St. Johns County
Local Mitigation Strategy

Prepared By:

St. Johns County LMS Working Group and St. Johns County Emergency Management

ST. JOHNS COUNTY
LOCAL MITIGATION STRATEGY

Originally Adopted by the St. Johns County Local Mitigation Strategy Working Group

2004

Most Current Update and Adoption

2025

St. Johns County Local Mitigation Strategy

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Section I – Planning Process

A. Local Mitigation Strategy

In the spring of 1998, the Florida Department of Community Affairs initiated a program to assist local governments in developing plans to reduce or eliminate risks to people and property from natural and human caused hazards. This program became known as the Local Mitigation Strategy (LMS). Later, the Disaster Mitigation Act of 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act to require Hazard Mitigation Plans to receive certain federal mitigation grants.

Hazard Mitigation has gained increased attention over the years due to the large number of natural hazards which have occurred throughout the world and in the U.S. A main area of concern is the rapid rise in the costs associated with disaster recovery. Money spent prior to an event to harden the community and reduce the impacts of a disaster can result in substantial savings in life and property following the event.

The primary objective of the LMS is to remove, if possible, otherwise limit the loss of life and property due to a disaster. The advantages of developing a local LMS program are numerous including collaboration among community partners; identifying priority projects and programs for funding; and increasing the likelihood of federal and state funding for hazard mitigation projects.

B. LMS Working Group

The LMS Working Group membership currently includes:

- **St. Johns County**: Board of County Commission, Emergency Management, Engineering Department, Fire Rescue, Growth Management, Health and Human Services, Animal Control, Public Works, Road and Bridge Department, Sheriff's Department, Utilities Department, Building Department, Community Redevelopment Agency
- **City of St. Augustine**: Administration, City Commission, Fire Department, Planning and Building Department, Utilities and Public Works, Police Department
- **City of St. Augustine Beach:** Public Works/Engineering, Building and Zoning
- **Other**: St. Johns County School District, Flagler Estates, UF Health St. Johns, Florida Forest Service, St. Johns River Water Management District, Northeast Florida Regional Council, University of Florida – IFAS Extension, Beaches Energy, Taylor Engineering, Florida Department of Transportation, Florida Division of Emergency Management (FDEM), St. Johns River State College, National Park Service, Florida School for the Deaf and Blind, Florida Department of Environmental Protection, Northeast Florida Regional Airport, Flagler College, St. Johns County Housing Partnership, Council on Aging, plus additional private sector businesses and interested residents.

The Working Group has nine (9) official voting positions. The Executive Committee members are nominated and voted in their positions annually. Each municipality and the school district are required to have a member on the Executive Committee. The current positions serving the executive committee are as follows:

1. Chair- St. Johns County Emergency Management- Coordinator
2. Vice Chair- St. Johns County Emergency Management- Deputy Director
3. Municipality- City of St. Augustine Beach- Building Official
4. Municipality- City of St. Augustine- Chief Resilience Officer
5. School District- Director of Facilities and Construction
6. St. Johns County Sheriff's Office- Emergency Manager
7. St. Johns County Utilities- Environmental Division Manager
8. St. Johns County Floodplain Management- Floodplain Manager
9. St. Johns County Chamber of Commerce- Senior Vice President of Economic Development

The official members of the voting group, also known as the Executive Committee, vote on all items at meetings that require action. Typical items that require actions include adding projects to the priority project list, approving project scores, and approving meeting minutes. Each municipal representative is responsible for ensuring LMS updates are adopted by their respective governing boards. Voting members are required to attend at least 50% of meetings. The LMS Working Group and Executive Committee are governed by the LMS Bylaws, which can be found in Appendix C.

C. Community Participation

The LMS planning process requires opportunities for public participation throughout the update process and documentation of solicitation for public involvement. All LMS Working Group Meetings are advertised in a newspaper of general circulation and on the St. Johns County Emergency Management website at least 10 days prior to the date of the meeting. Copies of the public meeting advertisements can be found in each meeting's documents in Appendix B.

The LMS Working Group Chair maintains the list of LMS Working Group members including all participating jurisdictions, neighboring counties, interested community members, local businesses, relevant state agencies, community organizations, academia, private businesses and more. Individuals on the contact list receive meeting invites, meeting minutes and relevant programmatic updates. The list contains representatives from the County's Community Redevelopment Agency (CRA) and community liaisons for the underserved communities and vulnerable populations. Several people on the list also represent the Volunteer Organizations Active in Disaster (VOAD), which is comprised of community organizations that help the underserved population daily. The Council on Aging (COA) provides services to the vulnerable aging population and has recently rejoined the working group. Anyone wishing to be added to the contact list may request to be added. The most recent contact list, including names, organizations and titles of participating individuals can be found in Appendix A.

The LMS has two additional participating entities which qualify as "jurisdictions" according to FEMA's definition- Beaches Energy and St. Johns County School District. Beaches Energy is a non-profit power and natural gas provider that serves the City of Jacksonville Beach and a small segment of Ponte Vedra Beach and the Palm Valley area. Beaches Energy is part of the City of Jacksonville Beach government. They participate in and adopt the Duval County

LMS and the St. Johns County LMS. Beaches Energy has limited infrastructure in St. Johns County.

Minutes of each meeting are maintained by St. Johns County Emergency Management and have been included in Appendix B. Efforts are made to solicit ideas, comments, and information from the public including providing the LMS via the St. Johns County Emergency Management website, allowing the public an opportunity to comment at regular Working Group meetings, public information workshops, and presentations at Commission Meetings. Feedback received from those meetings and workshops is presented to the LMS Working Group for review and inclusion into the updated LMS.

D. 2025 Update Planning Process

St. Johns County Emergency Management serves as the lead agency for the update process. Staff from Emergency Management fill the roles of LMS Chair and Vice Chair. The Chair, and in the absence of the Chair, the Vice Chair assures meetings are conducted quarterly, working group members remain aware and engaged throughout the updated process, and all revisions meet federal and state requirements.

Working Group members provide specific information to Emergency Management staff for inclusion related to the following topics:

- Changes to the community profile since the previous update
- Identification of potential hazards affecting the community
- Identification of people and infrastructure vulnerable to hazards
- Identification of new or removed critical facilities
- Mitigation initiatives (projects)
- Funding sources.

Once relevant data is collected, St. Johns County Emergency Management performs the analysis and revisions to the LMS. Each section of the LMS is reviewed by the Working Group, revised as necessary, and then brought forth for final discussions, edits and approval.

The 2025 LMS update process kicked off at the February 15, 2024, LMS Meeting with a brief overview of the proposed timeline and process as well as some suggested changes. At this time feedback was also solicited from the members present. Revisions to the plan took place as time permitted throughout 2024. Some of the key milestones and changes are as follows:

- February 15, 2024 – kickoff meeting
- February – May – Plan update process, community profile and hazard profile revisions
- May 16th – (public) LMS meeting- overview of changes to date presented; input sought from members on various sections and goals
- May – August – revisions continued with the hazard and vulnerability section
- August 15th – (public) LMS meeting- revisions presented to working group
- September 11th – (public) LMS sub-committee meeting to discuss project prioritization methodologies
- November 1st – a draft of the LMS was distributed to the LMS Working Group for review

- November 21st – (public) LMS Meeting- plan is presented to the Working Group and members from the public.
- February 13th – (public) LMS Meeting- the plan with revisions resulting from the review process were presented.

To date, no public feedback has been received. Additional opportunities for feedback will occur at the public meetings when the LMS is presented to the governing boards for official approval. The LMS is a living document, and public feedback may result in minor changes to the plan at any point in time. St. Johns County, City of St. Augustine, City of St. Augustine Beach, the School District, and Beaches Energy will each adopt the plan by resolution upon approval by FDEM and the Federal Emergency Management Agency (FEMA).

E. Capabilities and Integration

The purpose and success of the LMS is strengthened when existing planning mechanisms are in line with the LMS. Existing documents are used as references and incorporated into the LMS. Some of the existing planning mechanisms integrated into the LMS include the following:

- County and municipal comprehensive plans
- Strategic plans
- Land development regulations
- City codes
- State statutes
- Emergency management plans
- Vulnerability and adaptation plans required by the Florida Department of Environmental Protection for the Resilient Florida Grant Program.

These documents are used to develop and evaluate the goals, objectives and policies. Data from county/city GIS departments, the National Weather Service (NWS), National Oceanic and Atmospheric Administration (NOAA) and the Federal Emergency Management Agency (FEMA) were also integrated to complete the risk assessment. These same planning mechanisms are updated based on analysis from the LMS.

Integrating the LMS into other plans and programs enhances the purpose of the LMS. To reduce duplication of effort and streamline information, the County's Comprehensive Emergency Management Plan (CEMP) will now, as of the 2025 update, utilize the LMS for its risk assessment and community profile. The LMS will be an appendix to the CEMP. All changes made to the CEMP will be officially adopted by resolution by the St. Johns County Board of County Commissioners. The School District, City of St. Augustine, and City of St. Augustine Beach will adopt the CEMP via letters of promulgation along with other partner/supporting response agencies.

Currently, St. Johns County and the Cities of St. Augustine and St. Augustine Beach are active participants in the National Flood Insurance Program (NFIP). St. Johns County joined the NFIP on July 6, 1973, the City of St. Augustine joined October 11, 1972, and the City of St. Augustine Beach joined September 29, 1972. For a county or municipality to participate in

the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings be protected from damage by a 100-year flood event, and that new development in the floodplain does not exacerbate existing flood problems or increase damage to other properties. Each jurisdiction must continue to enforce codes and regulations compliant with requirements of the NFIP as to not jeopardize their good standing. At a minimum, St. Johns County, the City of St. Augustine and St. Augustine Beach will continue their commitment to NFIP in the following ways:

- Adopt, implement and enforce the local floodplain ordinance, which regulates and permits development in the Special Flood Hazard Area (SFHA) and designates a floodplain manager.
    - In the cities, the Building Official is identified as the Floodplain Administrator.
    - In St. Johns County, the Floodplain Manager is an authorized position in the Department of Growth Management.
- Maintain elevation certificates on file for all new construction in the SFHA or for substantial improvements to properties in the SFHA.
- Maintain public records and make the records available for review.
- Adopt the most recent Flood Insurance Rate Map (FIRM). (Most recent maps are effective as of December 7, 2018.)
- Maintain records pertaining to Letters of Map Amendments (LOMAS) and Letters of Map Revision (LOMR).
- Provide information related to flood hazards, flood maps, and other flood-related tools/data/resources to the public upon request.
- Continue to update the public and enable their participation in the flood remapping project.
- Maintain flood hazard publications at the main branch of the library.
- Where feasible, identify and acquire land in the SFHA for open space preservation.
- Promote flood hazard mitigation and flood insurance.
- Continue drainage maintenance and drainage system improvement projects.
- Conduct community outreach efforts for compliance with the Community Rating System (CRS) program.
- Continue floodplain management activities with the goal of maintaining CRS ratings of 5's (City of St. Augustine and St. Johns County) and 8's (St. Augustine Beach).
- Implement and enforce the following substantial improvement and substantial damage determination procedures:
    - For applications for building permits to improve buildings and structures, including alterations, movement, enlargement, replacement, repair, change of occupancy, additions, rehabilitations, renovations, substantial improvements, repairs of substantial damage, and any other improvement of or work on such buildings and structures, the floodplain administrator, in coordination with the building official, shall:

        (1) Estimate the market value, or require the applicant to obtain an appraisal of the market value prepared by a qualified independent appraiser, of the building or structure before the start of construction of the proposed work; in the case of repair, the market value of the building or

structure shall be the market value before the damage occurred and before any repairs are made
(2) Compare the cost to perform the improvement, the cost to repair a damaged building to its pre-damaged condition, or the combined costs of improvements and repairs, if applicable, to the market value of the building or structure
(3) Determine and document whether the proposed work constitutes substantial improvement or repair of substantial damage; the determination requires evaluation of previous permits issued for improvements and repairs as specified in the definition of "substantial improvement" and
(4) Notify the applicant if it is determined that the work constitutes substantial improvement or repair of substantial damage and that compliance with the flood resistant construction requirements of the Florida Building Code and this article is required.

The LMS has been used extensively with the CRS and is used to satisfy the 510-Floodplain Management Plan criteria for all jurisdictions represented in the LMS, including City of St. Augustine, St. Augustine Beach, and St. Johns County. The incorporation of the LMS into the CRS has assisted St. Johns County and the City of St. Augustine with receiving Class 5 CRS ratings.

Other existing planning mechanisms also help define each jurisdiction's capabilities to be a more resilient community. Items that contribute to the resiliency and mitigation capabilities include the adoption of building codes, participating in the NFIP, and having multiple plans and programs that address local hazards. Additionally, dedicated grant staff and resiliency positions have proven to be beneficial capabilities to reduce risk. One capability of each of the cities and the county is that they have the ability to hire contractors to assist when work exceeds the capabilities and workload of staff, which has proven beneficial when applying for mitigation grants.

Table 1: Mitigation Related Planning Mechanisms and Capabilities provides a summary of other relevant local plans, ordinances, programs, and staffing capabilities within the county and the cities that promote mitigation efforts.

Table 1: Mitigation Related Planning Mechanisms and Capabilities

Plan/Ordinance/Capability	St. Johns County	City of St. Augustine	City of St. Augustine Beach	School District
Comprehensive Plan	X	X	X	C
Land Development Code	X	X	X	C
Florida Building Code	X	X	X	X
Building Code Effectiveness Grading Schedule (BSEGS) Rating (Commercial / Residential)	3/4	3 / 4	2 / 3	n/a
Stormwater management program	X	X	X	C

Site plan review requirements	X	X	X	X
Capital Improvement Plan	X	X	X	X
CEMP	X	X	X	X
Flood Insurance Study or other flood study requirements	X	X	X	C
Participates in the NFIP	X	X	X	n/a
Participates in the CRS	X	X	X	n/a
Post-Disaster Redevelopment Plan				
FDEP Vulnerability Assessment	X	X	*	C
FDEP Adaptation Plan	*	*	*	
Designated resiliency position	X	X		
Dedicated grant staff	X	X		
Ability to contract with subject matter experts to augment staffing levels	X	X	X	X
Participates in Resilient First Coast initiative	X	X	X	
*** -** indicates "under development" X - indicates currently "in place" C – indicates it's covered by another jurisdiction's requirements				

St. Johns County, the City of St. Augustine, and St. Augustine Beach are in various stages of developing Adaptation Plans under the Resilient Florida Grant Program. The Adaptation Plan includes an expanded capabilities assessment. The St. Johns County draft Adaptation Plan has been included as Appendix G. As participating cities complete their adaptation plans and capability assessments, they will be included with St. Johns County's.

After the development of the 2020 LMS, the City of St. Augustine and St. Augustine Beach found ways to utilize the information to create new mitigation related policies. Utilizing the information from the risk assessment, the City of St. Augustine sought ways to reduce flooding to existing developed areas because of impacts from new development. The city created a Building Code Taskforce which recommended two new building permit requirements—a grading and drainage plan and a maximum impervious surface ratio. This process was such a success that it will be resurrected in 2025 to address bulkheads/seawalls and fill limits for new construction.

Subsequent to the last LMS update, the City of St. Augustine Beach identified the need for stormwater utility implementation to provide a dedicated funding source for stormwater management projects which help mitigate flooding and increase community resilience. As a result, the city developed a non-ad valorem special assessment (NAVSA). The NAVSA is of a tiered rate structure and applies to SFR, SFA, MFR and NSFR parcels within the City of St. Augustine Beach city limits. Additionally, the special assessment helps fund the City's stormwater system:

- Operation and Maintenance Program
- Capital Improvement Project Plan; and
- Reserves for:
  - Future projects

- Mizell Stormwater Management Facility operations and maintenance

This funding program will be evaluated in the next update to better understand how it helped reduce flooding in the City's jurisdiction.

St. Johns County's Comprehensive Plan is in the process of being updated. The Evaluation and Appraisal Review (EAR) component of the plan is updated every seven years. The county is in the process of updating the plan currently and hopes to have it approved by August 2025. The Coastal Management Element of the plan states, "As developments occur in the Coastal Management Area, the County will consider potential impacts on (but not limited to): natural resources, water-dependent or water-related uses, public facilities, emergency evacuations and shelters, and drainage. Consideration will also be given to the property's potential for impacts from storm surge, sea level rise, and other coastal flood-related issues." St. Johns County Emergency Management staff intends to meet with the consultants preparing the plan updates to incorporate the LMS where appropriate.

As previously mentioned, Beaches Energy is a part of the City of Jacksonville Beach's government organization. Beaches Energy serves a segment of St. Johns County with power, but their operation is affiliated with the City of Jacksonville Beach. Beaches Energy is actively engaged in the St. Johns County LMS and seeking to mitigate their infrastructure located in St. Johns County. However, they do not have the ability to create new planning or land development regulations within St. Johns County.

The St. Johns County School District has 51 total schools. The district has been steadily building new schools throughout the whole county to keep up with a growing demand. Due to the proximity of St. Johns County to the Atlantic Ocean, schools are already required to be built to a strong building code. The School District is responsible for following all applicable building codes and for permitting their own structures. They participate in the development of other plans like the Vulnerability Assessments and the Comprehensive Plan. Programs like the NFIP, CRS and BSEGS are only available to municipalities, not governmental entities with limited jurisdiction. Other regulations are applied and implemented based on where the individual schools are located.

St. Johns County Emergency Management and the School District work closely to ensure there is adequate hurricane evacuation shelter space available to meet the growing population demand. While schools are built to endure a high wind load, evacuation shelters have even higher standards. It is more cost effective to build new schools to meet the shelter design standards than retrofit older schools. Planned schools are evaluated for shelter suitability based on demand and location relative to other hazards (floodplains, evacuation zones, etc.). Schools built to shelter standards have reduced vulnerabilities and contribute to the community's resilience.

St. Johns County has some considerations and recommendations for redevelopment in the Coastal Management Element of the Comprehensive Plan. No comprehensive Post-Disaster Redevelopment Plan exists in the County or the cities. In the future, the jurisdictions and LMS

Working Group partners should work together to develop a countywide plan that would reduce future vulnerabilities to the many identified natural hazards.

F. Plan Monitoring, Evaluation and Future Updates

The St. Johns County Emergency Management Coordinator, who also serves as the LMS Chairperson, is responsible for monitoring and evaluating the plan. The Chair will monitor any changes throughout St. Johns County and make sure the information is promptly and properly conveyed within the LMS. The Plan, including project implementation status, is monitored on an ongoing basis and any necessary changes are presented to the LMS Working Group via email or at the next quarterly public meeting.

The plan will be evaluated annually as a part of the Florida Administrative Code 27P-22 update, which is due by the last working day of January or following a disaster. Items that will be considered during the evaluation process include the following:

- Are the goals and objectives still relevant?
- Are there any gaps in the goals and objectives?
- Has there been any changes in development that could impact our risk or vulnerabilities?
- Are there any changes to our Repetitive Flood Loss lists?
- Are there any changes to our critical facilities?
- Are we successfully implementing projects?
- Have there been any shifts or trends with the typical funding mechanisms? Are there new ones?

Over the five-year implementation timeframe of the LMS, the Working Group will continue to meet quarterly. All meetings will continue to be advertised to the public via the LMS website and local newspaper. The LMS also serves as the Floodplain Management Plan for the City of St. Augustine, St. Augustine Beach and St. Johns County under the CRS program. As a part of the annual CRS recertification, each community must provide the following information publicly:

1. Describe where a copy of the credited Floodplain Management Plan or Repetitive Loss Area Analysis can be obtained
2. Describe how this annual progress report was prepared and how it was submitted to the governing body, released to the media, and made available to the public
3. Updates to the implementation to flood-related action items (projects).

These updates are shared with local media, elected officials and posted to the County's website for the public to access.

After major disaster declarations the LMS Working Group harnesses the assistance of FEMA representatives canvassing the community and at Disaster Recovery Centers. The LMS Chair is responsible for meeting with FEMA Leads to help spread accurate messages about mitigation in the community and becoming involved with the LMS. This process helps the community become aware of funding options and how they can be involved. Public interest

in the LMS and mitigation funds is high after a disaster and there is usually an increase in public participation at LMS meetings for a few quarters.

A comprehensive update will be conducted every five years. The full update will begin approximately 18 months prior to expiration. LMS Working Group members will receive email notifications and will be asked to contribute to portions of the plan that directly affect their respective jurisdictions. In addition, the Working Group will be asked to review and contribute to portions of the plan that affect all participating jurisdictions. The LMS Chair will be responsible for ensuring the five-year update is completed in a timely fashion. The draft plan will be posted online for public comment alongside the currently approved plan for comparison. The Working Group will then hold at least one public workshop along with its regularly scheduled meetings for public input. The plan will be submitted to the State's Mitigation Planning Unit approximately six months prior to expiration for their review and approval. Once the plan is approved by the State's Mitigation Planning Unit it will go before each jurisdiction's governing board for adoption and then forwarded to FDEM and the Federal Emergency Management Agency (FEMA) for final approval.

Once the LMS is approved by the State of Florida and the FEMA, the role of St. Johns County Emergency Management Staff is to review and adjust accordingly per the monitoring and evaluation outlined above.

Section II - Goals

A. Goals

The LMS Working Group developed five overarching goals to help keep the whole community better protected from future hazard impacts. There have been no substantial changes in the levels of risk from the identified hazards, no major shift in the mission of the Mitigation Working Group, and no change in direction from the jurisdiction's leadership between the 2020 and the 2025 plan. The LMS Working Group reviewed as a part of the 2025 plan update and determined to still be adequate, valid and consistent with other plans.

1. **Protect the lives of the residents of St. Johns County and its municipalities.**

2. **Protect property to ensure that its intrinsic value is preserved.**

3. **Protect infrastructure so that it is available during and after a disaster.**

4. **Protect business activities so that they continue to provide economic strength to the community.**

5. **Protect the natural environment to ensure that quality of life and economic wellbeing are preserved.**

These goals are used as part of the project prioritization methodology. Projects recommended by Working Group members must first meet one of the goals to be considered.

Section III – Community Profile

A. County Description

St. Johns County is a rapidly growing county situated in the northeast Florida region, bounded by the Atlantic Ocean with approximately 42 miles of Atlantic Ocean shoreline on the east and the St. Johns River on the west. St. Johns County has a land area of 601 square miles, the longest shoreline in northeast Florida, and 221 square miles of water. The average elevation in St. Johns County is estimated at 15 feet.

There are two incorporated municipalities in St. Johns County – the City of St. Augustine and the City of St. Augustine Beach. Other notable unincorporated areas include Hastings, Ponte Vedra, Ponte Vedra Beach, Vilano Beach, St. Johns, Crescent Beach, Butler Beach, Fruit Cove, and Elkton. The county seat, St. Augustine, is the oldest permanent settlement in the United States. The City's historic resources, downtown area and special events attract millions of tourists annually.

Population and Housing

According to the US Census the total population in 2010 was 190,039. In 2020 the population increased to 273,425 (37.8% increase). The population has continued to increase and according to 2023 population estimates from the University of Florida's Bureau of Economic and Business Research (BEBR), there are now more than 315,000 individuals living in St. Johns County.

The City of St. Augustine has a population of 15,307 people (2023 BEBR) and a land area of 9.43 square miles. St. Augustine Beach has a 2023 population estimate of 6,953 people.

The population of St. Johns County's median age is 43.3- slightly older than the 41.8 years old of Florida. The population under age 65 accounts for nearly 82% of the population. Approximately 6.8% of people under the age of 65 have a disability.

Table 2: St. Johns County Population Distribution by Age

Population Distribution by Age	
Under 18	22.1%
18-21	4.81%
22-39	18.8%
40-64	36.2%
65+	18.1%

Source: https://statisticalatlas.com/county/Florida/St-Johns-County/Age-and-Sex

According to 2023 estimated Census data, 87.2% persons spoke only English at home and 12.6% spoke a language other than English at home in St. Johns County. These numbers only consider the population aged 5 years or older.

Table 3: Other Vulnerable Populations

Population Type	Location	Number
Special Medical Needs	Throughout County	458 registered with Emergency Management
Transients/homeless	Throughout County	442
SJC Detention Center (Inmates)	4500 Avenue D St. Augustine	664 at max capacity
Deep Creek Youth Academy	765 East St. Johns Ave. Hastings	64
SJC Community Work Release Center	4500 Avenue D St. Augustine	100 beds

Like other coastal counties of the State, a large portion of the population is concentrated along the county's main bodies of water: the Atlantic Ocan, Atlantic Intracoastal Waterway, and along the St. Johns River. These are areas most vulnerable to the effects of hurricane storm surge, wind, and freshwater flooding. Development along the ocean and the resulting vulnerability of that population to natural hazards is a major concern of emergency management planners.

The growing population is the leading requirement for more houses to accommodate the population.

Table 4: Household and Persons per Households per Year according to BEBR

Number of Households and Persons per Household (PpHh)						
	2010		2020		2023 (estimate)	
	Households	PpHh	Households	PpHh	Households	PpHh
St. Johns County	75,338	2.49	104,640	2.58	119,966	2.59

A concern of emergency managers is mobile home communities and scattered mobile homes located throughout the county. In 2000, there were 7,688 mobile homes which accounted for 13.3% of dwelling units. According to the American Community Survey as of 2023 the number of mobile homes in St. Johns County decreased to 5,051, accounting for 4.22% of all dwelling units. Occupants of mobile homes account for approximately 13,300 individuals that could potentially be affected by hazardous weather.

The value of property in St. Johns County has risen significantly over the last 4 years. Table 5 below illustrates the total value of property in St. Johns County from 2024. The average value of residential property went from $228,702 to nearly $450,000 while agriculture rose from $57,111 to $822,466.

Table 5: St. Johns County Property Types and Values - 2024

	Total Parcels	Just Value ($)	Average Value ($)
Residential	145,214	65,139,962,299	448,579
Commercial	4,546	5,330,127,539	1,172,487
Industrial	567	789,794,127	1,392,934
Government	1,704	2,241,897,528	1,288,446
Institutional	440	1,056,240,027	2,400,545
Agricultural	1,661	1,366,116,424	822,466
TOTAL	**154,132**	**75,924,137,944**	

Economy

St. Johns County is a high tourism area. The City of St. Augustine, St. Agustine Beach and Ponte Vedra Beach draw millions of visitors each year. Tourism is one of St. Johns County's primary economic engines. Visitors are spending more than $2.4 billion in the county annually. The largest employment industries in St. Johns County include health services and education, professional and business services, finance, insurance, and real estate.

Table 6: Employment by Major Sector

Industry	Number of Employees	Percent
Agriculture, forestry, fishing and hunting, and mining	557	0.4%
Construction	8,113	5.3%
Manufacturing	8,709	5.7%
Wholesale trade	3,816	2.5%
Retail trade	17,983	11.8%
Transportation and warehousing, and utilities	7,548	4.9%
Information	2,246	1.5%
Finance and insurance, and real estate and rental and leasing	22,317	14.6%
Professional, scientific, and management, and administrative and waste management services	21,849	14.3%
Educational services, health care and social assistance	30,398	19.9%
Arts, entertainment, recreation, and accommodation and food services	15,659	10.3%
Other services, except public administration	7,803	5.1%
Public administration	5,752	3.8%
TOTAL	**152,750**	**100%**

Source: US Census Bureau, American Community Survey, 2020

Table 7:Labor Statistics

St. Johns County Labor Force Statistics - 2023	
Civilian Labor Force	177,831
Employed	138,059
Unemployed	4,048
Unemployment Rate	2.2%
Armed Forces	773
Not in Labor Force	35,724

Source: US Census Bureau, American Community Survey, 2023

Income and Earnings

Per capita personal income in St. Johns County was estimated at $52,096 while the state's average is $38,850. The Median Household Income is estimated to be $105,153. However, 6.0% of the St. Johns County population was classified as living below the poverty level (American Community Survey 2023 estimates).

Environmentally Sensitive Areas

St. Johns County is part of the Atlantic Coastal Plain that is comprised of a diverse mixture of land cover that ranges from coastal marshes to upland oak hammocks and scrub areas. Included in the county are commercial and natural forest areas, rivers and associated wetlands. The large, forested areas in the county such as the Guana Tolomato Matanzas National Estuarine Research Reserve and Matanzas State Forest provide refuge for a wide variety of animal and plant species. The east and west coastlines provide habitats for plants and animals, protection from storms, recreational opportunities and economic income for the county. The sandy beach is generally backed by a dune system, which can reach heights of 40 feet, but typically ranges from 10 to 20 feet high. Other vulnerable areas are described within each hazard profile.

Land Uses and Development Trends

St. Johns County exhibits a pattern of rural, suburban and urban land uses. In the northwest and northeast part of the County there are intensive single family, multi-family, and commercial urban land uses. Both urban and suburban land uses dominate the east central portion of the County in and around the City of St. Augustine. Residential and Commercial development exists and are expanding both north and south of St. Augustine along US-1 and I-95. Recreation land uses also exist along the barrier islands and along the St. Johns River in the County.

In the last three decades, intense development occurred in the northwest portion of the County including Fruit Cove, Julington Creek, Switzerland, and areas around 210 West. Development of several large subdivisions and commercial properties are also emerging along US-1, SR-16 and I-95 corridors. Nocatee, Silverleaf, Shearwater and Rivertown are all large residential neighborhoods in northern St. Johns County.

Over the past five years, St. Johns County, Florida, has experienced significant development across various sectors, including residential, commercial, healthcare, and infrastructure.

Residential Development:
The county has seen substantial residential growth, with numerous housing projects underway to accommodate the increasing population. For instance, the Seccession Subdivision, approved in April 2024, plans to develop up to 99 single-family units with related amenities. However, not all proposed developments have been approved. In September 2024, the St. Johns County Board of Commissioners unanimously denied a rezoning request for a 247.26-acre site intended for up to 376 homes, citing traffic concerns raised by residents.

Commercial Development:
The World Commerce Center, a mixed-use development south of the World Golf Village, has expanded significantly. Recent additions include a Costco Wholesale Warehouse, a Buc-ee's convenience store with 104 fueling stations, and a Bass Pro Shops. A Home Depot is slated to open soon and a Walmart is preparing to begin construction.

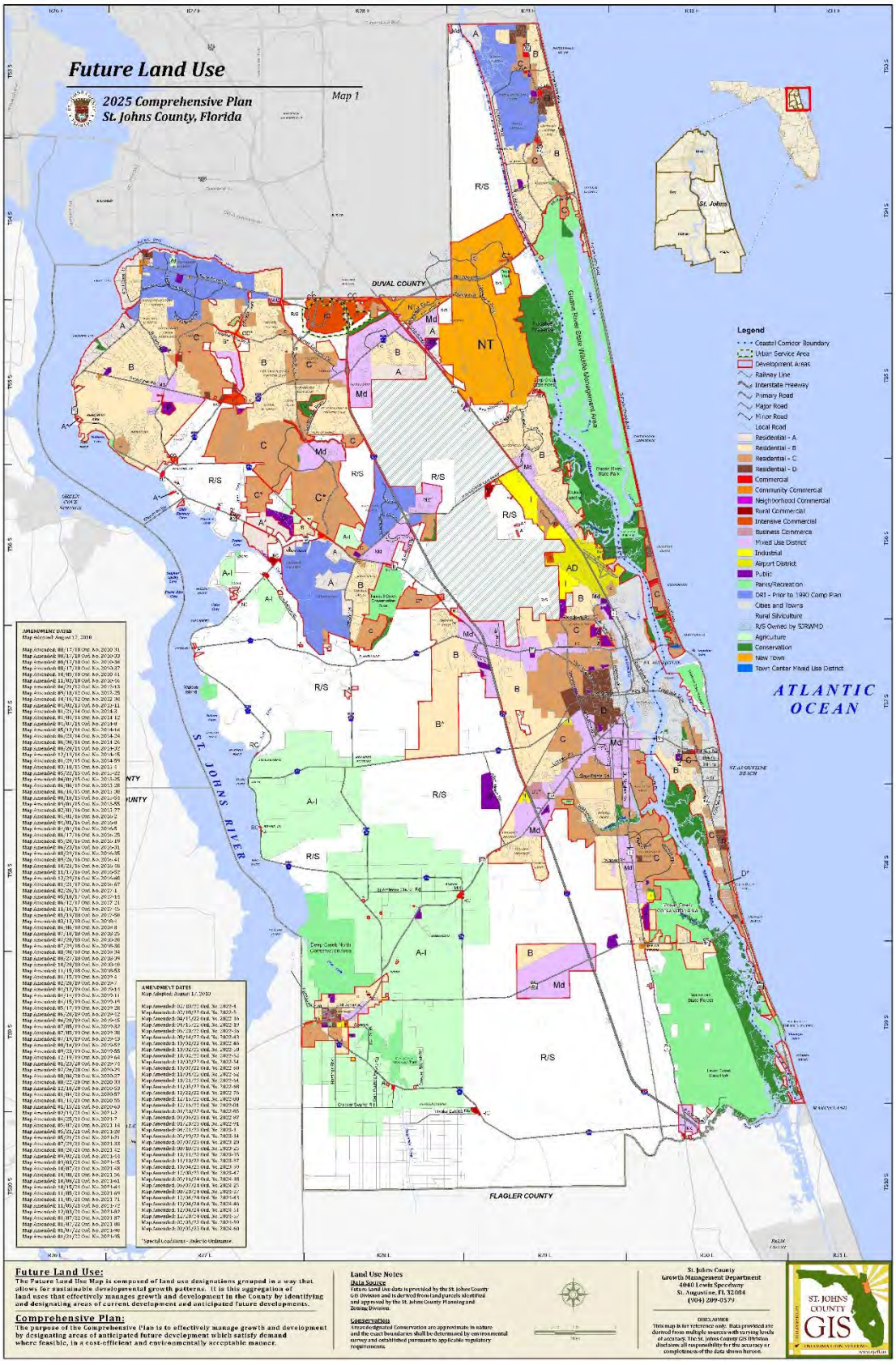
Healthcare Expansion:
In healthcare, Flagler Health+ has undergone significant changes. In September 2023, it merged with UF Health, resulting in the rebranding of Flagler Hospital to UF Health Flagler Hospital and the health system to UF Health St. Johns. Ascension St. Vincent's Hospital and several new stand-alone Emergency Rooms have opened over the last five years. A new clinic is also underway in the West Augustine Community.

The county is preparing for a potential doubling of its population by 2050, prompting the development of a 25-year growth plan. To manage the rapid growth, the county has undertaken a Comprehensive Plan update. This plan aims to effectively manage growth and development by designating areas of anticipated future development which satisfy demand where feasible, in a cost-efficient and environmentally acceptable manner.

Figure 1: Future Land Use Map is composed of land use designations grouped in a way that allows for sustainable developmental growth patterns. It is this aggregation of land uses that effectively manages growth and development in the County by identifying and designating areas of current development and anticipated future developments.

Overall, St. Johns County has experienced dynamic development over the past five years, with ongoing projects and planning efforts aimed at accommodating growth and enhancing community infrastructure. These developments have led to both increased opportunities and vulnerabilities as explained throughout the natural hazards section. However, even with all the growth and changes throughout St. Johns County and its participating jurisdictions, because it was anticipated and takes into account strong building and floodplain management codes, it did not change the direction or priorities of the LMS.

Figure 1: Future Land Use Map



IV. Risk Assessment

During the 2025 update process, it was determined that the LMS should serve as the single risk assessment for the County. As a result, hazards not historically included in the LMS have been integrated to meet the requirements of the St. Johns County CEMP.

Only hazards that have been determined to pose a significant risk to the county or stakeholders of either plan will be fully profiled. Natural and human-caused hazards not fully profiled include the following:

- Tsunamis – there is no history of previous tsunamis, no nearby faults, and if one were to occur, any impacts are expected to be minimal and localized to the shore
- Sinkholes – there is no karst topography in this area of Florida
- Earthquakes – St. Johns County is not near a fault line
- Dam/levee failure – there are no significant dams or levees in St. Johns County
- Commercial nuclear power plant incidents – there are no nuclear power plants nearby.

A. Natural Hazards

Each natural hazard profile contains the following information:

- Overview- a definition and general information of the hazard being described.
- Location- where the hazard occurred or could occur.
- Historical occurrences- the number of times a hazard has occurred. If a recorded event occurred within the past five years, it was noted in this LMS update. However, if an event was not noted, that does not indicate a decreased probability of occurrence, simply that the county has had period of inactivity for that hazard.
- Impacts- what has or could happen to each participating jurisdiction and the identified assets.
- Probability of future events- the likelihood of a hazard occurring in the future. Historical information from trustworthy sources is used to help calculate the probability of the hazard occurring. Often the probability is calculated based on the number of times a hazard has historically occurred. Official sources include the NWS, United States Geological Survey, Florida Forest Service, FDEM, Florida Department of Environmental Protection, Florida Department of Law Enforcement and others. Probability may also be referred to by the following scale:
    - Highly likely- Hazard is expected to occur at least annually
    - Likely- Hazard may occur once every 1-5 years
    - Possible- Hazard is expected to occur every 5-10 years
    - Low- Hazard occurs less than one time every 10 years
- Extent- how bad could it potentially be?
- Vulnerability- what is susceptible to impacts from the hazard? How has or will vulnerability change based on development changes?

1. Tropical Cyclones

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. Tropical cyclones rotate counterclockwise in the Northern Hemisphere. They are classified as follows:

- Tropical Depression: A tropical cyclone with sustained winds of 38 mph (33 knots) or less.
- Tropical Storm: A tropical cyclone with sustained winds of 39 to 73 mph (34 to 63 knots).
- Hurricane: A tropical cyclone with sustained winds of 74 mph (64 knots) or higher. In the western North Pacific, hurricanes are called typhoons; similar storms in the Indian Ocean and South Pacific Ocean are called cyclones.
- Major Hurricane: A tropical cyclone with sustained winds of 111 mph (96 knots) or higher, corresponding to a Category 3, 4 or 5 on the Saffir-Simpson Hurricane Wind Scale.

Hurricanes are categorized on the Saffir-Simpson Hurricane Wind Scale from 1 through 5 as described in Table 8.

Table 8: Saffir Simpson Hurricane Wind Scale

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt 119-153 km/h	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt 154-177 km/h	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph 96-112 kt 178-208 km/h	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt 209-251 km/h	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 137 kt or higher 252 km/h or higher	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks to months.

Hurricane winds can cause significant property damage, but traditionally, the greatest threat to life is flooding and storm surge. Although hurricane winds can exert tremendous pressure against a structure, a large percentage of hurricane damage is caused not by wind itself, but from flying debris. Tree limbs, signs and signposts, roof tiles, metal siding, and other lose objects can become airborne missiles that penetrate the outer shells of structures, destroying their structural integrity. Driving rains associated with hurricanes can enter through even the smallest openings or through penetrated exteriors exacerbating interior damage.

The external and internal pressures generated against a structure by wind vary greatly with increases in elevation, shapes of buildings, openings in the structures, and the surrounding buildings and terrain. High-rise buildings, particularly those located along the beachfront, will receive the full strength of a hurricane's wind on their upper stories.

Hurricane winds generate massive quantities of debris, which can easily exceed a community's solid waste capacity. This debris can cause environmental concerns due to the nature of the debris, some of which will be considered hazardous materials. Debris can block roads, impacting recovery.

1.1 Tropical Cyclone Location

All of St. Johns County and its jurisdictions is vulnerable to impacts from tropical depressions, tropical storms and hurricanes. The effects of an impacting tropical cyclone will depend upon strength, direction, size and location. A large storm can impact the entire county whereas a smaller storm may only impact inland or coastal areas.

1.2 Tropical Cyclone History

The last hurricane to make landfall in St. Johns County was Hurricane Dora in 1964. Since Dora, numerous hurricanes and tropical storms have impacted the area. Notable recent impacts include hurricanes Matthew (2016), Irma (2017), Ian (2022), Nicole (2022), Helene (2024), and Milton (2024).

Hurricane Matthew passed 30 miles offshore of St. Johns County on October 7, 2016, as a Category 3 hurricane. Hurricane force winds along the coast and tropical storm force winds throughout the county caused significant power outages, tree damage and to a lesser extent, structural damage. Hurricane Matthew produced significant storm surge flooding along the Atlantic coast. According to the NWS Jacksonville the highest recorded wind speed was 65 mph with gusts to 86 mph. Storm surge flooding along the Atlantic coast ranged from 2 to 7 feet above ground level, and approximately 5 feet in some areas along the St. Johns River. Heavy rainfall of between 4-10 inches was recorded across St. Johns County and its municipalities.

Hurricane Irma passed to the west of St. Johns County on September 10, 2017, as a Category 1 hurricane. Hurricane force winds and tropical storm force winds throughout the county resulted in significant power outages and tree damage. Hurricane Irma produced significant storm surge flooding along both the Atlantic coast and St. Johns River. According to the NWS Jacksonville the highest recorded wind speed was 65 mph with gusts to 78 mph. Storm surge flooding along the Atlantic coast ranged from 1-4 feet above ground level, and 1-4 feet along the St. Johns River. Heavy rainfall of between 8-10 inches was recorded across St. Johns County and its municipalities. Irma also produced two tornadoes that will be further discussed in the tornado hazard portion of the plan.

Hurricane Ian was a large tropical cyclone that made landfall on September 28, 2022, in southwest Florida near Cayo Costa as a strong Category 4. Ian thrashed parts of Florida's western coast, bringing intense winds, heavy rainfall, and catastrophic storm surges. A storm surge with an inundation of an unprecedented 12 to 18 feet above ground level was reported

along the southwestern Florida coast. Ian was downgraded to a tropical storm on September 29th as it tracked inland, crossing over the Florida peninsula leaving a pathway of excessive rainfall. Storm surge and heavy rainfall flooding began in downtown St. Augustine on the morning of September 29th. Ian flooded several areas of the county including Davis Shores, Butler Beach, Treasure Beach, and North Beach. Surge inundation reached levels near that of Hurricane Matthew in 2016 and beaches were severely eroded. Rainfall amounts between September 28th and 30th totaled just over 16 inches in portions of the county. There was an estimated $37.8 million in losses caused to residential property. Damage assessment teams found 380 affected structures, 223 with minor damage, and 33 structures with major damage.

On Tuesday, November 8th, just six weeks after Hurricane Ian impacted the area, Tropical Storm Nicole formed. Nicole continued to intensify into a Category 1 Hurricane after making landfall in the northern Bahamas. The storm then made landfall along the Florida east coast near Vero Beach during the early morning hours of November 10th. Substantial impacts were felt along the east coast of the state as hurricane-force winds, heavy rainfall, and high surf battered the region of the coastline still reeling from Hurricane Ian.

Locally, Nicole added to the erosion of the beach and dunes from Ian. A majority of the areas flooded from Hurricane Ian received a second round of flooding. State Road A1A in South Ponte Vedra Beach was washed out and residents became stranded when they attempted to evacuate as flood waters began to rise. Areas heavily impacted include Davis Shores, Summer Haven, Butler Beach, Treasure Beach, North Beach, Vilano Beach, Porpoise Point, and Roscoe Boulevard. In total, there was an estimated $34.1 million in losses from structures classified as either affected (319), minor (177), or major (20).

In 2023 St. Johns County braced for impacts from Hurricane Idalia but received no notable impacts.

In 2024 the County also prepared for impacts from Hurricane Debby's forecasted heavy rainfall. While portions of the county did receive sustained tropical storm force winds, rainfall totals were less than anticipated and there was no major wind damage.

September 26-27th of 2024 Hurricane Helene moved north along the Florida Peninsula in the Gulf of Mexico and made landfall in Taylor County as a Category 4, causing a historic storm surge and extensive damages along the Gulf Coast all the way up into Western North Carolina. Helene's large size resulted in sustained tropical storm force winds with maximum recorded gusts of 68 mph in St. Johns County. Downed trees caused power outages and numerous roofs throughout the county had minor damage to their roofs (shingle damage).

Three weeks after Hurricane Helene made landfall, Hurricane Milton made landfall near Siesta Key as a Category 3 and exited near Cape Canaveral as a Category 1. Upon exiting, Milton interacted with a passing front and transformed into a system with extra-tropical characteristics causing stronger, onshore winds on the north side of the storm. St. Johns County recorded wind gusts as high as 70 mph at the Ponte Vedra Fire Station and sustained winds of 40-65 throughout the county. Rainfall totals ahead of Milton and through the storm's

departure totaled between 9-15 inches. Flooding occurred in Hastings and Flagler Estates. The USGS River Gauge on Deep Creek in Spuds reached a new record high.

The following storms affected Northeast Florida and St. Johns County in the past 40 years:

Storm Name	Date
Tropical Storm Isadore	September/October 1984
Hurricane Bob	July 24, 1985
Tropical Storm Chris	August 1988
Tropical Storm Josephine	October 1996
Tropical Depression Georges	September/October, 1998
Hurricane Floyd	September 15, 1999
Tropical Storm Gabrielle	September 2001
Hurricane Charley	August 2004
Hurricane Frances	September 2004
Hurricane Jeanne	September 2004
Tropical Storm Ophelia	September 2005
Tropical Storm Alberto	June 2006
Tropical Storm Ernesto	August 2006
Tropical Storm Fay	August 2008
Tropical Storm Beryl	May 2012
Tropical Storm Debby	June 2012
Hurricane Matthew (Category 3)	October 2016
Hurricane Irma (Category 1)	September 2017
Hurricane Dorian (Category 2)	September 2019
Hurricane Ian	October 2022
Hurricane Nicole	November 2022
Hurricane Idalia	August 2023
Hurricane Debby	August 2024
Hurricane Helene	September 2024
Hurricane Milton	October 2024

1.3 Tropical Cyclone Probability

According to the Center for Climate and Energy Solutions, climate change is worsening hurricane impacts in the United States by increasing the intensity and decreasing the speed at which they travel. Scientists are currently uncertain whether there will be a change in the number of hurricanes, but they are certain that the intensity and severity of hurricanes will continue to increase. These trends are resulting in hurricanes being far more costly in terms of both physical damage and deaths.

Hurricane Dora was a category 2 when it made landfall in St. Johns County. Since then, no other hurricane has made landfall in northeast Florida. Despite historically low direct hits, St. Johns County is not immune to landfalling hurricanes. Tropical cyclones are likely to impact the area at least once every 1 to 5 years. Dora was a category 3 just before landfall. Taking

into account considerations of a changing climate and stronger storms, a category 5 hurricane cannot be ruled out.

Table 9: Probabilities of a Tropical Cyclone Impact in St. Johns County

Tropical Cyclone Impact Probabilities*									
County	# Named Storms 1880-2020	# Hurri-canes 1880-2020	# Major Hurri-canes 1880-2020	2024 Forecast Prob-ability of Named Storm impact	2024 Forecast Prob-ability of Hurricane impact	2024 Forecast Prob-ability of Major Hurricane impact	Average Prob-ability of Named Storm impact	Average Prob-ability of Hurri-cane impact	Average Prob-ability of Major Hurricane impact
St. Johns	68	23	5	51%	21%	5%	38%	15%	3%
***Defined as one or more storms within 50 miles of location** Source: https://tropical.colostate.edu/TC_impact.html									

1.4 Tropical Cyclone Vulnerability

St. Augustine is the Nation's Oldest City and its location on the Atlantic Coast leaves it vulnerable to the high winds of hurricanes. Its age alone makes the structures and infrastructure particularly vulnerable to hurricane damage. St. Augustine has old, historically significant structures whose loss would represent the loss of irreplaceable historical and cultural resources.

The proximity of dense population to the Atlantic Ocean, as well as the generally low coastal elevations, significantly increases the County's vulnerability. An important community lifeline, UF-Health St. Johns hospital is in a highly vulnerable location.

While all of St. Johns County is vulnerable in some degree to high winds, if a hurricane were to occur, there are certain areas and structures more vulnerable. The following areas/structures are the most susceptible to high winds from a hurricane:

- Areas along the Atlantic shoreline and Intracoastal Waterway
- Areas adjacent to the St. Johns River
- Multi-story buildings
- Mobile/manufactured homes, particularly older ones
- Unmitigated homes built before 2002

For major hurricanes (Category 3+), flying debris can make any structure without window protection or impact rated windows more susceptible to damage.

Future Vulnerability

The potential for property damage and human casualties in St. Johns County has increased over the last several decades primarily because of the rapid growth this county has experienced, particularly along the vulnerable coastline areas.

One thing Florida learned after Hurricane Andrew was that strong building codes can reduce loss, shorten recovery, and they are necessary. The Florida Building Code sets the minimum

building regulations that each county and municipality must adhere to. Counties and municipalities may require stronger or stricter codes. Structures built in the wind-borne debris region must be built to withstand impacts from high wind impacts and structures inland must be built to withstand at least 110 mph wind loads. Future development in St. Johns County will be required to meet the stringent building code, making the community better able to withstand hurricane winds than structures built before 2002.

Florida Power and Light (FPL), JEA, and Beaches Energy have all witnessed the impact mitigating the power grid can have on recovery and operations. FPL has improved service reliability by more than 40% by strengthening powerlines, poles and converting to underground services. This will help vulnerable people stay home or return home more quickly after a tropical cyclone impacts the area.

2. Coastal Flooding/Storm Surge

Coastal flooding is a term that refers to weather events that have the possibility of flooding the immediate coastline or even further inland. NOAA describes several factors that contribute to coastal flooding:

- Local severe weather events such as tropical cyclones or extra-tropical storms, create meteorological conditions that drive up the water level, creating a storm surge
- Large waves, driven by local winds or swells from distant severe weather, can raise average coastal water levels and cause large and damaging waves to reach land
- High tide levels caused by normal variations in the astronomical tide cycle
- The combination of storm surge and heavy rain events, whether locally or in the upland watershed
- Other larger scale regional and ocean scale variations, caused by seasonal heating and cooling and ocean dynamics, can contribute to high water levels
- Sea-level rise

Though coastal flooding in St. Johns County is often the result of storm surge, there are instances of abnormally high astronomical tides with onshore winds and weather systems such as nor'easters that have produced coastal floods.

Storm surge is the abnormal rise in ocean water levels caused by the wind and pressure forces of a hurricane or tropical storm. Storm surge easily overtakes dry land along the coast and Intracoastal Waterway and can cause rivers, streams and tributaries inland to flood. The amount of storm surge associated with a storm depends on the storm intensity, size, pressure, forward speed, angle of approach, width and slope of the ocean bottom, and local land features.

Storm surge can completely wash structures off their foundations or undermine foundations to the point of structural collapse. Battering waves may increase damage to buildings directly along the coast. Extended pounding by frequent waves can demolish any structure not specifically designed to withstand such forces. Storm surge may also cause extensive erosion of beaches and dunes. The results can be catastrophic failure of structures and infrastructure in surge areas.

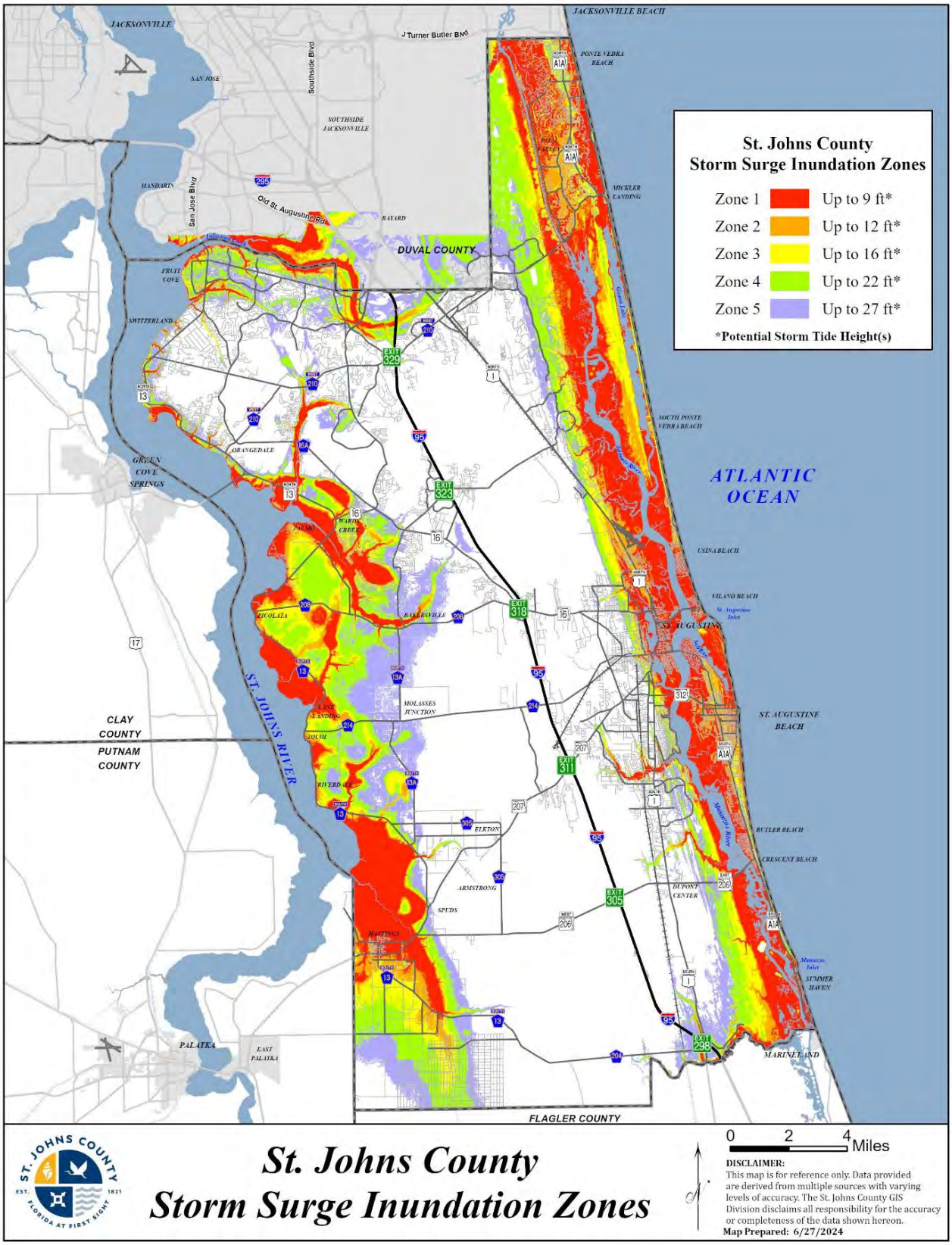
2.1 Coastal Flooding/Storm Surge Location

The location of coastal flooding is similar to that of storm surge; however, due to the nature of the events that cause coastal flooding, it is not expected to extend as far inland as storm surge. All coastal areas in St. Johns County are susceptible to coastal flooding with notable areas including the City of St. Augustine, South Ponte Vedra and Vilano Beach.

St. Johns County may have storm surge and coastal flooding along the Atlantic Coast, Intracoastal Waterway, and along the St. Johns River which makes up the western boundary of the county. The St. Johns River is shallow and strongly influenced by tides from the Atlantic Ocean up to 50 miles downstream. Areas particularly vulnerable include the entire shoreline of the St. Johns River, the southern portions of Julington Creek, shorelines adjacent to Cunningham Creek, Six Mile Creek and Deep Creek, which leads into and may cause the Hastings area to flood.

Complete details regarding the storm surge threat are available from the SLOSH (Sea, Lake and Overland Surges from Hurricanes) model currently in use by the NWS and National Hurricane Center. The Northeast Florida Regional Council updated the Storm Surge Atlas for St. Johns County utilizing new SLOSH data in 2020. Storm surge will have the greatest impact on structures and infrastructure located in storm surge zones illustrated in Figure 2 below. Zone 5 on the following map depicts the expected maximum extent of storm surge. The lavender areas, or zone 5, signifies where flooding from a storm tide forecast of 27 feet (above ground) would reach. The inundation zones are not equivalent to evacuation zones.

Figure 2: Storm Surge Inundation Zones



2.2 Coastal Flooding/Storm Surge History

Since the last LMS update St. Johns County has experienced three storm surge flooding events- Hurricane Ian in September 2022, Hurricane Nicole in November 2022 and Hurricane Milton in 2024. Other recent significant surge events include Hurricane Matthew (2016) and Hurricane Irma (2017).

Four of the last five surge events caused major flooding in the City of St. Augustine and major erosion along the beach. In some instances, 30-40 feet of the dune system were eroded, causing collapse of shoreline homes and endangering others. During Hurricane Nicole, surge washed over A1A eroding a part of the roadway.

Storm surge from these storms flooded homes along the Intracoastal Waterway in addition to some along the St. Johns River. Areas particularly hard hit include the City of St. Augustine, Davis Shores, Lincolnville, Treasure Beach, Butler Beach, Crescent Beach, Vilano Beach, North Beach and South Ponte Vedra Beach.

Other notable coastal flooding events occurred from nor'easters with strong onshore winds in September 2020, November 2021, April 2023, June 2023 and December 2023. Coincidentally, a number of these notable coastal flooding events happened during periods of astronomically high tides which exacerbated impacts.

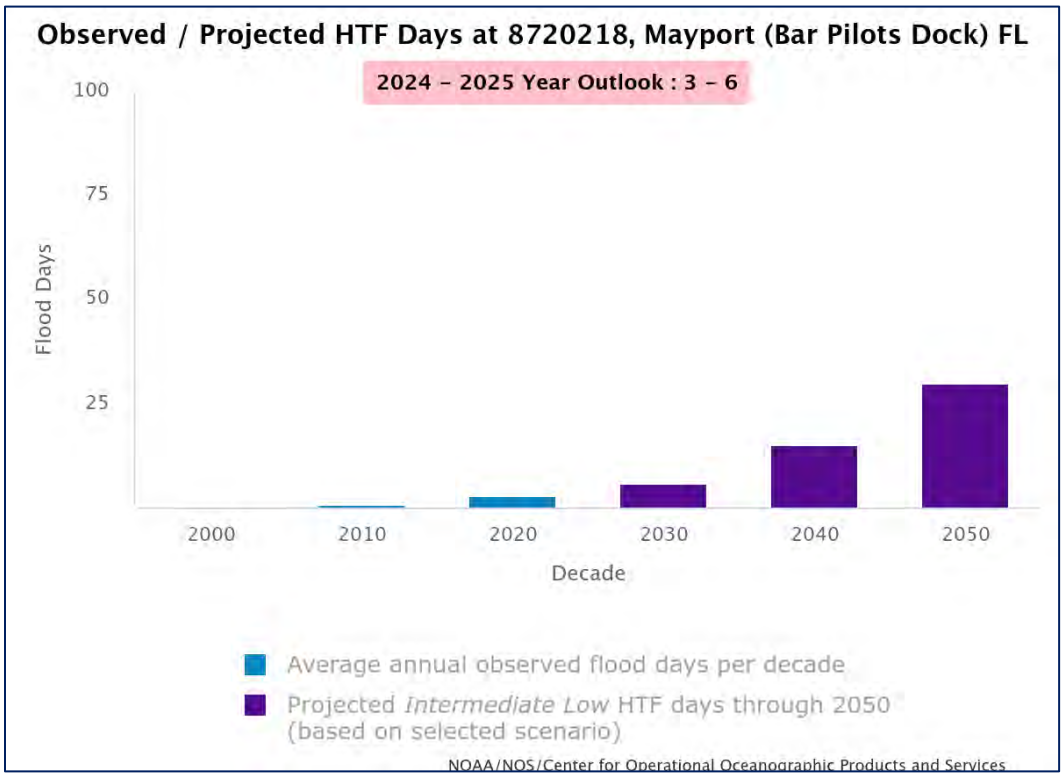
2.3 Coastal Flooding/Storm Surge Probability

Since 2016, St. Johns County has experienced storm surge from 6 tropical cyclones, five of which caused enough damage to result in FEMA Individual Assistance declarations. Given the number of coastal flooding and surge events that have occurred over the last 8 years, St. Johns County residents in vulnerable areas (up to zone 1 on Figure 2) should expect to see at least one event a year. The probability of a smaller coastal flooding event is highly likely. Coastal flooding of more significant magnitude (Zones 2-5) may occur slightly less frequently.

According to the NOAA, the number of coastal flooding days are increasing. Even utilizing a conservative sea level rise projection of "intermediate low" at the Mayport (Jacksonville) tide gauge, the number of coastal high tide flooding days is expected to be ten times more by 2050[1].

[1] https://tidesandcurrents.noaa.gov/high-tide-flooding/annual-outlook.html#decadal

Figure 3:Figure 3: Observed and Projected High Tide Flooding (HTF) Days per Decade



2.4 Coastal Flooding/Storm Surge Vulnerability

Coastal flooding can be extremely dangerous, and any factor alone or in combination with another can cause severe damage. Coastal flooding has the potential to destroy structures and infrastructure, as well as having strong environmental effects and can have major impacts on the local economy.

The northern beaches of St. Johns County are those located north of the St. Augustine Inlet, including the areas of Vilano Beach, North Beach, Usina Beach, South Ponte Vedra Beach, and Ponte Vedra Beach. The majority of the northern beaches are coquina beaches with a steep slope down the water's edge, making them, and the structures located on them, extremely susceptible to the battering wave action along with the beach erosion produced by storm surge. The northern beaches are made up of primarily single-family homes, one large condominium complex located on South Ponte Vedra Beach and a small commercial district in Vilano Beach consisting of one grocery store, less than a dozen restaurants, and five hotels.

State Road A1A travels the entire length of the northern beaches and lies close to the water's edge just north of Vilano Beach; it is an evacuation route and main thoroughfare for this entire area and would be vulnerable to over wash and erosion. During the hurricanes of 2022, a portion of A1A was compromised, making it impassable. The Florida Department of Transportation is continually attempting to protect this critical segment of A1A.

The structures that are not located directly on the northern beaches, but still east of the Intracoastal Waterway, would be vulnerable to the battering wave action and the erosion, though slightly less than those located directly on the beach.

South of the St. Augustine Inlet are the southern beaches of St. Johns County, including the areas of Anastasia Island, St. Augustine Beach, Crescent Beach, Treasure Beach, and Butler Beach. The southern beaches are mostly wide, white sandy beaches, making them, and the structures located on them, vulnerable to storm surge. The most vulnerable structures are those located directly on the beach and those located east of A1A. They will suffer from both the battering wave action along with the beach erosion produced by storm surge. The erosion would undermine the structure's foundations, potentially causing complete failure.

Structures that are located west of A1A, but still east of the Intracoastal Waterway, would be vulnerable to the battering wave action and the erosion, though slightly less than those located directly on the beach. These areas are mixed use, including single family homes, condominiums, marinas, tourist attractions, restaurants, businesses and hotels. These areas are some of the most popular tourist destinations in St. Johns County and include the St. Augustine Alligator Farm, St. Augustine Amphitheater, St. Augustine Lighthouse, Anastasia State Park, St. Augustine Beach Pier, Fort Matanzas National Monument and miles upon miles beautiful white sandy beaches. Along with the previously identified structures there are three fire stations and the City of St. Augustine Beach Administration building and Police Station located in this area.

The City of St. Augustine is the nation's oldest continuous city and as a result has numerous buildings of historical significance. The City of St. Augustine lies at the mouth of the St. Augustine Inlet with the Intracoastal Waterway on its eastern border. The City is home to single family and multi-family housing along with tourist attractions, the Castillo de San Marcos National Monument (the oldest masonry fort in the United States), Florida National Guard Headquarters, Flagler College, Lightener Museum, businesses, restaurants, hotels, churches, cemeteries and inns. The age of the structures in the City, from homes to commercial, will add to their vulnerability as the majority of the structures located in the City are over 100 years old, with many of them much older.

The Bridge of Lions is a low, drawbridge and serves as the main artery for traffic to and from Anastasia Island into the City. This bridge, due to its low height on each side of the River, is vulnerable to storm surge. The King Street bridge over the San Sebastian River is also very low and floods easily with Nor'easters and storm surge events. The City of St. Augustine Administration, Police Department, and Fire Department are all located within the City as well and are vulnerable to storm surge.

In confined harbors, the combination of storm tides, waves, and currents can also severely damage marinas and boats. The St. Augustine Inlet is the only navigable inlet between Jacksonville to the north and Ponce Inlet in the South. The St. Augustine City Marina, the Conch House Marina, Camachee Cove Marina, and over 50 mooring buoys are located just inside this inlet. Hundreds of Boats are docked in these marinas, and anchored to the mooring buoys would suffer catastrophic damage from an incoming storm surge. The docks in these

marinas would also suffer severe damage or complete destruction. Storm surge associated with hurricanes Matthew, Irma, Ian and Nicole all produced significant damage to the City of St. Augustine Marina.

In estuaries and freshwater marshes, saltwater intrusion endangers the public health, kills vegetation, and can send animals, such as snakes and alligators, fleeing from flooded areas. In southern St. Johns County, large estuarine communities could be vulnerable to saltwater intrusion.

Infrastructure as throughout St. Johns County and its jurisdictions is vulnerable to coastal flooding. UF Health-St. Johns is vulnerable to storm surge due to the proximity of the Intracoastal Waterway. Beaches Energy has identified two properties that would benefit from being elevated above the 500-year floodplain to protect their energy infrastructure. St. Johns County has identified several lift stations on the barrier island that could be elevated and floodproofed to reduce future damages. The City of St. Augustine mitigated 13 lift stations that were damaged during Hurricane Matthew and those efforts paid off for hurricanes Ian and Nicole.

Future Vulnerability

The Florida Building Code now includes a minimum of 1-foot freeboard. This means any structure built in the SFHA must be built at least one foot above the base flood elevation. St. Johns County and its municipalities are all required follow these requirements. Other measures required of the NFIP and building codes will help to reduce future vulnerability to new developments in areas along the coast.

While coastal wetlands, including saltmarshes, provide protection from flooding and storm surge events, northeast Florida (including Nassau, Duval, St. Johns, Flagler, and Volusia counties) has lost 9,000 acres of salt marsh since 1990 (Dix et al., 2021). Within the Guana-Tolomato Matanzas National Estuarine Research Reserve (GTMNERR), according to aerial estimates derived from data from FDEP, there has been a loss of 3,766 acres of salt marsh. Drivers of this coastal wetland loss can include erosion from wave energy, sea level rise, and increased development. Although northeast Florida is experiencing a vegetation shift in coastal wetlands from salt marsh to mangroves, there is still an overall coastal wetland loss which could impact the ability for coastal wetlands to provide ecosystem services such as storm protection.

The dune system protects the coastline from coastal flood events and storm surge. Every year, efforts are made to renourish the coast and ensure dunes are restored after events. As a part of restoration efforts dune grass and other plans that help hold the sand in place are planted. However, there are invasive plans, in particular, Kalanchoe x Houghtonii and Beach Vitex, that have the potential to destabilize the dunes. Efforts to control these species are underway.

3. Severe Thunderstorms

A thunderstorm is a transient storm of lightning and thunder, usually with rain, gusty winds, and sometimes hail. A storm is classified as severe if it contains one or more of the following phenomena:

- Hail 1-inch or greater
- Winds gusting in excess of 58 mph
- A tornado

Long-lived thunderstorms are called supercell thunderstorms. Supercell thunderstorms are responsible for producing the majority of severe weather, such as large hail and tornadoes. Downbursts are also occasionally associated with severe thunderstorms. A downburst is a strong downdraft resulting in an outward burst of damaging winds on or near the ground. Downburst winds can produce damage similar to a strong tornado. Although usually associated with thunderstorms, downbursts can even occur with showers too weak to produce thunder. Strong squall lines can also produce widespread severe weather, primarily very strong winds and/or microbursts.

On average, Florida has 3,500 cloud-to-ground lightning flashes per day and 1.2 million flashes per year occur, during a recent 10-year study according to Vaisala. Florida ranks fourth in the nation for lightning flashes behind Texas, Oklahoma and Kansas. However, because of the dense population and the amount of people that spend a great deal of time outdoors year-round, more people are struck and killed by lightning in Florida than any other state, according to Vaisala and the National Weather Service.

3.1 Severe Thunderstorm Locations

Thunderstorms can occur throughout all of St. Johns County and its jurisdictions.

3.2 Severe Thunderstorm History

Thunderstorms are common in St. Johns County, and area residents are quite familiar with them and the severe weather they can bring. According to the National Climatic Data Center (NCDC) Storm Events Database, during the period of 2020 – January 2024, St. Johns County experienced the following:

- 42 days with thunderstorm events with winds gust over 40 mph.
    - The highest recorded wind gust of 60 mph occurred in the Hastings area February 2020
- 9 days with hail events
- Total property damage for all hail and wind events was estimated at $1.05 million with no crop damage reported
- 4 recorded house fires caused by lightning
- 2 individuals struck by lightning.

3.3 Severe Thunderstorm Probability

According to NOAA, even though severe thunderstorms can occur any month of the year, the peak severe weather season in Florida is during the spring months of March, April, and May and the peak months for lightning strikes are June, July, and August. Thunderstorms occur almost daily during the summer months; some can become severe. Severe thunderstorms can

be expected to occur multiple times a year in St. Johns County. In terms of extent, St. Johns County can expect to see winds more than 70 mph, hail of 1-3 inches in diameter and continuous lightning when a severe storm occurs. A worst-case scenario would be a thunderstorm with a catastrophic tornado (refer to Section 4.3).

According to Climate Central, a recent study suggests that conditions favorable to severe thunderstorms could become about 5-20 percent more frequent per 1.8°F of warming. Whether these changing conditions will ultimately result in the formation of more severe storms remains an active area of research. A 2023 study projects a 6.6% increase in supercell frequency in the densely populated eastern U.S. by the end of this century because of climate warming.[2]

3.4 Severe Thunderstorm Vulnerability

Despite the fact the probability of severe thunderstorms and lightning occurring is high in St. Johns County, the vulnerability of the buildings and infrastructure is relatively low. Severe thunderstorms generally affect a much smaller segment of the county and its population at any given time. The Florida Building Code requires homes to be built to withstand high winds, which limits the potential exposure to homes. Critical facilities such as schools are also built to a higher standard which helps reduce impacts from storms.

Lightning can be one of the most dangerous and frequently encountered weather hazards. Many lightning victims are individuals engaged in recreation or work. Although most survive, survivors generally suffer long-term effects, including memory problems, numbness, attention deficits, sleep disorders, confusion and general loss of strength. Many also are left with a storm phobia.

While a lot of tall infrastructure is equipped with surge protections for lightning strikes, the following infrastructure may be particularly vulnerable if struck and damaged:

- Communications systems (phone networks)
- Companies with expansive or complicated computer networks
- AM/FM radio station towers
- The 11 communication towers hosting St. Johns County's 800 MHz radio system
- Cell towers
- The Northeast Florida Regional Airport Air Traffic Control tower

Characteristics that make buildings vulnerable include

- Chimneys
- Flagpoles
- Steeples, ridges and parapets

Properties in St. Augustine that might be vulnerable due to their height or exposure include:

- St. Augustine Amphitheater
- St. Augustine Lighthouse
- The gun deck at the Castillo de San Marcos

[2] https://www.climatecentral.org/climate-matters/severe-storm-super-hazards

- World Golf Hall of Fame Tower
- Roof top restaurants

Future Vulnerability
The Florida Building Code requires structures to be built to a high standard, especially to wind. This will help new structures better withstand high wind events. There has been significant growth, particularly in the unincorporated areas where large tracts of land have been clear cut for development. This leaves new structures vulnerable to lightning strikes and at risk of catching fire. New homes burn up to eight times faster than older homes, increasing the potential for loss of life and property. Lightning mitigation efforts, such as installing lightning rods, could reduce future vulnerability in new and existing developments.

4. Tornadoes

A tornado is a violently rotating column of air touching the ground, usually attached to the base of a thunderstorm. Tornadoes are nature's most violent storms, spawned from powerful thunderstorms. Winds of a tornado may reach 300 miles per hour and can create a damage path more than one mile wide and 50 miles long. Strong downburst (straight-line) winds may also occur due to the same thunderstorm. Hail commonly occurs in close proximity to tornadoes. Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. Tornadoes can develop rapidly and may dissipate just a quickly. Most tornadoes are on the ground for less than 15 minutes.

Although tornadoes in Florida are generally not as large and powerful as they are in the Midwest "Tornado Alley", they do occur in St. Johns County and have caused significant damage. Florida ranks third among the States in the number of tornados, behind Texas and Kansas. Tornadoes can also be spawned by tropical cyclones adding to the damage toll.

Tornadoes that occurred before 2007 were measured using the Fujita Scale. In February 2007 the scale was revised and renamed the Enhanced Fujita (EF) Scale to better align tornado damage with wind speeds. The new scale factors in how most structures are designed. The EF Scale is a set of wind estimates (not measurements) based on damage.

Table 10: Fujita and Enhanced Fujita Scales

Fujita Scale		EF Scale		
F Number	**Wind Speed (mph)**	**EF Number**	**Wind Speeds (mph)**	**Potential Impacts**
0	40 - 72	0	65 - 85	Roof shingles loosened or ripped off, damage to siding, shallow-rooted trees pushed over
1	73 – 112	1	86 – 110	Roofs ripped off, mobile homes overturned, large branches snapped from trees
2	113 – 157	2	111 – 135	Entire roofs of buildings ripped off, large trees uprooted, boxcars overturned

3	158 – 207	3	136 – 165	Strong-framed houses completely destroyed, buildings lifted off their foundations, heavy objects like cars thrown through the air
4	208 – 260	4	166 – 200	Well-constructed buildings leveled, cars and large objects thrown long distances, dirt/vegetation scored from earth
5	261 - 318	5	Over 200	Vehicles of all sizes shredded and thrown miles away, completely demolished neighborhoods and towns, entire landscapes scoured and flattened

4.1 Tornado Location

All areas of St. Johns County and its participating jurisdictions are equally susceptible to tornados.

4.2 Tornado History

A review of records from the NWS shows that between 1950 and 2024 St. Johns County has 65 recorded tornadoes, 6 of which occurred 2019 – May 2024.

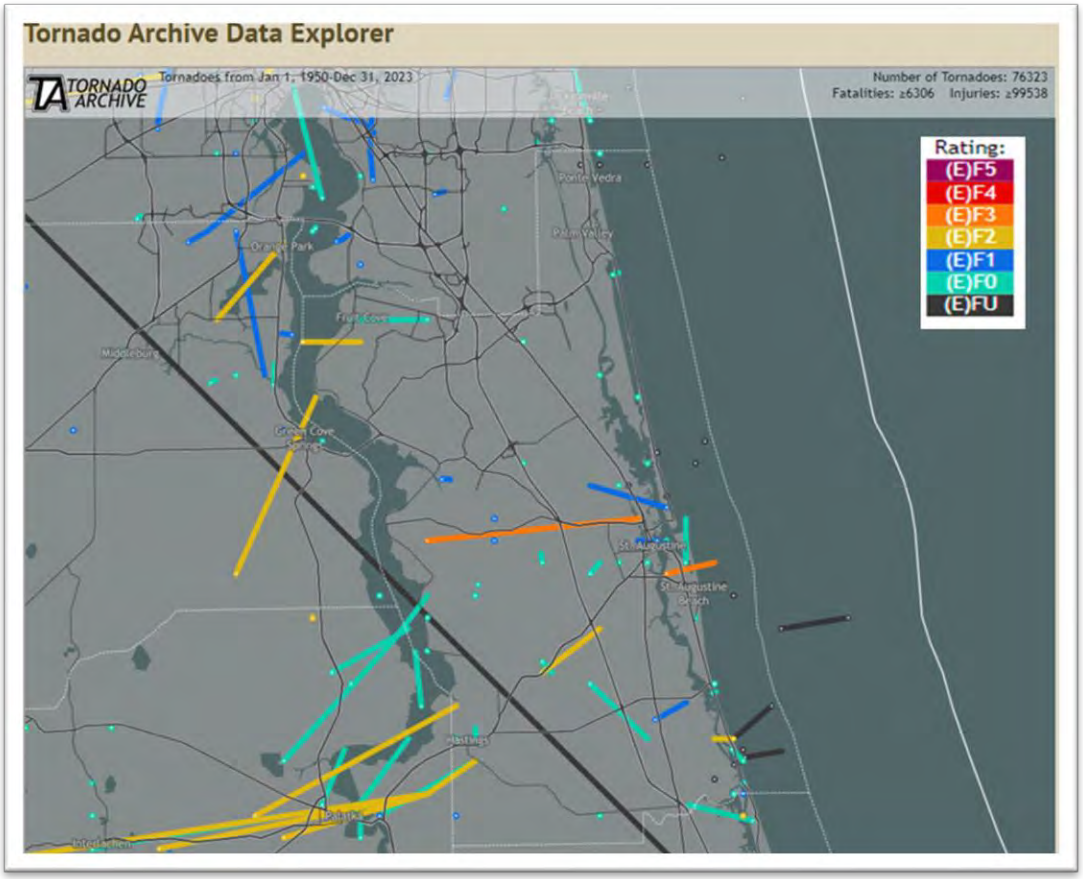
Table 11:Recent Tornado History

EF	Date	Winds/damage
0	12/13/2019	A tornado in Elkton just after 5am tracked ENE from the SW Corner of Saint Ambrose Church Road and CR 305 to just east of CR 207. Tree debris, shingles and part of a tin roof were reported in trees and across the ground. A kitchen and bath store in Elkton sustained major roof damage as well as damage to their supplies stored outdoors including solid surface countertops. The official NWS Storm Survey estimated peak winds around 85 mph (EF0) and reported road signs that were bent and/or twisted in Elkton. Metal roof panels were stripped off a building and thrown over a fence. A door was also extracted from a building.
0	3/31/2020	A weak EF0 tornado with peak winds near 80 mph briefly touched down in Ponte Vedra Beach near Guana River State Park. The tornado caused tree damage and some structural damage to nearby homes including a broken window. A tree was blown down near Sea Hammock Way.
0	2/14/2021	A tornado briefly touched down south of Bakersville near County Road 13A. There were tree limbs down near Molasses Junction.
0	9/11/2023	Images were shared showing roof damage to the sheet metal and wooden structure of a horse stable and an outdoor toilet blown over.
0	5/3/2024	A tornado touched down in the Beacon Lake neighborhood off CR-210. The tornado caused damage to roofs, fences, and patio furniture with winds up to 70 to 80 mph at its peak along a path measuring one-quarter of a mile and up to 125 yards wide.

1	5/11/2024	A tornado occurred just east of the St. Johns River, then traveled NE though the TrailMark and Samara Lakes neighborhoods. The tornado had estimated peak winds of 100 mph with a path 6.7 miles long and 310 yards wide as it swept through around 11:33 a.m. Shingles were ripped off, soffits and fences damaged, and some windows were broken.

There have been two F3 tornados recorded in St. Johns County, these storms occurred in 1958 and 1971; property damage estimates for these two storms were estimated as $250,000 per event.

Figure 4: Historic Tornado Tracks



4.3 Tornado Probability

Over the last 74 years there have been 65 recorded tornado events. On average, this equates to nearly one tornado every year. According to USATornadoes.com, the maximum tornado probability for St. Johns County for any given year since 2002 was 30% in 2017. Most months and years the probability ranges from 5-15%.[3] Tornados are likely to occur somewhere in St. Johns County at least once every 1-5 years.

[3] https://www.ustornadoes.com/2022/03/18/maximum-tornado-probabilities-by-month-and-year/

An analysis provided by Climate Central states that when excluding the weakest events, the overall number of U.S. tornadoes each year hasn't changed since 1970. Tornado activity has become concentrated in more frequent outbreaks (days with multiple tornadoes). The frequency of U.S. tornado outbreaks is increasing faster for the most extreme outbreaks. There is also evidence that tornadoes are getting more powerful in the U.S. and that fall tornado activity is increasing especially in the Southeast. Since 1979 "Tornado Alley" has shifted eastward, with increased tornadic activity observed in the South, Southeast, and Ohio Valley. However, there's no clear connection between these observed trends and climate change.[4]

In terms of extent, St. Johns County has never had a tornado stronger than an EF-3. Florida has only ever had two F-4 tornadoes. Based on this historical information, the probable worst-case scenario for St. Johns County would be a long track EF-3 tornado through the densely populated and commercialized area of downtown St. Augustine.

4.4 Tornado Vulnerability

All of St. Johns County is vulnerable to tornadoes including individuals living in mobile/manufactured and older homes due to the higher potential of damage to those structures. Mobile homes are located throughout the County, but the southwestern portion of the county has a higher percentage of mobile homes with the Flagler Estates community. Agriculture communities with large secondary structures such as barns and other substandard or older structures are also vulnerable to tornadoes. Crops can easily be damaged by tornadoes. The agriculture community is in the southwestern portion of the County, south of International Golf Parkway and west of Interstate 95. Infrastructure such as power lines is also susceptible to damage from tornadoes due to flying debris.

Cost estimates would vary greatly as they would be dependent on the location of the tornado, housing development vs. farmland, as thus a cost estimate cannot be easily calculated. Total damage estimates are not available from many of the historic tornadoes. Damage to homes is often covered by homeowner's insurance and the events do not rise to the level of a federal disaster declaration.

Future Vulnerability

The Florida Building Code will help reduce impacts from smaller tornadoes. As the county and its municipalities continue to grow, new structures will be at risk of damage from strong tornadoes. New homes built in the wind-borne debris area with impact windows will be less vulnerable than homes on the mainland portion of the county. Unfortunately, even the best built structures could be vulnerable to catastrophic structural damage from EF-3 tornadoes.

5. Flooding

Flooding is generally associated with small natural streams or other drainage systems that are overwhelmed by large amounts of runoff generated by episodes of extremely heavy rainfall. The National Flood Insurance Program (NIFP) defines a flood as a general and temporary

[4] https://www.climatecentral.org/climate-matters/severe-storm-super-hazards

condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties.

St. Johns County has several flood zones, as identified on the Flood Insurance Rate Maps (FIRMs). Maps of St. Johns County's flood zones can be found in Section 5.1.

Table 12: NFIP Flood Zone Definitions

Flood Zone	Description
A	Areas with a 1 percent annual chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
AE-Floodway	A floodway is the channel of a river and a portion of the adjacent floodplain that is reserved to discharge the 100-year (one percent annual chance) flood such that there will be a limited increase in the 100-year flood height.
AH	Areas with a 1 percent annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from one to three feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1 percent or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from one to three feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
VE	Coastal areas with a 1 percent or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
X-Shaded	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than one square mile.
X	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as a base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.

5.1 Flooding Location

Flooding occurs in several areas in St. Johns County. The two largest areas of note are the downtown area in the City of St. Augustine and Flagler Estates with roads frequently flooded after rains. Other areas of the County that have experienced significant flooding are the neighborhood surrounding the St. Augustine Amphitheater, the neighborhood to the west of Surfside Beach Park, North Beach, Hastings, and West Augustine.

The most well-known area with repetitive flooding is the waterfront area of downtown St. Augustine which is low in elevation and can flood from the combination of a full moon, a high tide and a northeasterly wind. Flooding also occurs throughout the County within low-lying areas and within the 100-year floodplain.

Notable roadways prone to flooding include:

- Solana Road
- Several sections of Roscoe Blvd. which runs along the Intracoastal Waterway
- Greenbriar Road east of Roberts Road
- International Golf Parkway west of the World Golf Village and a large section just west of US-1.
- San Marco/Avenida Menendez
- King Street
- A1A Coastal Highway
- Portions of US 1

Flooding as well as coastal flooding is modeled by FEMA as part of the NFIP. Vulnerability to flooding is documented in the Flood Insurance Rate Maps (FIRMs) delineating the 100-year flood (A, AE and VE zones) and the 500-year flood (shaded X zones). Figure 5 and Figure 6 below illustrate the updated FEMA Flood Zones for all of St. Johns County. St. Johns County GIS also maintains an interactive Flood Zone Viewer map where residents can get more specific, parcel-level flood information for their property. The Flood Zone Viewer can be located at https://www.gis.sjcfl.us/floodviewer/. The map also contains information for the City of St. Augustine Beach and the City of St. Augustine.

In St. Johns County floodplains are generally associated with the St. Johns River and the Intracoastal Waterway and their tributaries. Flooding within these areas accounts for the principle flooding problems within the County. As shown on the following map the largest portion of the county vulnerable to freshwater flooding is the area east of US 1 and areas along the St. Johns River. These are also the areas with the highest population concentrations within the County.

Figure 5: NFIP Flood Zones - Northern St. Johns County

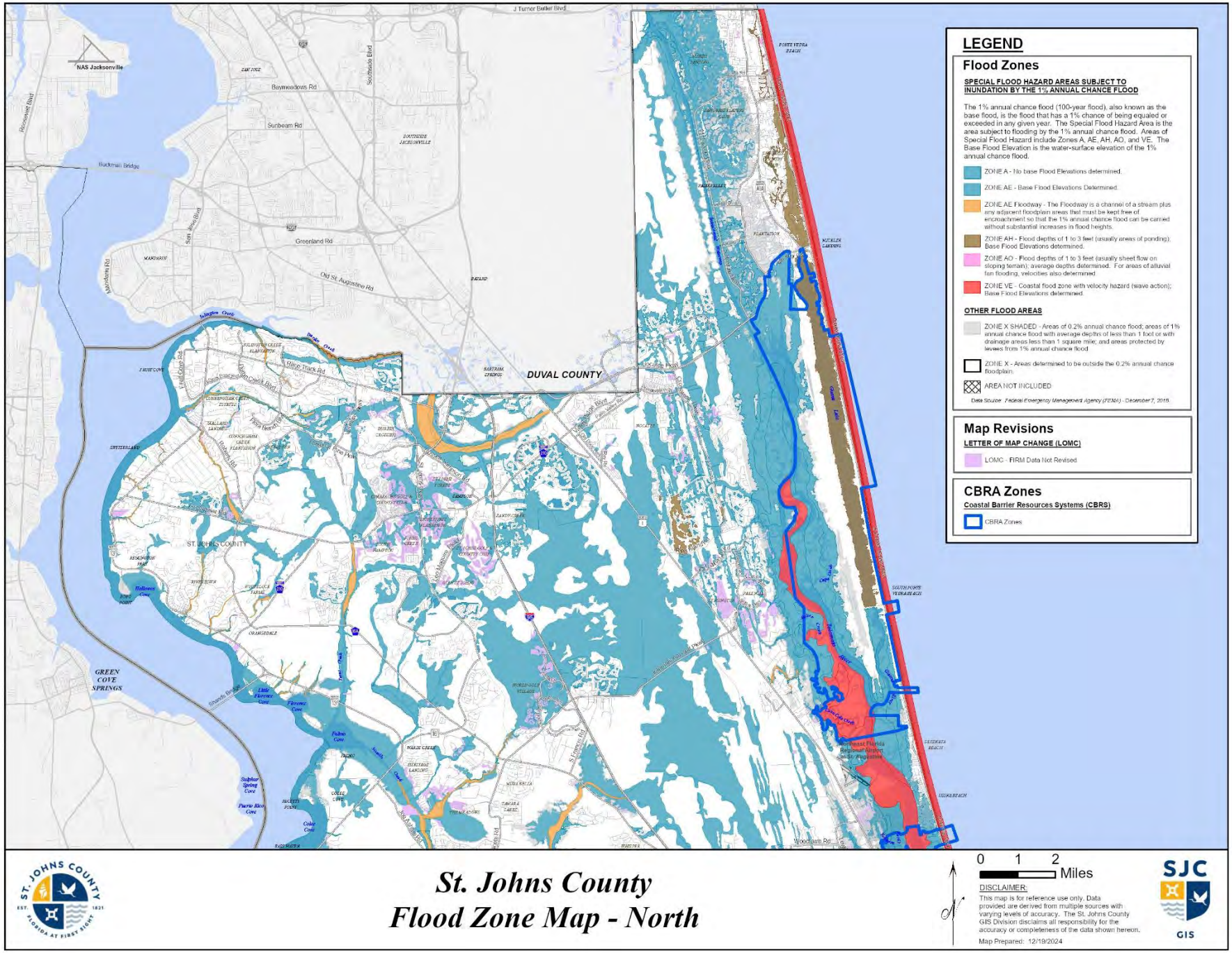
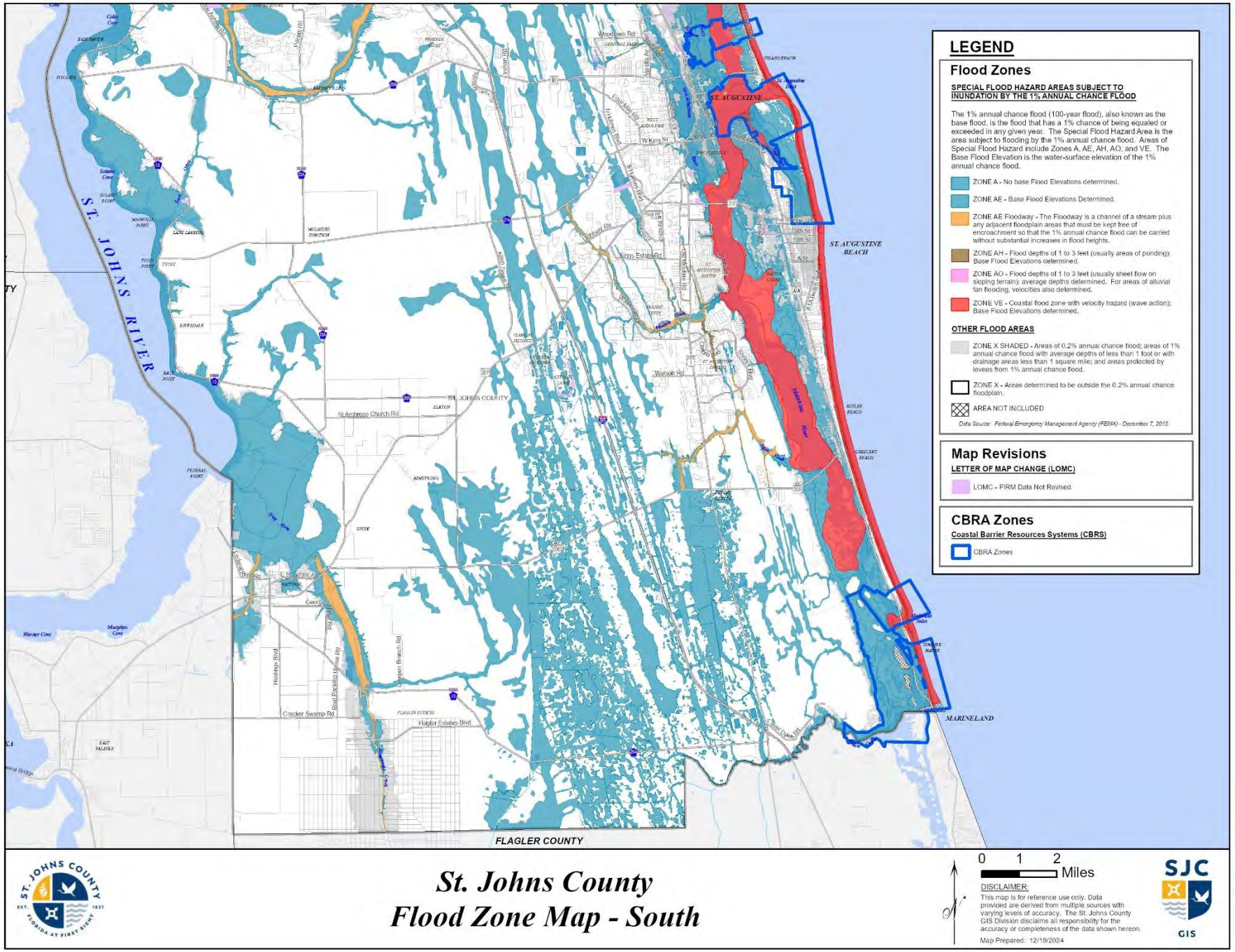


Figure 6: NFIP Flood Zones – Southern St. Johns County



5.2 Flooding History

On September 27, 2020, more than 5 inches of rain fell in less than 4 hours flooding US-1 near SR-312. State Road 207 and US-1 had more than 3 feet in the intersection, topping the hoods of several SUVs for sale at the adjacent car dealer. 25 of the 30 vehicles for sale were destroyed. This same rain event caused citywide flooding and some minor flooding of classrooms at Crookshank Elementary.

In July 2021 heavy rain from slow moving storms caused flood waters on Cordova Street in St. Augustine to be nearly two feet deep.

Heavy rainfall occurred around US1 near Palencia and the St. Augustine Airport on September 26, 2023, from an afternoon thunderstorm at high tide, trapping the typical drainage methods. Radar estimates and ground truth measurements indicate 6-8 inches of water fell in a 2-hour period. US-1 was flooded, but passable, and several feet of water covered neighborhood roadways in the Venetian/Old Dixie area. Two homes were reportedly flooded. The area remained flooded for several hours until the tide was able to recede.

In October 2024, rainfall during the week of Hurricane Milton led to historic flooding on Deep Creek in the Hastings area. According to a WeatherSTEM in Hastings, 13.57 inches of rain fell during the week causing impassible roads and severe damage to nearby homes.

The information contained here does not include storm surge flooding as that is covered in the Storm Surge/Coastal Flooding hazard section.

5.3 Flooding Probability

One could expect flood-prone areas such as the City of St. Augustine to flood multiple times a year due to heavy rainfall. Despite the inconvenience of these episodic floods, the impacts would be mostly to streets, and disruptions would be short in duration. The probability of flooding in the city is highly likely.

Areas in the FEMA-identified Special Flood Hazard Area (SFHA) have at least a .02% chance or a 1% annual chance of flooding each year. These areas are identified in Figure 5 and Figure 6. Flooding from rainfall in these areas is possible. The likelihood of rainfall flooding outside of the SFHA is low, but not impossible.

The highest flood waters on record for St. Johns County occurred in Flagler Estates on September 14th – 15th, 2001 because of Tropical Storm Gabrielle. The water reached a depth of 3 feet on Flagler Estates Boulevard and surrounding areas. If conditions were right, this extent of flooding, or possibly more, could be experienced in the future throughout all of St. Johns County and its jurisdictions.

According to Climate Central, intense rainfall is increasing. Warmer air holds more moisture- 4% more water vapor for every 1°F of warming. This relationship supercharges the water cycle, bringing heavier rainfall extremes. Intense rainfall will increase flood severity. Droughts are lengthening, and the soil is dryer which can have mixed effects on flood activity. Drier soils have

a greater capacity to soak up water from sustained rain, but during intense downpours dry and hardened soils can lead to more runoff and flash flooding.[5]

5.4 Flooding Vulnerability

A significant portion of the County's population is vulnerable to the effects of a 100-year flood event. This could mean either that the dwelling units are directly impacted by being flooded, or that the property or access to the property are flooded resulting in health and safety hazards. Flooding may also inundate potential evacuation routes and prevent people evacuating from vulnerable areas. Flooded roads and storms can also contribute to fatal accidents.

Homes built on grade are more susceptible to flooding than homes that are elevated. Building code revisions that occurred in the 2010s began requiring homes in the floodplain to be built at least one foot above the Base Flood Elevation in the SFHA.

The age of the structures in the City of St. Augustine, from homes to commercial, will add to their vulnerability as most of the structures located in the city are over 100-years old. The City of St. Augustine Administration, Police Department, and Fire Department are all located within flood-prone areas. Flooding in the city would force many of these businesses and tourist attractions to close, resulting in large economic losses. Due to the topography of the city, each of these structures and pieces of infrastructure, as well as the entire population, is vulnerable to freshwater flooding.

Approximately 60% of Flagler Estates is considered wetlands and Deep Creek traverses the central area of the community. There are roughly 2,000 people residing in Flagler Estates, most of whom are vulnerable to flooding.

Coastal Barrier Resource Systems (CBRS) are a system of protected coastal areas that include ocean-front land and other protected areas. These areas have restricted development to protect the barrier system and prevent future flood damage. There are 4 CRBS zones in St. Johns County, including:

1. Guana River Area (Unit FL03P) located in the Guana River Marsh Aquatic Preserve and Guana River Wildlife Management Area, extending out seaward to the 20-30-foot bathymetric contour.

2. Usina Beach area (Unit PO4A) located between Vilano and Usina Beaches, north of the St. Augustine Inlet. It extends from the Atlantic Ocean to the Tolomato River where it includes Saltwater Marsh.

3. Conch Island area (Unit P05 and P05P) which includes the Porpoise Point area on the southern tip of the northern barrier island to the north of the St. Augustine Inlet, the St. Augustine Inlet, Conch Island, an undeveloped island which is included in Anastasia State Park, and St. Augustine Beach.

[5] https://www.climatecentral.org/climate-matters/climate-change-and-inland-flooding

4. Matanzas River/Inlet area (Unit P05A and P05AP) which includes barrier island beginning approximately 1 mile north of the Inlet and extending south to the St. Johns County/Flagler County line, including an area that goes west into Pellicer Creek. It includes extensive saltwater and brackish marsh areas.

The Coastal Barrier Resources Act of 1982 (CBRA) was specifically designed to restrict federally subsidized development of undeveloped coastal barriers along the Atlantic and Gulf coasts to:

- Minimize loss of human life by discouraging development in high-risk areas
- Reduce wasteful expenditure of federal resources
- Protect the natural resources associated with coastal barriers.

Repetitive Loss Properties

The NFIP keeps track of the number of claims policy owners make. If the number and magnitude of claims meets a certain threshold, the structures may be classified as a Severe Repetitive Loss (SRL) or a Repetitive Loss (RL) property. SRL and RL properties often receive priority for mitigation funding.

- A RL is an insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.
- A SRL is any NFIP-insured residential property that has met at least 1 of the following paid flood loss criteria since 1978, regardless of ownership:
    - 4 or more separate claim payments of more than $5,000 each (including building and contents payments); or
    - 2 or more separate claim payments (building payments only) where the total of the payments exceeds the current value of the property.
    - In either case, 2 claim payments must have occurred within 10 years of each other.

RL and SRL properties have proven to be vulnerable to floods. The cause of the flood could be from storm surge, coastal flooding, or areal flooding.

According to the most recent data from the NFIP, St. Johns County, including the incorporated municipalities have 1,135 RL properties, and of those, 99 are classified as SRL. Both St. Johns County and the City of St. Augustine are working to mitigate RL and SRL properties through various avenues including elevating structures with the use of grant funds.

Community specific information on the type and number of SRL and RL properties as well as the amount of NFIP claims can be found in the following tables. Exact addresses are considered confidential and are thus not included. This information is current as of October 21, 2024.

Table 13:NFIP Repetitive Loss Properties by Building Type

Type and Number of Repetitive Loss Properties*			
	St. Johns County	**St. Augustine**	**St. Augustine Beach**
Single Family	528	421	6
Multi-Family (2-4 units)	24	37	2
Other Residential Units	4	8	2
Business/Non-Residential	11	65	1
Other Non-Residential	10	16	0
Total	**577**	**547**	**11**

Table 14: NFIP Severe Repetitive Loss Properties by Building Type

Type and Number of Severe Repetitive Loss Properties*			
	St. Johns County	**St. Augustine**	**St. Augustine Beach**
Single Family	17	61	1
Multi-Family (2-4 units)	1	6	0
Other Residential Units	1	2	0
Business/Non-Residential	1	6	1
Other Non-Residential	0	2	0
Total	**20**	**77**	**2**

Table 15: Total NFIP Claims for Repetitive Loss Properties

NFIP Claims for Repetitive Loss Properties			
	St. Johns County	**St. Augustine**	**St. Augustine Beach**
Building Payments	$56,172,529.22	$60,404,182.93	$554,351.72
Contents Payments	$9,249,192.54	$8,902,715.97	$74,341.71
Total Losses	1,418	1,385	29

In 2022 St. Johns County conducted a comprehensive Historical Flood Analysis to address requirements of Activity 510 (Step 5(c)) of the CRS. The analysis was conducted with RL and SRL data from 2018, which was the best available data at the time. The analysis has been included as Appendix F and will be updated as resources permit.

Future Vulnerability

The Florida Building Code now includes a minimum of 1-foot freeboard. This means any structure built in the SFHA must be built at least one foot above the base flood elevation. St. Johns County and its municipalities are all required follow these requirements. Additionally, the County's land development codes take into consideration the need to offset impervious surfaces to reduce future

flooding. This topic will be addressed by the City of St. Augustine in the coming months. Other measures required of the NFIP and building codes will help to reduce future vulnerability to new developments. The county and cities are also working to elevate vulnerable homes to reduce future flood damages.

With more intense rainfall predicted and increased impervious surfaces due to the growing population, flood prone areas are likely to increase. The City of St. Augustine is seeing more sunny day flooding, and any extra impervious surfaces will only exacerbate the issue. However, it remains to be seen how freeboard, onsite drainage, stormwater infrastructure, and development codes in newly developed areas of St. Johns County can combat future flood risk since many of these developments are so new.

6. Wildfire

Wildfire is defined by the Florida Forest Service (FFS) as any unplanned vegetative fire that threatens to destroy life, property, or natural resources. Wildfires occur in 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:

- 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.
- Surface Fires: Burn along the forest floor consuming the litter layer and small branches on or near the ground.
- Crown Fires: Spread rapidly by the wind, moving through the tops of the trees.
- Wildland/Urban Interface Fires: Fires occurring within the Wildland Urban Interface (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.

Florida has a history of naturally occurring wildfires. The hot, wet summers following long periods of uninterrupted growth cause the buildup of the underbrush, which is prime fuel for wildfires. Large amounts of dry underbrush require only an ignition source; this can be from a home fireplace, trash burn, carelessly tossed away cigarette, or a natural source such as lightening. Once ignited, the underbrush can burn thousands of acres.

6.1 Wildfire Location

Wildfire becomes a major issue when they threaten structures. Fires can occur throughout the county but pose the biggest threat in the WUI areas. Other factors can contribute to wildfire risk including structure type, vegetation, fuel density, and access. Areas of risk throughout the county have been identified as either low, medium or high-risk areas.

- **Low Wildfire Hazard** – Homes are built with concrete and appropriate non-flammable roofing materials. Short grass, low shrubs and light duff are present. The forest and heavy vegetation are not continuous throughout the community. Wildfires that do occur in these

areas are less intense and easier to suppress because of the lower volume of fuel to feed and sustain the fire. (Hastings, Butler Beach, Elkton).

- **Medium Wildfire Hazard** – Wildland vegetation is continuous throughout the community. Tall grass, medium shrubs, thick duff and ladder fuels are prominent in the areas. Vegetation is less than 30 feet from the structures. Homes are built with vinyl, plastic or other types of less fire-resistant materials. Access is limited and the concentration of fuel to feed fires causes more intense fire behavior. Fire suppression becomes more difficult and costlier. (Ponte Vedra Beach, St. Augustine, St. Augustine Beach, Vilano Beach, Bakersville, Fruit Cove, World Golf Village).
- **High Wildfire Hazard** – Dense, highly flammable vegetation surrounds the neighborhood and is within a few feet of homes. A thick layer of vegetation is present on the forest floor. Access to the neighborhood is limited to one entrance and/or on poorly maintained roads. Homes are rarely built with fire-resistant materials. Continuous, overgrown vegetation limits access and creates intense wildfire conditions. Fire suppression is challenging and requires more resources (engines, dozers and aircraft) and firefighters than normal. (Flagler Estates-both Flagler and St. Johns County, Del Webb, Palencia, Nocatee, Las Colinas, Cypress Point, The Colony, Kingston).

6.2 Wildfire History

In 1998 St. Johns County experienced its most severe outbreak of wildfire. Approximately 12,842 acres burned. No homes were lost, and one injury was reported. The cost to St. Johns County was $476,420; this does not include the cost for the timber that was lost during the fires. Other significant wildfire events (>100 acres) have been recorded in St. Johns County in 1985, 1990, 1993, 1998 - 1999, 2004, 2007, and 2011. Wildfires in 2011 burned several hundred acres of timber and came dangerously close to the St. Johns County Animal Control Facility and Pet Center, but no structures were burned. Another wildfire in 2011 burned over a thousand acres and caused closures of Interstate 95 and US Highway 1 for approximately 12 hours. Some timber was lost but no structures were burned. In May 2021 nearly 700 acres of rural St. Johns County near World Golf Village were burned when a controlled fire escaped the boundary.

According to Florida Forest Service from 2021 to July 26, 2024, there have been 108 brush or wildfires in St. Johns County. The breakdown per year is as follows:

- 2021 – 15 fires total
- 2022 – 29 fires total
- 2023 – 38 fires total
- 2024 – 26 fires so far.

6.3 Wildfire Probability

St. Johns County can expect to have multiple large fires every year, making this probability highly likely. Wildfire events typically correlate with dry periods and the typical Florida dry season which is November-May. Each year in Florida thousands of acres of wildland and many homes are destroyed by fires that can erupt at any time of the year from a variety of causes, including arson, lightning and debris burning. During prolonged periods of drought, the likelihood of fires will increase. It would be reasonable to assume St. Johns County could see future wildfires greater than 1,000 acres impacting WUI areas.

6.4 Wildfire Vulnerability

In recent history 1998 - 1999, 2004, 2007, and 2011 the fires have been larger and have threatened urbanized areas more frequently. St. Johns County is transforming from a rural county, to one which is much more urban in nature, but a large percentage of its land area is still covered in forest. As a result, many areas of the County are susceptible to wildfire. The most vulnerable areas are those generally located at the urban/wildland interface. These are areas where subdivisions occur adjacent to large undeveloped areas of forestland. Much of this land is in large ownerships including lands owned by large timber companies and actively managed for silviculture. When subdivisions are developed without clearing the wooded areas surrounding them the interface becomes extremely hazardous.

Many of these areas have an extensive canopy of longleaf pine, loblolly pine, pond pine, slash pine, sand pines that are being managed for silviculture and housing developments adjacent to these areas are vulnerable to fires. The following areas have been identified as some of the most vulnerable areas of St. Johns County to wildland fire.

- Some of the largest areas of silviculture in St. Johns County are around US 1 South of State Road 206, west of Interstate 95. Thousands of acres in this area are managed by large timber companies. Matanzas State Forest lies between US 1 South and the Intracoastal Waterway and is bordered by State Road 206 to the south. There are several subdivisions that encroach on the boundaries of the state forest and in 2005 these homes were threatened by a wildfire that started in Matanzas State Forest and evacuations were required. The St. Johns County Southeast Branch Library and Gamble Rogers Middle School are both located at the edge of the Matanzas State Forest.
- Whisper Ridge, a large subdivision with single family homes, and St. Johns County Fire Station 4 are located just off State Road 16, west of Interstate 95 and are surrounded by large tracts of timber.
- Palencia, a master planned community with commercial, single and multi-family homes, and St. Johns County Fire Station 15, have been constructed just north of the intersection of International Golf Parkway and US 1 North. Large areas of timber and upland forest surround these areas to the north and south, with saltwater marsh communities on the eastern boundaries. On the west side of US 1, across from the area is the St. Johns County Pet Center and the St. Johns County Stratton Road Transfer Station. They are surrounded by large tracks of managed timber, and in 2011 both were threatened by a wildland fire.
- Flagler Estates is a mostly mobile/manufactures home community that lies in the southeastern corner of the County. Approximately 60% of the land located in this subdivision is considered wetlands, and as such is heavily wooded. There are roughly 2,000 people residing in Flagler Estates, with most of the homes surrounded by forested lands.
- The St. Johns County Water Treatment Plant is located on County Road 214, near Interstate 95. This facility is a main supplier of drinking water to St. Johns County residents. It is surrounded by forested land on all sides.
- The area known as Vermont Heights is located just West of Interstate 95 on State Road 207. This area is mostly residential with both site-built, as well as mobile/modular, homes. The St. Johns County Tillman Ridge Transfer Station is also located in this area. This area is surrounded by both large tracts of managed timber and forested lands.

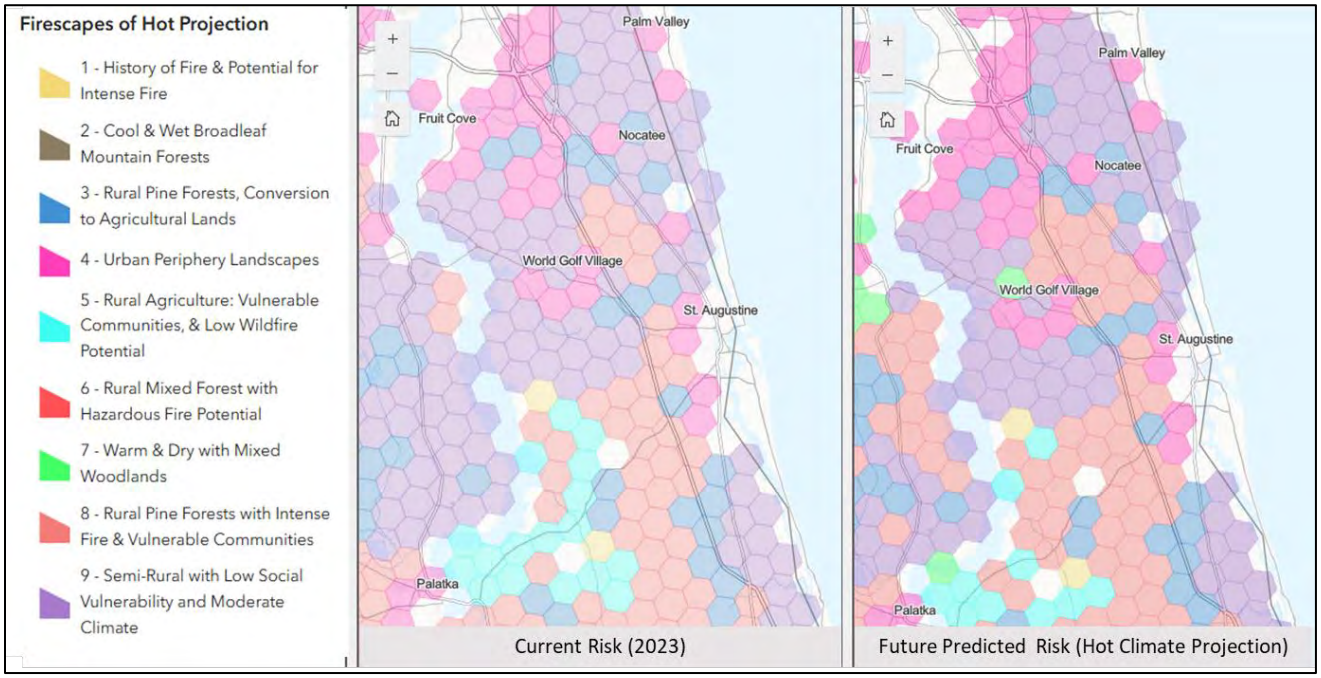
- The Nine Mile Construction & Demolition Landfill is located on International Golf Parkway. In 1995 a nearby wildfire caused the landfill to catch fire. The landfill burned for well over two weeks and was closed to any incoming garbage and debris. This area is still surrounded by large tracts of managed timber.

The upland pine communities in Florida are adapted for periodic episodes of fire, and they burn very easily. They also generate large quantities of flammable leaf litter and other combustible by-products, which catch fire easily and generate a very hot, if short-lived fire.

Adding to the fire hazard is the growing number of people living in new communities built in areas that were once wildland. According to Global Forest Watch St. Johns County has had a 42% decrease in tree cover since the year 2000. From 2013 to 2023, 57% of tree cover loss in St. Johns occurred within natural forest. Much of this tree cover loss is a result of new residential and commercial developments. While deforestation does reduce the number of acres available for wildfires, it does sometimes increase the number of homes built along and within vulnerable areas.

According to the analysis prepared by the USDA Forest Service's Eastern Forest Environmental Threat Assessment Center, the future predicted risk for St. Johns County under a hot climate, as depicted below in Figure 7, shows only minimal changes from the current risk. However, in the differences depicted, it should be noted that there is a growth in the amount of rural pine forest with intense fires and vulnerable communities in the World Golf Village area and in the southern portion of the county.

Figure 7: Wildfire Risk Based on Landcover Type and Future Risk



Source: https://experience.arcgis.com/experience/1f38db46f6654a92a345e8977bb624e3/page/Hot-Climate-Projection/

Future Vulnerability

As St. Johns County and its jurisdictions continue to be built out, the wildland continues to dwindle. The density of houses and the lack of access to preservations or forested areas by firefighters behind homes will increase the risk. According to the future risk modeled in Figure 7 above, the greatest increase in landcover is rural pine forest with intense fire and vulnerable communities. As such, extra effort should be made to maintain uncontrolled ground cover in forested areas to reduce the risk of wildfire.

7. Drought

A drought is a deficiency in precipitation over an extended period. Although droughts are a normal and recurring feature of our climate, sometimes they can endanger vegetation, animals, and even people. The duration of droughts varies widely. They can develop quickly and last a few weeks or can persist for months or years if exacerbated by extreme heat, wind, and other climate factors. Dry conditions and droughts can often lead to cascading hazards, like brush fires or wildfires. There are different types of droughts including those from meteorological, agricultural, societal, and hydrologic perspectives.

There are several drought indices utilized to monitor drought conditions- the Palmer Drought Severity Index (PDSI), U.S Drought Monitor (USDM), and the Keetch-Byram Drought Index (KBDI).

The KBDI is a reference scale for estimating the dryness of soil. It is updated continuously and uses daily maximum temperature and precipitation as its inputs. The KBDI attempts to measure the amount of precipitation necessary to return the soil to full field capacity. Typically, KBDI increases on non-precipitation days and decreases when rainfall is reported. The scale ranges from zero (no moisture deficit) to 800 and the higher the value, the more favorable conditions are for the spread and occurrence of wildfires.

Figure 8: Keech-Byram Drought Index (KBDI)

KBDI Scale	Expected Conditions and Wildfire Threat
0-200	Soil moisture is high. Typical of spring dormant season following winter precipitation.
200-300	Typical of late spring, early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.
300-400	
400-500	Typical of late summer, early fall. Lower litter and duff layers actively contribute to fire intensity and will burn actively.
500-600	
600-700	Often associated with more severe drought with increased wildfire occurrence. Intense, deep burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.
700-800	

- KBDI = 0 - 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. Typical of spring dormant season following winter precipitation
- KBDI = 400 - 600: Typical of late summer, early fall. Lower litter and duff layers actively contribute to fire intensity and will burn actively.
- KBDI = 600 - 800: Often associated with more severe drought with increased wildfire occurrence. Intense, deep burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

Once the KBDI numbers begin entering the 600-800 range, officials start considering taking more extreme preventative actions like issuing burn bans.

The PDSI is an index of the relative dryness or wetness of an area. The PDSI indicates the prolonged and abnormal moisture deficiency or excess. The PDSI is an important climatological tool for evaluating the scope, severity, and frequency of prolonged periods of abnormally dry or wet weather.

- -4.0 or less is considered an extreme drought
- -3.0 to -3.9 is considered a severe drought
- -2.0 to -2.9 is considered a moderate drought
- -1.9 to +1.9 is considered near normal conditions
- 2.0 to 2.9 is considered an unusual moist period
- 3.0 to 3.9 is considered a very moist period
- 4.0 and above is considered an extremely moist period

The USDM is a map released every Thursday, showing where drought is and how bad it is across the U.S. and its territories. The map uses six classifications: normal conditions, abnormally dry (D0), showing areas that may be going into or are coming out of drought, and four levels of drought: moderate (D1), severe (D2), extreme (D3) and exceptional (D4).

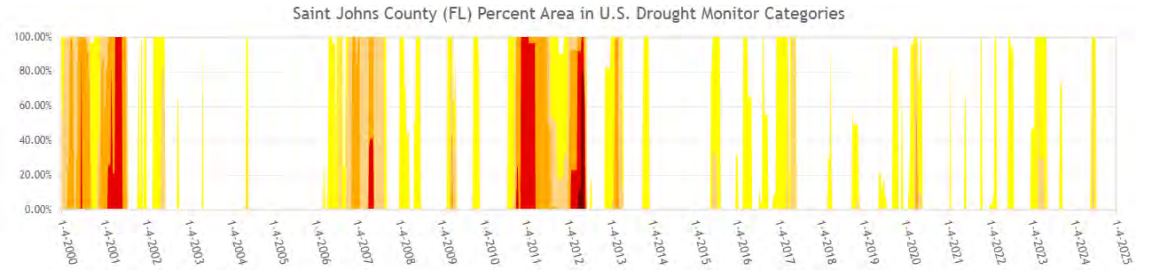
7.1 Drought Location

Drought can occur anywhere in St. Johns County and its jurisdictions. Drought can affect just a portion of the area at a time or the entire area.

7.2 Drought History

In May 2007 drought conditions persisted as the area experienced a 15 – 18-inch rainfall deficit. Below average potato and hay crops were reported due to the drought, but no loss estimates were compiled. According to the USDM, the majority of St. Johns County was in a drought from mid-August 2010 until the mid-June 2012. At the peak of the drought in May 2012, nearly 80% of the county was in an exceptional drought. Since then, through 2024, only short periods of abnormally dry and moderate drought have occurred.

Figure 9: Historic Drought Periods for St. Johns County



Category	None	D0	D1	D2	D3	D4
Description	Normal or wet conditions	Abnormally Dry	Moderate Drought	Severe Drought	Extreme Drought	Exceptional Drought

7.3 Drought Probability

Droughts occur slowly, over months to years and can continue for many months and years. Utilizing the USDM Time Series for the last 25 years, there has only been 2 years out of the last 25 where there was no record of some level of drought conditions. There have been 5 periods of extreme drought and one period of exceptional drought. Based on this history, the likelihood of an extreme-exceptional drought would be a likely, occurring on average once every 5 years and the occurrence of abnormally dry conditions could occur annually. In terms of extent, drought conditions could last a year or more, reaching -4.0 extreme drought on the PDSI or D4 on the USDM for two or more months.

According to Drought.gov, the Southeast region generally receives substantial precipitation and is often considered water rich. However, the region is increasingly experiencing record-breaking droughts, highlighting competing water demands. Drought conditions can develop rapidly in the Southeast, especially when the lack of rain and high temperatures combine to increase evapotranspiration of water in the soils.

7.4 Drought Vulnerability

The environment, particularly agriculture interests including farms and ranches in the unincorporated areas, would likely suffer the greatest impacts from extended periods of drought. The western area of the County is most vulnerable to the impacts of drought because this area is extensively involved in farming and ranching. A drought could cause significant economic hardships in the agricultural communities when crops are damaged or unable to grow. The urbanized communities along the coast are less vulnerable economically due to their location and non-agricultural economic base. Most infrastructure, schools, commercial developments, and residential homes are not vulnerable to drought unless wildfires occur. Residents of St. Johns County could see household wells dry up, which would cause major expenses for homeowners who rely on well water. Potential impacts to St. Johns County's potable water supply by saltwater intrusion during drought conditions are generally low.

Future Vulnerability

Drought has its largest impact on the agriculture and environment. Much of the large-scale developments occurring and being proposed are in the unincorporated areas of St. Johns County. Developed areas will be less vulnerable to droughts. Droughts are less likely to impact the City of St. Augustine and St. Augustine Beach due to their lack of farming and ranching.

8. Extreme Heat

A heat wave is when temperatures are abnormally and uncomfortably hot for an extended period. This event could last from one day to several weeks. Heat waves are often accompanied by high humidity. The heat index is the "apparent temperature" that describes the combined effect of high air temperature and high humidity. The higher this combination, the more difficult it is for the body to cool itself and it can result in heat exhaustion, heat stroke, and even death.

Figure 10: Heat Index Classifications

Classification	Heat Index	Effect on the body
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F - 103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°F - 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke highly likely

Due to the proximity to the Atlantic Ocean, extremely high temperatures are rare in St. Johns County and its jurisdictions. The highest ever recorded temperature was 103°F, but heat indices regularly reach 105-110°F in the summer.

8.1 Extreme Heat Location

Extreme heat can occur anywhere in St. Johns County and its jurisdictions.

8.2 Extreme Heat History

On July 20th, 1986, St. Augustine reached a record high temperature of 103°F. There have been no recorded extreme heat temperatures for St. Johns County in the NCDC Storm Events Database. The best available data for record heat indices comes from National NWS Jacksonville for the City of Jacksonville. The highest ever recorded heat indices occurred over a 3-day period in July 1980 ranging from 123-127°F.

NWS's records for the City of Jacksonville contain 26 of the highest heat indices for each month April – October dating back to the 1950s. Since 2020 there have been 25 heat index record-setting days.

Figure 11: Heat Index Records for Jacksonville, FL (1950- August 2024)

APR JAX Peak Heat Index	MAY JAX Peak Heat Index	JUN JAX Peak Heat Index	JUL JAX Peak Heat Index	AUG JAX Peak Heat Index	SEP JAX Peak Heat Index	OCT JAX Peak Heat Index
105F 04-30-1991 93/75	106F 05-27-2019 100/67	118F 06-29-1998 100/78	127F 07-13-1980 102/81	118F 08-11-2019 97/80	112F 09-05-2022 94/79	106F 10-09-2017 90/79
102F 04-28-1991 94/72	106F 05-29-2017 98/70	116F 06-04-1985 100/77	126F 07-12-1980 101/81	117F 08-13-2023 98/79	112F 09-03-2020 93/80	106F 10-07-2017 90/79
100F 04-28-2017 93/71	106F 05-31-2004 97/72	115F 06-23-1981 99/77	123F 07-14-1980 99/81	116F 08-14-2023 98/78	110F 09-04-2020 95/77	106F 10-09-2009 93/76
100F 04-29-1991 93/71	106F 05-29-1982 93/76	113F 06-23-2024 96/78	119F 07-17-1981 103/76	115F 08-01-1999 99/77	110F 09-02-2020 94/78	104F 10-04-1990 94/73
97F 04-09-2020 92/69	106F 05-25-1953 99/69	113F 06-30-2012 95/79	118F 07-20-2000 102/76	115F 08-20-1980 99/77	110F 09-16-2018 96/76	103F 10-08-2017 90/77
97F 04-27-1991 90/71	105F 05-28-2019 96/72	113F 06-25-1998 98/76	118F 07-18-1981 99/79	114F 08-12-2023 96/79	110F 09-09-1990 97/75	103F 10-10-2009 93/74
97F 04-29-1970 92/69	104F 05-25-1975 94/73	113F 06-02-1985 100/74	118F 07-11-1980 100/78	114F 08-08-2023 99/76	110F 09-05-1983 93/79	103F 10-07-2009 92/75
97F 04-23-1970 92/69	103F 05-26-2024 95/71	113F 06-18-1981 99/75	117F 07-22-2015 95/81	114F 08-07-2023 98/77	110F 09-03-1970 97/75	103F 10-02-1977 92/75
97F 04-24-1967 93/67	103F 05-31-2020 93/74	113F 06-09-1981 98/76	117F 07-14-1981 102/75	114F 08-09-2007 97/78	110F 09-02-1970 98/74	103F 10-01-1969 90/77
97F 04-18-1967 94/65	103F 05-30-2019 95/71	112F 06-26-2024 94/79	116F 07-31-2010 97/79	114F 08-08-2007 96/79	109F 09-01-2020 94/77	102F 10-12-2009 92/74
96F 04-20-2011 90/70	103F 05-30-2004 96/70	112F 06-21-2019 96/77	116F 07-31-1999 98/78	114F 08-01-1986 100/75	109F 09-24-2000 91/80	101F 10-22-2019 90/75
96F 04-24-1999 93/66	103F 05-25-2000 95/71	112F 06-29-2009 94/79	116F 07-22-1991 98/78	114F 08-26-1982 94/80	109F 09-18-1993 94/77	101F 10-17-2018 93/72
96F 04-23-1988 89/72	103F 05-14-1995 96/70	112F 06-21-2009 96/77	115F 07-30-2010 102/74	114F 08-22-1980 94/80	109F 09-04-1983 92/79	101F 10-11-2009 90/75
95F 04-05-2023 89/71	103F 05-29-1991 93/74	112F 06-20-2009 96/77	115F 07-16-1981 102/74	114F 08-01-1962 97/78	109F 09-12-1982 91/80	101F 10-08-2009 90/75
95F 04-06-2022 85/76	103F 05-30-1982 91/76	112F 06-17-2009 93/80	115F 07-03-1970 99/77	114F 08-18-1952 96/79	109F 09-06-1962 95/76	101F 10-01-2004 90/75
95F 04-29-2017 89/71	103F 05-28-1982 95/71	112F 06-14-1998 101/73	114F 07-30-2023 99/76	113F 08-15-2023 95/79	109F 09-15-1949 94/77	101F 10-05-2002 89/76
95F 04-05-2017 91/68	103F 05-22-1957 93/74	112F 06-27-1954 101/73	114F 07-19-2000 101/74	113F 08-14-2019 97/77	108F 09-04-1970 96/75	101F 10-02-1959 92/73
95F 04-28-2014 91/68	103F 05-12-1957 93/74	111F 06-17-2016 97/76	114F 07-04-1997 94/80	113F 08-10-2019 98/76	107F 09-19-2018 93/77	100F 10-07-2021 90/74
95F 04-27-2011 93/65	103F 05-26-1955 95/71	111F 06-16-2010 95/78	114F 07-21-1995 98/77	113F 08-13-2011 95/79	107F 09-18-2018 93/77	100F 10-31-2019 91/73
95F 04-26-2011 92/66	102F 05-09-2024 96/69	111F 06-13-2004 92/80	114F 07-25-1983 97/78	113F 08-05-2011 98/76	107F 09-17-2018 93/77	100F 10-16-2018 90/74
95F 04-09-2011 92/66	102F 05-23-2020 95/70	111F 06-24-1996 95/78	114F 07-15-1981 102/73	113F 08-01-2010 95/79	107F 09-12-2010 95/75	100F 10-16-2017 89/75
95F 04-29-2002 88/72	102F 05-31-2019 97/68	111F 06-16-1981 102/71	114F 07-06-1980 99/76	113F 08-02-1999 98/76	107F 09-08-1990 97/73	100F 10-06-2002 90/74
95F 04-21-2002 91/67	102F 05-26-2019 98/66	111F 06-14-1981 98/75	114F 07-08-1969 98/77	113F 08-10-1987 97/77	107F 09-02-1989 95/75	100F 10-06-2000 90/74
95F 04-20-2002 91/68	102F 05-30-2017 93/73	111F 06-11-1981 97/76	113F 07-21-2023 98/76	113F 08-22-1983 96/78	106F 09-06-2022 95/74	100F 10-04-1995 88/77
95F 04-13-2001 92/66	102F 05-03-2010 92/74	111F 06-29-1978 97/76	113F 07-05-2023 96/78	113F 08-09-1981 96/78	106F 09-11-2020 89/80	100F 10-03-1994 89/75

8.3 Extreme Heat Probability

Based on the number of events that have occurred over the last 4 years, St. Johns County may have at least one record setting extreme heat day per year, making the probability "highly likely". Depending on the month, records could range from 95-127°F, classifying the area as either Danger or Extreme Danger.

According to Center for Climate and Energy Solutions, across the globe, hot days are getting hotter and more frequent, while we're experiencing fewer cold days. In July 2023, Earth broke or tied its record for the hottest day on record, four days in a row. Over the past decade, daily record high temperatures have occurred twice as often as record lows across the continental United States, up from a near 1:1 ratio in the 1950s.[6] A recent study projects that the annual number of days with a heat index above 100°F will double, and days with a heat index above 105°F will triple, nationwide, when compared to the end of the 20th century. [7]

8.4 Extreme Heat Vulnerability

Heat waves are not uncommon in Florida. An extended heat wave could have an impact on the elderly, young and those with medical conditions. Those areas of St. Johns County that are inland, away from the moderating influence of the ocean and its breeze would be more vulnerable to extreme heat.

Extreme heat can also impact infrastructure- from transportation to utilities to clean water and agriculture. High heat can deteriorate and buckle pavement, warp or buckle railway tracks, and exceed certain types of aircraft operational limits. Electricity usage increases as air conditioning and refrigeration units in homes and offices work harder to keep indoors cooler. Transmission

[6] https://www.c2es.org/content/heat-waves-and-climate-change/
[7] https://iopscience.iop.org/article/10.1088/2515-7620/ab27cf

capacity across electric lines is reduced during high temperatures, further straining the electrical grid. Heat can have lasting impacts as crops may be damaged, reducing production which leads to short supply and or increased cost to the farmers and consumers.

Future Vulnerability
As global temperatures and the population throughout St. Johns County and its jurisdictions rise, people will continue to be vulnerable to extreme heat. If necessary, St. Johns County and its jurisdictions can open cooling shelters if there is ever an extended period of power outage during extreme temperatures. Extreme heat is not expected to increase vulnerability to any new infrastructure or developments.

9. Winter Storm / Freeze

A winter storm is defined as a storm that can range from a few hours of moderate snow to blizzard-like conditions with wind-driven snow that can last for days. Winter storms can impede visibility, affecting driving conditions, and can have an impact on communications, electricity or other services. Winter storms can range from several states to one county. St. Johns County is not generally susceptible to winter storms, because temperatures rarely reach snow-producing levels. The climactic conditions for winter storms are also not favorable. However, temperatures can reach levels low enough to cause damage to crops and water lines.

Freezing occurs when temperatures are below freezing, less than 32°F, over a widespread area for a significant period. Freezing temperatures can damage agricultural crops and burst water pipes in homes and buildings. In St. Johns County there is an average of 17 days a year at or below freezing. Frost, often associated with freezes, can increase damaging effects. Frost is a layer of ice crystals that is produced by the deposition of water from the air onto a surface that is at or below freezing.

Wind chill is the term used to describe the rate of heat loss on the human body resulting from the combined effect of low temperature and wind. As winds increase, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the internal body temperature. Exposure to low wind chills can be life threatening to both humans and animals alike.

The NWS issues the following products during winter storms and freezes:

Table 16: Winter Weather Watches and Warnings

Name	Description
Winter Storm Watch	Issued when conditions are favorable for a winter storm event in the next 24 to 72 hours. A watch is generally issued when the risk of a hazardous winter weather event has increased and is intended to give lead time for people to make plans.
Winter Storm Warning	Issued when a winter storm event is expected to meet or exceed local winter storm warning criteria in the next 12 to 36 hours. A warning is generally issued when a hazardous winter weather event is occurring, is imminent, or has a very high probability of occurrence, and is used when conditions pose a threat to life or property.

Winter Weather Advisory	Issued when a winter storm event is expected to meet or exceed local winter weather advisory criteria in the next 12 to 36 hours but stay below warning criteria. An advisory is for less serious conditions that cause significant inconvenience and should lead to cautious behavior to avoid injury or property damage.
Freeze Watch	Issued when there is a potential for significant, widespread freezing temperatures within the next 24 to 36 hours.
Freeze Warning	Issued when significant, widespread freezing temperatures are expected.
Frost Advisory	Issued when the minimum temperature is forecast to be 33 to 36 degrees on clear and calm nights during the growing season.

9.1 Winter Storm / Freeze Location

Areas west of I-95, away from the moderating influence of the Atlantic Ocean are more likely to be impacted from freezing temperatures, but the entire county (all jurisdictions) can be affected by winter storms and freezes.

9.2 Winter Storm / Freeze History

Some of the coldest ever recorded temperatures in St. Johns County were in January 1985. On January 21st, 1985, St. Augustine recorded a temperature of 10°F and the Hastings area recorded a temperature of 12°F.

Records show that St. Augustine received approximately 2 inches of snow in February 1951. St. Johns County experienced an ice storm Christmas 1989. As a result, I-95 along with many local roads were closed for 2 days and power outages were widespread. In March 1993 St. Johns County experienced the Storm of the Century. This storm produced ice and winds gusting over 70 mph, closing roads and causing power outages in many parts of the county for 3 days. As demonstrated in the above examples, snow, ice, gusting winds, and extremely cold temperatures could be expected in St. Johns County and its municipalities for multiple consecutive days. St. Johns County has not experienced winter storm conditions or extreme freezing conditions since these events.

9.3 Winter Storm / Freeze Probability

In St. Johns County, inclusive of its jurisdictions, one could experience wind chills between 36°F and -11°F. Winter storms are less frequent than freezes. The probability of a winter storm is low and could occur, on average, less frequently than once every 10 years. If a winter storm was to occur, a worst-case scenario would be equivalent to the March 1993 storm, with temperatures reaching 10°F. A freeze is likely to occur at least once every year or two.

Most of the research surrounding climate change discusses a warming climate. Information obtained from a 2009 Global Climate Change Impacts Report states that since the mid-1970's, the number of days per year in which the temperature falls below freezing has declined by 4-7 days over much of the Southeast or 5 days for St. Johns County.[8]

[8] https://nca2009.globalchange.gov/southeast/index.html

9.4 Winter Storm / Freeze Vulnerability

St. Johns County is vulnerability to the impacts from winter storms or freezes due to the County's large agricultural land use in the west. Many of the crops that are grown in this area are grown and harvested in the winter. A winter storm or extended freezing temperatures could cause significant economic losses in the agricultural communities. Winter Storms would affect roadway infrastructure throughout the County and municipalities, especially the bridges, if snow or ice began accumulating. St. Johns County's and its municipalities do not have removal equipment, nor do we have any spreading equipment for salt or sand. This would cause our transportation system to come to a standstill, affecting the economy of St. Johns County and its municipalities.

Those areas of St. Johns County that are inland, away from the moderating influence of the ocean and its breeze would be more vulnerable to winter storms and freezes. Extended cold could also damage utilities infrastructure such as pipes. This could cause issues with potable water and sewage systems being able to deliver and remove water and waste. It could also damage the pipes into privately owned homes as infrastructure is not built to withstand extreme cold. A winter storm or extended period of freezing temperatures could have an impact on the elderly, young and those with medical conditions. Extended periods of extreme cold could also affect the power grid due to high demand for heat.

Future Vulnerability

As development increases, open land will become built out. Agriculture will remain the most vulnerable sector to winter storms and freezes. If necessary, St. Johns County and its jurisdictions could open warming shelters if there is an extended power outage during winter weather conditions.

B. Biological and Human-Caused Hazards

In addition to natural hazards, St. Johns County has a variety of vulnerabilities to human-caused and biological hazards. A human-caused hazard is a hazard that arises from deliberate, intentional human actions to threaten or harm the well-being of others. Biological hazards refer to biological substances that pose a threat to the health of living organisms, primarily that of humans.

As required by Florida's CEMP regulations, biological and human-caused hazard profiles include the following:

- Overview
- Historic damages
- Probability of future events
- Severity of occurrence
- Vulnerability

1. Hazardous Materials

Vulnerability: Low
Probability of Future Occurrence: Small scale – Highly likely; Large Scale – Low
Overall Risk: Low-Medium

Hazardous materials are used to maintain the modern lifestyles of both urban and rural communities. Agricultural uses for chemicals range from fertilizers, insecticides and disease control for crops to ammonia refrigeration units for dairy products. These chemicals increase crop yields and ensure the delivery of fresh products to markets. Communities often use extremely hazardous chemicals, such as chlorine or sulfuric acid for treating drinking and wastewater.

Many hazardous chemicals pass through St. Johns County via roadway or railway on any given day. A railway, interstate and US highway all traverse the entire length of St. Johns County. Some of the common materials transported through the area are gasoline, propane, chlorine, and ammonia. Any of those chemicals or others could be involved in a transportation incident causing a major hazardous materials scene, threatening health and safety for individuals in nearby areas.

The southwestern portion of the County, in and around the Hastings area, has a large agricultural community which uses potentially hazardous materials in the farming process. These hazardous materials, if released, could affect individuals living in proximity to the agricultural fields. Additionally, throughout St. Johns County, many properties have sheds, barns and storage buildings, which may contain mixed groups of chemicals including paints, insecticides, fertilizers, petroleum products, lubricants and other common household or agricultural products. While it can be assumed few people store and dispose of these items in full compliance with the law, many of these materials are in such small quantity the concern of a full "hazmat" incident is minimized.

St. Johns County's vulnerability to hazardous materials accidents depends on three factors:

- The major transportation routes that pass through the community
- The hazardous material generators located in or near the community
- The resources in terms of people and property that are in an area of possible impact from a hazardous materials release.

Each year the number of registered facilities using hazardous materials in Northeast Florida increases. Supplying these facilities requires routinely transporting hazardous materials into the County by rail, truck, air and/or barge. The County is rapidly urbanizing, developing around the economic centers of St. Augustine, Ponte Vedra, and the World Golf Village. As the population and number of facilities that handle hazardous materials grow, greater numbers of people are vulnerable to an accidental release.

Each year facilities subject to the 1986 Emergency Planning and Community Right-To-Know Act must register and identify the type and quantity of hazardous materials on-site. Facilities are inspected, quantities are validated, and a risk assessment is completed. The assessments contain the following:

- A vulnerability zone (radius) around the facility that could be affected by a release.
- Population within this zone
- Potential environmental impacts within the zone
- Probability of occurrence
- Impacts to nearby critical facilities and property
- Impacts to the environment.

St. Johns County Fire Rescue maintains a Hazardous Materials Team which responds to hazardous materials incidents that occur regularly. The majority of these occurrences are small and easily managed. Small scale hazardous material incidents would include something similar to a propane tank leak, natural gas leak, or fuel spill.

As of this writing St. Johns County has never experienced a large-scale hazardous materials release that caused significant harm to the public or environment. One release of note did happen in August 2011. As fuel was being delivered to a gas station, vapors ignited as the fuel spilled and caused several explosions and a large fire. Foam was used to extinguish the fire, but a great deal of fuel leaked into the surrounding tidal saltwater marsh. There was one injury, and the gas station was a total loss. Dollar figures for damage estimates are not available for this incident.

The likelihood of a major hazardous material incident taking place is low.

2. Civil Disturbance

Vulnerability: Low
Probability of Future Occurrence: Low
Overall Risk: Low

St. Johns County has a minor history of civil unrest, occurring during the 1960's and early in 2020. The death of George Floyd in May of 2020 sparked national protests against law enforcement agencies and racial tensions rose. To date, St. Johns County and its municipalities have seen a few peaceful protests with gatherings of approximately 200-250 people. Neighboring Duval County has had past rioting. Areas most at risk in Duval County are not located near St. Johns County.

3. Mass Migration

Vulnerability: Low
Probability of Future Occurrence: Low
Overall Risk: Low

Mass immigration is a low probability due to St. Johns County's location being along the northeastern coast of Florida. On occasion an abandoned migrant vessel may wash ashore on the coast, but it is typically quickly removed. Potential impacts of such an event would be an increased need for social services, law enforcement and detention facilities.

4. Coastal Oil Spills

Vulnerability: Medium
Probability of Future Occurrence: Low
Overall Risk: Medium

Coastal oil spills are moderate to major impact should one occur. There are no nearby offshore oil rigs. Shipping on the St. Johns River is relatively light. The greatest threat comes from the Port of Jacksonville and future drilling off the coast of Cuba. With the large volume of waterborne traffic

at the Port of Jacksonville, a spill is possible. Time, distance and currents are favorable to St. Johns County's planning effort. Warning residents and landowners of the spill's approach allows for some mitigating actions to take place to minimize damage. Most response capabilities are beyond the scope of St. Johns County and would come from federal authorities in accordance with the Area Contingency Plan which is directed by the U.S. Coast Guard. St. Johns County's efforts would center on warning, recovery and mitigation. Depending on the size of the spill, tourism and the environment could be severely impacted.

5. Terrorism

Vulnerability: Low
Probability of Future Occurrence: Low
Overall Risk: Low

Terrorism incidents can come in many forms including cyber-terrorism, biological weapons, chemical weapons, nuclear weapons, explosive weapons, and incendiary weapons. Biological, nuclear, incendiary, chemical, and explosive materials (B-NICE) are considered hazardous by nature.

The following are descriptions of each type of potential hazardous threat by terrorist acts:

- Biological weapons - microorganisms and/or toxins from living organisms that have infectious or non-infectious properties that produce lethal or serious effects in plants and animals, including smallpox, anthrax, Ebola, and bubonic plague.
- Nuclear weapons - high-energy particles or gamma rays that are emitted by an atom that represent a hazard to humans both internally and externally.
- Incendiary weapons - intentional arson or explosions used to spread fire or chemical and biological weapons.
- Chemical weapons - gas, liquid, or aerosol agents used to affect the transmission of nerve impulses in the human nervous system, including blister/mustard agents, choking agents and blood agents.
- Explosive weapons- used to damage property and cause loss of human life by resulting secondary hazards such as unstable structures, debris and fire.
- Cyber weapon - computer viruses and software that can be used to penetrate and disrupt networks and steal information.

St. Johns County has never experienced an act of terrorism. The likelihood that one will occur is low, but never a 0% chance of one occurring.

All counties in Florida are vulnerable to a terrorist attack, whether physical destruction from bombs or contamination from chemical, biological weapons, or radiological materials. There is also the risk of cyber-terrorism attacks that could disrupt or destroy vital computer networks. There are several potential targets that are most vulnerable to a terrorist attack including:

- Northrup Grumman
- UF Health – St. Johns
- Florida National Guard Headquarters
- Florida National Guard Armory

- Schools
- Special Events (Francis Field, the St. Augustine Amphitheater, Fairgrounds)
- County and City Government Complex
- Facilities and sites of historical significance.

6. Exotic Pests and Diseases

Vulnerability: Medium
Probability of Future Occurrence: Possible
Overall Risk: Medium

Commercial agriculture and related industries in St. Johns County have an economic impact of more than $171 million with vegetable production contributing 28% of the total at $48 million. Major crops in the area are, and have historically been, potato and cabbage; however current growers in the area are seeking alternative cropping systems to stay sustainable. Over 3,000 acres of Asian vegetables are currently being grown in the county and other crops such as sweet potatoes, cucurbits, artichokes and various cole crops are being grown and evaluated for their profitability.

St. Johns County has never experienced an exotic pest or disease outbreak of record. Biological hazards, such as exotic pests and diseases could pose an economic or health threat to humans or the agricultural community. The possibility also exists for the importation of pathogens that could have a widespread effect on the livestock industries. St. Johns County's large agricultural areas are vulnerable to exotic pests and diseases. The St. Johns County Agricultural Extension Office, with assistance from the Florida Department of Health, as necessary, would be the lead agency for addressing and managing this type of outbreak.

7. Pandemic

Vulnerability: Medium
Probability of Future Occurrence: Possible
Risk: Medium

A pandemic is a disease outbreak that spans several countries and affects a large number of people. Pandemics are most often caused by viruses which can easily spread from person to person. A new virus can emerge from anywhere and quickly spread around the world. It is hard to predict when or where the next new pandemic will emerge.

In March 2020 the World Health Organization declared COVID-19 a pandemic. The pandemic had extensive economic impacts throughout the world. The coronavirus has continued to mutate and spread. Vaccines are now regularly available to help prevent severe infection and spread of the disease. Immune compromised individuals remain the most vulnerable to this virus and other highly contagious diseases.

The Florida Department of Health - St. Johns County, in conjunction with partner agencies will identify and manage any pandemic outbreak event. Potential impacts of a pandemic outbreak

include economic losses, hospital surge, mass care, mass casualties, population quarantine and infectious disease control.

8. Cyber-Attack

Vulnerability: Medium
Probability of Future Occurrence: Possible
Risk: Medium

A cyber-attack is deliberate exploitation of computer systems, technology-dependent enterprises and networks. Cyber-attacks use malicious code to alter computer code or data, resulting in disruptive consequences that can compromise data and lead to cybercrimes, such as information and identity theft.

Cyberattacks may include the following consequences:

- Identity theft, fraud, extortion
- Malware, pharming, phishing, spamming, spoofing, spyware, Trojans and viruses
- Stolen hardware, such as laptops or mobile devices
- Denial-of-service and distributed denial-of-service attacks
- Breach of access
- Password sniffing
- System infiltration
- Website defacement
- Private and public Web browser exploits
- Intellectual property theft or unauthorized access.

Both private and public entities in St. Johns County are vulnerable to cyber-attack.

9. Natural gas

Vulnerability: Low
Probability of Future Occurrence: Highly likely
Risk: Low

St. Johns County has over 2,000 miles of natural gas lines throughout the County. Natural gas lines run along most major roadways in the County. The lines are marked by either a yellow pipe along the side of the road or with a yellow stripe marked on the road. The lines are all privately owned by TECO Peoples Gas and are routinely maintained. TECO Peoples Gas also employs a strict safety program with a vehicle that routinely monitors the lines with detection equipment that will detect gas levels of 1 part per million. The biggest hazard to gas lines is breach by contractors working in the area.

10. Airplane Crashes

Vulnerability: Low
Probability of Future Occurrence: Likely
Risk: Low

St. Johns County has one (1) public municipal airport: Northeast Florida Regional Airport located at 4900 US-1 North in St. Augustine. Currently, no commercial airlines operate flights in or out of the Northeast Florida Regional Airport. There are multiple businesses, including the Northrup Grumman Corporation, and private charters operating at the airport. There have been several small aircraft incidents at the airport that have resulted in loss of life. The majority of these incidents have taken place on the airport property on or near the runway. A crash in March 2024 in the woods near the airport killed two when the plane went down shortly after takeoff. Two other fatal accidents occurred with small planes since the last plan update.

Military aircraft also operate in and out of the airport, as such; the potential for a military aircraft incident exists and could require specialized resources as in the event of an incident. Only a small segment of the population would be affected.

11. Special Events

Vulnerability: Low
Probability of Future Occurrence: Highly likely
Risk: Low

St. Johns County and the City of St. Augustine are tourist destinations and host many special events each year. Large local events include, but are not limited to, the Fourth of July Fireworks, the Easter Festival and Parade, Nights of Lights events, the Sing Out Loud Festival, and the TPC Golf Tournament. Each activity requires community planning and is a major impact on Law Enforcement and Emergency Services. Potential effects on St. Johns County include evacuation of large populations, mass care, mass casualty, sheltering, civil unrest and communications failures.

Section V – Mitigation Initiatives

A. Project Selection and Submission Criteria

In St. Johns County there are numerous areas and locations that suffer or are vulnerable to disasters such as hurricane, floods, wildfires and other natural and human caused disasters. The Working Group members submit the initiatives which reflect the needs of the community.

The Working Group has developed over the course of time and continues to enhance and improve upon a project list of potential mitigation projects. Projects are both structural and non-structural. Each project is submitted to the Working Group on the New Project Submission Form and then discussed in the context of cost, feasibility, responsible entity, implementation time, funding and areas affected. At that time, the Working Group Executive Committee will vote whether to add the project to the list or ask the project sponsor to revise or reconsider the project.

If the project receives approval by the Executive Committee, it will be added to the list with a ranking of High (H), Medium (M), or Low (L). These designations correspond to the following definitions:

- High- the project is in progress or actively seeking funding.
- Medium- the project sponsor's organization has identified the project as something that they would like to implement within the next few years and will consider funding opportunities as they arise.
- Low- the project sponsor's organization has identified the project as something that could feasibly reduce future impacts. However, for one reason or another, the project is not something the organization is ready to seek funding for.

The Hazard Mitigation Grant Program (HMGP) is one of the larges funding streams for mitigation projects. The way HMGP is administered in Florida requires counties to submit a letter from the LMS Chair with a prioritized list of mitigation projects. When applicants are ready to submit projects under the HMGP, the LMS Working Group will officially rank projects with a numerical score. HMGP projects are evaluated against 10 criteria and scored for a ranking as outlined in Section V.B.

Cost Benefit Analysis are completed only when a project has been identified for specific funding availability due to the extensive process involved in creating a cost benefit analysis.

The Working Group believes that project prioritization and reprioritization is an ongoing responsibility. The completion of a project alone may be a cause to reprioritize the remaining projects.

B. Project Prioritization Methodology

1. Feasibility Assessment

All potential mitigation efforts, whether educational, legislative, or structural, must meet certain standards to be considered as viable projects or initiatives. The feasibility assessment, which consists of the four questions below shall be considered by the Sponsor before completing the Proposed Mitigation Initiative Form for any new mitigation initiatives.

(1) Does the project provide a long-term solution to an existing or potential problem?
(2) Does the project or initiative address a hazard to which the local community is clearly vulnerable?
(3) Is the project or initiative technically and environmentally feasible?
(4) Is the project expected to provide a return on the investment?

2. Prioritization Criteria

There are 10 categories in which individual mitigation projects or initiatives are evaluated. Up to ten points may be awarded in each of the categories for a total possible point score of 100 points. Bonus points are also available.

Prioritizing the proposed mitigation actions is based on the following 10 categories:

- Population Benefited
- Environmental Impact
- Social Equity
- Future Risk of Property Damage
- Previous Damage
- Infrastructure Criticality
- Feasibility of Implementation
- Implementation Impacts
- Funding Availability
- Sponsorship

Pre-requisite: To be eligible for the project prioritization list, the proposed project must be consistent with at least one LMS Goal. The goals are as follows:

1. Protect the lives of the residents of St. Johns County and its municipalities.
2. Protect property to ensure that its intrinsic value is preserved.
3. Protect infrastructure so that it is available before, during, and after a disaster.
4. Protect business activities so that they continue to provide economic strength to the community.
5. Protect the natural environment to ensure that quality of life and economic wellbeing are preserved.

Which goal(s) does this project support? _____

1. Population Benefited

What percentage of the population will benefit from the mitigation initiative? The percentage is based on the total population of the jurisdiction (incorporated municipal area or the unincorporated area) where the project is located according to the most current United States Census figures.

- Project would benefit 75% or more of the population — 10 points
- Project would benefit 50-74% of the population — 8 points
- Project would benefit 25-49% of the population — 6 points
- Project would benefit 24-1% of the population — 4 points
- Project would benefit less than 1% of the population — 2 points

2. Social Equity

Utilizing the most recent data, what is the level of Social Vulnerability for the census tract where the project is located? Social Vulnerability levels are determined by the Center for Disease Control (CDC) and can be located on the interactive map[9].

- High vulnerability — 10 points
- Medium-High vulnerability — 8 points
- Low-Medium vulnerability — 4 points
- Low vulnerability — 0 points

3. Environmental Impact

What impact will the mitigation initiative have on the environment? The environment consists of the surrounding ecosystems, wildlife, and waterbodies.

- Project improves the environment — 10 points
- Project has no effect on environment — 6 points
- Project could cause negative impacts to the environment — -10 points

4. Reduces Risk of Future Property Damage

Does the project mitigate a frequently recurring hazard? How frequently is the hazard expected to occur that the initiative is designed to mitigate?

- Hazard is expected to occur at least annually — 10 points
- Hazard may occur once every 1-5 years — 8 points
- Hazard is expected to occur every 5-10 years — 6 points
- Hazard occurs less than one time every 10 years — 4 points
- There is no known history of occurrence — 2 points

[9] https://www.atsdr.cdc.gov/place-health/php/svi/svi-interactive-map.html?CDC_AAref_Val=https://www.atsdr.cdc.gov/placeandhealth/svi/interactive_map.html

5. Previous Damages ($)

How much damage, in dollars, has previously occurred to this building, infrastructure, or area?

- >$500,000 — 10 points
- $250,000 – $500,000 — 8 points
- $100,000 – $249,999 — 6 points
- $50,000 – $99,999 — 4 points
- < $50,000 or unknown — 2 points

6. Infrastructure Criticality

The critical question addressed here is, "does this proposed project help protect the community by hardening some critical element in the community's infrastructure that will reduce the potential loss of life or property damage if a disaster strikes"? Points under this criterion are awarded based on the nature of the facility or infrastructure element being mitigated.

- Primary critical facilities are defined as "Facilities critical to the immediate support of life and public safety." These are the facilities the community cannot afford to have any loss of function, even for a short period of time. Examples include a hospital, EOC, fire station, or emergency shelter. Mitigation initiatives or projects that will ensure continuity of operations for primary critical/essential services or infrastructure.

  10 points

- Secondary critical facilities and infrastructure are defined as, "Facilities that will be critical for community recovery and restoration of services." Examples of infrastructure include, but are not limited to power services, water, and wastewater.

  - Mitigation initiatives or projects that will support secondary critical/essential infrastructure or services with loss/damage history

    8 points

  - Mitigation initiatives or projects will support secondary critical/essential infrastructure or services without loss/damage history

    6 points

- Public convenience facilities are quality of life facilities such as parks, recreation areas, and non-essential public buildings. Project will support public convenience services or infrastructure

  4 points

- Mitigation initiatives or projects that will have no impact on community infrastructure or services

  0 points

7. Feasibility of Implementation

Is this project technically, financially, and legally feasible? Basically, this overarching requirement addresses the ease with which a project can be implemented. How easily can required permits be obtained? What is the timeframe for accomplishing this project's goals? Are there any technical problems that must be overcome to implement this project? How long before the proposed mitigation project will accomplish its stated goal?

Projects which can be accomplished quickly or have an inherent advantage over long term projects will receive higher scores.

- Project could be implemented in one year 10 points
- Project could be implemented in three years 8 points
- Project could be implemented in five years 6 points
- Project implementation would be greater than 5 years 2 points
- Project would be difficult to implement 0 points

8. Implementation Impacts

How might this project affect people living nearby? Will anyone be displaced by implementation of this project?

- Project has positive impacts to the people in the surrounding area 10 points
- Causes a temporary disturbance (temporary relocation or noise complaints, etc.) 0 points
- Causes future harm to people/negatively impacts people long-term (i.e. increases flood risk in another area when solving it at the project site -10 points

9. Funding Availability

Is there an identified funding source or entity for this project or initiative; is funding currently available for this particular project? Points will be awarded as follows:

- Matching funds are identified and available 10 points
- Matching funds can be made available in a short timeframe 6 points
- Matching funds are not available 0 points

10. Sponsorship

Does the project have an active sponsor? (sponsor would be defined as a local government agency, or other entity, that will take responsibility for the mitigation initiatives management and implementation) Is a local government agency (City or County), or other entity willing to match funds?

- Project has an identified sponsor willing to match funds 10 points
- Project has identified sponsor 6 points
- Project has no identified sponsor 0 points

Bonus Points- Number of Previous Damage Occurrences

How many times has the structure, infrastructure or area been damaged by previous hazard occurrences? The number of damaging events will equate to the number of points received. For example, if a house has flooded 4 times, 4 points would be awarded.

_____ points

St. Johns County Local Mitigation Strategy

Project Prioritization

Criteria	10 Points	8 Points	6 Points	4 Points	2 Points	0 Points	(-)10 Points
Population Benefited	Project would benefit 75% or more of the population.	Project would benefit 50-74% of the population.	Project would benefit 25-49% of the population.	Project would benefit 24-1% of the population.	Project would benefit less than 1% of the population.		
Social Equity	High	Medium-High		Low-Medium		Low	
Environmental Impact	Project would improve the environment		Project has no impact on the environment				Project could cause negative impact to the environment
Reduces Risk of Future Property Damage	Hazard is expected to occur at least annually	Hazard may occur once every 1-5 years	Hazard is expected to occure every 5-10 years	Hazard occures kess than once every 10 years	There is no known history of hazard		
Previous Damages	> $500,000	$250,000 - $500,000	$100,000 - $249,999	$50,000 - $99,999	< $50,000		
Infrastructure Criticallity	Facilities critical to the immediate support of life and public safety	Faciliies that support secondary criical/essential infastructure or services with loss/amage history	Facilities that support secondary critical/essential infrastructure or services without loss/damage history	Project will support public conveniene services or infrastructure		Projects have no impact on community infrastructure or services.	
Feasibility of Implementation	Project could be implemented in one year.	Prject could be implemented in three years.	Project could be implemented in five years.		Project implementation would be greater than 5 years.	Project would be difficult to implement.	
Implementation Impacts	Does not displace or negatively affect any people					Causes a temporary disturbance	Negatively impacts people
Funding Availability	Matching funds are identified and available		Matching funds can be made available in a shirt timeframe			Matching funds are not available	
Sponsorship	Project has an identified sponsor willing to match funds.		Project has identified sponsor.			Project has no identified sponsor.	
Project Occurrence	Previously damaged by hazard 10 times	Previously damaged by hazard 8 times	Previously damaged by hazard 6 times	Previously damaged by hazard 4 times	Previously damaged by hazard 2 times	No history of damages	

updated 11/2024

C. Funding

The following table provides current information on sources of available funding that is typically used for hazard mitigation projects. Funding sources often come and go; these programs are regularly available. As additional or updated information becomes available, the list will be amended accordingly.

Table 17: Common Mitigation Funding Avenues

Grant Program	Sponsoring Agency	Type of Assistance	Eligibility
Hazard Mitigation Grant Program (HMGP)	FEMA	Monetary	Only after a disaster
Legislative Pre-Disaster Mitigation Program (L-PDM)	FEMA	Monetary	Pre-Disaster
Building Resilient Communities and Infrastructure (BRIC)	FEMA	Monetary and Technical	States and Communities
Community Development Block Grant – Mitigation (CDBG-Mit)	HUD	Monetary and Technical	Tied to Disaster Funding
Flood Mitigation Assistance (FMA)	FEMA/National Flood Insurance Program	Monetary and Technical	Individual flood claims reaching a pre-set threshold
Hurricane Loss Mitigation Program (HLMP)	State of Florida	Monetary and Technical	Assistance for individual hardening of homes
Resilient Florida	State of Florida	Monetary	Mitigation and adaptation projects (may need to also be listed in a FDEP Adaptation Plan)
Local General Revenue	Local Government	Monetary	All projects

D. Project Implementation

The mitigation project description will provide information on who initiated the mitigation project or initiative and who will be responsible for overseeing the implementation. Individual agencies and/or their representative will be responsible for implementing the mitigation initiatives they have approved for funding.

Project implementation is tracked on an ongoing basis. The mitigation project list contains the most up-to-date information for each initiative. Projects that have been completed are removed from the main project list and tracked on a list of completed projects to show progress and celebrate

successes. Projects that have been deleted from the list can be found on the deleted project list along with a reason for removing the project from the list. All valid and desired projects will remain on the main project tracking sheet until they can be moved to the completed or deleted list. A copy of these three project lists can be found in Appendix D.

Projects may remain on the project list for many years. Implementing mitigation measures can be time consuming and costly. In addition, despite efforts to speed up the flow of money, the federal grant process is lengthy. It can be years from the time a grant application is submitted to when the project is able to begin construction. This limitation, in addition to grant complexities, can deter individuals from pursuing mitigation funding.

LMS Appendices are available upon request by emailing SJC-EOC@sjcfl.us or LNelson@sjcfl.us or by calling 904-824-5550