhoods that otherwise might not recover due to limited resources.</p> <p>For more information visit:  <a href="https://www.hudexchange.info/programs/cdbg-dr/">https://www.hudexchange.info/programs/cdbg-dr/</a></p>	<p>HUD Jacksonville Field Office  400 W Bay St #1015,  Jacksonville, FL 32202  (904) 232-1777</p>	Post-Disaster
HUD HOME Investment Partnerships Program (HOME)	<p>The HOME Investment Partnerships Program (HOME) provides formula grants to States and localities that communities use - often in partnership with local nonprofit groups - to fund a wide range of activities including building, buying, and/or rehabilitating affordable housing for rent or homeownership or providing direct rental assistance to low-income people. HOME is the largest Federal block grant to state and local governments designed exclusively to create affordable housing for low-income households.</p> <p>For more information visit:  <a href="https://www.hud.gov/program_offices/comm_planning/affordablehousing/programs/home">https://www.hud.gov/program_offices/comm_planning/affordablehousing/programs/home</a></p>	<p>HUD Jacksonville Field Office  400 W Bay St #1015,  Jacksonville, FL 32202  (904) 232-1777</p>	Yearly
Partners for Fish and Wildlife program	<p>Restores, improves, and protects fish and wildlife habitat on private lands through alliances between the U.S. Fish and Wildlife Service, other organizations, and individuals, while leaving the land in private ownership.</p> <p>For more information visit:  <a href="https://www.fws.gov/southeast/our-services/partners-program/">https://www.fws.gov/southeast/our-services/partners-program/</a></p>	<p>U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program  1875 Century Boulevard  Atlanta, Georgia 30345  (404) 679-7138</p>	

Funding Source	Purpose	Contact	Application Period
Tax Incentives for Preserving Historic Properties	<p>The Federal Historic Preservation Tax Incentives program encourages private sector investment in the rehabilitation and re-use of historic buildings.</p> <p>For more information visit:</p> <p><a href="http://ncshpo.org/">http://ncshpo.org/</a></p> <p><a href="https://www.nps.gov/tps/tax-incentives.htm">https://www.nps.gov/tps/tax-incentives.htm</a></p>	<p>Division of Historical Resources 500 South Bronough Street R.A. Gray Building, Room 305 Tallahassee, FL 32399-0250 (850) 245-6300</p>	
Payments in Lieu of Taxes (PILT)	<p>Payments help local governments carry out such vital services as firefighting and police protection, construction of public schools and roads, and search-and-rescue operations. The payments are made annually for tax-exempt Federal lands administered by the Bureau of Land Management, the National Park Service, the U.S. Fish and Wildlife Service (all agencies of the Interior Department), the U.S. Forest Service (part of the U.S. Department of Agriculture), and for Federal water projects and some military installations. PILT payments are one of the ways the Federal Government can fulfill its role of being a good neighbor to local communities. For more information visit:</p> <p><a href="https://www.doi.gov/pilt">https://www.doi.gov/pilt</a></p>		
U.S. Army Corps of Engineers (USACE) Aquatic Ecosystem Restoration	<p>The Corps of Engineers can carry out aquatic ecosystem restoration and protection projects. Such projects generally include manipulation of the hydrology in and along bodies of water, including wetlands and riparian areas. A project is adopted for construction only after a detailed investigation determines that the project will improve the quality of the environment and is in the best interest of the public.</p> <p>For more information visit:</p> <p><a href="https://www.mvr.usace.army.mil/Business-With-Us/Outreach-Customer-Service/Ecosystem-Restoration/Section-206/">https://www.mvr.usace.army.mil/Business-With-Us/Outreach-Customer-Service/Ecosystem-Restoration/Section-206/</a></p>	<p>Section 206 project requests should be directed to (309) 794-5704 or Email at <a href="mailto:customeroutreach@usace.army.mil">customeroutreach@usace.army.mil</a>.</p>	U.S. Army Corps of Engineers (USACE) Aquatic Ecosystem Restoration

Funding Source	Purpose	Contact	Application Period
U.S. Army Corps of Engineers (USACE) Flood Plain Management Services	<p>Under the authority provided by Section 206 of the 1960 Flood Control Act (PL 86-645), as amended, the Corps of Engineers can provide the full range of technical services and planning guidance that is needed to support effective flood plain management. General technical assistance efforts under this program includes determining: site-specific data on obstructions to flood flows, flood formation, and timing; flood depths, stages or floodwater velocities; the extent, duration, and frequency of flooding; information on natural and cultural flood plain resources; and flood loss potentials before and after the use of flood plain management measures. Types of studies have been conducted under the FPMS program include: flood plain delineation/hazard, dam failure analyses, hurricane evacuation, flood warning, floodway, flood damage reduction, storm water management, flood proofing, and inventories of flood prone structures.</p> <p>For more information visit:  <a href="https://www.nae.usace.army.mil/Missions/Public-Services/Flood-Plain-Management-Services/">https://www.nae.usace.army.mil/Missions/Public-Services/Flood-Plain-Management-Services/</a></p>	Brian Balukonis, Flood Risk Management Program Manager (978) 318-8643.	
U.S. Army Corps of Engineers (USACE) Emergency Streambank and Shoreline Protection	<p>The Corps of Engineers is authorized to construct bank protection works to protect vital public facilities that are being threatened by streambank and shore erosion. Some examples of the types of infrastructure that are eligible for protection are public buildings, roads, sewerage treatment plants, public utilities, non-profit schools and hospitals, bridges, etc. Private property, infrastructure/facilities, or vacant lands are NOT eligible for protection under this authority. In addition the erosion protection must be more cost effective than relocating the facility. For more information visit:  <a href="https://www.lrn.usace.army.mil/Missions/Corps-of-Engineers-Assistance-and-Outreach/Continuing-Authorities-Program/Emergency-Streambank-and-Shoreline-Protection/">https://www.lrn.usace.army.mil/Missions/Corps-of-Engineers-Assistance-and-Outreach/Continuing-Authorities-Program/Emergency-Streambank-and-Shoreline-Protection/</a></p>	U.S. Army Corps of Engineers, Nashville District 110 9th Avenue South Room A405 Nashville, TN 37203 (615) 736-7865 CELRN-Customer-Outreach@usace.army.mil	



Funding Source	Purpose	Contact	Application Period
U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) Emergency Watershed Protection (EWP) Program	<p>The program is designed to help people and conserve natural resources by relieving imminent hazards to life and property caused by floods, fires, windstorms, and other natural occurrences. EWP is an emergency recovery program. All projects undertaken, with the exception of the purchase of floodplain easements, must have a project sponsor.</p> <p>For more information visit:  <a href="https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nd/programs/planning/ewpp/?cid=stelprdb1077239">https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nd/programs/planning/ewpp/?cid=stelprdb1077239</a></p>	Fred Reaves, National Emergency Watershed Protection Program Manager (202) 690-0793.	Yearly
U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) Watershed and Flood Prevention Operations Programs	<p>This program provides for cooperation between the Federal government and the states and their political subdivisions to work together to prevent erosion; floodwater and sediment damage; to further the conservation development, use and disposal of water; and to further the conservation and proper use of land in authorized watersheds. For more information visit:  <a href="https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wfpo/">https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wfpo/</a></p>	Kevin.Farmer@wdc.usda.gov (202) 720-3413.	Yearly
U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) Watershed Rehabilitation	<p>The Watershed Rehabilitation Program helps project sponsors rehabilitate aging dams that are reaching the end of their 50-year design lives. This rehabilitation addresses critical public health and safety concerns. Since 1948, the Natural Resources Conservation Service NRCS has assisted local sponsors in constructing more than 11,800 dams. For more information visit:  <a href="https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wr/">https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wr/</a></p>	jesse.wilson@wdc.usda.gov or call 202-720-0189 (office).	U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) Watershed Rehabilitation

Funding Source	Purpose	Contact	Application Period
U.S. Department of Agriculture's Rural Development	<p>The Section 504 Home Repair program provides loans to very-low-income homeowners to repair improve or modernize their homes or grants to elderly very-low-income homeowners to remove health and safety hazards. For more information visit:</p> <p><a href="https://www.rd.usda.gov/programs-services/single-family-housing-repair-loans-grants">https://www.rd.usda.gov/programs-services/single-family-housing-repair-loans-grants</a></p>	<p>Director, Daryl L. Cooper Single Family Housing (352) 338-3436 daryl.cooper@fl.usda.gov</p>	<p>Applications for this program are accepted through your local RD office year round</p>
U.S. Department of Agriculture's Rural Development	<p>The Water &amp; Waste Disposal Loan &amp; Grant Program provides funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas. For more information visit:</p> <p><a href="https://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program">https://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program</a></p>	<p>Philip Leary, 4440 NW 25th Place Gainesville, FL 32606 (352) 338-3400</p>	<p>Applications for this program are accepted through your local RD office year round</p>
U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) Watershed Rehabilitation	<p>The Watershed Rehabilitation Program helps project sponsors rehabilitate aging dams that are reaching the end of their 50-year design lives. This rehabilitation addresses critical public health and safety concerns. Since 1948, the Natural Resources Conservation Service NRCS has assisted local sponsors in constructing more than 11,800 dams. For more information visit:</p> <p><a href="https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wr/">https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wr/</a></p>	<p>jesse.wilson@wdc.usda.gov (202) 720-0189</p>	<p>Varies by Grant Program</p>
Rivers, Trails and Conservation Assistance Program	<p>The National Park Service Rivers, Trails, and Conservation Assistance program supports community-led natural resource conservation and outdoor recreation projects across the nation. Our national network of conservation and recreation planning professionals partners with community groups, nonprofits, tribes, and state and local governments to design trails and parks, conserve and improve access to rivers, protect special places, and create recreation opportunities. For more information visit: <a href="https://www.nps.gov/orgs/rtca/index.htm">https://www.nps.gov/orgs/rtca/index.htm</a></p>	<p>Deirdre Hewitt, Program Manager ser_rtca@nps.gov</p>	<p>Varies by Grant Program</p>

Funding Source	Purpose	Contact	Application Period
Citizen Corps	<p>The mission of Citizen Corps is to harness the power of every individual through education, training, and volunteer service to make communities safer, stronger, and better prepared to respond to the threats of terrorism, crime, public health issues, and disasters of all kinds through:</p> <ol style="list-style-type: none"> <li>1. Preparing the public for local risks with targeted outreach</li> <li>2. Engaging voluntary organizations to help augment resources for public safety, preparedness and response capabilities</li> <li>3. Integrating the whole community and integrates nontraditional resources to ensure disaster preparedness.</li> </ol> <p>For more information visit:  <a href="https://www.ready.gov/citizen-corps">https://www.ready.gov/citizen-corps</a></p>		Available all year
Firehouse Subs	<p>Firehouse Subs Public Safety Foundation is dedicated to improving the life-saving capabilities of first responders and public safety organizations in communities served by Firehouse Subs by providing funding, resources and support For more information visit:  <a href="https://www.firehousesubs.com/public-safety-foundation/">https://www.firehousesubs.com/public-safety-foundation/</a></p>	<p>Firehouse Subs Public Safety Foundation, Inc.,  12735 Gran Bay Parkway,  Suite 150, Jacksonville,  Florida, 32258,  (904) 886-8300</p>	Varies
Florida Department of Environmental Protection CWSRF Program	<p>The Clean Water State Revolving Fund (CWSRF) program provides low-interest loans for planning, designing and constructing water pollution control facilities under Chapter 62-503, F.A.C. The department receives requests for funding throughout the year for wastewater, stormwater, and certain energy and other types of projects. The information gathered in the request is used to establish project priorities for listing projects in order of priority for funding at the beginning of each fiscal year and each quarter, thereafter, as funds are available. For more information visit: <a href="https://floridadep.gov/wra/srf">https://floridadep.gov/wra/srf</a></p>	<p>3900 Commonwealth Boulevard - MS 3505  Tallahassee, FL 32399-3600  Main Phone: 850-245-2835  SRF_Reporting@dep.state.fl.us</p>	<p>Funds are made available for Planning Loans, Design Loans and Construction Loans. Small, disadvantaged communities may also be eligible for grants.</p>

## **APPENDIX A: MITIGATION SURVEY RESULTS**

The Duval County Local Mitigation Strategy - Risk Assessment Subcommittee devised a public Mitigation Survey to solicit feedback from the public regarding both their prior experience and perceptions regarding mitigation within Duval County. The survey consisted of 22 questions, with 16 substantive questions and 5 demographic questions. Information regarding the survey, including a direct URL and a QR Code were included in the 2019-2020 City of Jacksonville Emergency Preparedness Guide, which was mailed directly to every postal mailing address on file with the United States Postal Service in Duval County. The number of addresses exceeded 418,000. In addition to including the information and link in the Preparedness Guide, flyers were posted at branches of Jacksonville Public Libraries over the summer of 2019. Additionally, staff from the Emergency Preparedness Division attended several meetings of local Citizens Planning Advisory Committees (CPAC) and delivered brief presentations explaining the Local Mitigation Strategy and advised of the ongoing mitigation survey. The results of this survey aligned very closely with expectations of the Risk Assessment Subcommittee, and were considered during revision of the LMS Goals and Strategies, as well as during project formulation. Several survey respondents requested projects that would fund public education and awareness campaigns; this will provide momentum to accomplish several public education projects which are included in the project list. The Emergency Preparedness Guide mitigation page, survey advertisements from the public library, sample CPAC Meeting agendas and summaries, and survey results are included on the following pages.

Figure A.1: Emergency Preparedness Guide Cover and Page 6: Mitigation



Source: <https://www.coj.net/departments/fire-and-rescue/docs/emergency-preparedness/get-ready/jaxready-emergency-preparedness-guide-2019-final.aspx>



Figure A.2: North District CPAC Meeting Agenda

**North District  
Citizens Planning Advisory Committee**

Chair: Mike Getchell

Vice Chair: Teresa Moore

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**MEETING NOTICE AND AGENDA**

**Date:** August 14, 2019

**Time:** 5:30 p.m.

**Location:** Oceanway Senior Center 12215 Sago Ave. W., Jacksonville, FL 32218

1. **Call to Order/Verify Quorum**
2. **Approval of the Previous Meeting Summary**
3. **Elected Officials Report**
4. **Presentation/Guest Speaker:** (Ten (10) minute time limit)
  - Noah Ray, JFRD Emergency Preparedness Supervisor
5. **Staff Reports:** (Three (3) minute time limit)
  - Jacksonville Sheriff's Office (**JSO**) - Assistant Chief, Gregory Burton
  - Jacksonville Fire and Rescue Department (**JFRD**) - District Chief, Andrew Harrold
  - Neighborhood Department – Bryan Mosier
  - Duval County Public Schools (**DCPS**) – Victoria Schultz
  - Florida Department of Transportation (**FDOT**) – Derek Dixon
  - Jacksonville Public Library (**JPL**) – Michael Sullivan
  - Municipal Code Compliance (**MCCD**) – Elaine Lancaster
  - Parks and Recreation – Keith Meyerl
6. **Subcommittee/Liaison Reports:** (Three (3) minute time limit)
  - Governmental Affairs – Vice Chair, Teresa Moore & Erin Abney - Planning & Development
  - Ad Hoc - Taxation, Revenue Utilization and Expenditures (TRUE) - Jim Mazur
7. **Neighborhood Coordinator's Report** – Michelle Godwin
8. **Chair's Report** – Chair, Mike Getchell
9. **Unfinished Business**
10. **New Business**
11. **Public Comments/Announcements** (Three (3) minute time limit)

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**NOTE: North CPAC Does Not Meet in July or December**

**NEXT CPAC MEETING:** September 11, 2019, 5:30 p.m. Oceanway Senior Center, 12215 Sago Ave. W., Jacksonville, FL 32218

**NEXT Governmental Affairs Subcommittee meeting:** September 5, 2019, 5:30 p.m. Oceanway Senior Center, 12215 Sago Ave. W., Jacksonville, FL 32218

**The following provision is required by Section 286.0105, Florida Statutes:** If a person decides to appeal any decision made by the North CPAC with respect to any matter considered at such meeting, he or she will need a record of the proceedings, and that, for such purpose, may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based.

**Pursuant to the American with Disabilities Act,** accommodations for persons with disabilities are available upon request. Please allow 1-2 business days notification to process; last minute requests will be accepted, but may not be possible to fulfill. Please contact Disabled Services Division at: V (904) 630-4940, TTY-(904) 630-4933, or email your request to

[ADAAccommodationRequest@coj.net](mailto:ADAAccommodationRequest@coj.net)

City of Jacksonville – NEIGHBORHOOD SERVICES OFFICE – 214 N. Hogan St. – 5<sup>th</sup> Floor  
Jacksonville, FL 32202 – Phone (904) 255-8250 – Direct Line (904) 255-8236

Source: [https://www.coj.net/getattachment/Departments/Neighborhoods/Neighborhood-Services-Office/Citizen-Planning-Advisory-Committees-\(CPACs\)/CPAC-District-6-North/North-CPAC-August-14-2019-Agenda.pdf.aspx?lang=en-US](https://www.coj.net/getattachment/Departments/Neighborhoods/Neighborhood-Services-Office/Citizen-Planning-Advisory-Committees-(CPACs)/CPAC-District-6-North/North-CPAC-August-14-2019-Agenda.pdf.aspx?lang=en-US)

Figure A.3: North District CPAC Meeting Summary

## North Citizens Planning Advisory Committee

### August 14, 2019 Meeting Summary

Oceanway Senior Center, 12215 Sago Ave. W., Jacksonville FL 32218

#### Meeting Attendance

**CPAC Members:** Mike Getchell, Chair; Teresa Moore, Vice Chair; Rev. Joseph Tate, Copper Hill HOA; Dot Mathias, Charter Member; Vicki Drake, Duval County Council PTSA/PTA; Jim Mazur, Eagle Bend; Jim Sumara, Heckscher Drive CC; Ingrid Montgomery, Victoria Preserve; Matt Stone, Marshwind HOA; Don Green, Captiva Bluff; Deb Green, Captiva Bluff; Dotty Boland, Amelia View HOA; Tommy Ruffin, Council Appointee District 7; Michael Wozinak, Lydia Estates; Shelley Wozinak, Lydia Estates; Josephine Fiveash-Porter, Northlake HOA

**Visitors:** Frank Atwill, Atwill LLC; Bob Austin; Blue Grass/Northwood HOA; Marion Burke; Patricia Cooper; Blue Grass/Northwood HOA; Donald Drake, Captiva Bluff; Jamie Lacy, San Mateo; Marshall Marrow; Northlake; Jamika Smith, Captiva Bluff; Al Saffer, Armsdale; Cristina Salas; Cedar North HOA

**Staff and Elected Officials:** Nikki Evans, Executive Council Assistant to CM Salem; Victoria Schultz, DCPS; Derek Dixon, FDOT; Chief Andrew Harrold, JFRD; Noah Ray, JFRD Emergency Preparedness Dept.; Tim Rogers, Director of Jacksonville Public Libraries; Assistant Chief Gregory Burton, JSO; Chiquita Moore, Operations Director of Neighborhoods; Elaine Lancaster, Municipal Code Compliance Supervisor; Michelle Godwin-Ware, Neighborhood Services Office; Erin Abney, Planning and Development.

#### Meeting Summary

1. **Call to Order/Verify Quorum:** Chair Mike Getchell called the meeting to order at 5:34 p.m. Michelle Godwin verified a quorum.
2. **Approval of the Previous Meeting Summary:** CPAC member Dot Mathias motioned that the June meeting summary be approved. CPAC member Teresa Moore seconded. The motion unanimously passed.
3. **Presentation:**
  - Noah Ray, JFRD Emergency Preparedness Supervisor, presented on the City of Jacksonville Emergency Preparedness Division's Mitigation Strategy Update. Mr. Ray explained that the purpose of the mitigation strategy is to reduce the loss of life and property by lessening the impact of disasters. Mr. Ray advised that in order to change the outcome of some direct and indirect actions, Duval County is creating a risk assessment committee to work on revision of the current plan. Mr. Ray announced that CPAC members may participate in the mitigation survey as well as obtain additional information regarding mitigation and tips on how to make your home safer by visiting [Link to the JFRD Emergency Preparedness Mitigation Survey](#). Noah Ray may be contacted at [NRay@coj.net](mailto:NRay@coj.net) or (904) 630-7020.
4. **Elected Officials:** Nikki Evans, Executive Council Assistant to Council Member At Large 2 Ronald Salem, introduced herself to CPAC members. Nikki Evans may be contacted at (904) -255-5143 or [NEvans@coj.net](mailto:NEvans@coj.net)
5. **Staff Reports:**
  - **Jacksonville Sheriff's Office (JSO)** – Zone 6 Assistant Chief Gregory Burton announced the numbers of car burglaries are down in Zone 6; however, auto thefts have increased. Chief Burton also announced that robberies are up because of Internet Cafés but the Internet Café on Harts Road has been closed. Chief Burton announced that the three year survey came out and Zone 6 came in second for approval of services provided. Assistant Chief Burton may be contacted at (904) 696-4335.



Figure A.4: Southwest District CPAC Meeting Agenda

## Southwest District

### Citizens Planning Advisory Committee

Chair: Shirley Lowry

Vice Chair: Bruce Tyson

## **MEETING NOTICE AND AGENDA**

**Date:** August 12, 2019

**Time:** 6:30 p.m.

**Location:** Lane Wiley Senior Center, 6710 Wiley Road, Jacksonville FL 32210

1. **Call to Order/Verify Quorum**
2. **Approval of the Previous Meeting Summary**
3. **Elected Officials**
4. **Jacksonville Sheriff's Office (JSO)** – Lt. Jaime Eason
5. **Jacksonville Fire & Rescue (JFRD)** – Chief Jack Griggs
6. **Speakers:** (Five (5) minute time limit)
  - Noah Ray, JFRD Emergency Preparedness Supervisor
7. **Staff Reports:** (Three (3) minute time limit)
  - Neighborhoods Department – Bryan Mosier
  - Duval County Public Schools (DCPS) – Tracy Pierce
  - Florida Department of Transportation (FDOT) – Derek Dixon
  - Jacksonville Public Library (JPL) – Kristi Dorney
  - Military and Veterans Affairs (MVA) – Caroline Adkins
  - Municipal Code Compliance (MCCD) – Robert Bautochka
  - Parks and Recreation – Keith Meyerl
  - Planning and Development Department (PDD) – Andy Hetzel
8. **Subcommittee/Liaison Reports :** (Three (3) minute time limit)
  - Cecil Field – Bruce Tyson
  - Transportation – Tom Martin
9. **Neighborhood Coordinator's Report** – Michelle Godwin-Ware
10. **Chair's Report** – Shirley Lowry
11. **Unfinished Business**
12. **New Business**
13. **Public Comments/Concerns/Announcements - (Three (3) minute time limit)**
14. **Motion to Adjourn**

**NOTE: Ethics Training Scheduled for September 9th meeting.**

**NEXT MEETING: September 9, 2019** the meeting will begin at 6:30 p.m., at the Lane Wiley Senior Center, 6710 Wiley Rd., Jacksonville FL 32210.

**The following provision is required by Section 286.0105, Florida Statutes:** If a person decides to appeal any decision made by the Southwest Citizens Planning Advisory Committee with respect to any matter considered at such meeting, he or she will need a record of the proceedings, and that, for such purpose, may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based.

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Jacksonville, FL 32202 – Telephone (904) 255-8250 – Direct Line (904) 255-8236

Source: [https://www.coj.net/getattachment/Departments/Neighborhoods/Neighborhood-Services-Office/Citizen-Planning-Advisory-Committees-\(CPACs\)/CPAC-District-4-Southwest/SW-CPAC-Agenda-August-12-2019.pdf.aspx?lang=en-US](https://www.coj.net/getattachment/Departments/Neighborhoods/Neighborhood-Services-Office/Citizen-Planning-Advisory-Committees-(CPACs)/CPAC-District-4-Southwest/SW-CPAC-Agenda-August-12-2019.pdf.aspx?lang=en-US)



Figure A.5: Southwest District CPAC Meeting Summary

<b>Southwest Citizens Planning Advisory Committee</b> <b>August 12, 2019 Meeting Summary</b> Lane Wiley Senior Center, 6710 Wiley Road, Jacksonville FL	
<b>Attendance</b> <b>CPAC Members</b> Chair – Hyde Grove Terrace – Shirley Lowry Budget Automotive Repair – Linda Barrow Budget Automotive Repair – Darrell Barrow Hyde Grove Terrace - Peggy Meyers Vice Chair – Trinity Ministries – Bruce Tyson Murray Hill Historic Preservation - Len Burroughs Springtree HOA – Dewey Walker Watermill Masters HOA – Tom Martin William Fonferek- Westland HOA Christina Purdy – Cecil Pines Blue Lake Estates – Annette Brown Sweetwater Church of Christ – Dr. Willie Crosby  <b>Visitors</b> Nathlyn Hemmingway - Navy	<b>Staff and Officials</b> Council Member Randy DeFoor District 14 Executive Council Assist. To CM DeFoor CD 14 – Brooks Dame DCPS – Warren Jones, School Board District 5 DCPS - Tracy Pierce Jacksonville Fire & Rescue - Battalion Chief, Michael Barrow Jacksonville Public Library – Kristi Dorney Jacksonville Sheriff's Office – Lt. Dennis Pellot Military Veterans Affairs – Caroline Adkins Municipal Code Compliance Dept. – Ernest Murphy Municipal Code Compliance Dept. - Robert Bautochka Neighborhoods Dept. – Chiquita Moore Neighborhood Services Office– Michelle Godwin Planning and Development – Andy Hetzel  <b>Excused</b> Cedar Hills Estates – Jacquelyn Woods Cedar Hills Estates – Johnny Carter Charter Member – Don Ingram Fishweir Neighborhood Watch - Bernice Gremer
<ol style="list-style-type: none"> <li><b>1. Call to Order/Verify Quorum:</b> Chair Shirley Lowry called the meeting to order at 6:34 p.m. Michelle Godwin verified a quorum.</li> <li><b>2. Approval of the Previous Meeting Summary:</b> Tom Martin moved that the June meeting summary be approved. Len Burroughs seconded the motion. The motion passed unanimously.</li> <li><b>3. Elected Officials' Reports:</b> <ul style="list-style-type: none"> <li>Brooks Dame, Executive Council Assistant to Council Member Randy DeFoor, District 14, introduced herself to CPAC members. Brooks Dame may be contacted at (904) -255-5160 or <a href="mailto:BDame@coj.net">BDame@coj.net</a></li> <li>Warren Jones, School Board Member, District 5, discussed the reason for the School Board's request for a special election on November 5, 2019 for a half-cent School Capital Outlay Sales Surtax. The half-cent Sale Surtax would be effective over 15 years and be used to pay for \$2 billion worth of infrastructure at local schools. School Board Member, Warren Jones, may be contacted at (904) 390-2372 or <a href="mailto:jonesw2@duvalschools.org">jonesw2@duvalschools.org</a></li> <li>Randy DeFoor, Council Member District 14, introduced herself to CPAC members and advised that she is part of the Finance and Rules Committee. Council Member DeFoor announced that City Council will meet with the School Board on Wednesday, August 14, 2019 to discuss questions that City Council has about the School Boards proposed tax. Council Member Randy DeFoor may be contacted at (904) 255-5214 or <a href="mailto:RDeFoor@coj.net">RDeFoor@coj.net</a></li> </ul> </li> <li><b>4. Presentations:</b> Noah Ray, JFRD Emergency Preparedness Supervisor, presented on the City of Jacksonville Emergency Preparedness Division's Mitigation Strategy Update. Mr. Ray explained that the purpose of the mitigation strategy is to reduce the loss of life and property by lessening the impact of disasters. Mr. Ray advised that in order to change the outcome, some direct and indirect actions. Duval County is preparing a risk assessment committee to work on revision of the current plan. Mr. Ray announced that CPAC members may participate in the mitigation survey as well as obtain additional information regarding mitigation and tips on how to make your home safer by visiting <a href="#">Link to the JFRD Emergency Preparedness Mitigation Survey</a>          Noah Ray may be contacted at <a href="mailto:NRay@coj.net">NRay@coj.net</a> or (904) 630-7020</li> </ol>	
Page 1 of 3	August 12, 2019 Southwest CPAC Summary

Source: [https://www.coj.net/getattachment/Departments/Neighborhoods/Neighborhood-Services-Office/Citizen-Planning-Advisory-Committees-\(CPACs\)/CPAC-District-4-Southwest/SW-CPAC-Summary-August-12-2019final.pdf.aspx?lang=en-US](https://www.coj.net/getattachment/Departments/Neighborhoods/Neighborhood-Services-Office/Citizen-Planning-Advisory-Committees-(CPACs)/CPAC-District-4-Southwest/SW-CPAC-Summary-August-12-2019final.pdf.aspx?lang=en-US)

Figure A.6: Duval Prepares Meeting Invites

5/14/2019

COJ.net - Local Mitigation Strategy (LMS) Advisory Committee (Duval Prepares)

This is a preview mode of page [Local Mitigation Strategy \(LMS\) Advisory Committee \(Duval Prepares\)](#). [Close](#) the preview mode.

## Local Mitigation Strategy (LMS) Advisory Committee (Duval Prepares)

May 15, 2019 - May 15, 2019

10:00 AM

Jacksonville City Hall – Lynwood Roberts Room (117 West Duval Street)

Noah Ray (904.630.7020 )

The Local Mitigation Strategy (LMS) Advisory Committee, also known as **Duval Prepares**, will convene on May 15, 2019, at 10:00 a.m. for the second quarterly meeting of 2019.

The purpose of this meeting will be to discuss the ongoing revision of the [Duval County Local Mitigation Strategy](#), (set to expire August of 2020), current [mitigation projects](#) throughout the County, a mitigation project submission update regarding the [Hazard Mitigation Grant Program](#) related to Hurricane Irma, and an upcoming [grant funding opportunity](#) through the [Hazard Mitigation Grant Program](#) (Hurricane Michael, DR-4399).



### COJ.net - Upcoming Events

Local Mitigation Strategy (LMS) Advisory Committee (Duval Prepares)

August 22, 2019 - August 22, 2019  
10:00 AM

Jacksonville City Hall – Lynwood Roberts Room (117 West Duval Street)

The Local Mitigation Strategy (LMS) Advisory Committee, also known as **Duval Prepares**, will convene on August 22, 2019, at 10:00 a.m. for the Third quarterly meeting of 2019.

## Duval County Local Mitigation Strategy Advisory Committee (Duval Prepares) - 2020 LMS Draft Review

February 10, 2020 - February 10, 2020

1:30 PM

City of Jacksonville City Hall Building, 117 West Duval Street,  
Lynwood Roberts Room

The final draft version of the Local Mitigation Strategy (LMS) is attached for review. This version incorporates requests from the Risk Assessment Subcommittee during last week's final planning meetings. The most recent review tool provided by the Florida Division of Emergency Management is attached for reference. This review tool includes the criteria that will be used to determine compliance for the LMS.

The County is required to hold a public hearing regarding the plan; this meeting will serve as the public hearing and opportunity for public comments. The meeting has been publicly noticed at the City of Jacksonville City Hall. All meetings of Duval Prepares are open to the public. [View the public notice here.](#)

A Microsoft Word version of the public notice is attached here for any who would like to post it elsewhere in the community and add their contact information for their constituents.

In addition to review and public comment for the LMS, some information regarding grant funding opportunities and this year's Emergency Preparedness Guide will also be discussed.

For questions, please contact:

Noah Ray, MPA, FAEM



## Ray, Noah

**Subject:** Local Mitigation Strategy (LMS) Advisory Committee (Duval Prepares)  
**Location:** Jacksonville City Hall - 117 West Duval Street [SKR-1ST-LYNWOOD ROBERTS ROOM]

**Start:** Tue 2/26/2019 10:00 AM  
**End:** Tue 2/26/2019 11:00 AM

**Recurrences:** (none)

**Meeting Status:** Meeting organizer

**Organizer:** Ray, Noah

**Required Attendees:** Bowman, Aaron; aglick@necr.org; alsandrik@noaa.gov; aaskew@neptune-beach.com; annaleasawinter@freshfromflorida.com; Hipps, Angie; ashortelle@sjrwmd.com; abelabout@eismannrusso.com; ben.witmeier@aecon.com; beth.miller@hcr-manorcare.com; bette.bolivar@navy.mil; Centeno, Bibinia; billbrim@fssjax.org; chagan@unf.edu; Mayor Latham, Charlie; chris.crouch@jaxport.com; cstyles@flyjacksonville.com; Chris.quirn@myjaxchamber.com; cdostie@doctiehomes.com; dendicot@unf.edu; daniel.davis@myjaxchamber.com; darryl.f.melton@gmail.com; Joseph, Daryl; Whitnill, David; Hahn, David; david.j.yoder@navy.mil; dianams@coj.net; greened@duvalschools.org; Coleman Mazon, Dina; emiller@gatepetro.com; ed.ward@dot.state.fl.us; Lukacovic, Ed; edmund@aux-e.com; dende@jea.com; elainebrown@nbfl.us; epayne@necr.org; eglasser@coab.us; Arceo, Emerito; eric.green@jaxport.com; Huxford, Folks; fcastillo@FeedingNEFL.org; gabriela.vigo@dhs.gov; gsample@sjrwmd.com; hireland@jaxbchfl.net; heather.duncan@att.com; ingrans.collett@prudential.com; inote@jtafla.com; jane.wahl.brez@statefarm.com; jfleet@fleetarchitectsplanners.net; jason.a.kirk@usace.army.mil; jeffw@uwnefl.org; jeremy.pope@citizensfla.com; Holland, Jerry; Pappas, John; john.a.pellenti@mail.mil; johnjordan@crisismg.org; mccaip@jea.com; john.bethea@hcahealthcare.com; Juan.A.Rodriguez@usace.army.mil; karen.ketchie@bmjjax.com; knelson@jaxbchfl.net; khankin@sjrwmd.com; Katherine.Hulett@DMSRecovery.com; Reed, Kristen; Curry, Lenny; LisaKing@langtonconsulting.com; liz.lawrence@redcross.org; luis.c.parrales@uscg.mil; mmoehring@necr.org; Mark.Baughman@jaxport.com; Mike Key; edwardzm4@duvalschools.org; boylanmt6ms@gmail.com; president@langtonconsulting.com; snapp.michael@mayo.edu; Williams, Mike S; Sands, Mike; mike.gilmer@citizensfla.com; nboyle@unf.edu; nford@jtafla.com; Ivey, Patrick L; wrightp@duvalschools.org; peter.wolf@noaa.gov; richard.ward@flhealth.gov; rick.corley@jmfamily.com; Gillrup, Rob; stratton@duvalschools.org; russ.armistead@jaxufl.edu; scott.cordero@noaa.gov; scott.gamit@aecon.com; mayor@baldwinfl.com; sean.p.haley2@navy.mil; scorbin@coab.us; Shannon@StJohnsRiverKeeper.org; Burch, Stephanie; stephen.michael@wellsfargo.com; stetro@comcast.net; sswann@appliedtm.com; steve.grossman@flyjacksonville.com; Woodard, Steven; susan.towler@floridablue.com; susan.west@dmsrecovery.com; tammy.brown@jaxport.com; terry.dlugos@flyjacksonville.com; Thomas.T.Pequignot@uscg.mil; Smith, Timothy; Smith, Todd; Goldsbury, Tom; vguillilo@coab.us; bmann@jaxbchfl.net; Spann, Bill; Towler, Susan; Millican, Steven W CIV NAVSTA Mayport, N37; Hulett, Katherine; Bolivar, Bette RDML CNRSE HQ, N00; Bohentin, Sarah; Blankinship, Shannon; 'Chernise@acgfl.org'; Sposato, John V. - Emergency Planning and Business Cont Coord SKR-1ST-LYNWOOD ROBERTS ROOM

**Optional Attendees:**

**Resources:**

Figure A.7: Survey advertisement hosted at Jacksonville Public Library locations




**CITY OF JACKSONVILLE  
EMERGENCY PREPAREDNESS DIVISION**

# **PUBLIC SURVEY**

## **WE WANT YOUR FEEDBACK**

Help with the upcoming revision of the  
**Duval County Local Mitigation Strategy**  
with this quick 20 question survey.  
The survey takes about 8 minutes.



**[bit.ly/mitigationpublicsurvey](https://bit.ly/mitigationpublicsurvey)**

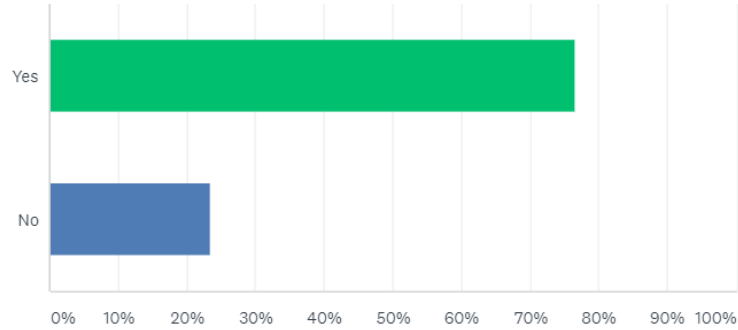
Participation in this survey is voluntary and any response shared will not be attributed to your agency or organization directly, unless requested otherwise. Your input is crucial to our effectiveness. We are grateful for your support.

*June 3, 2019*

**Figures A.8 –A.21: Mitigation Survey Results**

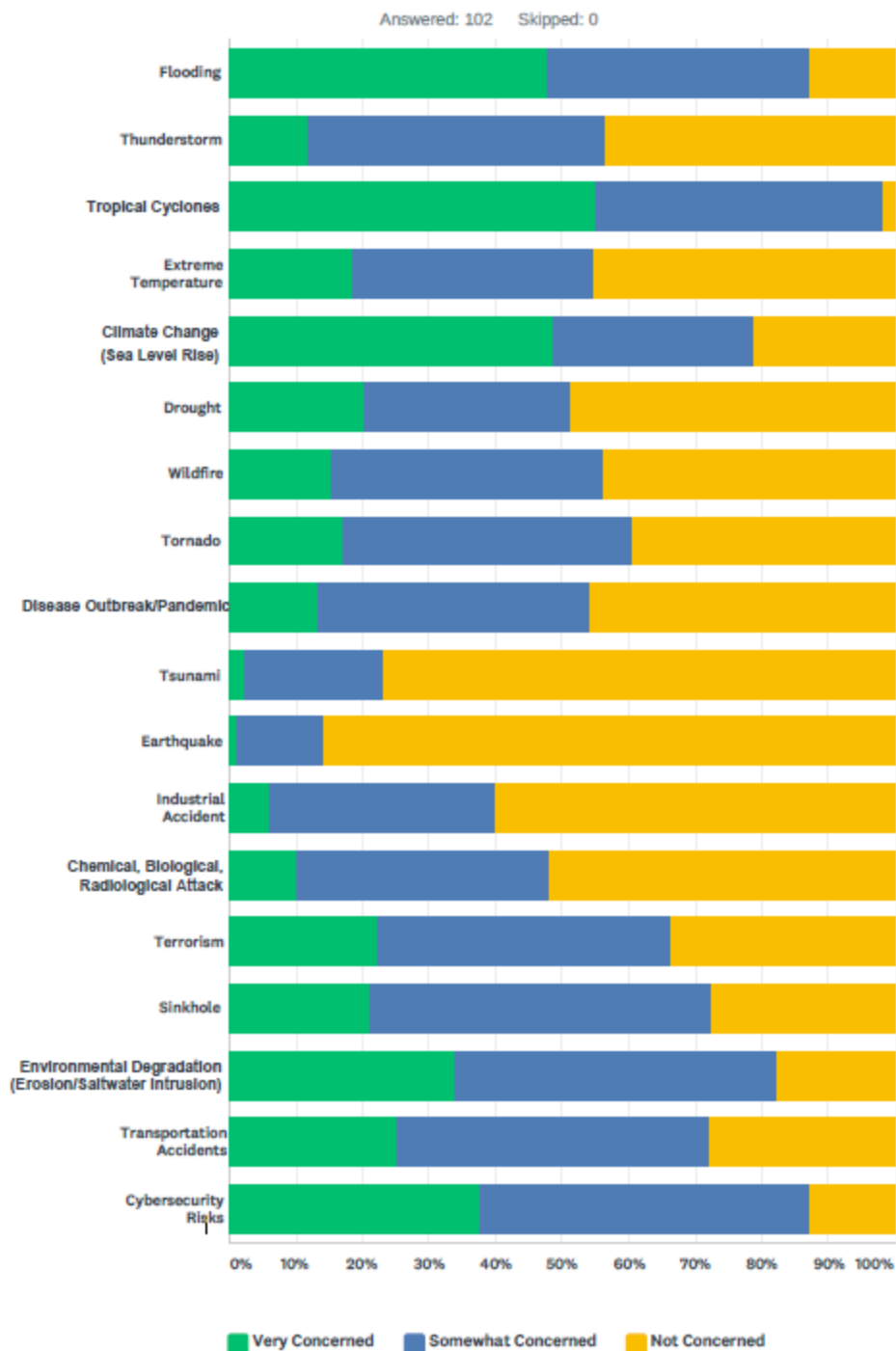
During the past five years, have you or someone in your household directly experienced a hazard in Duval County such as a hurricane, flood, wildfire or other type of hazard?

Answered: 102 Skipped: 0



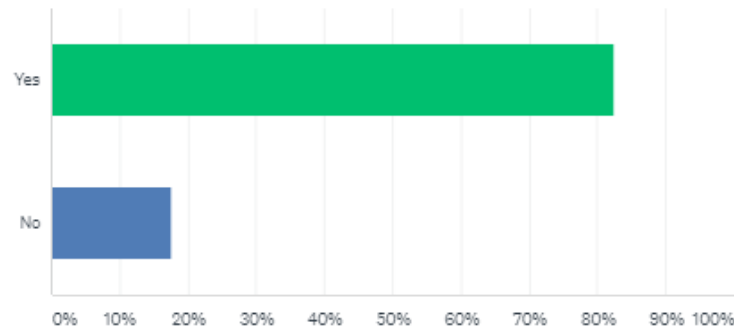
ANSWER CHOICES	RESPONSES	
Yes	76.47%	78
No	23.53%	24
TOTAL		102

Based on recent analysis, Duval County could be impacted by numerous types of hazards. How concerned are you about the following hazards affecting Duval County?



## Have you received information about how to make members of your household and your home safer from natural disasters or other hazards?

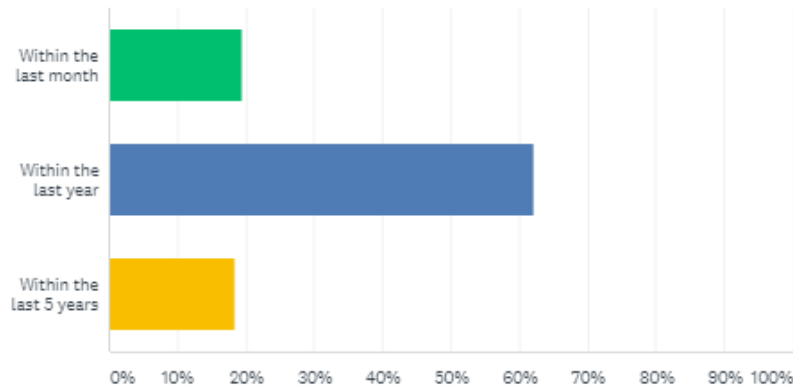
Answered: 102 Skipped: 0



ANSWER CHOICES	RESPONSES	
▼ Yes	82.35%	84
▼ No	17.65%	18
<b>TOTAL</b>		<b>102</b>

## If YES, how recently?

Answered: 87 Skipped: 15

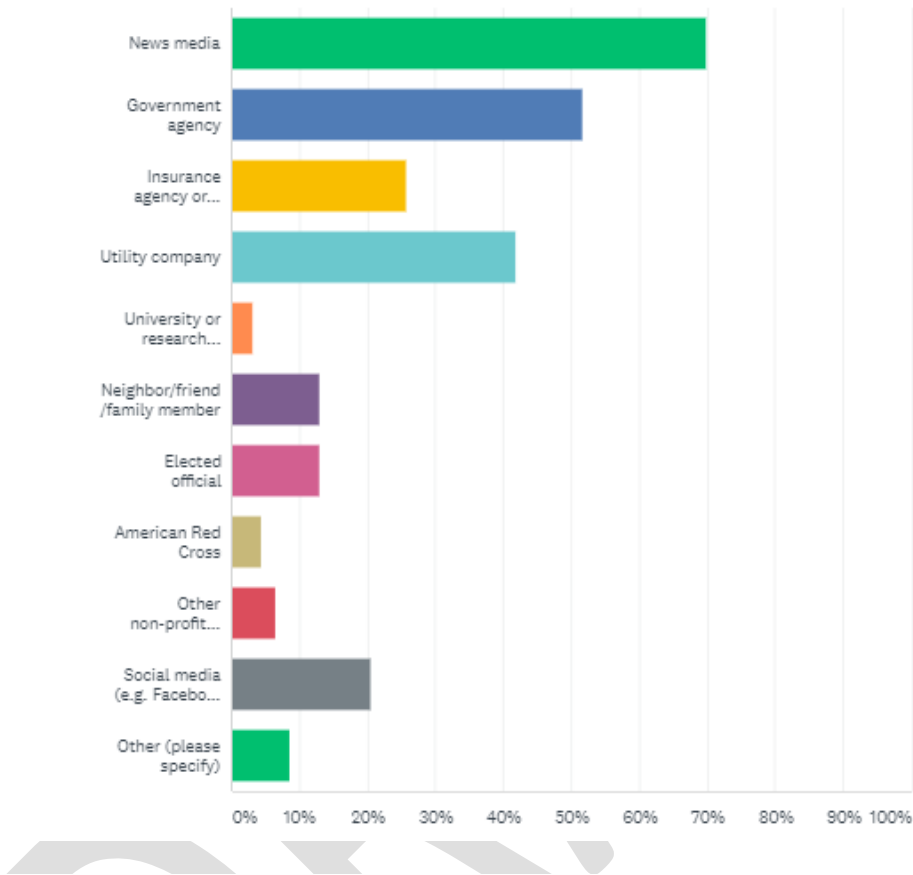


ANSWER CHOICES	RESPONSES	
▼ Within the last month	19.54%	17
▼ Within the last year	62.07%	54
▼ Within the last 5 years	18.39%	16
<b>TOTAL</b>		<b>87</b>



From whom did you last receive information about how to make members of your household and your home safer from natural disasters and other hazards? (Please check all that apply).

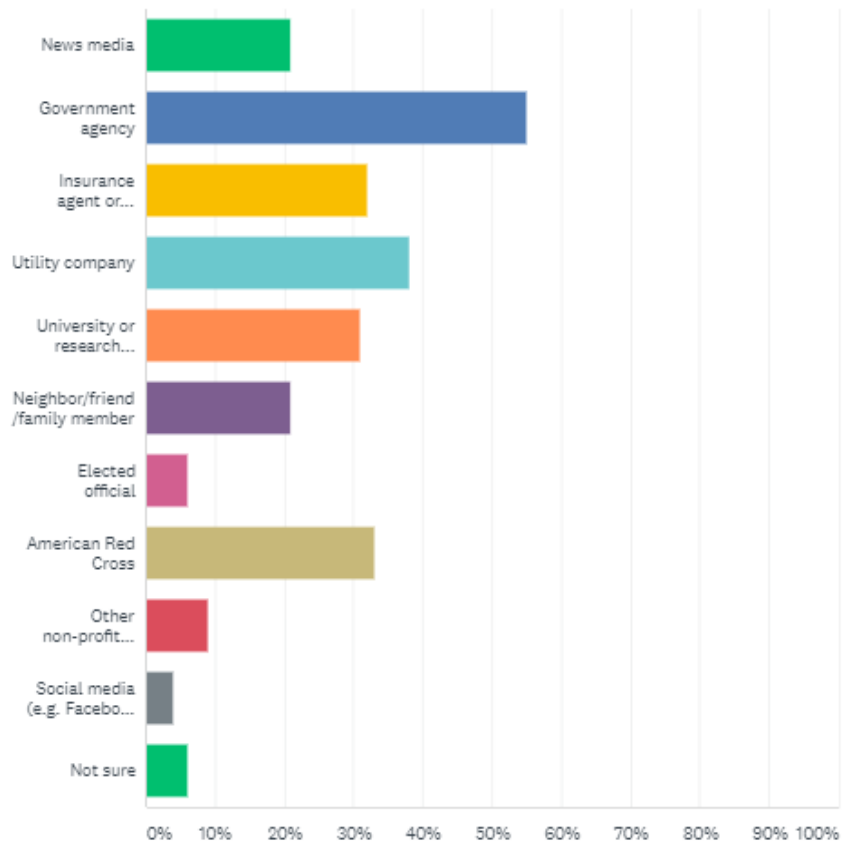
Answered: 93    Skipped: 9



ANSWER CHOICES	RESPONSES	
News media	69.89%	65
Government agency	51.61%	48
Insurance agency or company	25.81%	24
Utility company	41.94%	39
University or research institution	3.23%	3
Neighbor/friend/family member	12.90%	12
Elected official	12.90%	12
American Red Cross	4.30%	4
Other non-profit organization	6.45%	6
Social media (e.g. Facebook, Twitter)	20.43%	19
Other (please specify)	<a href="#">Responses</a> 8.60%	8
Total Respondents: 93		

Whom would you most trust to provide you with information about how to make your household and home safer from hazards? (Please check all that apply).

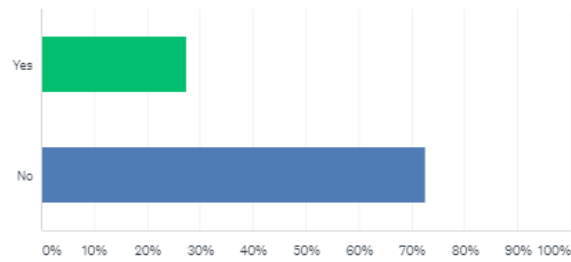
Answered: 100 Skipped: 2



ANSWER CHOICES ▼	RESPONSES ▼	
▼ News media	21.00%	21
▼ Government agency	55.00%	55
▼ Insurance agent or company	32.00%	32
▼ Utility company	38.00%	38
▼ University or research institution	31.00%	31
▼ Neighbor/friend/family member	21.00%	21
▼ Elected official	6.00%	6
▼ American Red Cross	33.00%	33
▼ Other non-profit organization	9.00%	9
▼ Social media (e.g. Facebook, Twitter)	4.00%	4
▼ Not sure	6.00%	6
Total Respondents: 100		

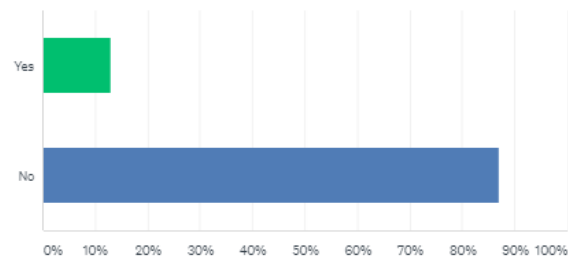
Prior to receiving this survey, were you aware that Duval County maintains a Local Mitigation Strategy plan?

Answered: 102 Skipped: 0



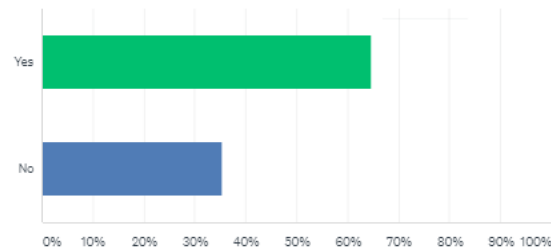
Do you know what is in the Local Mitigation Strategy Plan?

Answered: 101 Skipped: 1



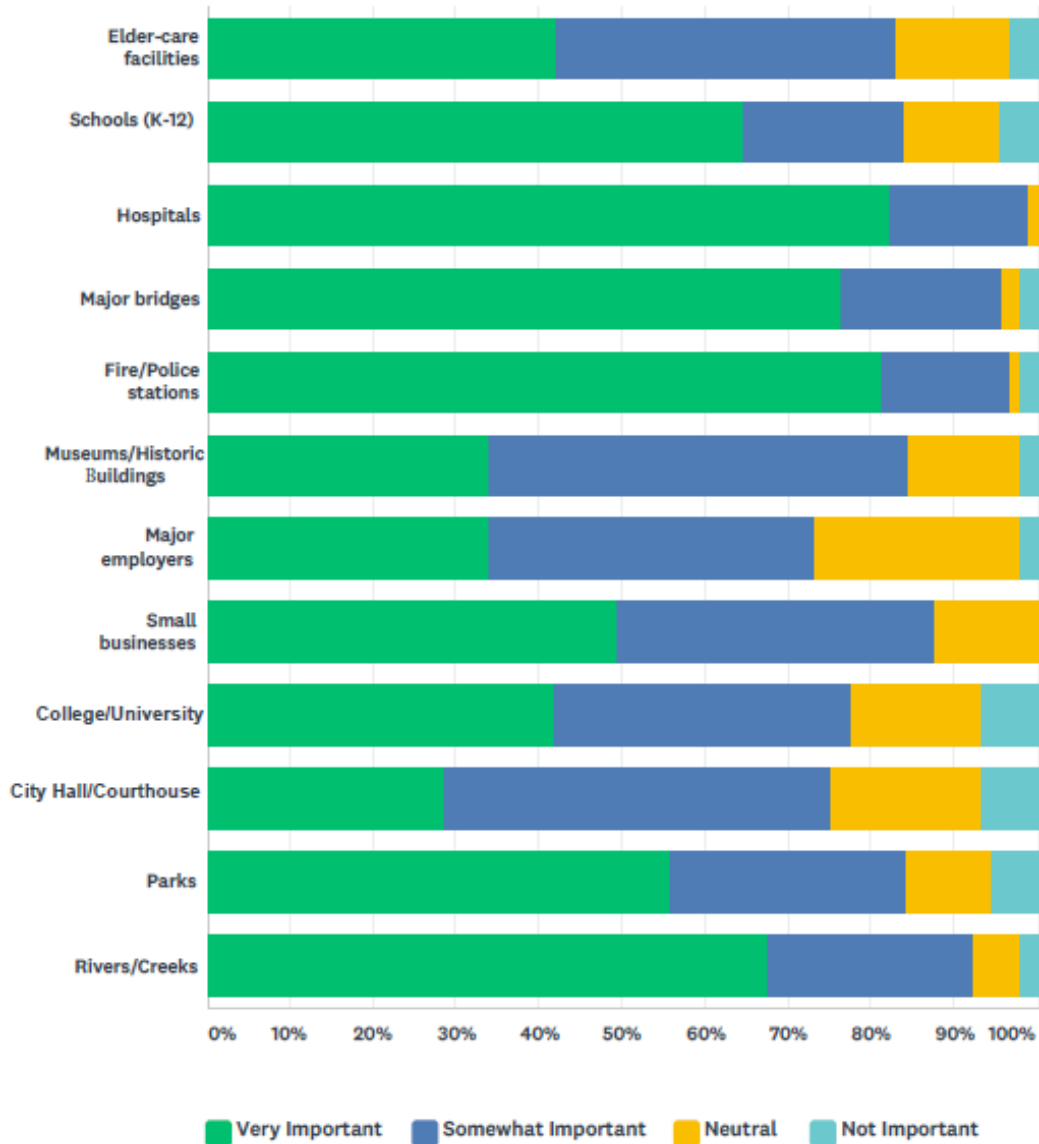
Prior to receiving this survey, were you aware that the Federal Emergency Management Agency (FEMA) can provide funding assistance for hazard mitigation projects in Duval County?

Answered: 102 Skipped: 0



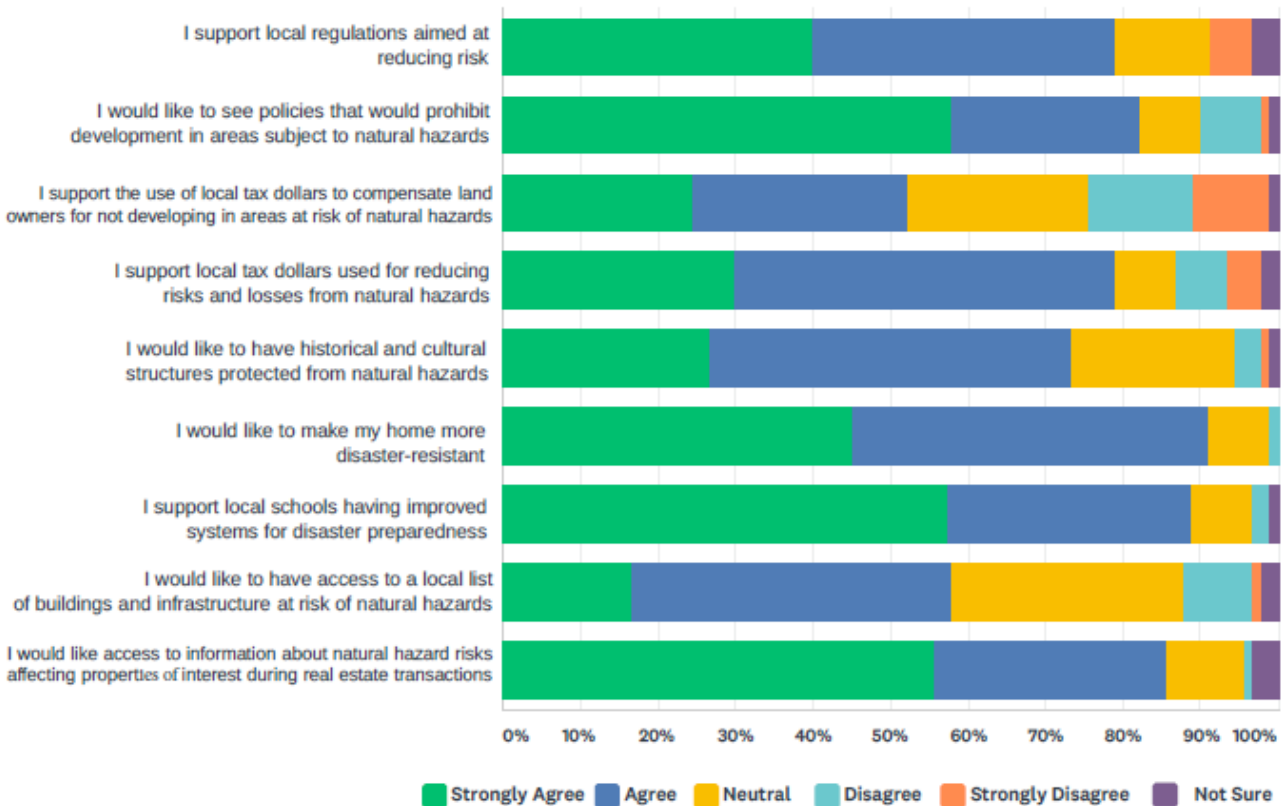
Community assets are features, characteristics, or resources that either make a community unique or improve the quality of community life. Tell us what specific types of community assets are most important to you.

Answered: 90 Skipped: 12



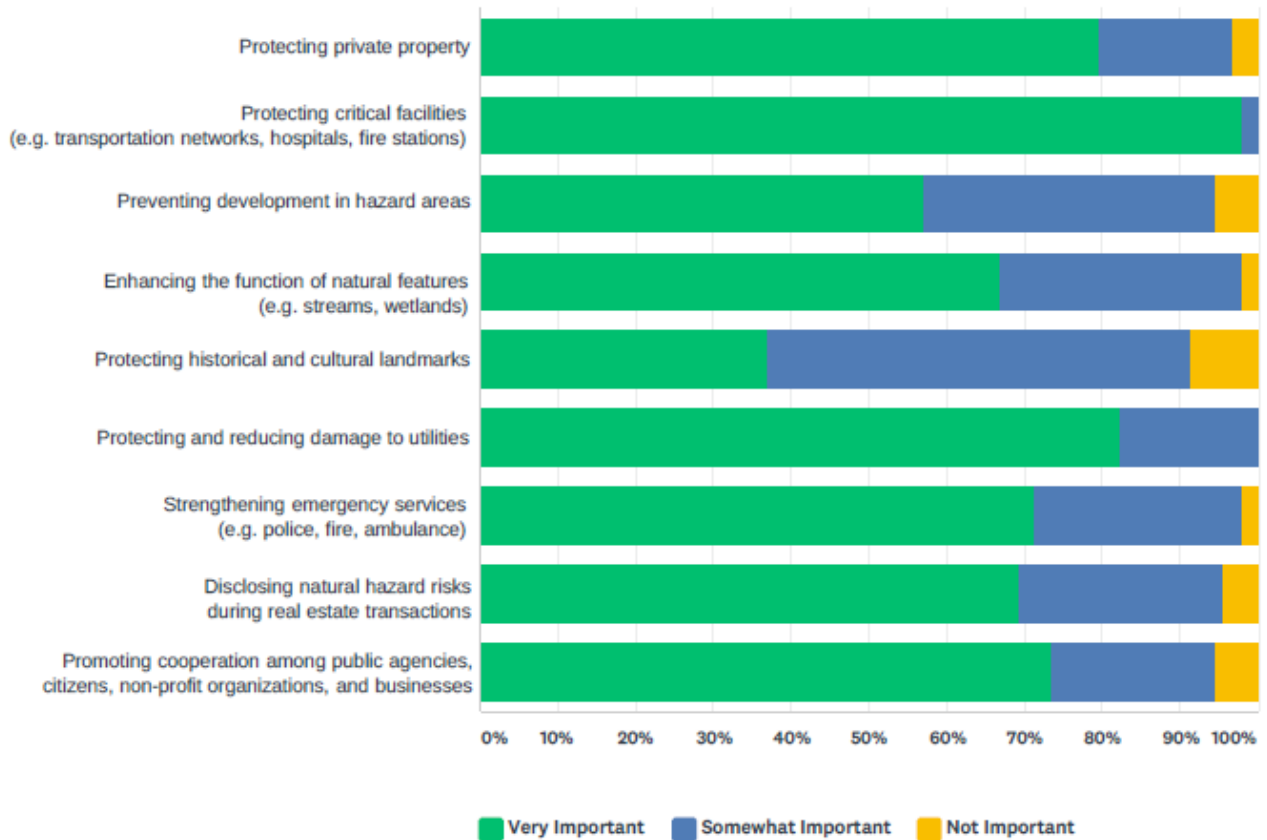
A number of activities can reduce your community's risk from hazards. These activities can be both regulatory and non-regulatory. Please check the box that best represents your opinion of the following strategies to reduce the risk and loss associated with these hazards. *(Regulatory defined as: A rule or order issued by a government agency and often having the force of law.)*

Answered: 90 Skipped: 12



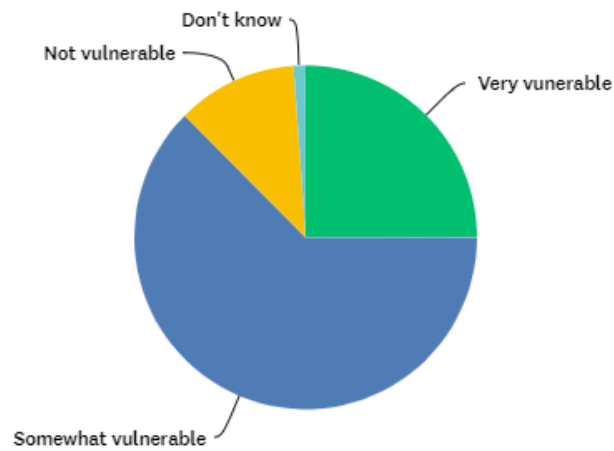
Natural hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural hazards in your county. Please tell us how important each one is to you.

Answered: 90 Skipped: 12



## How vulnerable do you consider your home to the impact of a hazard?

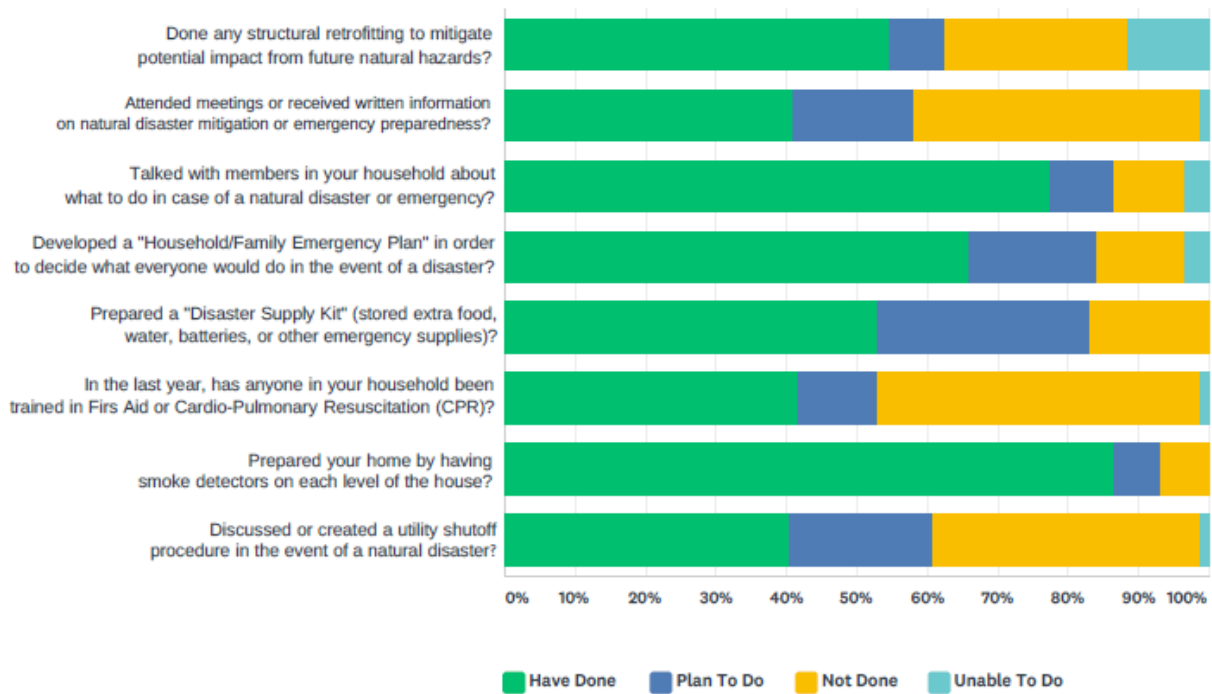
Answered: 88 Skipped: 14



ANSWER CHOICES	RESPONSES	
Very vulnerable	25.00%	22
Somewhat vulnerable	62.50%	55
Not vulnerable	11.36%	10
Don't know	1.14%	1
TOTAL		88

## In your household, have you or someone in your household:

Answered: 89 Skipped: 13



## Do you live, work, or own property in Duval County? (check all that apply).

Answered: 89 Skipped: 13

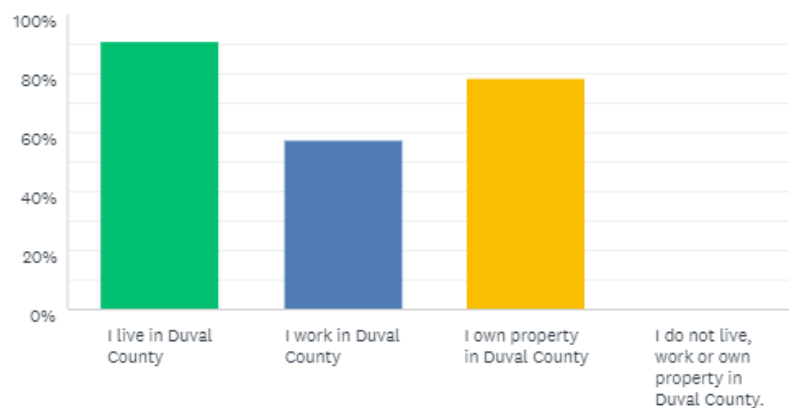




Table A.1 : Survey Demographics Table

## Public Opinion Survey on Mitigation

### Age

<i>Answer Choices</i>	<i>Responses</i>	
Under 18	0.00%	0
18-24	0.00%	0
25-34	3.49%	3
35-44	12.79%	11
45-54	16.28%	14
Over 55	66.28%	57
Prefer not to answer	1.16%	1
<b>Answered</b>		<b>86</b>
<b>Skipped</b>		<b>16</b>

### Education Level

<i>Answer Choices</i>	<i>Responses</i>	
High school graduate/GED	5.68%	5
Some college/trade school	19.32%	17
College degree	38.64%	34
Postgraduate degree	36.36%	32
Prefer not to answer	0.00%	0
Other (please specify)	0.00%	0
<b>Answered</b>		<b>88</b>
<b>Skipped</b>		<b>14</b>

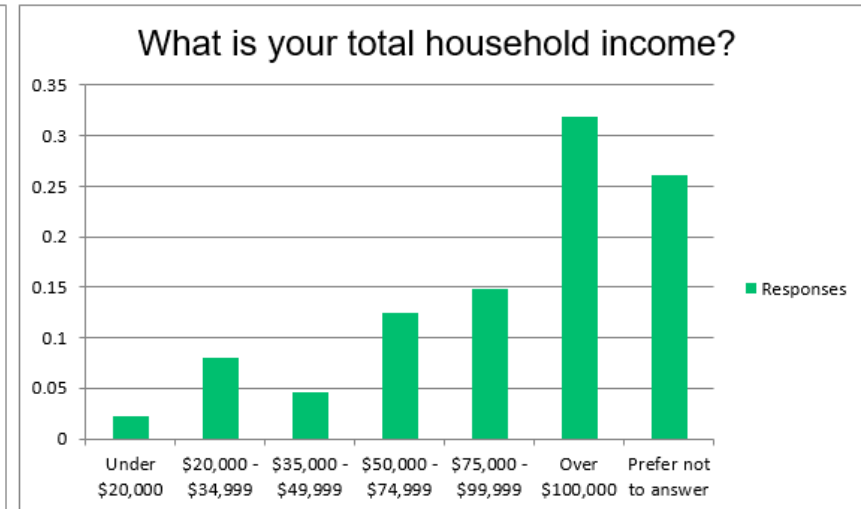
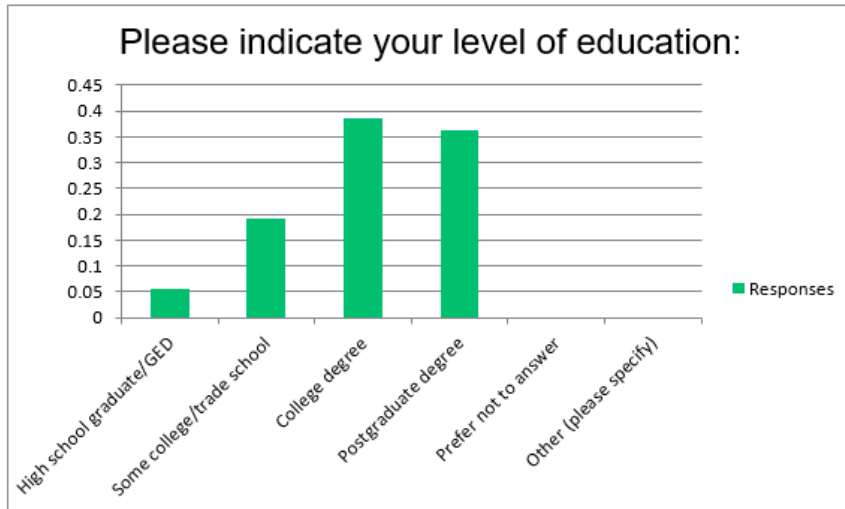
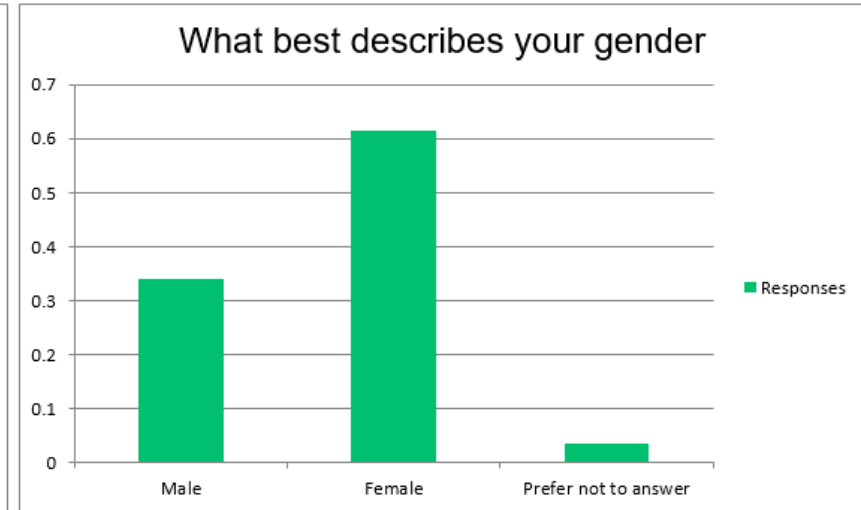
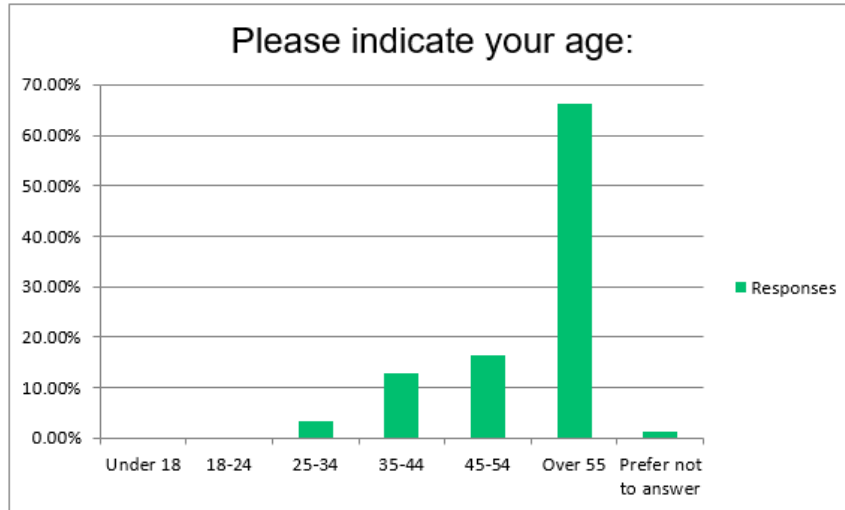
### Gender

<i>Answer Choices</i>	<i>Responses</i>	
Male	34.09%	30
Female	61.36%	54
Prefer not to answer	3.41%	3
Prefer to self-describe:		3
<b>Answered</b>		<b>88</b>
<b>Skipped</b>		<b>14</b>
<b>Skipped</b>		<b>14</b>

### Household Income

<i>Answer Choices</i>	<i>Responses</i>	
Under \$20,000	2.27%	2
\$20,000 - \$34,999	7.95%	7
\$35,000 - \$49,999	4.55%	4
\$50,000 - \$74,999	12.50%	11
\$75,000 - \$99,999	14.77%	13
Over \$100,000	31.82%	28
Prefer not to answer	26.14%	23
<b>Answered</b>		<b>88</b>
<b>Skipped</b>		<b>14</b>

Table A.2: Survey Demographics Bar Charts



## APPENDIX B: 2020 LMS UPDATE SCHEDULE

### Critical Milestones

**Table A.4: Critical Plan Update Milestones**

<b>Date</b>	<b>2020 LMS Update Activity</b>	<b>Participation</b>
8.28.19	Review of Subcommittee Membership, invitation to participate in Risk Assessment Subcommittee . Preliminary schedule determined for plan update.	LMS Advisory Committee (Duval Prepares) General Public Invited
1.16.19	Host “Power Outage” Virtual Tabletop (VTTX) in the COJ EOC, assess vulnerability for critical infrastructure disruption hazard	EPD Staff, JEA, County stakeholders
1.22.19	LMS Advisory Committee Risk Assessment Subcommittee convenes for first official meeting	LMS Advisory Committee Risk Assessment Subcommittee
2.14.19	Strategy meeting for public outreach campaign (survey) and review of LM best practices	LMS Advisory Committee Risk Assessment Subcommittee
2.26.19	Review of public outreach campaign planning efforts and recommendation of LMS update	LMS Advisory Committee (Duval Prepares) General Public Invited
2.27.19	Active Shooter exercise at Jacksonville International Airport, operational vulnerability assessment resulting in AAR	EPD Staff, JFRD, JSO, JAA, County stakeholders
3.1.19	Review of final survey draft and discussion of outreach methods Discussion of FEMA’s THIRA tool	LMS Advisory Committee Risk Assessment Subcommittee
3.14.19	Host “Tornado” Virtual Tabletop (VTTX) in the COJ EOC, assess vulnerability to severe weather and review operational procedures	EPD Staff, County stakeholders
3.28.19	Host “Hurricane” Virtual Tabletop (VTTX) in the COJ EOC, assess vulnerability to tropical cyclone impacts countywide	EPD Staff, County stakeholders
3.21.2019	Discussion regarding performance measures being added to the LMS Discussion of new hazards to be analyzed in 2020, including more detail for technological and man-made hazards	Security and Emergency Preparedness Planning Council (SEPPC), aka LMS Working Group
4.01.19	Discuss THIRA/HIVA and devise performance measures for LMS to support goals and objectives	LMS Advisory Committee Risk Assessment Subcommittee
4.25.19	Review of draft Hazard Profile format, new to the 2020 LMS Comparative Analysis of hazards between counties in Florida	LMS Advisory Committee Risk Assessment Subcommittee
5.06.19	FDEM Statewide HURREX, COJ and JEA Joint HURREX resulting in vulnerability assessment data and AAR with	FDEM, EPD Staff, JEA, County Stakeholders

Date	2020 LMS Update Activity	Participation
	recommendations	
5.14.19	Presentation of Risk Assessment Subcommittee accomplishments to date, formal recommendation of public survey. Approval of HIVA methodology including quantitative scale. Approval of new project additions to LMS.	LMS Advisory Committee (Duval Prepares) General Public Invited
5.23.2019	Update to stakeholders regarding LMS revision efforts to date, including risk assessment methodology and public outreach strategy.	Security and Emergency Preparedness Planning Council (SEPPC), aka LMS Working Group
6.01.19	Begin mailing process for the COJ Emergency Preparedness Guide, which contains a link to Mitigation Survey, to 418,000 residents of Duval County	EPD, JEA, Private vendor
6.05.19	Begin vulnerability assessment according to methodology recommended by SEPPC Begin update of hazard profiles in the draft LMS, continues until January 2020	EPD Staff, input from stakeholders and subject matter experts
8.12.19 8.14.19	Attend CPAC meetings to gather public opinions and input for LMS Update	EPD staff
8.21.19	LMS Update Workshop (FL391) hosted in Duval County, at the COJ EOC. Workshop delivered by FDEM Mitigation team	FDEM, Duval Prepares members, stakeholders from throughout Florida Region III.
8.21.19	FDOH Duval Hosts Pandemic Influenza TTX; review of operational response plans and vulnerability assessment	FDOH, EPD, County stakeholders
8.22.19	Discussion of LMS Project List, approval of new projects additions to LMS. Review of FDEM's LMS Update Manual (2019. Ed.) Preliminary survey results revealed	LMS Advisory Committee (Duval Prepares) General Public
9.19.19	Update to stakeholders regarding LMS revision efforts to date	Security and Emergency Preparedness Planning Council (SEPPC), aka LMS Working Group
11.7.19	Review Florida Department of Law Enforcement 2019 Critical Infrastructure Enhanced Security Report for information supporting HIVA	EPD Staff
11.4.19	EPD Staff meet with DHS, FDLE, JSO to discuss THIRA and gather information to support technological and man-made hazards in the LMS	EPD, DHS, FDLE, JSO
11.4.19	EPD Staff meet with DHS, FDLE, JSO to discuss THIRA and gather information to support technological and man-made hazards in the LMS	EPD, DHS, FDLE, JSO

<b>Date</b>	<b>2020 LMS Update Activity</b>	<b>Participation</b>
12.12.19	Update to stakeholders regarding LMS revision efforts to date	Security and Emergency Preparedness Planning Council (SEPPC), aka LMS Working Group
1.27.20 1.28.20	LMS Risk Assessment Subcommittee meets to formally review the final draft of the plan	LMS Advisory Committee Risk Assessment Subcommittee
2.10.2020	Duval Prepares meets to review the final draft of the plan Meeting was publicly noticed and the general public was invited to provide public comment	LMS Advisory Committee (Duval Prepares) General Public

### Timeline Narrative for LMS Update Process, Inception to Current

The requirements of the Disaster Mitigation Act of 2000 (DMA2K) imposed significant plan revisions many of which concerned the need to better integrate mitigation policy into other local land-use related plans. Consistent with the established evaluation and revision procedures, the Advisory Committee/Duval Prepares contracted with the Northeast Florida Regional Council, who serves as the regional planning agency for the northeast area and as such have a great deal of expertise in both the development and execution of a range of local plans. Under the terms of the contract, the Regional Council staff in conjunction with County Emergency Management representatives served to facilitate particular meetings during the 2002-2005 planning and updating of the Local Mitigation Strategy. These planning efforts included expanding the list of people and organizations invited to participate, expanding the list of participants actively encouraged to participate, and revising portions of the local mitigation strategy that did not meet requirements set by the Disaster Mitigation Act of 2000.

On March 27, 2003 the Advisory Committee/Duval Prepares met to review the requirements of the Disaster Mitigation Act of 2000 (DMA2K) and discuss any necessary revisions to the LMS. In addition, they reviewed and updated the goals. The Regional Council then began drafting the necessary revisions. The Committee met again on July 17, 2003, September 18, 2003 and January 9, 2004 to review and update the hazards analysis, the maps of the vulnerable areas and the projects list. In each case, the necessary revisions were made by the Regional Council staff and presented at the next meeting of the Committee. All of these meetings were public meetings and noticed on a public notice board in each municipal City Hall as standard procedure. Unfortunately, public attendance was usually low at these meetings but increased through additional efforts as described in section C below. At the meeting on February 16, 2004 the final draft was reviewed, approved and forwarded for state and FEMA review. On July 16, 2004, the Committee received a letter with the joint state/FEMA final comments.

The revisions were made by Council staff and the revised plan was placed on both the Council and Duval Prepares websites to facilitate public input and to allow Council members a final comment period without the need for a general meeting over very minor changes. No comments were received and the corrected final draft was again forwarded to the state and FEMA for review. The Committee continued to use this approach in conjunction with planning and informational workshops to gain public input.

A final copy of the document was presented to all participating jurisdictions to the City of Jacksonville City Council, City of Atlantic Beach City Commission, Town of Baldwin Town Council, City of Jacksonville Beach City Council, and the Neptune Beach City Council for their approval and adoption. There have been no changes to the jurisdictions participating in this process.

The LMS was subsequently reapproved in 2010 after a process of review and validation by the Duval Prepares Advisory Committee and public hearings regarding the update process. The 2010 LMS was subsequently approved by the City of Council of City of Jacksonville, the City Commissions of the City of Atlantic Beach, City of Jacksonville Beach, City of Neptune Beach, and the Town of Baldwin. There were no changes to the jurisdictions and the hazards were evaluated to be at the same level of risk as in the 2005 LMS update. As a new directive from FEMA, extensive mapping of the vulnerabilities of the county to its major hazards and the impacts to its building values was incorporated into the LMS.

In January 2014, the Duval Prepares partners kicked off the planning cycle for the five year update of the 2015 Local Mitigation Strategy. Concurrently, the LMS Working Group membership received notification from the Director of Emergency Preparedness for the City of Jacksonville that the mitigation planning

update process is in progress, inclusive of an all-hazard identification and vulnerability assessment. All members and stakeholders were invited to participate in the process to (1) identify and confirm the hazard identification and the supporting vulnerability analysis and to (2) participate and support the decision making process and adoption of projects for the 2015 update, while reporting on the status of completed, deferred, or deleted projects.

To ensure the development of a functional document that will facilitate hazard mitigation activities in the City of Jacksonville, the LMS Advisory Committee members who are subject matter experts, and representatives of the jurisdictions within the City of Jacksonville, conducted an all-county Hazard Identification and Vulnerability Assessment (HIVA) which considered natural and man-made/technological hazards, and their impacts, which could be reduced or eliminated through mitigation. This assessment built upon the initial LMS adopted in 1998, and ratified in the subsequent 2005 and 2010 updates. This comprehensive process provides a pre-disaster analysis for post-disaster planning and recovery by identifying all local hazards and hazard areas, defining all areas of vulnerability - both geographic and demographic - and assessing the capacity of the community to mitigate the effects of those hazards. In addition, this assessment addresses the probability of occurrence of each hazard.

Duval Prepares, the LMS Advisory Committee, affirmed the hazards listed below as priorities as the top priorities for the 2015 LMS Update at the January 20, 2015 hazard prioritization meeting. One new hazard was identified, which was called "Adaptation to Climate Change" in light of the findings in scientific literature, the State of Florida Enhanced Hazard Mitigation Plan which addresses this issue, and the forthcoming work in the resilience arena, as championed by 100 Resilient Cities Initiative, in which the City of Jacksonville was an inaugural member.

The update process for the 2020 revision of the plan followed the guidelines established during previous update cycles of the plans, and relied heavily on the guidance of the Risk Assessment Subcommittee. The revision focused heavily on aligning the goals and objectives to the shifting political and cultural environment that resulted from a slew of devastating hurricane seasons in Florida. The HIVA was expanded to incorporate and formally include technological and manmade hazards such as critical infrastructure disruption, hazardous material incidents, terrorism and targeted violence, and cyberattacks. Climate change was incorporated as a factor of the risk assessment and each individual hazard was evaluated with regard to the potential effects of climate change. The previous "Adaptation to Climate Change" hazard was subsequently analyzed in the context of individual hazards rather than a standalone hazard. Sea Level Rise was added as a natural hazard to allow for dedicated analysis of this facet of climate change. Subject matter experts within law enforcement and homeland security were consulted regarding the hazard and vulnerability analysis for technological and man-made hazards.

## **APPENDIX C: ADAPTATION ACTION AREA WORKING GROUP FINDINGS**

### **Adaptation Action Area Working Group**

Pursuant to Section 163.3177(6)(g)(10) Florida Statutes, the City has adopted an Adaptation Action Area (AAA) designation that is based on a medium range impact of a two-foot rise in sea level by 2060. The AAA is a policy tool that facilitates consideration of the potential for impacts related to sea level rise, designates vulnerable areas, and prioritizes adaptation strategies as deemed appropriate. An AAA Working Group has been established to review existing City programs and policies in relation to the AAA and to determine the need and appropriate timing for additional and financially feasible responses to the effects of coastal flooding within the AAA.

### **2030 Comprehensive Plan - Conservation/Coastal Management Element**

#### **Objective 11.5**

The City has established an Adaptation Action Area (AAA) and shall consider appropriate responses to address current and future risks related to the associated impacts of sea-level-rise.

#### **Policy 11.5.1**

The City of Jacksonville shall recognize the Coastal High Hazard Area (CHHA) identified in Map C-18 as also encompassing the Adaptation Action Area (AAA) for those low-lying coastal zones that may experience coastal flooding due to extreme high tides and storm surge and are vulnerable to the impacts of rising sea level. (§163.3177(6)(g)(10), F.S.) Land within the AAA is subject to potential high tide inundation under a horizon 2060 two foot sea level rise scenario.

#### **Policy 11.5.2**

The City shall consider the implications of the AAA when reviewing changes to the use, intensity and density of land lying within the AAA.

#### **Policy 11.5.3**

The City shall recognize existing regulations, programs and policies that overlap with the AAA and that are currently in place to limit public investment and address appropriate development and redevelopment practices related to flooding. These regulations, programs and policies include but are not limited to the floodplain management ordinance, CHHA policies, the Local Mitigation Strategy and the Post Disaster Redevelopment Plan and shall only be applied in cases where such regulation would otherwise apply to a development or redevelopment project.

#### **Policy 11.5.4**

The City of Jacksonville shall create a working group to review existing programs and policies in relation to the AAA to determine the need and appropriate timing for additional and financially feasible



responses to the effects of coastal flooding within the Adaptation Action Area. The working group shall be established within one year of the effective date of this policy.

#### AAA Working Group Goal

Evaluate the City's existing programs and policies in relation to the 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.

#### AAA Working Group Scope

##### TASK 1: Identify the Impacts of Coastal Flooding within the AAA

- Define the condition of, and affects resulting from, coastal flooding within the AAA.
  - At a minimum, considerations should include population, critical infrastructure, natural resources, and economic impact.

##### TASK 2: Evaluate the City's Existing Programs and Policies

- Examine the strengths, weaknesses and opportunities of the City's existing policies and regulations in relation to the AAA.
  - The review may include, but is not limited to, drainage regulations and infrastructure, flood zone regulations, land use policies, and zoning regulations.

##### TASK 3: Recommendations

Based on the findings of Task 2, recommend policy and regulatory changes deemed necessary and appropriate to protect private and public investment within the AAA.

Recommendations should include, but may not be limited to, additional and financially feasible actions/initiatives

The AAA Working Group Recommendations (Resolution 2019-893) follow on the subsequent pages.

Figure C.1 Adaptation Action Area Working Group Recommendations

**Staff Report on**  
**Resolution to Approve the Adaptation Action Area Workgroup**  
**Report and Recommendations**

**RESOLUTION 2019-893**

Resolution 2019-893 recognizes and approves the Adaptation Action Area Workgroup Report and Recommendations, dated November 2019.

The City of Jacksonville implemented the Florida Statutes 2015 Peril of Flood legislation (Section 163.3178(2)(f)2, Florida Statutes) by establishing an Adaptation Action Area (AAA). An AAA is a designation in the Conservation/Coastal Management Element of the City's Comprehensive Plan, which identifies an area that experiences coastal flooding due to extreme high tides and storm surge and that is vulnerable to the impacts of sea level rise. The purpose of designating an AAA is to prioritize funding and resources for infrastructure needs and adaptation planning. The City's AAA designation was adopted into the Comprehensive Plan in 2017 and included a commitment to establish a Workgroup to review existing programs and policies in relation to the AAA to determine the need and appropriate timing for additional and financially feasible responses to the effects of coastal flooding within the AAA.

The Workgroup was established and held public meetings from February through August of 2019. At the meetings, the Workgroup learned about and evaluated existing policies and regulations related to infrastructure, land development, utilities, and emergency management and received public comment. Discussions resulting from these presentations culminated in a series of recommendations. When compiled, these recommendations, which were structured within an adaptation planning framework, ended up creating the following core areas on which Jacksonville's resiliency efforts can be based: Education and Community Outreach; Land Development Regulations and Procedures; Inter-agency Coordination; Infrastructure; and Economic and Human Resources.

Three fundamental recommendations provide the foundation for the full list of the Workgroup's recommendations:

- Expand the current boundaries of the AAA to accurately reflect Jacksonville's unique interconnected coastal and riverine system (Exhibit 1 includes a map of the recommended boundary).
- Hire or appoint a Chief Resiliency Officer or establish a resiliency office or similar agency or authority. This position or office should oversee long-term objectives related to education, awareness, coordination and implementation.

- Fund and conduct a thorough Vulnerability Assessment to define the level of impact and to identify the people, infrastructure, habitats and functions that may be affected.

A full list of the Workgroup recommendations is attached to this report and is included in Exhibit 1 of Resolution 2019-893.

The Planning and Development Department recommends **APPROVAL** of **Resolution 2019-893**.

## RECOMMENDATIONS

### *Adaptation Action Area Report and Recommendations, November 2019*

#### Education and Community Outreach

1. 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, or other innovative and effective approaches.
2. The City should fund and gather post-storm mitigation efforts to include comprehensive and immediate documentation of the spatial limits of upland flooding after a major storm event. A post-storm report and mapping should be formulated and be made publicly available.
3. The City should establish a technical advisory committee to provide expertise regarding the different aspects of sea level rise adaptation.
4. If deemed appropriate by the City, a member of the technical advisory committee may be appointed as an ex-officio member of the Downtown Investment Authority (DIA), Downtown Development Review Board (DDRB), Planning Commission (PC) or similar organization in order to advise regarding the effects of sea level rise and storm surge effects on proposed projects and abutting properties in the AAA.
5. Update the Adaptation Action Area for sea level rise and infrastructure vulnerability assessments every five (5) years so that decisions regarding adaptation planning and investments can be based on best available data.
6. The City, through educational campaigns, promotional materials, and partnerships with non-profit and for-profit entities, should promote and participate in the implementation of green infrastructure solutions to mitigate flooding within the AAA.

#### Land Development Regulations and Procedures

1. The AAA boundary should be defined as, or take into consideration, the greater of the Cat 3 storm surge area or the FEMA 500-year flood plain as shown (2019) but not include those 500-year flood plains disconnected from the Cat 3 surge area, and implement adaptation strategies commensurate with the storm and flood risks.
2. The City should explore the use of a resilience scorecard, matrix, rating system, or similar approach and user guidelines to assist local planners and emergency managers to integrate disaster risk into Land Use and Zoning decisions and the feasibility of incentivizing green infrastructure and hazard mitigation projects on residential and commercial properties.
3. The City Ordinance Code and other relevant Land Development Regulations should be evaluated, and revised when feasible, to encourage and increase protection strategies for new development and significant redevelopment of properties within the AAA. Such protection strategies should consider nuisance flooding, tidal fluctuations, sea level rise, and storm surge and may include, but are not limited to, increasing buffers and setbacks; requiring or limiting (as appropriate) storm hardening or green infrastructure solutions; increasing freeboard requirements; requiring more stringent design standards for stormwater facilities; and exploring the use of a resilience scorecard, matrix, rating system, or similar approach and user guidelines.
4. In order to reduce or mitigate upstream flooding, the City should evaluate and prioritize opportunities to acquire lands located within major stormwater basins that can serve as

- both recreation and open space and flood water storage capacity during major storm and high tide events.
5. The City shall evaluate the feasibility of providing incentives to the owners of existing structures located within the AAA for the removal of such structures or the renovation of such structures to bring them into compliance with City Ordinance Codes revised for adaptation and resiliency.
  6. In order to guide development away from the AAA and environmentally sensitive lands towards areas that are already high, dry, and connected, the Planning and Development Department shall explore the feasibility of offering density bonuses, transfers of development rights, clustering development entitlements, or other similar types of strategies to limit new development within the AAA and within environmentally sensitive or special flood hazard areas, or as an incentive for a development's use of low impact development stormwater solutions.
  7. The City should consider revising the City Ordinance Code and any other relevant Land Development Regulations to distinguish between properties within the AAA versus those outside of the AAA with regards to the current redevelopment or renovation threshold above which a structure must come into compliance with the City's Ordinance Code as regulations pertaining to properties within the AAA may be more stringent.
  8. The City Ordinance Code and any other relevant Land Development Regulations shall be amended to include requirements for disclosure of a property's location within the AAA along with an explanation of the AAA. At a minimum, these requirements shall address disclosure before final action or approval in the following processes or situations: sale, lease or transfer of property; issuance of building permits; requests for zoning and land use changes; and subdivision review and platting.
  9. The City should develop and create systems and processes to safeguard local natural environments from an anticipated 2-foot sea level rise. Measures should include, but not be limited to promoting preservation, reforestation, and afforestation to increase soil moisture retention, provide shade and increase habitat for species under stress; and removing invasive non-native vegetation within the AAA to benefit shoreline stabilization.

#### Inter-Agency Coordination

1. The City should establish a top-level position or authority, create an office, and/or assign tasks to oversee and coordinate the planning of interagency resiliency programs and public and private projects, engage stakeholders to promote public-private partnerships, and manage and leverage funding for resiliency initiatives. Tasks of such a position, authority, or office may include, but are not limited to, educational outreach, development of resiliency tools or resources for public and private use, and creation of a resource center to assist property owners.
2. The City shall coordinate with all applicable agencies to mitigate flood hazards on adjacent properties that may occur due to publicly funded actions.
3. In non-urban areas or low energy environments, discourage the permitting of bulkheads where bulkheads do not currently exist, and instead, encourage soft solutions to stabilize shorelines.
4. In order to reduce or mitigate upstream flooding, the City should evaluate and prioritize opportunities to acquire lands located within major stormwater basins that can serve as both recreation and open space and flood water storage capacity during major storm and high tide events.



5. The City's Emergency Preparedness Division shall consider collaborating with relevant entities and non-profit organizations in order to prepare for trauma associated with displacement and post-traumatic stress disorder following an extreme weather event.
6. Update the Adaptation Action Area for sea level rise and infrastructure vulnerability assessments every five (5) years so that decisions regarding adaptation planning and investments can be based on best available data.
7. The City should evaluate private and public development or redevelopment projects that are within the AAA prior to making public expenditures for these projects.
8. The City should develop and create systems and processes to safeguard local natural environments from an anticipated 2-foot sea level rise. Measures should include, but not be limited to promoting preservation, reforestation, and afforestation to increase soil moisture retention, provide shade and increase habitat for species under stress; and removing invasive non-native vegetation within the AAA to benefit shoreline stabilization.
9. The City shall coordinate and participate in any state or regional resiliency efforts.

#### Infrastructure

1. The City should assess and compare protection mechanisms, such as hard structural options like sea walls or other physical barriers and soft structural options like living shorelines and dune or wetland restoration, when designing and engineering such systems for capital improvement projects located within the AAA. Factors to compare and consider include, but may not be limited to, a cost/benefit analysis and an analysis of the short and long-term impacts of these systems to the surrounding areas.
2. The City should consider the feasibility of various options for requiring the repair and maintenance of private sea walls/bulkheads that are critical in the protection of private property, significant resources, or public infrastructure.
3. The City should consider the repair, maintenance, and improvement of drainage infrastructure projects based on their location within the AAA and the frequency of nuisance flooding within the area. Planning for the probable occurrence of nuisance flooding in the future may also be considered.
4. The City should evaluate the feasibility of updating the Master Stormwater Management Plan and prioritize areas related to mapping floodplains in areas of the City not yet mapped.
5. The City should evaluate alternative stormwater storage solutions and natural groundwater storage solutions such as, but not limited to, low impact development features, trees, and wetland systems and evaluate and improve stormwater infrastructure to consider extreme storm events.
6. The City should evaluate private and public development or redevelopment projects that are within the AAA prior to making public expenditures for these projects.
7. The City should develop and create systems and processes to safeguard local natural environments from an anticipated 2-foot sea level rise. Measures should include, but not be limited to promoting preservation, reforestation, and afforestation to increase soil moisture retention, provide shade and increase habitat for species under stress; and removing invasive non-native vegetation within the AAA to benefit shoreline stabilization.

### Economic and Human Resources

1. Based on available data, the City should study or analyze the conditions preceding, and during, Hurricane Irma (2017) and the area affected by flood waters resulting from the storm.
2. The Planning and Development Department shall consider demographic, socioeconomic, and development data such as, but not limited to, age (elderly and children); income; lack of personal transportation or transit-dependent; number of historic properties; government-owned properties; and locations connected to centralized water/sewer when evaluating the city's sensitivity to coastal flooding and sea level rise within the AAA.
3. The City's Emergency Preparedness Division shall consider collaborating with relevant entities and non-profit organizations in order to prepare for trauma associated with displacement and post-traumatic stress disorder following an extreme weather event.
4. The City shall continue to strengthen its efforts towards equity and environmental justice. With regards to communities living within the AAA, the City should monitor demographic, socioeconomic, and housing data to prevent or manage any signs of climate gentrification.
5. The City shall consider the impact of AAA strategies and regulations on economically distressed communities and seek opportunities to mitigate negative impacts in an equitable manner.
6. If deemed appropriate by the City, a member of the technical advisory committee may be appointed as an ex-officio member of the Downtown Investment Authority (DIA), Downtown Development Review Board (DDRB), Planning Commission (PC) or similar organization in order to advise regarding the effects of sea level rise and storm surge effects on proposed projects and abutting properties in the AAA.

## **APPENDIX D: STORMWATER RESILIENCY GROUP FINDINGS**

The City of Jacksonville Storm Resiliency and Infrastructure Development Review Committee met bi-weekly between February 26, 2019 and June 7, 2019. The SRAIDRC was charged “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; 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.”

The SRAIDRC produced a final report, which is summarized on the subsequent pages through a presentation compiled by members of the committee.

DRAFT



Figure D.1 City of Jacksonville Storm Resiliency and Infrastructure Development Review Committee Final Presentation



# City of Jacksonville Storm Resiliency and Infrastructure Development Review Committee



June 25, 2019

# AGENDA

- Committee Charge
- Process
- Presentation Highlights
- Identified Challenges
- Committee's Response



*Northbank, St. Johns River*

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## COMMITTEE CHARGE

- Jacksonville Waterways Commission, August 2018
- “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.”

# PROCESS

## Schedule

- Bi-weekly meetings from February 15, 2019 – June 7, 2019
- Bi-weekly meetings held in the Sunshine



## Committee Members

- Chair: Sam Mousa, Chief Administrative Officer
- Vice-chair: Lori Boyer, Council Member
- City of Jacksonville, Public Works Director - John Pappas
- City of Jacksonville - Jim Love, Council Member
- Federal Emergency Management Agency – Marc May
- JEA – Deryle Calhoun
- United States Navy – Eric Denfeld

# PROCESS

## Committee Liaisons

- City of Jacksonville, Planning Director – Bill Killingsworth
- Florida Department of Environmental Protection – Greg Strong
- Florida Department of Environmental Protection – Jim Maher
- Florida Department of Environmental Protection – Tom Kallemeyn
- St. Johns River Water Management District – Geoff Sample
- US Army Corps of Engineers – Susan Kaynor
- US Army Corps of Engineers – Mark Evans
- Federal Emergency Management Agency – Patricia Smithline
- Federal Emergency Management Agency - David Kulberg
- JEA – Steve McInall

Committee Website:  
[www.coj.net/sraidrc](http://www.coj.net/sraidrc)

## PRESENTATION HIGHLIGHTS FROM USACE SEA LEVEL RISE CONCERNS IN NE FL

- Direct impacts of sea level rise and coastal storms on communities, businesses, and Mayport NAS
- Increase in flood risks due to flood frequency and drainage issues
- Impacts on water supply and storage related to saltwater intrusion and rising groundwater levels
- Impacts to natural systems



*Hurricane Irma – Roosevelt Square Shopping Center,  
September 11, 2017*



## PRESENTATION HIGHLIGHTS FROM FDEP RESILIENT FLORIDA COASTLINES

- Looking at coastal resilience planning from the State perspective
  - Comprehensive Plans for coastal communities require a Coastal Management Element
    - Requirements within Florida Statutes: Peril of Flood and Adaptation Action Areas
- Florida Resilient Coastlines Program
  - Resources, funding, and coordination
- Living shorelines
  - Restoration techniques that use natural materials to stabilize shorelines and prevent erosion.



*Hurricane Irma - Riverside, September 11, 2017*



*Coastline image from FDEP*



*Hurricane Irma - Hogan & Water Street, September 11, 2017*

## PRESENTATION HIGHLIGHTS FROM JEA JEA'S RESILIENCY PROGRAM

### Goals

- Understand current & future severe weather & climate risks
- Identify JEA system vulnerabilities to identified risks
- Update design & construction standards
- Develop adaptation strategies
- Develop resiliency plan
- Benchmarking and using best practices from leading utilities

### Activities

- Establish future extreme weather scenarios
- Perform vulnerability assessment & risk analysis of select JEA facilities
- Develop mitigation & adaptation strategies
- Perform economic cost-benefit analysis
- Prioritize strategies
- Update design & construction standards
- Develop resiliency plan and implementation roadmap



## CHALLENGES NEW DEVELOPMENT - INFRASTRUCTURE

- Extent of survey data on adjacent properties is insufficient to evaluate off-site impacts and contributions.
- Incomplete implementation of Floodplain Management Code, Chapter 652
- Timeframe for installation and completion of development's drainage system
- Quality and permeability of fill material
- Rear lot swales (vs. pipes) may hinder City access and may be exacerbated by the actions of subsequent lot owners
- Impact of eliminating the existing tree canopy
- Design standards for impervious surface area vs. lot coverage
- Timeframe for expiration of a 10-set approval and floodplain permit
- Alternative to bulkheads – site specific living shorelines

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## CHALLENGES EXISTING SYSTEMS - INFRASTRUCTURE

- 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



*Major Outfall, City of Jacksonville Public Works*



*Hurricane Irma - Riverside, September 11, 2017*

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## COMMITTEE RESPONSE DEVELOPMENT & INFRASTRUCTURE

- Ordinance 2019-331 amends Chapter 652, Floodplain Management Ordinance
  - Requires A-3 soil or permeability analysis for fill material.
  - Adds definition for “*Floodway setback*. The area between the outer boundary of the regulatory floodway associated with natural named wetland systems shown on the FIRM and a line parallel thereto at a distance of 25 feet. The purpose of this 25-foot floodway setback is to minimize encroachments, and to protect floodplain storage and natural floodplain functions.”
  - Responsibility for hearing and deciding on requests for appeals and requests for variances from Ch. 652 shifts from the Subdivision Standards Policy and Advisory Committee (SSPAC) to the Chiefs of Building Inspection, Engineering & Construction Management, and Development Services sitting as a committee of three.
  - Requires that floodway setbacks be shown on preliminary subdivision plats.
  - Adds floodway setbacks to the locations where no development shall be allowed, unless a floodway encroachment analysis demonstrates no increase in BFE.
  - Adds new section that requires the finished floor elevation in special flood hazard areas to be two feet above the base flood elevation.

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## COMMITTEE RESPONSE DEVELOPMENT & INFRASTRUCTURE

- Ordinance 2019-375 amends Chapter 656, Zoning Code, and Chapter 654, Code of Subdivision Regulations
  - Requires that all subdivisions be designed using Impervious Surface Ratios (ISR) – table added to Chapter 654
  - Requires ISRs in addition to maximum lot coverage within Chapter 656, per each Zoning District
- Recommended ordinance change to create a wetland buffer that is an average of 25 feet and a minimum of 15ft
  - Applies whether or not there are impacts to the wetlands
  - OGC and Planning to draft and file.

## COMMITTEE RESPONSE DEVELOPMENT & INFRASTRUCTURE

- Updates and revisions to Land Development Procedures Manual through Subdivision Standards and Policy Advisory Committee (SSPAC)
  - Soil permeability on filled lots – Require A-3 Soil for fill or allow for a Pre vs. Post analysis to ensure that the fill material will not adversely impact groundwater levels.
  - Maintenance of drainage plans – Plans submitted for review shall include a proposed “Maintenance of Drainage” (MOD) plan which identifies the site-specific method to maintain stormwater drainage patterns during the construction of a project.
  - Backyard drainage swales – All rear-lot drainage systems shall be included as a part of the ongoing development’s stormwater management certification requirements. An access easement shall be dedicated to the City of Jacksonville and the appropriate State Agency for access to rear-lot drainage systems for inspection by the City of Jacksonville or such State Agency.
  - 6-month site development inspection – Once a project begins, a 6-month inspection report will be required. Formal inspection reports will be required to be submitted every 6-months until construction is complete.
  - Required topography to include 100 feet off site in all directions.

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## COMMITTEE RESPONSE INTERAGENCY COORDINATION

- The goal is to mitigate and resolve poor stormwater system performance that cause adverse impacts to citizens and the environment by improving current processes and looking for proactive solutions.
- Documents stormwater jurisdiction and processes
- Interagency database and GIS resource training (COJ, DEP, SJRWMD)
- Discuss long-term efforts for stormwater improvements
- Post-storm season interagency stormwater followup



*Hurricane Irma - Riverside, September 11, 2017*



## COMMITTEE RESPONSE LONG-TERM STRATEGY

- RFP to be released to provide the City with professional services related to Master Stormwater Management Plan modeling and resiliency analysis and design implementation services.




*Hurricane Irma - Hogan & Water Street, September 11, 2017*

- Identify specific critical infrastructure based on the updated MSMP
  - Stormwater
  - Roadways
  - Seawalls/Bulkheads
  - City Emergency Facilities
- Determine “critical” infrastructure improvements
- Prioritize Infrastructure Improvements
- Develop CIP (5yr – 10yr – 25yr – 50yr)

## APPENDIX E: LMS ADVISORY GROUP AND WORKING GROUP AGENDAS

Figure E.1: LMS Working Group (SEPPC) Agenda Q1 2019



ONE CITY. ONE JACKSONVILLE.


**City of Jacksonville, Florida**  
*Lenny Curry, Mayor*  
Emergency Preparedness Division  
515 N. Julia Street  
Jacksonville, FL 32202  
(904) 255-3110  
www.jaxready.com

**Security and Emergency Preparedness Planning Council (SEPPC) Meeting**  
**Duval County Emergency Operations Center, Executive Room**  
**March 21 2019, 1300**  
**AGENDA**

SPEAKER	TOPIC
<b>Steven Woodard</b> <i>Division Chief, Emergency Preparedness City of Jacksonville</i>	Opening Remarks / Introductions
<b>Noah Ray</b> <i>Supervisor, Emergency Preparedness City of Jacksonville</i>	COJ Emergency Preparedness Guide 2019-2020
<b>Todd Smith</b> <i>Deputy Chief, Emergency Preparedness City of Jacksonville</i>	Anti-Vehicle Barrier Program Update
<b>Noah Ray</b> <i>Supervisor, Emergency Preparedness City of Jacksonville</i>	Progress Report COJ Comprehensive Emergency Management Plan 2020 Update Local Mitigation Strategy 2020 Update
<b>Todd Smith</b> <i>Deputy Chief, Emergency Preparedness City of Jacksonville</i>	Training & Exercise Opportunities
<b>Noah Ray</b> <i>Supervisor, Emergency Preparedness City of Jacksonville</i>	Emergency Coordinating Officer Summit <ul style="list-style-type: none"><li>Continuity of Operations Plan (COOP) Updates</li><li>Cost Documentation &amp; Cost Recovery Courses</li><li>New EOC Protocols</li></ul>
<b>Steven Woodard</b> <i>Division Chief, Emergency Preparedness City of Jacksonville</i>	Open Discussion



Figure E.2: LMS Working Group (SEPPC) Agenda Q2 2019



ONE CITY. ONE JACKSONVILLE.

**City of Jacksonville, Florida**


*Lenny Curry, Mayor*  
 Emergency Preparedness Division  
 515 N. Julia Street  
 Jacksonville, FL 32202  
 (904) 255-3110  
[www.jaxready.com](http://www.jaxready.com)

**Security and Emergency Preparedness Planning Council (SEPPC) Meeting**  
**Duval County Emergency Operations Center, Executive Room**  
**May 23, 2019 | 1300**

AGENDA

SPEAKER	TOPIC
<p><b>Dr. Charles Moreland</b>  <i>Director, Community Affairs</i></p>	<p>Opening Remarks / Introductions</p>
<p><b>Noah Ray</b>  <i>Supervisor, Emergency Preparedness</i></p>	<ul style="list-style-type: none"> <li>- City of Jacksonville Emergency Preparedness Guide</li> <li>- ECO Summit Update</li> <li>- Local Mitigation Strategy Update</li> </ul>
<p><b>Steven Woodard</b>  <i>Division Chief, Emergency Preparedness</i></p>	<p>Recommendation of Prioritization of Selected Projects              for Submission under HMGP DR-4399 (Michael)</p>
<p><b>Todd Smith</b>  <i>Deputy Chief, Emergency Preparedness</i></p>	<ul style="list-style-type: none"> <li>- Hurricane Concept of Operations: Readiness</li> <li>- 2019 Jacksonville and the Beaches Regional TTX</li> </ul>
<p><b>Steven Woodard</b>  <i>Division Chief, Emergency Preparedness</i></p>	<p>Round Table Discussion: Agency Storm Readiness</p>
<p><b>Steven Woodard</b>  <i>Division Chief, Emergency Preparedness</i></p>	<p>Open Discussion</p>
<p><b>Dr. Charles Moreland</b>  <i>Director, Community Affairs</i></p>	<p>Closing Remarks and Adjournment</p>

Figure E.3: LMS Working Group (SEPPC) Agenda Q3 2019




ONE CITY. ONE JACKSONVILLE.

**City of Jacksonville, Florida**  
*Lenny Curry, Mayor*  
Emergency Preparedness Division  
515 N. Julia Street  
Jacksonville, FL 32202  
(904) 255-3110  
[www.jaxready.com](http://www.jaxready.com)

**Security and Emergency Preparedness Planning Council (SEPPC) Meeting**  
**Duval County Emergency Operations Center, Executive Room**  
**September 19, 2019 | 1300**  
**AGENDA**

SPEAKER	TOPIC
<b>Dr. Charles Moreland</b> <i>Director, Community Affairs</i>	Opening Remarks / Introductions
<b>Stephen McManus</b> <i>Captain, Emergency Preparedness</i>	Hurricane Recovery Update – Dorian
<b>Noah Ray</b> <i>Supervisor, Emergency Preparedness</i>	Regional Catastrophic Preparedness Grant
<b>Noah Ray</b> <i>Supervisor, Emergency Preparedness</i>	Local Mitigation Strategy Update
<b>Steven Woodard</b> <i>Director, Emergency Preparedness</i>	Recommendation of Prioritization of Selected Projects for Submission under HMGP DR-4399 (Michael)
<b>Steven Woodard</b> <i>Director, Emergency Preparedness</i>	Round Table Discussion: Evacuation
<b>Steven Woodard</b> <i>Director, Emergency Preparedness</i>	Open Discussion
<b>Dr. Charles Moreland</b> <i>Director, Community Affairs</i>	Closing Remarks and Adjournment

Figure E.4: LMS Working Group (SEPPC) Agenda Q4 2019




ONE CITY. ONE JACKSONVILLE.

**City of Jacksonville, Florida**  
*Lenny Curry, Mayor*  
Emergency Preparedness Division  
515 N. Julia Street  
Jacksonville, FL 32202  
(904) 255-3110  
[www.jaxready.com](http://www.jaxready.com)

**Security and Emergency Preparedness Planning Council (SEPPC) Meeting**  
**Duval County Emergency Operations Center, Executive Room**  
**December 12, 2019 | 1300**  
**AGENDA**

SPEAKER	TOPIC
<b>Dr. Charles Moreland</b> <i>Director, Community Affairs</i>	Opening Remarks / Introductions
<b>Noah Ray</b> <i>Emergency Preparedness</i>	Hurricane Recovery Update <i>Matthew, Irma, Dorian</i>
<b>Noah Ray</b> <i>Emergency Preparedness</i>	Local Mitigation Strategy Update
<b>Noah Ray &amp; Sarah Bohentin</b> <i>Emergency Preparedness, Neighborhoods</i>	Mitigation: Acquisition and Demolition Projects
<b>Noah Ray</b> <i>Emergency Preparedness</i>	Grant Funding Opportunities
<b>Steven Woodard</b> <i>Director, Emergency Preparedness</i>	Emergency Preparedness Year-End Review
<b>Steven Woodard</b> <i>Director, Emergency Preparedness</i>	Open Discussion
<b>Dr. Charles Moreland</b> <i>Director, Community Affairs</i>	Closing Remarks and Adjournment

Figure E.5: LMS Advisory Group (Duval Prepares) Agenda Q1 2019



ONE CITY. ONE JACKSONVILLE.

**City of Jacksonville, Florida**  
*Lenny Curry, Mayor*  
Emergency Preparedness Division  
515 N. Julia Street  
Jacksonville, FL 32202  
(904) 255-3110  
[www.jaxready.com](http://www.jaxready.com)

**Local Mitigation Strategy Advisory Group (Duval Prepares) Meeting**  
**117 West Duval Street, 1st Floor - Lynwood Roberts Room**  
**February 26, 2019 | 10:00 -11:00 AM**

**AGENDA**

**Opening Remarks / Introductions**


**2019-2020 Emergency Preparedness Guide**  
*Mitigation Feature*

**Local Mitigation Strategy Update (2020)**  
*Update Schedule*  
*LMS Risk Assessment Subcommittee Initial Findings*  
*Community/ Stakeholder Survey*

**Mitigation Grants Update**  
*HMGP – Tier III Funding*

**Closing Remarks and Adjournment**

Figure E.6: LMS Advisory Group (Duval Prepares) Agenda Q2 2019



ONE CITY. ONE JACKSONVILLE.

**City of Jacksonville, Florida**  
*Lenny Curry, Mayor*  
Emergency Preparedness Division  
515 N. Julia Street  
Jacksonville, FL 32202  
(904) 255-3110  
[www.jaxready.com](http://www.jaxready.com)

**Local Mitigation Strategy Advisory Group (Duval Prepares) Meeting**  
**117 West Duval Street, 1st Floor - Lynwood Roberts Room**  
**May 15, 2019 | 10:00 -11:00 AM**

**AGENDA**

**Opening Remarks / Introductions**

**2019-2020 Emergency Preparedness Guide**  
*Mitigation Feature & Survey Completed*

**Local Mitigation Strategy Update (2020)**  
*Update Schedule*  
*THIRA and Stakeholder Preparedness Review*


**Resiliency Exposure Analysis And Community Conversations**

**Mitigation Grants Updates**  
*HMGP DR4337 (Irma) – Project Status Update*  
*HMGP DR4399 (Michael) – Tier III Funding Update*  
*Recommendation*

**LMS Project Additions**  
*Recommendation*

**Closing Remarks and Adjournment**

Figure E.7: LMS Advisory Group (Duval Prepares) Agenda Q3 2019



ONE CITY. ONE JACKSONVILLE.

**City of Jacksonville, Florida**  
*Lenny Curry, Mayor*  
Emergency Preparedness Division  
515 N. Julia Street  
Jacksonville, FL 32202  
(904) 255-3110  
[www.jaxready.com](http://www.jaxready.com)

**Local Mitigation Strategy Advisory Group (Duval Prepares) Meeting**  
**117 West Duval Street, 1st Floor - Lynwood Roberts Room**  
**August 22, 2019 | 10:00 -11:00 AM**

**AGENDA**

**Opening Remarks / Introductions**

**FEMA 2019 Regional Catastrophic Preparedness Grant Program**

**2019-2020 Emergency Preparedness Guide**  
*Mitigation Feature & Survey Results*

**Local Mitigation Strategy Update (2020)**  
*Update Schedule*  
*THIRA Update*  
*Mitigation Initiatives*

**LMS Project Additions**  
*Recommendation to Adopt*


**Mitigation Grants Updates**  
*HMGP DR4399 (Michael) – Tier III Funding Update*  
*Project Recommendation*

**Comments and Open Discussion**

**Closing Remarks and Adjournment**



Figure E.8: LMS Advisory Group (Duval Prepares) Agenda Q4 2019/Q1 2020



ONE CITY. ONE JACKSONVILLE.

**City of Jacksonville, Florida**  
*Lenny Curry, Mayor*  
Emergency Preparedness Division  
515 N. Julia Street  
Jacksonville, FL 32202  
(904) 255-3110  
[www.jaxready.com](http://www.jaxready.com)

**Local Mitigation Strategy Advisory Group (Duval Prepares) Meeting**  
117 West Duval Street, 1st Floor - Lynwood Roberts Room  
February 10, 2020 | 1:30 -3:30 PM

**AGENDA**

**Opening Remarks / Introductions**

**FEMA 2019 Regional Catastrophic Preparedness Grant Program**

**2020-2021 Emergency Preparedness Guide**

**Mitigation Grants Updates**  
*HMGP DR4399 (Michael) – Tier III Funding Update*  
*HMGP DR4468 (Michael) – Tier I Funding Update*  
*CDBG-MIT – Action Plan*

**Local Mitigation Strategy Update (2020)**  
*Final Draft Review*

**LMS Project Additions – Revised LMS List**  
*Recommendation to Adopt*

**Public Comments**

**Open Discussion**

**Closing Remarks and Adjournment**

## APPENDIX F: DUVAL PREPARES ROSTER

**Table A.5.1: LMS Advisory Committee (Duval Prepares) Roster of Participants**

<b>Name</b>	<b>Organization</b>	<b>Title</b>
<b>Risk Assessment Subcommittee members are designated in blue.</b>		
<b>A</b> Armistead, Russ	University of Florida (UF)	CEO (Retired)
<b>B</b> Bebout, Ashley	Eisman Russo	Program Administrator
Bell, Corey	COJ - JaxPort	Manager of Public Safety and Security
Bethea, John	Memorial Hospital - Jacksonville	Emergency Management Coordinator / Hospital EM Secondary
Blankinship, Shannon	St. Johns River Water Management District (SJRWMD)	Outreach Director
Bohentin, Sarah	COJ Neighborhoods	Disaster Assistance Program Manager
Boylan, Michael	City of Jacksonville City Council	City Council Representative, City of Jacksonville District 6
Boyle, Nancy	University of North Florida (UNF)	Director, Small Business Resource Network (SBRN)
Bradley, William	JTA	
Brim, Bill	Lutheran Social Services of Northeast Florida	Director of Development
Brown, Elaine	City of Neptune Beach	Mayor
<b>C</b> Cameron, David	City of Atlantic Beach Police	Lieutenant of Community Affairs & Special Events
Canfield, Jason	Naval Station - Mayport	Commanding Officer
Castillo, Frank	Feeding Northeast Florida	President and CEO
Cavin, Ellyn	COJ Planning and Development Department	Chief of Development Services
Centeno, Bibinia	COJ - Risk Management	Manager
Collett, Ingram "Ace"	Prudential	Regional Security Director
Corbin, Shane	City of Atlantic Beach (COAB)	Planning Director
Cordero, Scott	National Weather Service (NWS) JAX	Head Meteorologist
Crouch, Chris	COJ - JaxPort	Risk Manager
<b>D</b> Daly, Tom	COJ - Community Development	Chief of Housing and Community Development
Davis, Daniel	Jax Chambers	President & CEO
Dendor, Ed	JEA	Emergency Preparedness and Business Continuity (Retired)
Deptula, Dan	COJ - JAXPORT	Assistant Director, Terminal Operations



Name	Organization	Title
Dickens, Dave	St. Johns River Water Management District (SJRWMD)	Emergency Coordinating Officer
Dlugos, Terry	Jacksonville International Airport (JIA)	Director of Operations
Duncan, Heather	AT&T (ATT)	Regional Director
<b>E</b> Earl, Donald	United Way of Northeast Florida	Director, 2-1-1 Call Center
Edwards, Michael	Duval County School Police (DCSP)	Director of Police
Endicott, Dan	University of North Florida (UNF)	EH&S
<b>F</b> Fleet, Janis & Robert	Fleet Architects	President
Ford, Nathaniel (Nate)	COJ - JTA	Chief Executive Officer
<b>G</b> Gazdick, Amber	Duval County School Police (DCSP)	Administrative Lieutenant
Geraci, Chris	COJ - JTA	Chief of Safety and Security - PRIMARY POC
Gideon, Josh	Building Inspection Division	Division Chief
Gillrup, Rob	COJ	Housing Services Manager
Glasser, Ellen	City of Atlantic Beach (COAB)	Mayor
Green, Eric	COJ - JaxPort	Chief Executive Officer (CEO)
Greene, Diana	Duval County Public Schools (DCPS)	Superintendent
Grossman, Steve	Jacksonville Aviation Authority	JAA Exec. Director & CEO
Gualillo, Victor	Atlantic Beach Police Department (ABPD / COAB)	Commander
<b>H</b> Hagan, Cathy	University of North Florida (UNF)	Director, Florida Small Business Development Center
Hahn, David	COJ - Public Works	Engineer Manager
Haley, Sean, Capt.	Naval Air Station - Jacksonville (NAS JAX)	Chief of Staff
Hamrock, Susan	Jaxport	Executive Secretary, Public Safety
Hankin, Karl	St. Johns River Water Management District (SJRWMD)	Director, Division of Projects
Herrick, Janet	Onsite Environmental Consulting (OEC)	CEO/President
Hipps, Angie	Emergency Preparedness Division	Secretary
Holland, Jerry	COJ	Duval County Property Appraiser
Hoyles, Adam	Onsite Environmental Consulting (OEC)	Vice President of Operations
Huish, Lisa	Heartland Hospice Care	Administrator, RN

Name	Organization	Title
Hulett, Katherine	DMS Recovery	Closeout Specialist
Huxford, Folks	COJ Planning and Development Department	Chief of Current Planning
<b>I</b> Ireland, Heather	City of Jacksonville Beach (COJB)	Senior Planner
Irwin, Bob	United States Navy - Region Southeast Command	Deputy Regional Emergency Manager
Ivey, Pat	Jacksonville Sheriff's Office (JSO)	Under Sheriff of Duval County
<b>J</b> Joseph, Daryl	COJ - Parks & Recreation	Director of Parks, Recreation & Community Services Department
<b>K</b> Kelly, Susan	COJ - Planning and Development	City Planner III
Key, Michael	Neptune Beach Police Department	Commander
King, Lisa	Langton Consulting	Senior Vice President
Kirk, Jason	US Army Corps of Engineers	Colonel, Jacksonville District
<b>L</b> Lahav, Sean	NEFRC	Resiliency Coordinator
Latham, Charlies	City of Jacksonville Beach (COJB)	Mayor
Lawrence, Liz	American Red Cross of North Florida	Recovery and Preparedness Manager
Lendvay, Ronald	COJ - JaxPort	Director of Public Safety and Security
Letro, Steve	National Weather Service, Jacksonville Office	Head Meteorologist (Retired) <a href="#">LMS Advisory Committee Co-Chair</a>
Lukacovic, Ed	COJ Planning and Development Department	City Planner
Lynch, Sean	Town of Baldwin	Mayor
<b>M</b> Mann, William	City of Jacksonville Beach (COJB)	Planning Development Director
Mason, Dinah	COJ - Public Works	Administration Manager
McCarthy, John	COJ - JEA	Chief Procurement Officer, Logistical Operations and Support Svcs.
McElroy, Alan	COJ - JEA	Director of Emergency Preparedness & Business Continuity
Michael, Stephen A.	Wells Fargo	Vice President - Regional Emergency Manager
Miller, E.	Gate Petroleum	Risk Manager
Moehring, Margo	Northeast Florida Regional Council	Director of Policy and Planning <a href="#">LMS Risk Assessment Subcommittee Chair</a>
Mosier, Bryan	COJ - Neighborhoods Department	Director of Neighborhoods Department

Name	Organization	Title
<b>P</b> Pappas, John	COJ - Public Works	Director
Parrales, Luis, CDR.	United States Coast Guard (USCG) - Sector Jacksonville	Director of Safety and Security
Payne, Elizabeth	NEFRC	CEO
Pelleriti, John	Florida National Guard	Colonel, USNG
Pequignot, Tom, LCVR.	United States Coast Guard (USCG) - Sector Jacksonville	Contingency Planning / Force Readiness Chief
Pope, Jeremy	Citizens of Florida	Senior Director of Consumer & Policy Services
<b>Q</b> Quinn, Chris	JAX Chamber	VP of Industry and Government Affairs
<b>R</b> Ray, Noah	COJ Emergency Preparedness Division	Emergency Preparedness Supervisor LMS Coordinator
Reed, Kristen	COJ Planning and Development Department	Chief of Community Planning
Rodriguez, Juan	United States Army Corps of Engineers	Engineer
Rogers, Fred	Marine Corps Support Facility Blount Island	Emergency Manager
<b>S</b> Saldana, Edmund	The Independent Living Resource Center (ILRC) NE FL	Board of Directors
Sample, Geoffrey	St. Johns River Water Management District (SJRWMD)	Intergovernmental Coordinator
Sandrik, Al	National Weather Service (NWS) JAX	Warning Coordination Meteorologist
Sapora, John	LISC	Disaster Recovery Resiliency Manager
Sciotto, Steve	Jacksonville Beach Fire Department (JBFD)	Fire Chief
Scott, Anthony	United States Coast Guard (USCG) - Sector Jacksonville	Emergency Management and Force Readiness
Smith, Timothy	Jacksonville Fire and Rescue Department (JFRD)	Recovery
Smith, Todd	Jacksonville Fire and Rescue Department (JFRD)	Deputy Director
Snapp, Mike	Mayo Hospital	Hospital EM - Primary Liaison Officer
Spann, William (Bill)	COJ - Military and Veterans Affairs	Director of Military and Veterans Affairs
Speiser, Bill	JAXPORT	Public Safety Officer (Retired)
Sposato, John	JEA	Emergency Planning and Business Continuity Coordinator
Stratton, Robert	Duval County Public Schools (DCPS)	Supervisor of Risk Management

Name	Organization	Title
Swann, Steve	City of Atlantic Beach (COAB)	City Engineer
<b>T</b> Towler, Susan	Florida Blue	Vice President, Florida Blue Foundation
<b>V</b> Vaughn, Nick	Navy Region Southeast	Commander, EM/CBRN Coordinator
Vigo, Gabriela	Department of Homeland Security (DHS)	Liaison
<b>W</b> Wahl, Jane	State Farm Insurance Company	Process Manager
Ward, Ed	Florida Department of Transportation (FDOT)	District Emergency Coord. Officer
Ward, Richard	Duval County Health Department (DOH)	Director of Emergency Preparedness and Response
Williams, Mike	Jacksonville Sheriff's Office (JSO)	Sheriff of Duval County
Willie, Darryl	Duval County Public Schools (DCPS)	Board Member District 4
Wilson, Mark	Nassau County Emergency Management	Mitigation Coordinator
Winkler, Jeff	United Way of North East Florida	Head of Basic Needs
Wolf, Peter	National Weather Service (NWS) JAX	Meteorologist
Woodard, Steven	COJ Emergency Preparedness Division	Director Emergency Preparedness Division LMS Advisory Committee Co-Chair

**Contact information of Duval Prepares members has been removed from the Local Mitigation Strategy due to privacy concerns.**

Information is available on a need-to-know basis and is designated "For Official Use Only (FOUO)."

**Table A.5.2: LMS Planning Support Staff, 2020 Revision**

<b>Name</b>	<b>Organization</b>	<b>Title</b>
Deptula, Dan	JAXPORT	Assistant Director, Terminal Operations; CAPT USCG (Retired)
Diaz, Richard	County of Sonoma, California	Deputy Emergency Services Coordinator
Dominguez, Paul	COJ Emergency Preparedness Division	Planner / Compliance Specialist
Harbison, Matthew	COJ Emergency Preparedness Division	Planning Intern (University of North Florida)
Herbert, Allison	Clay County Sheriff's Office	Emergency Management Coordinator
Mealer IV, Arthur "AJ"	COJ Emergency Preparedness Division	Planning Intern (Florida State College at Jacksonville)
Mikell, Taylor	COJ Emergency Preparedness Division	Planning Intern (Florida State College at Jacksonville)
Nelson, Shannon	COJ Emergency Preparedness Division	Planner / Public Outreach Specialist
Sherriff, Autumn	COJ Emergency Preparedness Division	Planner / Vulnerability Assessment Specialist

Present and former Emergency Preparedness Division staff members listed in Table A.5.2: LMS Planning Support Staff, 2020 Revision are credited for their work in updating the Local Mitigation Strategy Plan on behalf of Duval County.

## APPENDIX G: COMPLETED PROJECTS LIST

Table A.6: Mitigation Initiative List, Completed Projects

Completed Projects								
Jurisdiction (Location)	Project Name	Project Description	Hazards Mitigated	Funding Source	Match	Responsible Agency	Cost	Status
Goal 1 Reduction Of Risk								
City of Atlantic Beach	Stormwater Drainage Infrastructure	City of Atlantic Beach Salt Air Gravity Sewer Rehabilitation	F/SS	HMGP Tropical Storm Fay	Y	City of Atlantic Beach	\$400,000.00	Completed. Risk of flooding reduced.
Town of Baldwin	Infrastructure	Baldwin Bypass on US 90 and US 301	CID/	DOT Capital Improvement Plan	Y	FDOT	\$650,000.00	Completed.
City Jacksonville Fire and Rescue	Wind Retrofit Program Group I	Groups of fire stations grouped into phases 1-6 for wind retrofit	W	HMGP	Y	City of Jacksonville Fire Rescue	\$150,000.00	Completed. Risk of winds <180 mph reduced.
City Jacksonville Fire and Rescue	Wind Retrofit Program Group II	Groups of fire stations grouped into phases 1-6 for wind retrofit	W	HMGP	Y	City of Jacksonville Fire Rescue	\$150,000.00	Completed. Risk of winds <180 mph reduced.
City Jacksonville Fire and Rescue	Wind Retrofit Program Group III	Groups of fire stations grouped into phases 1-6 for wind retrofit	W	HMGP	Y	City of Jacksonville Fire Rescue	\$150,000.00	Completed. Risk of winds <180 mph reduced.

Completed Projects								
Jurisdiction (Location)	Project Name	Project Description	Hazards Mitigated	Funding Source	Match	Responsible Agency	Cost	Status
Goal 2 Decrease Vulnerability								
City of Jacksonville	Adoption of Redevelopment Process	Develop functional procedures for EOC Executive Group to identify redevelopment options pre-event	F/SS/W	EMPA/EMPG	N	EPD/Planning and Dev. Dept.	\$200,000.00	Completed with adoption of 2012 Post Disaster Redevelopment Plan and incorporation of Recovery Strategy into the Comprehensive Emergency Management Plan (CEMP) 2017
City of Jacksonville	Safety Review in Overarching comprehensive plans	Procedures to require public safety review of new development in identified hazard areas (flood zones, flood-prone areas, urban/wildland interface areas) & impact on hurricane evacuation	F/SS/W/T	EMPA/EMPG	N	EPD/ Planning and Dev./ NEFRC / Planning Council / Floodplain Manager	\$100,000.00	Completed with adoption of 2010 FEMA flood maps, 2012 Duval County Post Disaster Redevelopment Plan, 2013 Statewide Hurricane Evacuation Study, Program, the 2014 Community Rating Community Assistance Visit (CAV) for a ranking of 6
City of Jacksonville	Wind Retrofits – public buildings for response and recovery	City of Jacksonville Traffic Engineering Bldgs. (2) Wind Retrofit	W	HMGP Tier I	Y	City of Jacksonville and Dept. of Public Works	\$45,000.00	Completed, Tropical Storm Fay retrofit. Risk of winds <180 mph reduced.

Completed Projects								
Jurisdiction (Location)	Project Name	Project Description	Hazards Mitigated	Funding Source	Match	Responsible Agency	Cost	Status
City of Jacksonville	ROW Retrofits	Solid Waste Division & Solid Waste Div. C. Maintenance Bldg.— 1031 Superior St. W	W	HMGP Tier I	Y	City of Jacksonville and Dept. of Public Works	\$94,000.00	Completed, Tropical Storm Fay retrofit. Risk of winds <180 mph reduced.
City of Jacksonville	ROW Retrofits	Rights of Way (ROW) Div. GM East Yard Complex 609 St. Johns Bluff Road N.	W	HMGP Tier I	Y	City of Jacksonville and Dept. of Public Works	\$94,000.00	Completed, Tropical Storm Fay retrofit. Risk of winds <180 mph reduced.
City of Jacksonville	ROW Retrofits	ROW-GM West Yard Complex and ROW-GM West Yard Complex 2 2639 1st Street W	W	HMGP Tier I	Y	City of Jacksonville and Dept. of Public Works	\$94,000.00	Completed, Tropical Storm Fay retrofit. Risk of winds <180 mph reduced.
City of Jacksonville	DPW Retrofit	Public Buildings Division - 555 W. 44th St.	W	HMGP Tier I	Y	City of Jacksonville and Dept. of Public Works	\$94,000.00	Completed, Tropical Storm Fay retrofit. Risk of winds <180 mph reduced.
JAXPORT	Infrastructure Improvements	Masthead Lighting Tie Downs Wind Retrofit - Talleyrand, Blount Island, and Dames Pt.	W	HMGP Tier I	Y	JAXPORT	\$53,000.00	Completed, Tropical Storm Fay retrofit. Risk of winds <180 mph reduced.
City of Jacksonville	Shelter Assessment and retrofit program	Mandarin Middle 2nd Floor Shuttering	W	HB7121	Y	DCPS	\$498,000.00	Completed, 2004 combined State Funding. Risk of winds <180 mph reduced.
DCPS		Chimney Lakes Elementary 2nd floor shuttering	W	HB7121	Y	DCPS	\$300,000.00	Completed, 2004 combined State Funding. Risk of winds <180 mph reduced.



Completed Projects								
Jurisdiction (Location)	Project Name	Project Description	Hazards Mitigated	Funding Source	Match	Responsible Agency	Cost	Status
DCPS	Shelter Retrofit	AAA High School (Atlantic Coast HS) shuttering and hurricane shelter construction	W	DCPS CIP	N	DCPS	\$2,000,000 for mitigation features	Completed in 2011. Applied for PDM in 2010, FEMA did not select for further review. Risk of Critical Infrastructure Disruption reduced. Risk of winds <180 mph reduced.
DCPS	Shelter Retrofit	Westview K-8 School hurricane shelter construction	W	DCPS CIP	N	DCPS	\$300,000 for mitigation features	Completed in 2011. Applied for PDM in 2010; FEMA did not select. Risk of Critical Infrastructure Disruption reduced. Risk of winds <180 mph reduced.
DCPS	Shelter Retrofit	Bartram Springs Elementary hurricane shelter construction	W	DCPS CIP	N	DCPS	\$250,000 for mitigation features	Completed in 2011. Applied for PDM in 2010; FEMA did not select. Risk of Critical Infrastructure Disruption reduced. Risk of winds <180 mph reduced.

Completed Projects								
Jurisdiction (Location)	Project Name	Project Description	Hazards Mitigated	Funding Source	Match	Responsible Agency	Cost	Status
DCPS	Shelter Retrofit	Twin Lakes EL SpNs generator	W/CID	HB7121	Y	DCPS	\$350,000 for special needs generator and shutters	Completed in 2010. Risk of Critical Infrastructure Disruption reduced.
City of Jacksonville	City Shelter Retrofit Evaluation Program	Northwest Multipurpose Center Shelter Code Plus Construction	F/SS/W	HB7121/ CDBG, Jacksonville CIP	Y	City of Jacksonville/Parks and Recreation Dept.	\$5,000,000 (\$325,000 for mitigation features)	Completed in 2010. Risk of Critical Infrastructure Disruption reduced.
Town of Baldwin	Community Shelter	Town of Baldwin Community Center Post Disaster Shelter	W/WF/CID	HMGP Tier 1, Jacksonville landfill tipping fees	Y	Town of Baldwin	\$300,000.00	Completed in 2014. Used Tropical Storm Debby funds for a post disaster shelter to serve in a whole community context. Risk to winds <180 mph reduced.
Jacksonville Fire and Rescue	Wind Retrofit Program Group I	JFRD Group 1 Fire Stations Wind Retrofit	W	HMGP Tier 1	Y	Jacksonville Fire and Rescue/ EPD	\$50,000.00	Completed in 2010. HMGP Funds Hurricane Charley. Risk to winds <180 mph reduced.
Jacksonville Fire and Rescue	Wind Retrofit Program Group II	JFRD Group 2 Fire Stations Wind Retrofit	W	HMGP Tier 1	Y	Jacksonville Fire and Rescue/, EPD	\$200,000.00	Completed in 2010. Retired in 2013. HMGP Funds Hurricane Frances. Risk to winds <180 mph reduced.

Completed Projects								
Jurisdiction (Location)	Project Name	Project Description	Hazards Mitigated	Funding Source	Match	Responsible Agency	Cost	Status
Jacksonville Fire and Rescue	FS Construction - FS #40	JFRD Code Plus Construction FS 40	F/SS/W/T/	HMGP Tier 3	Y	Jacksonville Fire and Rescue / EPD	\$650,000.00	Completed in 2011. Retired in 2-12/ Groundhog Day Disaster Funds
Jacksonville Fire and Rescue	Wind Retrofit Program Group III	JFRD Group 3 Fire Stations Wind Retrofit	W	HMGP	Y	City of Jacksonville Fire Rescue	\$150,000.00	Completed, risk to winds <180 mph reduced
Jacksonville Fire and Rescue	Wind Retrofit Program Group IV	JFRD Group 4 Fire Stations Wind Retrofit	W	HMGP Tier 1	Y	City of Jacksonville Fire Rescue	\$185,000.00	Completed. Frances HMGP Funds. Risk to winds <180 mph reduced
City of Atlantic Beach	Wind Retrofit of Shutters	Retrofit the EOC, Police Department Building, FS#55, Council Chamber, and City Hall for protection from wind	W	HMGP Tier I	Y	City of Atlantic Beach - Police and Public Works Departments	\$315,719.00	Completed, risk to winds <180 mph reduced
Goal 4 Land Use Zoning Development Controls								
City of Jacksonville	NEFRC Resilience Planning Project	Vulnerability assessment for the City of Jacksonville. Final session of the EPB Environmental Symposium.	All Hazards	NEFRC Funding	N	Northeast Florida Regional Planning Council (NEFRC	\$50,000.00	Completed 2016, resilience increased regionwide
Goal 6 Prevention of Repetitive Loss: Acquisition Relocation Demolition of Repetitive Structures								
City of Jacksonville	Residential Mitigation Project	4260 Yacht Club Rd Elevation, Ortega River	F/SS/W	FMAP 2005	Y	EPD/ Property Owner	\$800,000.00	Completed in 2010, Risk to 100 yr. floods reduced to 0%

Completed Projects								
Jurisdiction (Location)	Project Name	Project Description	Hazards Mitigated	Funding Source	Match	Responsible Agency	Cost	Status
City of Jacksonville	Small Business Mitigation Project	Clark's Fish Camp - 12903 Hood Landing Road Elevation; Julington Creek	F/SS/W	FMA 2007	Y	EPD/ Property Owner	\$371,000.00	Completed in 2010, Risk to 100 yr. floods reduced to 0%
City of Jacksonville	Residential Mitigation Project	4914 Rhode Island Drive South acquisition/demolition; Ribault River	F/SS	FMA 2007	Y	EPD/ Property Owner	\$150,000.00	Completed in 2009, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	2811 W. Fourth St. Mitigation Reconstruction; street flooding	F/SS/W	SRL 2008	Y	EPD/ Property Owner	\$150,000.00	Completed in 2010, , Risk to from 100 yr. floods reduced to 0%
City of Jacksonville	Residential Mitigation Project	6804 Bakersfield Drive acquisition/demolition; Wills Branch Creek	F/SS	SRL 2008	Y	EPD/ Property Owner	\$550,000.00	Completed in 2010, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	7080 Delaware Court acquisition demolition; Wills Branch Creek	F/SS	SRL 2008	Y	EPD/ Property Owner	\$350,000.00	Completed in 2010, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	1873 Powell Place Minor Flood Control (changed to Standard Elevation); St. Johns River	F/SS/W	Previous FMAP 2005; new award -	Y	EPD/ Property Owner	\$250,000.00	Completed in 2015. Change in Mitigation Alternative – increased to a standard elevation project in 2011 after DEM engineering review
City of Jacksonville	Residential Mitigation Project	6864 Bakersfield Drive acquisition/Demolition; Wills Branch Creek	F/SS	SRL 2009	Y	EPD/ Property Owner	\$250,000.00	Completed in 2011, Risk to property reduced to 0%

Completed Projects								
Jurisdiction (Location)	Project Name	Project Description	Hazards Mitigated	Funding Source	Match	Responsible Agency	Cost	Status
City of Jacksonville	Residential Mitigation Project	6872 Bakersfield Drive acquisition Demolition; Wills Branch Creek	F/SS	SRL 2009	Y	EPD/ Property Owner	\$250,000.00	Completed in 2011, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	6882 Bakersfield Drive acquisition Demolition; Wills Branch Creek	F/SS	RFC 2009	N	EPD/ Property Owner	\$280,000.00	Completed in 2011, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	6910 Bakersfield Drive acquisition; Demolition; Wills Branch Creek	F/SS	RFC 2009	N	EPD/ Property Owner	\$281,000.00	Completed in 2011, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	32 Dongalla Court Minor Flood Control, Pottsburg Creek	F/SS	SRL 2010	Y	EPD/ Property Owner	\$45,000.00	Completed in 2011, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	6906 Bakersfield Drive acquisition/demolition; Wills Branch Creek	F/SS	FMAP 2010	Y	EPD/ Property Owner	\$250,000.00	Completed in 2012, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	6842 Bakersfield Drive acquisition/demolition; Wills Branch Creek	F/SS	SRL 2010	Y	EPD/ Property Owner	\$250,000.00	Completed in 2012, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	6817 and 6847 Bakersfield Drive acquisition/Demolition; Wills Branch Creek (2 parcels)	F/SS	SRL 2010	Y	EPD/ Property Owner	\$555,000.00	Completed in 2012, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	10130 Paxton Road acquisition Demolition; Trout River	F/SS	SRL 2010	Y	EPD/ Property Owner	\$200,000.00	Completed in 2012, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	5180 Martha Ann Dr. Acquisition Demolition; Pottsburg Creek	F/SS	SRL 2010	Y	EPD/ Property Owner	\$550,000.00	Completed in 2013, Risk to property reduced to 0%

Completed Projects								
Jurisdiction (Location)	Project Name	Project Description	Hazards Mitigated	Funding Source	Match	Responsible Agency	Cost	Status
City of Jacksonville	Residential Mitigation Project	5138 Martha Ann Dr. Acquisition Demolition; Pottsburg Creek	F/SS	SRL 2010	Y	EPD/ Property Owner	\$450,000.00	Completed in 2013, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	1580 Navaho Drive acquisition demolition; Wills Branch Creek	F/SS	RFC 2010	N	EPD/ Property Owner	\$550,000.00	Completed in 2013, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	6768 Bakersfield Drive Acquisition demolition; Wills Branch Creek	F/SS	SRL 2010	Y	EPD/ Property Owner	\$258,000.00	Completed in 2012, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	7048 Seneca Ave. Acquisition demolition; Wills Branch Creek	F/SS	SRL 2010	Y	EPD/ Property Owner	\$260,000.00	Completed in 2012, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	3915 San Jose Blvd. Acquisition/ Demolition; St. Johns River /San Marco area	F/SS	SRL 2010	Y	EPD/ Property Owner	\$339,000.00	Completed in 2012, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	6958 Bakersfield Drive, Wills Branch Creek Acquisition/demo	F/SS	FEMA pre and post disaster grant program	Y	Jacksonville EPD/ Property Owner	\$275,000.00	Completed 2017, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	6968 Bakersfield Drive, Wills Branch Creek Acquisition/demolition	F/SS	FEMA pre and post disaster grant program	N	Jacksonville EPD/ Property Owner	\$239,000.00	Completed 2017, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	1570 Navaho Drive Wills Branch Creek Acquisition/demolition	F/SS	FEMA pre and post disaster grant program	N	Jacksonville EPD/ Property Owner	\$230,000.00	Completed 2017, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	4604 Fremont, drainage canal overflow; Acquisition/demolition	F/SS	FEMA pre and post disaster grant program	Y	Jacksonville EPD/ Property Owner	\$148,000.00	Completed 2017, Risk to property reduced to 0%

Completed Projects								
Jurisdiction (Location)	Project Name	Project Description	Hazards Mitigated	Funding Source	Match	Responsible Agency	Cost	Status
City of Jacksonville	Residential Mitigation Project	3804 and 3806 Boone Park Avenue; Little Fishweir Creek Acquisition/demo	F/SS	FEMA pre and post disaster grant program	N	Jacksonville EPD/ Property Owner	\$365,000.00	Completed 2017, Risk to property reduced to 0%
City of Jacksonville	Residential Mitigation Project	Elevation Project: 5156 Martha Ann Drive standard elevation, Pottsburg Creek	F/SS	FEMA pre disaster grant program	Y- 10%	Jacksonville EPD/ Property Owner	\$290,000.00	Completed 2018, Risk to 100yr floods reduced tp 9%

## APPENDIX H: DEFERRED PROJECT LIST

Table A.6: Mitigation Initiative List, Deferred Projects

Deferred Projects											
#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation	Jurisdiction Directly Benefitting	Hazards Mitigated	LMS Goals Met	Potential Funding Source(s)	Match	Estimated Costs	Why Deferred?	Timeframe for Completion
1	Master Drainage Plan: Master Plan and design comprehensive storm water/drainage of Atlantic Beach	COAB	City of Atlantic Beach - Department of Public Utilities	City of Atlantic Beach	F/SS	Goal 1	Multiple: Local/ State/ Federal (including post disaster funding)	Y	\$30,000	No funding	More than 12 months
2	Donner Subdivision Sewer Retrofit: Atlantic Beach Upgrades	COAB	City of Atlantic Beach - Department of Public Utilities	City of Atlantic Beach	F/SS	Goal 1	Multiple: HMGP, Tropical Storm Debby Tier I	Y	\$155,000	Completed using other funds or no deemed longer necessary	More than 12 months
3	Area B Sewer Upgrade: Upgrade 3,600 l.f. of pipe. Line existing manholes; complete point repairs	COAB	City of Atlantic Beach - Department of Public Utilities	City of Atlantic Beach	F/SS	Goal 1	Post Disaster Funding	Y	\$200,000	Completed using other funds or no deemed longer necessary	More than 12 months



Deferred Projects											
#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation	Jurisdiction Directly Benefitting	Hazards Mitigated	LMS Goals Met	Potential Funding Source(s)	Match	Estimated Costs	Why Deferred?	Timeframe for Completion
4	Mayport Road Lift Station Force Main Upgrade: Replace aging cast-iron sewer force main from 799 Mayport Road Sanitary Sewer Lift Station to Donner Road discharge manhole (approx. 2,300 LF)	COAB	City of Atlantic Beach - Department of Public Utilities	City of Atlantic Beach	F/SS	Goal 1	Post Disaster Funding	Y	\$300,000	Completed using other funds or no deemed longer necessary	6 Months

Deferred Projects											
#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation	Jurisdiction Directly Benefitting	Hazards Mitigated	LMS Goals Met	Potential Funding Source(s)	Match	Estimated Costs	Why Deferred?	Timeframe for Completion
5	Sherman Creek Flood Mitigation: Construction of a bulkhead/retaining wall to prevent the flooding of Sherman Creek, which bisects the property containing City Hall and the Police Department building/JFRD Fire Station #55	COAB	City of Atlantic Beach - Public Works Department	City of Atlantic Beach	F/SS	Goal 1	Post Disaster Funding	Y	\$500,000	Completed using other funds or no deemed longer necessary	24 Months
6	Area D Sewer Retrofit: Sewer pipe upgrade - more than 50 years old (3,300 l.f.)	COAB	City of Atlantic Beach - Department of Public Utilities	City of Atlantic Beach	F/SS	Goal 1	HMGP Tier III	Y	\$165,000	Deferred for future funding opportunity	More than 12 months
7	Sewer Pipe Upgrade - Phase 1: Forrester Sewer Pipe upgrade	COAB	City of Atlantic Beach - Department of Public Utilities	City of Atlantic Beach	F/SS	Goal 1	HMGP Tier III	Y	\$200,000	Deferred for Future Opportunity	More than 12 months

Deferred Projects											
#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation	Jurisdiction Directly Benefitting	Hazards Mitigated	LMS Goals Met	Potential Funding Source(s)	Match	Estimated Costs	Why Deferred?	Timeframe for Completion
8	Sand Dune Revegetation: Jacksonville Beach Sand Dune revegetation	Beaches Municipalities, Duval County	City of Jacksonville Beach	All Beaches Municipalities, Duval	F/SS/W/ACC	Goal 1	USACE, FEMA	Y, 12.5% Local Match through PA Program	\$10,000,000 to \$15,000,000	Funded through PA Program, DR4283 and DR4337	More than 12 months
9	Utilities: East end of 3rd Street between Seagate and 7th Avenue N.	COJB	City of Jacksonville Beach - Beaches Energy Services	City of Jacksonville Beach	F/SS/W	Goal 1	TBD	Unknown	Unknown	No funding identified	Unknown
10	Utilities: East of 3rd Street between 17th Ave. S. and St. Johns County line	COJB	City of Jacksonville Beach - Beaches Energy Services	City of Jacksonville Beach	F/SS/W	Goal 1	TBD	Unknown	Unknown	No funding identified	Unknown
11	Storm water pumps: Installation of pumping facility for Hopkings Creek	CONB	City of Neptune Beach - Public Works	City of Neptune Beach	F/SS	Goal 1	Multiple: Local/ State/ Federal (including post disaster funding)	Y	Unknown	No Funding	More than 12 months

Deferred Projects											
#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation	Jurisdiction Directly Benefitting	Hazards Mitigated	LMS Goals Met	Potential Funding Source(s)	Match	Estimated Costs	Why Deferred?	Timeframe for Completion
12	Comprehensive Drainage Study: Master Plan and design for comprehensive storm water/drainage of Neptune Beach	CONB	City of Neptune Beach - Public Works	City of Neptune Beach	F/SS	Goal 1	Multiple: Local/ State/ Federal (including post disaster funding)	Y	\$300,000	No Funding	More than 12 months
13	DCPS Facilities Storm Drainage Improvements	COJ	Duval County Public Schools (DCPS)	City of Jacksonville	F/SS/W	Goal 1	Multiple: Storm water Management Fund; DOE; DCPS	Y	\$5,000,000	Insufficient funding in the utility fee fund	More than 12 months

Deferred Projects											
#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation	Jurisdiction Directly Benefitting	Hazards Mitigated	LMS Goals Met	Potential Funding Source(s)	Match	Estimated Costs	Why Deferred?	Timeframe for Completion
14	Moncrief Creek Drainage Improvement Project: Bank stabilization and channel widening between 33rd Street and Gulf View. In-line Regional Storm water Facility at Gulf View. Bank stabilization from 26th Street to 16th Street. Off-line Regional Storm water Facility Relocation of repetitive loss properties as applicable	COJ	City of Jacksonville - Public Works	City of Jacksonville	F/SS	Goal 1	Multiple: Storm water MGMT. Fund; Bond funds; Federal and State aid, if available	Y if Post-disaster	\$15,000,000	Insufficient funding in the utility fee fund, not feasible at this time.	More than 12 months
15	Flood Mitigation on Public Buildings: Flood Mitigation for Armory (Historic Bldg.)	COJ	City of Jacksonville - Public Works	City of Jacksonville	F/SS	Goal 2	HMGP Tier III	Y	\$1,800,000	Asbestos	More than 12 months

Deferred Projects											
#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation	Jurisdiction Directly Benefitting	Hazards Mitigated	LMS Goals Met	Potential Funding Source(s)	Match	Estimated Costs	Why Deferred?	Timeframe for Completion
16	Wind Retrofit: ARC Jacksonville Headquarters Retrofit - Headquarters 851 Riverside	American Red Cross of NE Florida	American Red Cross/EPD	American Red Cross of NE Florida	W	Goal 2	Post Disaster Funding	Y	\$70,000+	Not ranked high enough in FEMA Benefit Cost Ratio	More than 12 months
17	Incentive Mechanisms: Establish procedure for mitigation category in Capital Improvements Elements	COJ	FL Office of Insurance Regulation /Private Insurance companies, Florida Windstorm Underwriters insurance	City of Jacksonville	W/SS/WF/ACC	Goal 2	Not known	Not known	Not Known	Change in flood maps, change in hurricane evacuation zones require more study	More than 12 months
18	Incentive Program: Discount program on property owners insurance for mitigation construction/retrofit feature	COJ	FL Office of Insurance Regulation /Private Insurance companies, Florida Windstorm Underwriters insurance	City of Jacksonville	W/SS/WF/ACC	Goal 2	Not Known	Not Known	Not Known	Changes require more study	More than 12 months

Deferred Projects											
#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation	Jurisdiction Directly Benefitting	Hazards Mitigated	LMS Goals Met	Potential Funding Source(s)	Match	Estimated Costs	Why Deferred?	Timeframe for Completion
19	Critical infrastructure hardening: FSCJ Campus Buildings – North Campus Health, and Bartram Springs	Florida State College at Jacksonville (FSCJ)	FSCJ	Florida State College at Jacksonville (FSCJ)	W	Goal 2	Multiple/ Local/ State/ Federal (include post disaster funding)	Y	\$1,000,000+	Capital campaign halted	More than 12 months
20	Critical Infrastructure Hardening: Bartram Degree Completion Center (South in Mandarin) to be used as hurricane risk shelter	COJ	Florida State College Jacksonville (FSCJ)	City of Jacksonville	W/SS/F	Goal 2	Post Disaster Funding	Y	\$3,000,000	Capital Campaign Halted	More than 12 months
21	Critical Infrastructure Hardening: Shelter assessment and retrofit program at buildings 42, 51, 10, 45, 53 and Hicks Hall (old AOL building)	COJ	University of North Florida (UNF)/ City of Jacksonville - Emergency Preparedness Division (EPD)	City of Jacksonville	W	Goal 2	Post Disaster Funding	Y	\$3,000,000 to \$5,000,000	FEMA did not select PDM project for funding - also Tier III under HMGP for Bldgs. 42 and 51 project	More than 12 months

Deferred Projects											
#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation	Jurisdiction Directly Benefitting	Hazards Mitigated	LMS Goals Met	Potential Funding Source(s)	Match	Estimated Costs	Why Deferred?	Timeframe for Completion
22	Wind Retrofit: American Red Cross Headquarters on 851 Riverside	COJ	American Red Cross of Northeast Florida/City of Jacksonville - Emergency Preparedness Division (EPD)	City of Jacksonville	W	Goal 2	Post Disaster Funding	Y	\$70,000	Not ranked high enough in FEMA Benefit Cost Ratio	More than 12 months
23	Incentive Mechanisms: Establish procedure for mitigation category in Capital Improvements Elements	COJ	FL Office of Insurance Regulation /Private Insurance companies, Florida Windstorm Underwriters insurance	City of Jacksonville	W/SS/W F/ACC	Goal 2	Unknown	Unknown	Unknown	Change in flood maps, change in hurricane evacuation zones require more study	More than 12 months
24	Critical Infrastructure Hardening: FSCJ Campus Buildings – North Campus Health, and Bartram Springs	COJ	Florida State College Jacksonville (FSCJ)	City of Jacksonville	W	Goal 2	Multiple: Local/State/Federal (includes Post Disaster Funding)	Y	Unknown	Capital Campaign Halted	More than 12 months



Deferred Projects											
#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation	Jurisdiction Directly Benefitting	Hazards Mitigated	LMS Goals Met	Potential Funding Source(s)	Match	Estimated Costs	Why Deferred?	Timeframe for Completion
25	CERT Program: Education on preparing post-disaster kits - (first aid, saws, tools, etc.) for pre-during-post events	COJ	City of Jacksonville - Emergency Preparedness Division/CERT/Jacksonville Fire and Rescue Department	City of Jacksonville	All Hazards	Goal 3	City Operational Budget	N/A	Unknown	No Funding	Biannual
26	Incentive Mechanisms: Discount program on property owners insurance for mitigation construction/retrofit features	COJ	FL Office of Insurance Regulation /Private Insurance companies, Florida Windstorm Underwriters insurance	City of Jacksonville	W/SS/WF/ACC	Goal 3	Unknown	Unknown	Unknown	Changes require more study	More than 12 months
27	Critical Infrastructure Hardening: FSCJ Campus Buildings – North Campus Health, and Bartram Springs	COJ	Florida State College Jacksonville (FSCJ)	City of Jacksonville	W	Goal 3	Multiple: Local/State/Federal (includes Post Disaster Funding)	Y	\$1,000,000	Capital Campaign Halted	More than 12 months

Deferred Projects											
#	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation	Jurisdiction Directly Benefitting	Hazards Mitigated	LMS Goals Met	Potential Funding Source(s)	Match	Estimated Costs	Why Deferred?	Timeframe for Completion
28	Residential Elevation: 7215 Secret Woods Ct., Pottsburg Creek	COJ	City of Jacksonville - Emergency Preparedness Division (EPD)	City of Jacksonville	F/SS	Goal 6	Post Disaster Funding	Y	\$23,000	Hoemowner withdrew, SOW not defined and no funding	More than 12 months

## APPENDIX I: DELETED PROJECTS LIST

Table A.7: Mitigation Initiative List, Delete Projects

Deleted Project List									
Project Number	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Jurisdictions Directly Benefitting from the Project	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Why Deleted?	Timeframe for Completion
1	Generator project : Portable Generators for lift stations	City of Jacksonville Beach	City of Jacksonville Beach	City of Jacksonville Beach	F/SS/CID	Goal 2: Decrease Vulnerability	Post Disaster Funding	Deleted at request of City of Jacksonville Beach	More than 12 months
2	Alternate EOC: Build-out emergency generator for alternate EOC	City of Jacksonville Beach	City of Jacksonville Beach	City of Jacksonville Beach	F/SS/CID	Goal 2: Decrease Vulnerability	Post Disaster Funding	Not needed	More than 12 months
3	Data Records Retention: City-wide imaging of records	City of Jacksonville Beach	City of Jacksonville Beach	City of Jacksonville Beach	F/SS/CID	Goal 2: Decrease Vulnerability	Post Disaster Funding	Not needed	More than 12 months
4	Public Safety Building: Code plus construction of new Public Safety Building	City of Atlantic Beach	City of Atlantic Beach	City of Atlantic Beach	F/SS/W/T/WF	Goal 2: Decrease Vulnerability	Pre Disaster Mitigation	Deleted at request of City of Atlantic Beach, when project did not meet FEMA criteria for BCR	More than 12 months

Deleted Project List									
Project Number	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Jurisdictions Directly Benefitting from the Project	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Why Deleted?	Timeframe for Completion
5	Retrofit water wells: Alternative electric source	JEA	JEA	City of Jacksonville	F/SS/W	Goal 2: Decrease Vulnerability	Post Disaster Funding	Project deleted at JEA's request	More than 12 months
6	Retrofit: Hardening of Jacksonville Aviation Authority Critical Facilities	City of Jacksonville	Jacksonville Airport Authority (JAA)	City of Jacksonville	W	Goal 2: Decrease Vulnerability	Multiple: Local, State, Federal (including Post Disaster Funding)	Project deleted at JAA's request	More than 12 months
7	6850 Bakersfield Drive acquisition/demolition; Wills Branch Creek	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	SRL 2010	Never started. Property owner abandoned the project. Bank assumed ownership default. No owner voluntary participation. Delete from LMS	More than 12 months

**Deleted Project List**

Project Number	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Jurisdictions Directly Benefitting from the Project	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Why Deleted?	Timeframe for Completion
8	5123 Martha Ann Drive minor flood control; Pottsburg Creek	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	FMAP 2010	After consultation, property owner declined to complete voluntary participation forms. Delete from LMS	More than 12 months
9	6889 Bakersfield Drive, Acquisition/demolition; Wills Branch Creek	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	FEMA SRL program	Delete – property owner sold property. New owner will not accept the FEMA award offer.	24 months

**Deleted Project List**

Project Number	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Jurisdictions Directly Benefitting from the Project	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Why Deleted?	Timeframe for Completion
10	5104 Martha Ann Drive Minor Flood Control; Pottsburg Creek	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	FMAP 2010	After consultation, property owner declined to complete voluntary participation forms. Delete from LMS	More than 12 months
11	4902 Rhode Island Drive acquisition/demolition; Ribault River	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	FMAP 2010	Submitted to the State; BCR less than 1.0. Delete from LMS.	More than 12 months
12	9653 Carbondale Drive East Elevation, demolition; Trout River	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS/W	Goal 6: Prevention of Repetitive Loss	FMAP 2010	Preliminary review; BCR less than 1.0 Delete from LMS	More than 12 months
13	4130 Leonard Circle acquisition/demolition; street flooding Moncrief basin	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	FMAP 2010	Preliminary review; BCR less than 1.0 Delete from LMS	More than 12 months

Deleted Project List									
Project Number	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Jurisdictions Directly Benefitting from the Project	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Why Deleted?	Timeframe for Completion
14	4347 Ortega Farms Circle Acquisition/Demolition; Ortega River	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	SRL 2010	Preliminary review; BCR less than 1.0 Delete from LMS	More than 12 months
15	1231 Ribault Circle Dr. Acquisition/Demolition; Ribault River	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	FMAP	Preliminary review; BCR less than 1.0 Delete from LMS	More than 12 months
16	1237 Ribault Circle Dr. Acquisition; Ribault River	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	FMAP	Preliminary review; BCR less than 1.0 Delete from LMS	More than 12 months
17	2748 Sam Hardwick Blvd. Acquisition/demolition; street flooding after Tropical Storm Fay	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	FMAP	Preliminary review; BCR less than 1.0 Delete from LMS	More than 12 months
18	6910 New Kings Road Minor Flood Control	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	FMAP	Preliminary review; BCR less than 1.0 Delete from LMS	More than 12 months

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Project Number	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Jurisdictions Directly Benefitting from the Project	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Why Deleted?	Timeframe for Completion
19	1430 Belleshore Circle acquisition/ Demolition; St. Johns River	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	FMAP	After consultation, property owner declined to complete voluntary participation forms. Delete from LMS	More than 12 months
20	4041 Sunbeam Road acquisition	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	Pre or post disaster funds	Deferred – no action from property owner or Department of Public Works	More than 12 months
21	7038 Seneca Ave. Acquisition demolition; Wills Branch Creek	City of Jacksonville	City of Jacksonville EPD / Property Owner	City of Jacksonville	F/SS	Goal 6: Prevention of Repetitive Loss	FMAP	Preliminary review; BCR less than 1.0 Delete from LMS	More than 12 months



**Deleted Project List**

Project Number	Name & Description of Project	Jurisdiction (Location of Project)	Agency Responsible for Implementation.	Jurisdictions Directly Benefitting from the Project	Hazards Mitigated	Mitigation Goals Achieved	Potential Funding Source(s)	Why Deleted?	Timeframe for Completion
22	Community Response Plans: Develop site specific community response plans for potential water and wastewater facility chemical release	JEA	JEA	City of Jacksonville		Goal 6: Prevention of Repetitive Loss	Not Known	Deleted – change of approach. JEA and EPD modified strategy to address this vulnerability, using Duty Watch Officer and State Warning Point for monitoring of conditions	24 Months
23	Beaver St. Enterprise Center Retrofit	Episcopal Diocese	City of Jacksonville/Episcopal Diocese of Florida/Fresh Ministries	City of Jacksonville	CID/HazMat	Goal 6: Prevention of Repetitive Loss	HMGP Tier III	Deleted. Applied for HMGP Tier III funds for Hurricane Isaac. DEM did not select for further review.	More than 12 months

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