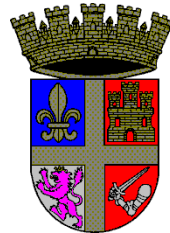


# St. Johns County Local Mitigation Strategy



Prepared By:

St. Johns County LMS Task Force and St. Johns County  
Emergency Management

**ST. JOHNS COUNTY  
LOCAL MITIGATION STRATEGY**

*Originally Adopted By the St. Johns County Local  
Mitigation Strategy Task Force*

*2004*

*Most Current Update and Adoption*

*2015*

**Revisions and Updates made by the St. Johns County Local  
Mitigation Strategy Task Force on the following dates:**

**February 2010**

**May 2010**

**February 2013**

**September 2013**

**October 2014**

**January 2015**

**March 2015**

**May 2015**

## **Current Participating Agencies**

City of St. Augustine Fire Department  
City of St. Augustine Planning and Building  
City of St. Augustine Police Department  
City of St. Augustine Beach Public Works  
Diversified Engineering International, Inc.  
Flagler Estates Road and Water District  
Flagler Hospital  
Florida Department of Agriculture and Consumer Services – Florida Forest Service  
Northeast Florida Regional Council  
St. Johns County Board of County Commissioners  
St. Johns County Emergency Management  
St. Johns County Engineering Department  
St. Johns County Fire and Rescue  
St. Johns County Health Department  
St. Johns County Planning Department  
St. Johns County Property Appraisers  
St. Johns County Public Works  
St. Johns County Road and Bridge Department  
St. Johns County School Board  
St. Johns County Sheriffs Department  
St. Johns County Utilities Department  
Town of Hastings  
University of Florida – IFAS Extension

## **Founding Participating Agencies**

Anastasia Mosquito Control District  
City of St. Augustine  
City of St. Augustine Beach  
Diversified Engineering International, Inc.  
Flagler College  
Flagler Estates Road and Water District  
Northeast Florida Regional Council  
St. Johns County Airport Authority  
St. Johns County Board of County Commissioners  
St. Johns County Building Department  
St. Johns County Department of Emergency Management  
St. Johns County Fire/Rescue  
St. Johns County Health Department  
St. Johns County Planning Department  
St. Johns County Property Appraisers Office  
St. Johns County Sheriff's Office  
St. Johns County Utilities Department  
Town of Hastings

# St. Johns County Local Mitigation Strategy

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## Section I - Introduction

### A. Local Mitigation Strategy

In the spring of 1998, the Florida Department of Community Affairs (DCA) initiated a program to assist local governments in developing plans to reduce or eliminate risks to people and property from natural and man-made hazards. This program is known as the Local Mitigation Strategy or the LMS.

Hazard Mitigation has gained increased attention over the past few years due to the large number of natural hazards which have occurred throughout the world and in the U.S. in particular. A main area of concern is the rapid rise in the costs associated with disaster recovery. It has become apparent that 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 benefit cost ratios are extremely advantageous. As a result, the Federal Emergency Management Agency (FEMA) and the State of Florida have recently developed National and State Mitigation Strategies respectively and funding is increasingly becoming available to support hazard mitigation efforts.

The advantages of developing a local LMS program are numerous including guidance in developing pre and post disaster mitigation plans; identifying priority projects and programs for funding; and increasing the likelihood of Federal and state funding for pre and post disaster, hazard mitigation projects.

### B. Planning Process

On May 14, 1998, the Northeast Florida Regional Council (NEFRC) contracted with St. Johns County to facilitate in developing the LMS. Through a Memorandum of Agreement the Strategy developed is intended to provide one unified program for the County and its incorporated municipalities. Through the process of developing a unified Mitigation Strategy, it is intended that the local governments preserve, protect, and improve the safety and durability of their communities. The primary objective of the Local Mitigation Strategy is to remove if possible, otherwise to limit the losses of life and property due to a disaster. The Regional Council role as a facilitator allowed communities to provide unrestricted input regarding local mitigation needs, without appearing biased. The resulting LMS provides the best fit for St. Johns County, and is based countywide agreement.

In August of 1998, a countywide LMS Task Force was organized with members from a broad cross section of the County including elected officials, County Department heads, County staff, representatives from the cities of St. Augustine, Hastings, St. Augustine Beach, Flagler County's Marineland, and local businesses and business people. The LMS Task Force membership currently includes:

**St. Johns County:** Board of County Commission - Commissioner, Emergency Management - Planner, Engineering Department - Engineer, Fire and Rescue – Deputy Chief, Health Department – Risk Manager, Planning Department - Planner, Property Appraisers Office – Asst. Property Appraiser, Public Works - Engineer, Road and Bridge Department - Supervisor, Sheriff's Department - Deputy, Utilities Department – Operator, Building Department – CRS Coordinator;

**City of St. Augustine:** Fire Department – Fire Chief, Planning and Building Department - Planner, Police Department – Police Officer;

**City of St. Augustine Beach:** Public Works – Public Works Director;

**Town of Hastings** – Consultant;

St. Johns County School District – Risk Manager, Flagler Estates Road and Water District – Manager, Flagler Hospital – Risk Manager, Florida Forest Service - Forester, Northeast Florida Regional Council - Planner, University of Florida – IFAS Extension – Extension Officer, Diversified Engineering International - Engineer.

St. Johns County, City of St. Augustine, Town of Hastings and the City of St. Augustine Beach will each adopt the plan by resolution upon approval by FDEM and/or FEMA. The Taskforce had been meeting on a quarterly basis since August 1998, in November 2008 the Taskforce decided to begin meeting three times a year and has since. The Task Force has been responsible for developing all work products for the LMS including the development of a set of guiding principles; identification of potential hazards affecting the community; identification of people and infrastructure which are vulnerable to hazards; identification of critical facilities which are necessary for maintaining health, safety and welfare of residents before, during, and after a catastrophic event; and the development of a prioritized list of pre and post hazard mitigation initiatives (projects) eligible for funding. The work of the Task Force continues; meeting schedules are created for a permanent committee responsible for reviewing new initiatives and ranking them. The third page of this document lists all founding agencies as well as currently participating agencies in the Local Mitigation Strategy.

The Florida Division of Emergency Management assisted in the effort by providing St. Johns County with data used during the hazard identification process. Data used from other sources includes information on 100 and 500-year floodplains, critical facilities, wildfire vulnerability and evacuation routes for the County. Additional information has been developed using the SLOSH (Sea, Lake and Overland Surges from Hurricanes) computer model. Complete details regarding the storm surge threat are available from the SLOSH model used by the National Weather Service and the National Hurricane Center. The SLOSH model has a long proven record and is used in this analysis for storm surge vulnerability levels.

Since the creation of the first LMS document, St. Johns County has continued to work to continuously maintain and update the LMS as needed and to add new mitigation initiatives as projects are completed and new projects are initiated. Through this planning process, St. Johns County has been able to get many projects initiated, funded, and completed through the guidance of the LMS. The Task Force continues this process in addition to working to keep the LMS in compliance with Federal Emergency Management Agency regulations for County LMS documents. Regular maintenance of the LMS is coupled with updates to maintain FEMA compliance. The Task Force continues to meet on a regular basis to discuss the LMS.

The Northeast Florida Regional Council staff in conjunction with the St. Johns County Emergency Management representatives served to facilitate the meetings during the 2002-2006 planning and updating of the Local Mitigation Strategy. As of 2007 St. Johns County Emergency Management had taken over these tasks. These planning efforts include expanding the list of people and organizations invited to participate, expanding the list of participants



actively encouraged to participate, revising portions of the local mitigation strategy to be as up-to-date as possible, performing a more detailed risk assessment and damage loss estimate analysis, holding meetings 3 times a year, and setting up public information workshops and meetings among other planning activities.

St. Johns County Emergency Management performs the data collection, analysis and revisions to the Local Mitigation Strategy with the assistance of the Task Force members. Each section of the Local Mitigation Strategy was reviewed and revised as necessary, and then brought forth to the Task Force for review, discussion and approval. The updates that were made in the statistical portion of the document due to more current information becoming available; the Guiding Goals and Principles of the LMS Taskforce were also updated to better describe the mitigation goals of St. Johns County; and all Maps within the document were updated with the most current information. Other portions of the document have remained unchanged.

The LMS document was presented to the St. Johns County Commission, City of St. Augustine, City of St. Augustine Beach, and the Town of Hastings for their approval and adoption once the revisions were made to meet the newly set requirements. When the Local Mitigation Strategy was approved by the State of Florida and the Federal Emergency Management Agency in 2010, the role of St. Johns County Emergency Management Staff became to review and adjust accordingly.

### **C. Community Participation**

Federal mandates regarding Local Mitigation Strategies require increased public participation and documentation of solicitation for public involvement. All LMS Task Force Meetings are advertised in a newspaper of general circulation at least 10 days prior to the date of the meeting. Copies of the Public Meeting Advertisements and the Affidavit establishing that the advertisement was published in the St. Augustine Record are in Appendix E. This is to assure that the public is informed of meetings and given a chance to participate if interested. Minutes of each meeting or workshop held are recorded and maintained by St. Johns County Emergency Management and are also in Appendix E. Increased efforts are made to solicit ideas, comments, and information from the general public. These efforts include providing access to the LMS document upon request, allowing the public an opportunity to comment at regular Task Force meetings, public information workshops, and presentations at County Commission Meetings. As specific outreach activities are conducted, more details of such meetings or efforts are added to the information provided in the Local Mitigation Strategy.

At least one public meeting/workshop was held once the draft of the updated Local Mitigation Strategy was complete. This workshop was held in order to solicit ideas and comments from the general public to incorporate into the final copy of the plan before it is submitted for review to State and Federal reviewers. People invited to any public information meetings or workshops are the general public, task force members, County, City, and State representatives and all others that may be interested.

A copy of the Local Mitigation Strategy document is made available at the St. Johns County Emergency Management office. Announcements of meetings or workshops and where to obtain

more information are made in the local and county newspapers. Other public outreach activities include periodic presentations to St. Johns County Commission and municipal Commission/Council meetings that are open to the public.

#### **D. Private Sector Participation**

Since the beginning of the Local Mitigation Strategy program in St. Johns County, efforts have been made to insure participation by the private sector. Included on the mailing list for the St. Johns County LMS Task Force are representatives from the insurance industry, healthcare, representatives from the County's largest employers, local business people, local private school representatives, local farmers, and others.

Prior to each LMS meeting information packets are sent to the private sector participants. By sending out emails to notify members of all upcoming meetings, the representatives from the private sector are being actively encouraged to participate in the Local Mitigation Strategy planning process. When possible, all LMS members were also phoned to remind them of the upcoming meetings. The meetings were attended sporadically by the private sector due to conflicts and busy schedules. However, at least one representative and sometimes more from the private sector were in attendance at each of the LMS meetings and valuable input was obtained from these individuals.

The St. Johns County LMS Task Force continues to hold LMS meetings and continues to coordinate and encourage private and public sector interest and involvement. Efforts to expand the list of participating agencies and organizations to include a broader spectrum of representation from the community are on-going. An informational workshop is held in order to provide new members and interested parties with information regarding the Local Mitigation Strategy planning process and why their participation is important. These efforts continue throughout the planning process for updating and maintaining the Local Mitigation Strategy. New participants are continuously sought for inclusion on the mailing list. In addition the Chamber of Commerce is used as an information source to obtain up-to-date information on businesses and organizations so that it is certain that all have been given the opportunity to participate in the planning process.

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

As part of the planning process for the creation of the LMS document, other existing documents are used as references and incorporated into the LMS document. These existing documents include County and Municipal Comprehensive Plans, Regional Strategic Plans, Land Development Regulations, City Codes, State Statutes, and Emergency Management Plans. These documents are used to obtain the goals, objectives and policies that are incorporated into the LMS document as guiding principles, which are discussed in detail in Section II. These documents are listed in Appendix B.

Efforts are made in current and future planning activities to review new documents and documents previously not reviewed in order to cover the wide spectrum of plans within the County and State. There are always new plans and studies being written and developed that have

not yet been reviewed and incorporated into the LMS, but as the LMS is a living document they will be incorporated in the current planning cycle and future reviews of the LMS.

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

Part of the LMS document contains Guiding Principles, which as explained above were obtained by reviewing other pertinent county and municipal documents. Through this process of information incorporation into the LMS, new goals, objectives and policies can be created to fill in the gaps in the existing documents in order to increase the county's ability to effectively mitigate against hazards. In this way the goals and principles of the LMS will be incorporated into other planning documents such as the St. Johns County Comprehensive Plan, City of St. Augustine Comprehensive Plan, City of St. Augustine Beach Comprehensive Plan, Town of Hastings Comprehensive Plan, St. Johns County Comprehensive Emergency Management Plan, St. Johns County Land Development Regulations and any other appropriate documents in the County or Municipalities that deal with hazard mitigation. Any changes made to the above stated documents or any other appropriate documents, would be made by Resolution by the governing body of the Jurisdiction in which it pertains

The 2010 LMS has been used extensively with Community Ratings System Planning and for back-up documentation. It has also been used in the update for the St. Johns County Comprehensive Plan as well as the St. Johns County Comprehensive Emergency Management Plan. The Risk Assessment portion of the LMS has proved to be invaluable when writing the aforementioned documents. Changes made to these documents were made by Resolution by the St. Johns County Board of County Commissioners.

Currently, St. Johns County, the Town of Hastings, and the Cities of St. Augustine and St. Augustine Beach are active participants in the National Flood Insurance Program (NFIP). Each Jurisdiction will continue to enforce codes and regulations compliant with requirements of the NFIP. St. Johns County and its municipalities will continue their commitment to NFIP in the following ways:

- Maintain elevation certificates on file for all new construction in the SFHAS or for substantial improvements to properties in the SFHA.
- Maintain public records and make them available for review.
- Maintain records pertaining to LOMAS and LOMRS
- Provide information related to flood hazards, flood maps, etc., to the public upon request.
- Continue community outreach efforts for compliance with the community rating system program.
- Continue to promote flood insurance to property owners.
- 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, continue to identify/acquire land in the SFHA open space/preservation.
- Promote flood hazard mitigation to the public.
- Continue drainage maintenance and drainage system improvement projects.
- Continue floodplain management activities and move towards a CRS rating of 5.

- Create and enforce a floodplain management plan.
- Schedule annual meetings with CRS User Group and ensure all municipalities participate.

## **G. Reevaluation Criteria**

The LMS document has to be updated over time to change with the growing and changing community. Strategies, and mitigation initiatives change, Comprehensive Plans updated, and projects completed. These changes need to be reflected in the LMS document. In order to ensure that the document remains updated and current, the LMS Task Force meets three times a year and the LMS is reviewed a minimum of once every year or following a disaster (mandatory) to determine if any updates or corrections are necessary. Updates may include new issues, new projects, changes to existing projects, consideration of new funding sources, changes to timeframes of existing projects, or changes to the mitigation strategy program itself.

As a result, the LMS is maintained by the St. Johns County LMS Task Force in order to meet the needs of St. Johns County and its residents. The LMS Taskforce, in conjunction with the community, meet and review comments and recommendations for all portions of the LMS process including the planning process, risk assessment, mitigation strategy, and plan maintenance. Any changes to the Local Mitigation Strategy are then voted on by the Taskforce Members at a publicly noticed meeting. The changes to the LMS have been minor and have including only updating information and more in-depth information on some items. It is essential that all facets of the community be represented at the Task Force meetings including the public, to ensure that the plan is staying up to date with all aspects of the community. Details on how the public continues to be included and encouraged to participate throughout the reevaluation, maintenance, and review process are outlined in Section I, C. Through these meetings, facilitated by St. Johns County Emergency Management staff, the LMS document is reevaluated and updated regularly.

The St. Johns County Emergency Management Planner, who also serves as the LMS Chairperson, is responsible for monitoring the plan. She will monitor any changes throughout St. Johns County and make sure the information is promptly and properly entered into the LMS Plan on a quarterly basis. As these monitoring updates are entered into the LMS they will be presented to the Local Mitigation Strategy Taskforce as an item on the Agenda at one of the meetings held three times a year and will be voted on by all members.

## **H. Submission of Plan to SHMO**

Within five years of the plan's update approval by the Federal Emergency Management Agency (FEMA), the plan must be submitted to the State Hazard Mitigation Officer for review and approval. As described above the Local Mitigation Strategy is continually updated as the needs of the community change. The Local Mitigation Strategy Task Force meets 3 times a year and at each meeting we review the document and make changes accordingly. The plan will be officially updated for its next 5 year review in 2015. The Taskforce will then hold at least one public workshop along with its regularly scheduled meetings, which are open to the public, for public input. The plan will then go before each municipalities governing board for approval and then forwarded to the State and FEMA for review and approval.

## **I. Conflict Resolution**

Recognizing that disputes between jurisdictions, interest groups, units of government and the private sector sometimes occur in a decision making process, the St. Johns County LMS Task Force agreed to resolve all conflicts in policy, procedures and issues based on the Regional Dispute Resolution Process.

The Northeast Florida Regional Council currently uses this process, established by the Florida Legislature as part of the 1993 Environmental Land Management Study (ELMS) legislation to facilitate intergovernmental problem solving. The process offers a reasonable approach to solving public problems. It provides a forum to cooperatively resolve issues and differences between local governments and private interests in a timely, informal, and a cost-effective manner.

The process should take no longer than two weeks. The core of the process is a settlement meeting at which disagreeing parties explain their interests, explore options, and seek a mutually acceptable agreement. Many times it ends at this point. However, if a solution is not reached, other options available include additional settlement meetings. Disputes and conflicts that cannot be resolved at this level can be escalated to mediation.

The process essentially saves time and money by seeking mutually beneficial solutions. Within this process, direct communication encourages improved control of outcomes and the quality of the agreement itself. The conflict resolution process was not required during the development of the LMS. The LMS Task Force resolves all conflicts by democratic rule.

## Section II - Guiding Goals and Principles

### A. Goals

The purpose for developing a set of Goals and Guiding Principles is to clearly state what the community's overall vision for hazards mitigation is and to ensure that the community adequately addresses its mitigation needs before and after a disaster. Before beginning the process of developing the Guiding Principles for the St. Johns County Local Mitigation Strategy (LMS) the Task Force identified the goals they believed should be foremost in overall development of this document. The following goals are intended to be the leading concepts of this Strategy. In short, the purpose of the Local Mitigation Strategy is to provide guidance to the County in building a safer and more resilient community. The declaration of these ultimate goals provides the overall guidance for the Strategy. The goals are provided in a ranked order, where the first goal is paramount. The activities recommended as mitigation efforts by this Strategy must first meet or further these goals.

- 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 environment to ensure that quality of life and economic wellbeing are preserved.**

These goals are used as part of the project prioritization methodology. Projects recommend by this Strategy must first meet one of the goals to be considered, then will receive points based on which Goals they will routinely further.

### B. Guiding Principles

The Guiding Principles for St. Johns County outlined in the following document, which was developed and approved by the Task Force as part of the LMS process. It was compiled from existing adopted Goals, Objectives, Policies, and Ordinances, which address hazard mitigation and long-term recovery.

The Guiding Principles were compiled by reviewing existing requirements in the adopted Comprehensive Plan of each local government as well as State, Regional and Local planning documents. These documents have already adopted requirements which address hazard mitigation and long-term recovery and which are already serving as the County's Adopted Guiding Principles. They are shown in the text summary and in the following matrix format which identifies in a narrative description how they contribute to a comprehensive mitigation

strategy as well as the source of the requirement and if and how it has been implemented. Sources include State Statutes, the County and Municipal Comprehensive Plans; the Strategic Regional Policy Plan developed by the NEFRC; St. Johns County Comprehensive Emergency Management Plan, and local ordinances.

A review of these Guiding Principles will quickly reveal several mitigation approaches commonly used in the County and municipal plans. Among these are the policies which, direct growth away from or restrict growth in the hazardous areas. The restriction of growth in the Coastal High Hazard Areas (CHHA) for example is common to each, the County and coastal municipal plans. Prohibitions on development, which increases off site flooding or does not provide for proper transportation drainage, are common in St. Johns County. These examples are given to introduce the concepts that St. Johns County and its municipal governments have available to them and the regulatory authority and public support for development of a unified mitigation strategy.

It is not intended that the inclusion of these policies as Guiding Principles in the Local Mitigation Strategy will provide a fixed master plan for the future development or revision of policies, but that they when viewed as a whole represent a community policy statement relating to the future development in St. Johns County. As such they are intended to provide the guidelines for revision of development regulations and to focus future policy development on the goals stated above. The LMS also relates to the intent and mandates of the State and Federal governments to encourage local jurisdictions to undertake a coordinated and effective program that will reduce the vulnerability of its population and infrastructure to the effects of disasters. When the use of these Guiding Principles for future policy development is combined with the direct implementation of mitigation projects identified in this Strategy, the County will have a unified mitigation approach.

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>   | <b>SOURCE</b>   | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b>  |
|--|---|---|
| <p>Reduce the quantity and improve the quality of storm water runoff to surface water bodies by increasing the amount of green permeable open space and the use of more permeable surfaces through the following policy program.</p>   | <p>City of St. Augustine<br/> Comprehensive Plan - Future<br/> Land Use Element - Objective<br/> 4</p>                              | <p>Implementation ongoing</p>   |
| <p>Require subdivisions to be platted and recorded and include road and drainage maintenance plans as outlined in the City of St. Augustine’s subdivision ordinance (Ordinance 83-9) prior to a building permit being issued.</p>  | <p>City of St. Augustine<br/> Comprehensive Plan - Future<br/> Land Use Element</p>   | <p>On-going enforcement</p>   |
| <p>Ensure that coastal area population densities are coordinated with the St. Johns County and Northeast Florida Regional Council’s Hurricane Evacuation Plans.</p>  | <p>City of St. Augustine<br/> Comprehensive Plan - Future<br/> Land Use Element - Objective<br/> 10</p>                             | <p>The Regional Council recently completed the updated Evacuation Study. Local review and coordination are in progress.</p> |
| <p>Continue to operate the drainage system based upon the existing master planning process as established by the City (city of St. Augustine) staff and under the aegis of the Director of Public Works and will provide for maintenance of its existing drainage system data base; continue to establish a list of prioritized renewal/replacement projects; and will facilitate periodic updates of the master plan.</p> | <p>City of St. Augustine<br/> Comprehensive Plan -<br/> Infrastructure Element -<br/> Drainage Sub Element -<br/> Objective 1.2</p> | <p>Implemented</p>  |
| <p>Investigate the feasibility of establishing a storm drainage utility and a system of storm drainage user fees and charges which follow a cost of service approach to rate structuring, and produce revenues adequate to fund ongoing maintenance efforts and ongoing renewal and replacement improvements.</p>  | <p>City of St. Augustine<br/> Comprehensive Plan -<br/> Infrastructure Element -<br/> Drainage Sub Element -<br/> Objective1.3</p>  | <p>Implemented</p>  |
| <p>The storm drainage system will adhere to stringent regulatory requirements as necessary to promote the conservation and protection of natural resources.</p>  | <p>City of St. Augustine<br/> Comprehensive Plan -<br/> Infrastructure Element -<br/> Drainage Sub Element -<br/> Objective1.4</p>  | <p>On-going enforcement</p>   |
| <p>Protect valuable functions of wetlands, estuaries, tidal marshes and submerged lands, including the territorial sea by maintaining native vegetative communities and</p>  | <p>City of St. Augustine<br/> Comprehensive Plan -</p>  | <p>On-going enforcement</p>   |



| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>   | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b>   |
|--|--|--|
| hydrologic systems, through continued enforcement of Ordinance 88-39, Conservation Overlay zone Development□, for all development proposals in the conservation zones....  | Conservation Element - Objective7  |  |
| Control erosion and sedimentation in development areas both during and after construction.   | City of St. Augustine Comprehensive Plan - Conservation Element - Objective 6      | Enforced through Development Code  |
| Establish development guidelines for the remaining undisturbed areas of the 100 year flood plain so that the flood-carrying and flood-storage capacity of those lands is maintained.   | City of St. Augustine Comprehensive Plan - Conservation Element Objective 9        | Implemented  |
| Reduce or prevent storm damage by protecting natural systems which serve as buffers against those storms.  | City of St. Augustine Comprehensive Plan - Conservation Element Goal 3 Objective 1 | Implemented  |
| Ensure that a total evacuation of the City during a Category 3 storm can be accomplished in less than 12 hours, or in a time period determined to be safe from the recommendations of a new hurricane evacuation study and plan in 1998, by providing adequate evacuation routes and shelters. | City of St. Augustine Comprehensive Plan - Conservation Element Goal 3 Objective 2 | The Regional Council recently completed the updated Evacuation Study. Local review and coordination are in progress. |
| Regulate development within coastal high-hazard areas by enforcing coastal construction standards.   | City of St. Augustine Comprehensive Plan - Conservation Element Goal 3 Objective 3 | On-going enforcement   |
| Research strategies in post-disaster redevelopment planning that eliminate exposure to natural hazards.  | City of St. Augustine Comprehensive Plan - Conservation Element Goal 3 Objective 4 | Ongoing  |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>   | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b> |
|--|--|--|
| <p>The City of St. Augustine will implement the Future Land Use Map illustrated in the Future Land Use Element through the year 2015 to limit population concentrations in the coastal high hazard areas.</p>  | <p>City of St. Augustine<br/> Comprehensive Plan -<br/> Conservation Element Goal 3<br/> Objective 6</p>                   | <p>Ongoing</p>   |
| <p>The City of St. Augustine will limit capital expenditures that subsidize development in coastal high hazard areas, but will place no limitation on expenditures in those areas that enhance or restore natural resources.</p>   | <p>City of St. Augustine<br/> Comprehensive Plan - Capital<br/> Improvements Element<br/> Objective 2</p>                  | <p>On-going enforcement</p>                                  |
| <p>Protect human life and health.</p> <p>Minimize expenditure of public money for costly flood control projects.</p> <p>Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public</p> <p>Minimize prolonged business interruptions.</p> <p>Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in floodplains.</p> <p>Maintain a stable tax base by providing for the sound use and development of floodprone areas in such a manner as to minimize future flood blight areas.</p> <p>Ensure that potential home buyers are notified that property is in a flood area.</p> | <p>City of St. Augustine --<br/> Chapter 13 Flood Control of<br/> the St. Augustine Code.</p>                              | <p>On-going enforcement</p>                                  |
| <p>Standards for Flood Hazard Reduction. Provisions for development in flood hazard areas in order to minimize damages.</p>  | <p>City of St. Augustine --<br/> Chapter 13 Flood Control of<br/> the St. Augustine Code. Sec<br/> 13-61 through 13-65</p> | <p>On-going enforcement</p>                                  |
| <p>Conservation Overlay Zone Development. Establishes criteria for the review of development proposals and to manage and regulate and direct development within the</p>  | <p>City of St. Augustine --<br/> Chapter 11 Environmental<br/> Protection of the St. Augustine</p>                         | <p>Implemented</p>   |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>   | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b>  |
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| Conservation Overlay Zones 1, 2, and 3.  | Code.  |   |
| Coastal Construction Requirements generally. All structures shall be designed so as to minimize damage to life, property and the natural environment.  | City of St. Augustine Building Code Sec. 8-134   | On-going enforcement  |
| All subdivisions require a drainage design plan show existing and proposed features. The plan shall equal or exceed design standards set forth hereinafter and the policies and procedures established in the Drainage Manual of the FDOT. | City of St. Augustine Subdivision Regulations Division 3 Section 23-96.                | On-going enforcement  |
| Roadway ditches standards and requirements.  | City of St. Augustine Subdivision Regulations Sec. 23-98 through 23-103                | On-going enforcement  |
| Base future land use decisions on the carrying capacity and the ability to evacuate in a major hurricane event as defined by the Northeast Florida Regional Hurricane Evacuation Plan.   | City of St. Augustine Beach Comprehensive Plan Future Land Use Element Objective L.1.5 | The Regional Council completed the updated Evacuation Study. Local review and coordination are pending. |
| Coordinate with St. Johns County and the NEFRC in establishing the carrying capacity of the coastal areas.   | City of St. Augustine Beach Comprehensive Plan Future Land Use Element Policy L.1.5.1  | The Regional Council completed the updated Evacuation Study. Local review and coordination are pending. |
| Amendments to the Future Land Use Plan shall reflect densities and intensities that do not exceed the carrying capacity of the designated evacuation routes.   | City of St. Augustine Beach Comprehensive Plan Future Land Use Element Policy L.1.5.2  | The Regional Council completed the updated Evacuation Study. Local review and coordination are pending. |
| Exiting evacuation routes shall be so marked and should be given special consideration for improvement over other roads and highways in the City.  | City of St. Augustine Beach Comprehensive Plan Future Land Use Element Policy          | On-going enforcement  |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>   | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b>  |
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|  | L.1.5.3  |   |
| Update the hurricane evacuation and disaster preparedness plan every five years in conjunction with St. Johns County, and re-evaluate its effectiveness immediately after a major disaster event, to recommend appropriate improvements. | City of St. Augustine Beach<br>Comprehensive Plan Future<br>Land Use Element Policy<br>L.1.5.4 | Ongoing   |
| Update hurricane guide, showing evacuation routes, hurricane hazards, safety procedures, shelters, and other pertinent information.  | City of St. Augustine Beach<br>Comprehensive Plan Future<br>Land Use Element Policy<br>L.1.5.5 | Ongoing   |
| Adhere to the DEP's Coastal Setback Requirements and their permitted variances regardless of the size of the developable parcel.   | City of St. Augustine Beach<br>Comprehensive Plan Future<br>Land Use Element Policy<br>L.1.5.6 | On-going enforcement  |
| Encourage St. Johns County, the SJRWMD and/or the State of Florida to purchase areas subject to seasonal or periodic flooding including flood-prone areas adjacent to the Atlantic Ocean to be used for public and beach-access parking. | City of St. Augustine Beach<br>Comprehensive Plan Future<br>Land Use Element Policy<br>L.1.5.7 | Ongoing   |
| Identify at least two methods to improve approaches of evacuation routes which are subject to flooding.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Transportation Element<br>Objective T.2.2 | The Regional Council completed the updated Evacuation Study. Local review and coordination are pending. |
| Continue to coordinate with FDOT and St. Johns County on the study of and necessity for improved evacuation with elevation standards.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Transportation Element Policy<br>T.2.2.1  | Ongoing   |
| Assist in protecting, conserving, and enhancing remaining coastal dunes and beach by requesting assistance from the Department of Environmental Protection.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element              | Ongoing   |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>   | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b> |
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|  | Objective CC.1.2   |  |
| Promote hazard mitigation by enforcement of the coastal construction setback line.   | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policies CC.1.2.6 | On-going enforcement   |
| Enforce requirements of the National Flood Insurance Program by continuing to participate in the program, specifically designating coastal high hazard areas and limiting development in such areas along with relocating any infrastructure.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.1.2.7   | On-going enforcement   |
| Land Development Regulations should include revised regulations of building practices and land uses that reduce the vulnerability of human life and property to natural hazards, specifically hurricanes, in high hazard areas.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.1.2.8   | Implemented  |
| Participate with all applicable State and Federal Agencies to insure public safety by keeping Disaster Preparedness plans current incorporating the hazard mitigation annex of the peacetime emergency plan as well as updates by the Regional Planning county and St. Johns County. | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Objective CC.1.3  | Ongoing  |
| Assessment of the impact of new development on emergency evacuation routes will be incorporated into the City land development ordinance.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.1.3.1   | Ongoing  |
| Existing evacuation routes will be given priority for improvement over other transportation facilities in the Annual Capital Improvements Program.   | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.1.3.2   | Ongoing  |
| St. Augustine Beach shall prepare and update its hurricane evacuation plan and disaster preparedness plan every five years and also reevaluate its effectiveness   | City of St. Augustine Beach<br>Comprehensive Plan  | Ongoing  |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>   | <b>SOURCE</b>   | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b>   |
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| immediately after a major disaster event to recommend appropriate improvements and post-disaster redevelopment activities both immediate and long term.  | Conservation/Coastal Element Policy CC.1.3.3  |  |
| City shall update its hurricane guide showing evacuation routes, hurricane hazards, safety procedures, shelters, and other pertinent information for its citizens every year by the anniversary date of the adoption of the Comprehensive Plan.                  | City of St. Augustine Beach Comprehensive Plan Conservation/Coastal Element Policy CC.1.3.4 | Ongoing  |
| City's disaster preparedness plans shall give priority to accommodations for the handicapped and indigent, including transportation and appropriate sheltering by May, 1992.   | City of St. Augustine Beach Comprehensive Plan Conservation/Coastal Element Policy CC.1.3.5 | Implementation ongoing   |
| St. Augustine Beach will annually coordinate disaster preparedness plans with St. Johns county and the City of St. Augustine.  | City of St. Augustine Beach Comprehensive Plan Conservation/Coastal Element Policy CC.1.3.6 | Implementation ongoing   |
| Limit public expenditures to that which supports recreation, expenditures to the City-owned City Hall/Fire Department square, conservation of natural resources, and/or the extension of sewer facilities for public health within the coastal high hazard area. | City of St. Augustine Beach Comprehensive Plan Conservation/Coastal Element Objective CC1.4 | Enforced. City has moved its Public Works and Police Departments as well as its City Hall off the ocean front. |
| Infrastructure shall be planned and required to be installed currently with future development in areas outside of coastal high hazard areas.  | City of St. Augustine Beach Comprehensive Plan Conservation/Coastal Element Policy CC.1.4.1 | Implementation Ongoing   |
| All private and public infrastructure, utilities and drainage improvements must be constructed concurrently, or in accordance with a phased plan approved by St. Augustine Beach   | City of St. Augustine Beach Comprehensive Plan Conservation/Coastal Element Policy CC.1.4.2 | On-going enforcement   |
| City shall reduce hurricane evacuation times by establishing for reviewing new development in relation to evacuation.  | City of St. Augustine Beach Comprehensive Plan  | Ongoing  |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>  | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b> |
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|   | Conservation/Coastal Element<br>Objective CC.1.5   |  |
| Transportation systems shall be designed and built to handle traffic generated during emergency evacuations as defined in the City's evacuation plan.   | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.1.5.1 | Implementation ongoing                                       |
| All roadways in the coastal zone shall be constructed to City specifications using salinity tolerant construction techniques and materials.   | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.1.5.2 | Implementation ongoing                                       |
| Transportation drainage systems including swales and ditches shall be maintained to ensure hydraulic capability.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.1.5.3 | Implementation ongoing                                       |
| City will coordinate with St. Johns County in lobbying FDOT for the improvements of the bridge on SR 312 or an additional bridge which crosses the Intracoastal as well as other key evacuation routes. | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.1.5.4 | Completed  |
| Reduce the potential for flood-related adverse impacts in St. Augustine Beach by five percent in 3 years.   | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Objective 2.5   | Implemented through revised building code.<br>(10% discount) |
| Review existing development in low-lying areas subject to flooding and modify drainage systems by five percent in these areas in 3 years to minimize potential damage to property and natural systems.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.2.5.1 | Implemented through revised building code.                   |
| Protect natural resources of the City from contamination by any hazardous substances.   | City of St. Augustine Beach  | None in City   |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>  | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b>  |
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|   | Comprehensive Plan<br>Conservation/Coastal Element<br>Objective CC.2.7                               |   |
| In conformance with State and Federal regulations, commercial establishments which use, create, store, generate or transport toxic or hazardous substance shall prepare a plan which identifies the materials and how these materials will be handled and disposed.   | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.2.7.1 | Implemented by County   |
| St. Augustine Beach will work with other State agencies to develop sites for households, small businesses and other low volume generators of hazardous waste to deliver hazardous waste for later disposal at an approved hazardous waste disposal site.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.2.7.2 | Two gas stations in City. No problems reported.   |
| Sites polluted from underground petroleum storage tanks shall be promptly cleaned up and the tank replaced, repaired or removed as presented in an approved plan within six months of discovering the petroleum.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.2.7.3 | On-going enforcement  |
| City shall make every reasonable effort to ensure public safety health and welfare of people and property from the effects of coastal storms by limiting public expenditures in areas subject to repeated damage by wind and water thereby reducing the exposure of humans and property to natural hazards, i.e., hurricanes. | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Goal CC.4       | Ongoing   |
| Prepare a post-disaster redevelopment plan by 1993 to reduce the exposure of human life and property to the destruction of hurricanes.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.4.1   | Implemented through revised building code and through the City's participation in FEMA's Community Rating Service. City has a rating of 8, which saves the City's property owners 10% on their flood insurance premium, |
| City shall include in its post-disaster redevelopment plan a delineation of activities that give priority to immediate repair and cleanup actions over long term redevelopment activities.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.4.1.1 | Ongoing   |



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| City will amend its building code to specify standards for the removal, relocation or structural modification of damaged infrastructure and structures.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.4.1.2 | Implemented  |
| City shall establish as its standard for inclusion in the Land Development Regulations that any structure damaged beyond fifty percent of value more than once during storms, hurricanes or northeasters will be determined to be a non-conforming use if located in a coastal high hazard area.           | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.4.1.3 | LDR development ongoing                                      |
| City shall include in the post-disaster redevelopment plan, recommendations of interagency hazard mitigation reports.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.4.1.4 | Ongoing  |
| City shall include in the post-disaster redevelopment plan, measures for eliminating unsafe conditions and inappropriate uses in coastal high hazard areas.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.4.1.5 | Ongoing  |
| City shall restrict the intensity of development within coastal high hazard areas consistent with public safety needs through the adoption of the Land Development Regulations.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Objective 4.2   | LDR development ongoing                                      |
| City shall designate the Coastal High Hazard Area as those areas which are within the FEMA V (Velocity) Zones and areas seaward of the Coastal Construction Control Line and within those areas which may be repeatedly damaged; redevelopment will be limited to conservation and recreational land uses. | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.4.2.1 | On-going enforcement   |
| By 1992, the City shall identify any areas within the coastal high hazard area needing redevelopment and develop a plan for eliminating unsafe conditions and inappropriate conditions.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Policy CC.4.2.2 | Implemented  |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>  | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b> |
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| St. Augustine Beach shall not allow public expenditures that subsidize future development in the high-hazard coastal area, except for expenditures which support recreation, expenditures to the City-owned City Hall/Fire Department square, conservation of natural resources, and/or the extension of sewer facilities for public health.  | City of St. Augustine Beach<br>Comprehensive Plan<br>Conservation/Coastal Element<br>Objective C.1.5 | On-going enforcement   |
| Protect human life and health.<br><br>Minimize expenditure of public money for costly flood control projects.<br><br>Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public<br><br>Minimize prolonged business interruptions.<br><br>Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in floodplains.<br><br>Maintain a stable tax base by providing for the sound use and development of floodprone areas in such a manner as to minimize future flood blight areas.<br><br>Ensure that potential home buyers are notified that property is in a flood area. | City of St. Augustine Beach<br>Flood Damage Prevention<br>Regulations - Objectives.                  | On-going enforcement   |
| Standards for Flood Hazard Reduction. Provisions for development in flood hazard areas in order to minimize damages.  | City of St. Augustine Beach<br>Land Development Regulations<br>Sec. 5.03.05                          | On-going enforcement   |
| Performance of all stormwater management systems shall comply with this section of the city's code as well as all state regulations.  | City of St. Augustine Beach<br>Land Development Regulations<br>Sec. 6.05.00                          | On-going enforcement   |
| The Town requires a 35-foot natural buffer around all wetlands and prohibits the location of residential, commercial and industrial land uses within the buffer areas, but allows resource-based recreational activities within buffer areas subject to best  | Town of Hastings<br>Comprehensive Plan -<br>Conservation Element Policy                              | On-going enforcement   |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>  | <b>SOURCE</b>   | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b> |
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| management practices.   | V.2.4   |  |
| The Town requires that post-development runoff rates and pollutant loads not exceed redevelopment conditions.   | Town of Hastings<br>Comprehensive Plan -<br>Conservation Element Policy<br>V.2.5                  | On-going enforcement   |
| Town regulates development within the 100-year flood plain in order to maintain the flood-carrying and flood storage capacities of the floodplains and to reduce the risk of property damage and loss of life by establishing minimum floor elevations and by limiting impervious development on residential lots to a maximum of 20%. Commercial property development is also limited to 20% unless retention or detention areas are approved on a case-by-case basis. | Town of Hastings<br>Comprehensive Plan -<br>Conservation Element Policy<br>V.2.7                  | On-going enforcement   |
| Prohibits development or dredging and filling of wetlands which would significantly alter their functions and by only allowing non-intensive agriculture, aquaculture and silviculture type practices.  | Town of Hastings<br>Comprehensive Plan -<br>Conservation Element Policy<br>V.2.8                  | On-going enforcement   |
| Require the maintenance of the quantity and quality of surface water runoff by prohibiting any development which may diminish or degrade the quality and quantity of surface water runoff within the Town.  | Town of Hastings<br>Comprehensive Plan -<br>Conservation Element Policy<br>V.2.12                 | On-going enforcement   |
| Require all hazardous waste generators properly manage their own wastes and require that new hazardous waste generators comply with all applicable federal and state permitting requirements before approving any development plans.  | Town of Hastings<br>Comprehensive Plan -<br>Conservation Element Policy<br>V.2.13                 | On-going enforcement   |
| Resource Protection Standards for the Town of Hastings are detailed in the Land Development Regulations   | Town of Hastings - Land<br>Development Regulations,<br>Article V Resource Protection<br>Standards | On-going enforcement   |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>  | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b>  |
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| <p>Local governments should sign statewide mutual aid agreements.</p> <p>Local governments are encouraged to consider the impact and compatibility of emergency preparedness and recovery plans on adjacent areas.</p> <p>Local governments should participate in region and state wide disaster exercises.</p> <p>Establish a work group to coordinate compatibility among communications systems within the region.</p> <p>Review and update the Regional Hurricane Evacuation Study every five years.</p> <p>Local governments shall consider utilizing the Northeast Florida Regional Planning Council's Regional Dispute Resolution Process as the first means of settling disputes concerning emergency preparedness.</p>   | <p>Strategic Regional Policy Plan-<br/>Emergency Preparedness<br/>Element Policies 3.1.1 through<br/>3.1.6</p> | <p>Northeast Florida Regional Council is responsible for the implementation of its Strategic Regional Policy Plan. The Council is developing ways to implements these policies.</p> |
| <p>The location of solid waste and commercial hazardous waste management facilities and/or regional hazardous waste storage, transfer or treatment facilities in the coastal high hazard area are assumed to have adverse regional impacts which shall be prevented.</p> <p>Development within hurricane evacuation areas should be responsible and permitted only when evacuation route capacity and shelter space capacity is available. Responsible development includes but is not limited to: structures elevated in storm surge and flooding areas; adequate drainage in flooding areas; and sufficient access for emergency response vehicles to all development.</p> <p>Assist in the development of funding for public acquisition of coastal property that has been destroyed or damaged as the result of a hurricane, storm or flooding.</p> <p>Reduce public expenditures that subsidize increased densities in the coastal high hazard area except for restoration, enhancement of natural resources, or development</p> | <p>Strategic Regional Policy Plan-<br/>Emergency Preparedness<br/>Element Policies 3.2.1 through<br/>3.2.8</p> | <p>Northeast Florida Regional Council is responsible for the implementation of its Strategic Regional Policy Plan. The Council is developing ways to implements these policies.</p> |

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| <p>of recreational facilities.</p> <p>Educate citizens and businesses about the impacts of natural disasters, including economic disruption, personal safety and property loss.</p> <p>The siting of new critical facilities or institutions, such as hospitals, nursing homes, adult congregate living facilities and correctional facilities in coastal high hazard areas are assumed to have adverse regional impacts and shall be prevented.</p> <p>Coastal high-hazard areas, for uniformity and planning purposes, are defined as category 1 evacuation zones or as designated by the local government.</p> <p>Protect the primary dune systems of the region. Provide technical assistance to local governments in the development and implementation of dune protection plans.</p> |  |   |
| <p>Public and private members of the community shall be encouraged to support and participate in Local Emergency Planning Committee activities.</p> <p>The risks of hazardous materials to the public and the environment should be determined through the Local Emergency Planning Committee, local emergency management agencies and facilities.</p> <p>Train emergency responders to appropriate levels for responding to hazardous materials incidents in accordance with the SERC Training Task Force Training Guidelines.</p> <p>A hazardous waste disposal day program should be supported by communities throughout the region.</p>  | <p>Strategic Regional Policy Plan-<br/>Emergency Preparedness<br/>Element Policies 3.3.1 through<br/>3.3.4</p> | <p>Northeast Florida Regional Council is responsible for the implementation of its Strategic Regional Policy Plan. The Council is developing ways to implements these policies.</p> |
| <p>Assess the numbers and requirements of special needs populations.</p> <p>Local governments should be encouraged to require new, reconstructed and expanded health care facilities outside the hurricane evacuation areas to be built to shelter</p>   | <p>Strategic Regional Policy Plan-<br/>Emergency Preparedness<br/>Element Policies 3.4.1 through<br/>3.4.4</p> | <p>Northeast Florida Regional Council is responsible for the implementation of its Strategic Regional Policy Plan. The Council is developing ways to implements these</p>           |

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| <p>specifications.</p> <p>Local governments should develop incentives to encourage existing health care facilities outside the storm surge areas to retrofit buildings to shelter specifications.</p> <p>Health care facilities outside the hurricane evacuation areas shall be encouraged to establish aid agreements with similar facilities within the hurricane evacuation areas.</p>   |  | <p>policies.</p>  |
| <p>An adverse regional impact is assumed when a proposed development in a hurricane evacuation zone is anticipated to utilize twenty-five percent (25%) or more of an identified hurricane evacuation route's level of service E hourly directional maximum service volume based on the Florida Department of Transportation's Generalized Peak Hour/ Peak Direction Level of Service Maximum Volumes as presented in the Florida Highway Systems Manual which shall be mitigated.</p> <p>Roads which function as evacuation routes with high clearance times, particularly intercommunity routes, should receive high priority in FDOT or local capital improvement programs.</p> <p>Suspend road construction projects on evacuation routes during hurricane watches and move construction barriers to maximize capacity.</p> <p>Develop a system of emergency communication on highways including electronically controlled message signs and a radio station to broadcast highway conditions.</p> | <p>Strategic Regional Policy Plan-<br/>Emergency Preparedness<br/>Element Policies 3.5.1 through<br/>3.5.4</p> | <p>Northeast Florida Regional Council is responsible for the implementation of its Strategic Regional Policy Plan. The Council is developing ways to implements these policies.</p> |
| <p>Establish a procedure for prioritizing and retrofitting existing public facilities located outside of the coastal high hazard area to shelter specifications.</p> <p>Adopt construction standards and techniques, and siting decisions for public buildings that would make these structures suitable for public shelters.</p> <p>Where shelter deficits exist, an adverse regional impact is a proposed development with anticipated public shelter space demand that will require 200 spaces or five</p>   | <p>Strategic Regional Policy Plan-<br/>Emergency Preparedness<br/>Element Policies 3.6.1 through<br/>3.6.8</p> | <p>Northeast Florida Regional Council is responsible for the implementation of its Strategic Regional Policy Plan. The Council is developing ways to implements these policies.</p> |

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| <p>percent (5%) of the shelter space capacity; or where shelter deficits do not exist, an adverse regional impact is a proposed development with anticipated public shelter space demand that will cause a deficit of 200 spaces or more which shall be mitigated.</p> <p>Educate residential home builders about the benefits of constructing new residences outside of the hurricane evacuation areas with a "safe room" to serve as home shelters. Insurance agencies shall be encouraged to provide incentives to prepare existing residences as home shelters.</p> <p>Require new and existing mobile home and RV parks to have on-site shelter facilities for their residents or plans for alternative off-site shelters.</p> <p>Require new apartment complexes and condominiums located outside of hurricane evacuation areas to provide on-site shelter space.</p> <p>Innovative programs for financing shelter space should be examined including special assessment districts.</p> <p>Encourage the Humane Society and local animal control departments to develop their role in animal evacuation during disasters.</p> |   |   |
| <p>Local governments shall address post-disaster redevelopment planning within their comprehensive plans in accordance with Rule 9J-5, F.A.C.</p> <p>Replacement development should be consistent with local, regional and state programs designed to ensure safe and timely evacuation.</p> <p>Increase attention given to building code regulations and enforcement that may not be sufficient to protect the life and safety of the occupants.</p> <p>Communities should maintain emergency recovery funding and staffing plans to enable quick restoration of services lost to disasters.</p> <p>Recovery plans should include the identification of potential disaster field offices and</p>   | <p>Strategic Regional Policy Plan-<br/> Emergency Preparedness<br/> Element Policies 3.7.1 through<br/> 3.7.6</p> | <p>Northeast Florida Regional Council is responsible for the implementation of its Strategic Regional Policy Plan. The Council is developing ways to implements these policies.</p> |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>   | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b>  |
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| disaster assistance centers.<br><br>Identify areas for potential acquisition in areas of existing vulnerable development.  |  |   |
| Local governments should encourage their elected and appointed officials to attend the Public Officials Conference and other state wide training sessions and conferences.<br><br>Local governments shall conduct training exercises which include roles for their elected and appointed officials.<br><br>Educate citizens on the need for personal disaster plans including provisions for their pets.<br><br>Encourage media personnel to attend educational conferences on disasters so they can better inform and educate the public. | Strategic Regional Policy Plan-<br>Emergency Preparedness<br>Element Policies 3.8.1 through<br>3.8.4 | Northeast Florida Regional Planning Council is responsible for the implementation of its Strategic Regional Policy Plan. The Council is developing ways to implements these policies. |
| Requirements for Stormwater management, including minimum design standards and finished floor elevations and lot grading plans.  | St. Johns County Paving and<br>Drainage Standards Ordinance<br>96-40                                 | On-going enforcement  |
| Requirements for roadway design, including pavement design and roadway drainage.   | St. Johns County Paving and<br>Drainage Standards Ordinance<br>96-40                                 | On-going enforcement.   |
| Through the future land use plan, the County shall ensure safe evacuation of coastal areas and shall coordinate coastal area population densities with appropriate regional hurricane plans.   | St. Johns County<br>Comprehensive Plan Coastal<br>Element - Objective A.1.5                          | Implemented   |
| Existing evacuation routes shall be mapped and physically posted and should be given special consideration for improvement over other transportation facilities.   | St. Johns County<br>Comprehensive Plan Coastal<br>Element - Policy A.1.5.1                           | Ongoing   |
| The County shall update its hurricane evacuation plan and disaster preparedness plan   | St. Johns County   |   |



| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>  | <b>SOURCE</b>   | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b> |
|---|---|--|
| every three years and also shall re-evaluate its effectiveness immediately after a major disaster event to recommend appropriate improvements.  | Comprehensive Plan Coastal Element - Policy A.1.5.2                   | Ongoing  |
| The County shall update its hurricane guide annually if needed, showing: evacuation routes, hurricane hazards, safety procedures, shelters and other pertinent information for its citizens.  | St. Johns County Comprehensive Plan Coastal Element - Policy A.1.5.3  | Ongoing  |
| The County shall complete a County-wide master drainage study by, which shall include inventories of existing drainage facilities and address their deficiencies. Upon completion of the drainage study for each sub-basin, the County shall review and amend the Plan to include or implement the sub-basin study's findings.  | St. Johns County Comprehensive Plan Coastal Element - Objective F.1.3 | Implemented  |
| The County shall coordinate with DEP and St. Johns River Water Management District in the identification of all drainage basins in the County to assure uniformity of basin designation.  | St. Johns County Comprehensive Plan Coastal Element - Policy F.1.3.1  | Ongoing  |
| As the drainage studies for each sub-basin are completed, the County shall establish drainage facility priorities in the sub-basin based on the potential damage created by flooding, the water quality in the area, and the impacts to areas of special concern (e.g., OFW, Class II).   | St. Johns County Comprehensive Plan Coastal Element - Policy F.1.3.2  | Ongoing  |
| Upon identification of deficiencies by the master drainage study, the County shall take action to address such deficiencies through the establishment of stormwater utilities for the affected areas, or other appropriate implementation mechanism.  | St. Johns County Comprehensive Plan Coastal Element - Policy F.1.3.3  | Ongoing  |
| Pending completion of the master drainage study, the following standards shall be considered for addition to the Paving and Drainage Ordinance (86-4) by April 1991:<br><br><u>Water Quality</u><br><br>1. Draw down of the required retention volume within 72 hours following a storm event.<br><br>2. Special criteria for Class II, OFW, and recharge areas, which shall, at a minimum, be consistent with standards contained in Chapter 17-3, 17-25 and 40C-42 F.A.C. | St. Johns County Comprehensive Plan Coastal Element - Policy F.1.3.4  | Ongoing  |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>   | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b> |
|--|--|--|
| <u>Water Quantity</u><br><br>1. The 10-year return period shall be used to design minor internal drainage facilities.<br><br>2. The 25-year/24-hour storm event shall be used to design storage basins for peak flow attenuation in addition to the current 10-year/24-hour storm event.<br><br>3. The 25-year return period storm shall be used for the design of major drainage facilities such as: canals, drainage ditches and culverts external to the development.<br><br>4. Antecedent Moisture Condition shall be the average wet season (AMC II). |  |  |
| The County shall manage and regulate development within the 100-year flood plain through enforcement of the Flood Plain Management Ordinance (90-24) and the procedures recommended by FEMA as incorporated within the County's development permit review process.   | St. Johns County<br>Comprehensive Plan Coastal<br>Element - Policy F.1.3.6                         | On-going enforcement   |
| Vegetative buffers of at least 25 feet shall be required and maintained between natural drainage courses and developed areas to protect the water quality of the drainage course.  | St. Johns County<br>Comprehensive Plan Coastal<br>Element - Policy F.1.3.7                         | On-going enforcement   |
| County shall develop coordination mechanisms between the planning and engineering departments to ensure that plans developed for drainage facilities are consistent with, and support, the Future Land Use Element.  | St. Johns County<br>Comprehensive Plan Coastal<br>Element - Objective F.1.4                        | Implemented  |
| The County shall manage, use, conserve, protect, and enhance coastal resources, along with protecting human life from natural disasters.   | St. Johns County<br>Comprehensive Plan<br>Coastal/Conservation<br>Management Element - Goal<br>G.1 | On-going enforcement   |
| The County shall assure the protection, conservation and enhancement of the County's coastal barrier areas, dunes, and beaches through: (a) coordination of County   | St. Johns County<br>Comprehensive Plan   | On-going enforcement   |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>   | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b> |
|--|--|--|
| permitting activities with the activities of other regulating state and federal agencies; (b) establishment or continued enforcement of construction standards for the coastal building zones; and (c) the establishment of procedures and land development regulations to protect the County's dune systems.  | Coastal/Conservation Management Element - Objective G.1.2                                    |  |
| The County shall provide technical support and assistance to applicable state and federal agencies in identifying and inventorying all beaches and dune systems, so that they may be protected, enhanced and re-nourished.   | St. Johns County Comprehensive Plan Coastal/Conservation Management Element - Policy G.1.2.1 | Ongoing  |
| <p>By April 1991, the County shall develop procedures and, through adoption of land development regulations shall develop and adopt standards and procedures, to ensure the protection, enhancement or restoration of the County's dune systems. At a minimum, these procedures or regulations shall provide for:</p> <ul style="list-style-type: none"> <li>-- Coordination with DEP as to applications to develop seaward of the established Coastal Construction Control Line, in order to monitor and comment on DEP applications for variances to the CCCL requirements, and to favor variances to County setback requirements where possible or appropriate to avoid or minimize development seaward of the CCCL; and</li> <li>-- The County's use of beach ramp fees/tolls, consistently with applicable law, for dune restorations and enhancement programs (such as, without limitations, the construction of dune walkovers, the establishment of a salt-tolerant vegetation/revegetation program, and public education programs in cooperation with the Marine Extension Service), and to further control beach access in order to prevent dune damage; and</li> <li>-- Establishment of standards and enforcement mechanisms to prevent destruction of dune vegetation; and</li> <li>-- Continued enforcement of the County's requirements and prohibitions against uncontrolled vehicular beach access pursuant to Ordinance No. 73-2, and</li> </ul> | St. Johns County Comprehensive Plan Coastal/Conservation Management Element - Policy G.1.2.2 | Ongoing  |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>  | <b>SOURCE</b>   | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b> |
|---|---|--|
| <p>related ordinances; and</p> <p>-- Continued enforcement, through the development permit review process, of applicable state, federal or local coastal construction zone requirements;</p> <p>-- Improvements to beach access and parking facilities as provided in Policy H.1.1.1.</p>   |   |  |
| <p>Seawall and other shoreline modifications shall be set at, or landward of, the mean high water line, except as provided by law. The County and other agencies having jurisdiction shall coordinate in establishing appropriate setbacks.</p>   | <p>St. Johns County<br/> Comprehensive Plan<br/> Coastal/Conservation<br/> Management Element - Policy<br/> G.1.2.3</p>                         | <p>On-going enforcement</p>                                  |
| <p>The County shall prepare post-disaster redevelopment plans which will reduce or eliminate the exposure of human life and public and private property to natural hazards.</p>   | <p>St. Johns County<br/> Comprehensive Plan<br/> Coastal/Conservation<br/> Management Element -<br/> Objective G.1.3</p>                        | <p>Ongoing</p>   |
| <p>The County shall update its hurricane evacuation plan and Peacetime Emergency Plan every three years, and shall re-evaluate their effectiveness immediately after a major disaster event to recommend and adopt appropriate modifications.</p> <p>The County shall update its hurricane guide showing evacuation routes, hurricane hazards, safety procedures, shelters, and other pertinent information for its citizens.</p> <p>Disaster preparedness plans shall include accommodations for the handicapped and indigent, including transportation and sheltering.</p> <p>County shall add three additional public buildings as hurricane evacuation shelters to its inventory of evacuation centers.</p> <p>The County shall coordinate disaster preparedness plans with adjacent counties and</p> | <p>St. Johns County<br/> Comprehensive Plan<br/> Coastal/Conservation<br/> Management Element -<br/> Policies G.1.3.1 through<br/> G.1.3.10</p> | <p>Implementation ongoing</p>                                |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>  | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b> |
|---|--|--|
| <p>municipalities.</p> <p>Emergency vehicles and personnel shall be stationed on the barrier islands during an emergency situation at the discretion of the Chairman of the Board of County Commissioners or other appropriate official.</p> <p>The County shall reduce the risks to human life, and to public and private property from natural disasters through the following post-disaster redevelopment planning and implementation of hazard mitigation measures:</p> <p>The County shall consider, and as necessary implement where appropriate, the recommendations of the hazard mitigation annex of the local peacetime emergency plan.</p> <p>Concurrently with the investigation provided for in Policy G.2.5.4, the County shall investigate development credits or transfer of development rights for use as incentives to reduce rebuilding damaged structures in the CHHA.</p> <p>St. Johns County shall direct population concentrations away from the CHHA by limiting residential densities as shown on the Future Land Use Map.</p> |  |  |
| <p>The County shall cooperate with, and provide technical support and assistance to, the appropriate State and Federal regulatory agencies, and shall implement the requirements of Policy of G.1.5.3 (and other applicable Policies in other Plan Elements), in order to protect, enhance, and restore the environmental quality of the County's Coastal Area and waterways.</p>   | <p>St. Johns County<br/> Comprehensive Plan<br/> Coastal/Conservation<br/> Management Element -<br/> Objective G.1.5</p> | <p>Ongoing</p>   |
| <p>Routing of new infrastructure and public services within the Coastal Area shall be designed to direct growth away from environmentally sensitive areas and the coastal high hazard area, and to limit public expenditures within the coastal high hazard area.</p>   | <p>St. Johns County<br/> Comprehensive Plan<br/> Coastal/Conservation<br/> Management Element -<br/> Objective G.1.7</p> | <p>Ongoing</p>   |
|   |  |  |

| <b>CATEGORY</b><br><hr/> <b>Objective/Policy</b>   | <b>SOURCE</b>  | <b>NOTES</b><br><b>(Design; Implementation; Enforcement)</b> |
|--|--|--|
| The County shall maintain hurricane evacuation times.  | St. Johns County<br>Comprehensive Plan<br>Coastal/Conservation<br>Management Element -<br>Objective G.1.79 | Ongoing  |
| The County shall protect flood plains, wetlands, forests, and surface waters within the County from development impacts to provide for maintenance of environmental quality and wildlife habitats. | St. Johns County<br>Comprehensive Plan<br>Coastal/Conservation<br>Management Element -<br>Objective G.2.2  | On-going enforcement   |

### C. Government Coordination

Every governmental agency plays a role in hazard mitigation at some level. Future funding guidelines, from the State and Federal government, will include mandated active involvement by recipient agencies. In order to be effective, the St. Johns County Mitigation Strategy must be a redefining process, evaluating developing as well as addressing existing hazard vulnerabilities. The following table will grow and evolve as agencies begin to redefine roles and adopt activities that will further the mitigation process.

#### GOVERNMENT COORDINATION TABLE

| AGENCY/ENTITIES                                     | MITIGATION FUNCTIONS   |
|---|--|
| Florida Division of Emergency Management            | Technical Assistance, Advice and Funding   |
| Northeast Florida Regional Council                  | Technical Assistance for Comprehensive Planning and Strategic Regional Policy Plan   |
| St. Johns County Board of County Commissioners      | Policy Guidance and Regulatory authority   |
| St. Johns County Administrator                      | Supervision and Guidance   |
| St. Johns County Department of Emergency Management | Management of Plan/Strategy Development/ Implementation, and Mitigation Task Force Member  |
| St. Johns County School District                    | Provide shelters for evacuees.   |
| St. Johns County Mitigation Task Force              | Develop a recommended Local Mitigation Strategy for St. Johns County for approval by the St. Johns County Board of County Commissioners. Conduct periodic reviews of the mitigation strategy to ensure that goals are accomplished according to the established milestones |
| St. Johns County Engineering Department             | Follow and implement the County's Engineering Standards and ensure compliance.   |
| St. Johns County Building Department                | Follow and implement the County's Building Code and ensure compliance. Administer the Community Rating System Program.   |
| St. Johns County Road and Bridge Department         | Follow and implement the County's requirements for roadways and maintain roadways, ditches and drainage basins within its jurisdictions.   |
| City of St. Augustine                               | Member of Mitigation Task Force. Input and Assistance in the Development and Implementation of Plans and   |

| AGENCY/ENTITIES                         | MITIGATION FUNCTIONS  |
|---|---|
|   | Strategy.   |
| City of St. Augustine Beach             | Members of Mitigation Task Force. Input and Assistance in the Development and Implementation of Plans and Strategy. |
| Town of Hastings                        | Members of Mitigation Task Force. Input and Assistance in the Development and Implementation of Plans and Strategy. |
| Flagler Estates Road and Water District | Members of Mitigation Task Force. Input and Assistance in the Development and Implementation of Plans and Strategy. |
| Florida Department of Transportation    | Maintain roadways, ditches and drainage basins within its jurisdiction  |



## Section III - Hazards Identification and Vulnerability Assessment

### A. County Description

St. Johns County is 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 600 square miles and has the longest shoreline in northeast Florida. According to the US Census its population in 2010 was 190,039 with a density of 316.4 persons per square mile. The population estimate for 2013 is 209,647. This is a suburban county partially within the Jacksonville Urban Area with several urban areas. Anticipated growth will continue the induction of St. Johns County as an urbanized area within northeast Florida. However, the southern half of the county is classified as rural. The expansion of the urban area is expected to proceed southward from the County line. Like every other coastal county of the State, a large portion of the population is concentrated along the counties main bodies of water: the Atlantic coast, inter-coastal waterway, and along the St. Johns River. These are areas most vulnerable to the effects of hurricane storm surge, wind, and freshwater flooding.

The county seat, St. Augustine, is the oldest permanent settlement in the United States, with a population of 12,975 people and a land area of 9.43 square miles according to the 2010 U.S. Census. The 2013 population estimate is 13,679.

### B. Population and Housing

Development along the ocean and the resulting vulnerability of that population to natural hazards is a major concern of emergency management planners. Most population growth in the last few decades has occurred closest to water bodies and this trend is expected to continue. Increasing coastal development is accompanied by certain social and economic costs due to imperiled public safety and property damage, as well as potential losses from hurricanes, flooding, or high winds.

Along with the growing population is the decrease in household size leading a requirement for more houses to accommodate the population. While the St. Johns County is still mostly suburban, the overall household size showed some decrease between 1980 from 2.65 to 2.44 in 2000, but then showed an increase in 2012 to 2.55. Some of that may be attributable to a downturn in the economy beginning in 2008.

**Number of Households  
Persons per Household, 1980 -2000- 2012**

| County    | 1980       |      | 2000       |      | 2012       |      |
|-----------|------------|------|------------|------|------------|------|
|           | Households | PPH  | Households | PPH  | Households | PPH  |
| St. Johns | 18,623     | 2.65 | 49,614     | 2.44 | 59,500     | 2.55 |

Another concern of emergency managers is mobile home communities and scattered mobile homes located in low-lying, flood prone and storm surge areas. In 1990, mobile homes numbered 7,187 and accounted for 17.45 percent of dwelling units. By 2000, the number of

mobile homes crept up to 7,688 and accounted for 13.3 percent of all dwelling units. According to the American Community Survey as of 2012 the number of mobile homes in St. Johns County is 8,338 which accounts for 9.3% of all dwelling units. Occupants of mobile homes account for approximately 21,000 people that could potentially be affected by hazardous weather.

In St. Johns County as of 2012 there are approximately 18,137 persons aged 18 and over with a disability. Of that number, 9,293 are aged 65 and over.

According to the American Community Survey, as of 2012, 166,580 persons spoke only English at home and 14,883 spoke a language other than English at home. These numbers only take into account the population aged 5 years or older.

The population of St. Johns County's median age is slightly older than the 40.8 years old of Florida. The median age rose from 41.6 in 2000 to 42.2 in 2010. The population under age 65 accounts for 84% of the population, with the age group 45-54 years representing the largest population per age group at 16.1%.

### **C. Income and Earnings**

Per capita personal income in St. Johns County was estimated at \$36,639; this is 138% of the state average of \$26,451. The Median Household Income is estimated to be \$64,346. However, 9.8% of the St. Johns County population was classified as living below the poverty level. (numbers are as of 2012)

### **D. Land Uses and Development Trends**

St. Johns County exhibits a pattern of rural, suburban and urban land uses. In the northwest part of the County there are suburban subdivisions in the Julington Creek/ Fruit Cove area. More intense single family, multi-family, and commercial urban land uses are found in the northeast part of the County, mainly Ponte Vedra Beach. 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 both north and south of St. Augustine along U.S. 1. Recreation land uses also exist along the barrier islands in the County.

In the 1980's the highest growth areas were in the northeast portion of the County, specifically the Ponte Vedra Beach/Palm Valley area. In the last two decades, development has occurred in the northwest portion of the County including Fruit Cove, Julington Creek, Switzerland, and areas around 210 West. Several large subdivisions are also emerging along I-95. These areas are growing fast due to several factors including low land prices, good schools, and accessibility to major roads and employment centers. This growth includes Developments of Regional Impact planned or projects that are currently being developed within the County that will bring a mix of residential, commercial, and retail to the County. All future development will follow best use practices and mitigate vulnerability to hazards to the greatest extent possible. The following Map is a Future Land Use Map and identifies areas of development and future development within the County.



## E. Hazards Identification and Impact

The following sections identify potential hazards that could affect the County and its residents. For the purposes of the 2015 LMS update, no new hazards have been identified. The probability of each hazard occurring has been verified from trustworthy sources including the National Weather Service, United States Geological Survey, Florida Forest Service, Florida Division of Emergency Management, Florida Department of Environmental Protection, Florida Department of Law Enforcement and others. Not every hazard was examined in depth as some hazards have a low probability of occurring in St. Johns County and the Local Mitigation Strategy should focus on the hazards in which are most likely to occur and that we can have the most effect on with mitigation actions. The hazards that St. Johns County recognizes as a possibility, but are not analyzed in depth, are tsunamis, sinkholes, earthquakes, dam/levee failure and sea level rise.

Each hazards characteristic is described and past occurrences have been identified when possible. The previous occurrences for each hazard were updated if possible. 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. Table A-1, the Hazards Quick Reference Table, in the appendices outlines the specifics of the hazards identification section in greater detail. Multi-hazard maps are included throughout Section E. In each of the hazards identified and defined, the latest occurrence of that hazard event is listed.

### 1. Hurricanes and Tropical Storms

Hurricanes have the greatest potential for causing disaster then any other single natural threat to St. Johns County. The first step in the formulation of a hurricane disaster mitigation strategy is to identify and analyze the expected hurricane hazards such as storm surge and winds. The effects of an impacting hurricane will depend upon the strength, direction and, location of impact of the storm. Hurricanes are categorized on the Saffir-Simpson Hurricane Wind Scale from one through five. (See below) Categories one and two storms are considered “minor” hurricanes, although they can cause significant damage and potential loss of life. Categories 3, 4 and 5 hurricanes are “major” hurricanes and can cause massive destruction and loss of life.

#### SAFFIR/SIMPSON HURRICANE WIND SCALE

| Category     | Sustained Winds                          | Types of Damage Due to Hurricane Winds  |
|--------------|--|---|
| 1            | 74-95 mph<br>64-82 kt<br>119-153 km/h    | <b>Very dangerous winds will produce some damage:</b> 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<br>83-95 kt<br>154-177 km/h   | <b>Extremely dangerous winds will cause extensive damage:</b> 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<br>(major) | 111-129 mph<br>96-112 kt<br>178-208 km/h | <b>Devastating damage will occur:</b> 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            | 130-156 mph                              | <b>Catastrophic damage will occur:</b> Well-built framed homes can sustain severe   |

|              |   |   |
|--------------|---|---|
| (major)      | 113-136 kt<br>209-251 km/h                                  | 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<br>(major) | 157 mph or higher<br>137 kt or higher<br>252 km/h or higher | <b>Catastrophic damage will occur:</b> 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. |

The three major hazards produced by a hurricane are the storm surge, high winds and rainfall. The 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 produces most of the flood damage and drowning associated with storms that make landfall or that closely approach the coastline. Of the hurricane hazards, the storm surge is considered to be the most dangerous as ninety percent of hurricane-related deaths have been caused by drowning.

St. Johns County is a coastal County and may have storm surge associated with hurricanes as well as surge effects associated with the St. Johns River which functions less as a river and more like a tidally influenced lagoon along its lower portions from Palatka to Jacksonville which make 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. As a result, within St. Johns County, areas adjacent to the St. Johns River and its tributaries are subject to storm surge. Areas of particular vulnerability 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 Town of Hastings to flood.

A review of records from the National Weather Service between 1984 and 2014 shows that St. Johns County and Northeast Florida have had brushes with hurricanes but no direct impacts in the past fifty years. The last hurricane to directly impact Northeast Florida was hurricane Dora in 1964, which came ashore in northern St. Johns County. You will note since the last LMS update Tropical Storms Beryl and Debby both passed through St. Johns County. Tropical Storm Beryl moved onshore on the northeast Florida coast the night of Sunday May 27<sup>th</sup>, 2012 and moved slowly inland across St. Johns County through the day on Monday the 28<sup>th</sup>. Tropical storm force winds caused tree and power line damage throughout the County. Instrumentation at the Northeast Florida Regional Airport in St. Augustine recorded the highest wind speed of 26 mph with gusts to 47 mph. Heavy rainfall of between 2-5 inches was reported across St. Johns County and its municipalities. Tropical Storm Debby moved across the State of Florida from the northeast Gulf of Mexico, St. Johns County began feeling the rain and some wind effects from Debby on Monday, June 25<sup>th</sup>, 2012. Debby moved across the State very slowly and finally exited into the Atlantic Ocean on Wednesday, June 27<sup>th</sup>. During this 3 day time frame Debby produced 12-15 inches of rain in the northern portion and 5-8 inches in the southern portion of St. Johns County. Some road flooding was reported throughout the County along with sporadic power outages and tree damage. The highest sustained wind speed of 31 mph and gust of 46 mph was recorded at the Northeast Florida Regional Airport in St. Augustine on June 25<sup>th</sup>, 2012.

The following storms approached the closest to Northeast Florida and St. Johns County in the past thirty years:

|                                   |                         |
|-----------------------------------|-------------------------|
| Hurricane Dennis .....            | August, 1989            |
| 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               |

**a. Storm Surge**

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 National Weather Service and National Hurricane Center. The SLOSH model has a long proven record and will be used in this analysis for storm surge vulnerability levels. The Northeast Florida Regional Council updated the Storm Surge Atlas for St. Johns County utilizing the SLOSH data in 2014. Storm surge will have the greatest impact to structures and infrastructure located in storm surge zones illustrated in Map 1. Storm Surge can completely wash structures off their foundations or undermine foundations to the point of structural collapse. Residents living in these structures will face dire consequences if they fail to follow an evacuation order and stay in these structures. The last known occurrence of Storm Surge in St. Johns County was in 1964 when Hurricane Dora came ashore in St. Johns County. Map 1 represents the storm surge threat identified in the SLOSH model as shown in the Storm Surge Atlas. There has been no storm surge event since the last LMS update.

**b. High Winds**

If a hurricane were to occur in the County there are certain areas where winds would be higher due to topography (higher elevations), proximity to the ocean, and/or land use patterns such as large clear-cut within the forest.

The following areas appear to be the most susceptible to high winds from a hurricane:

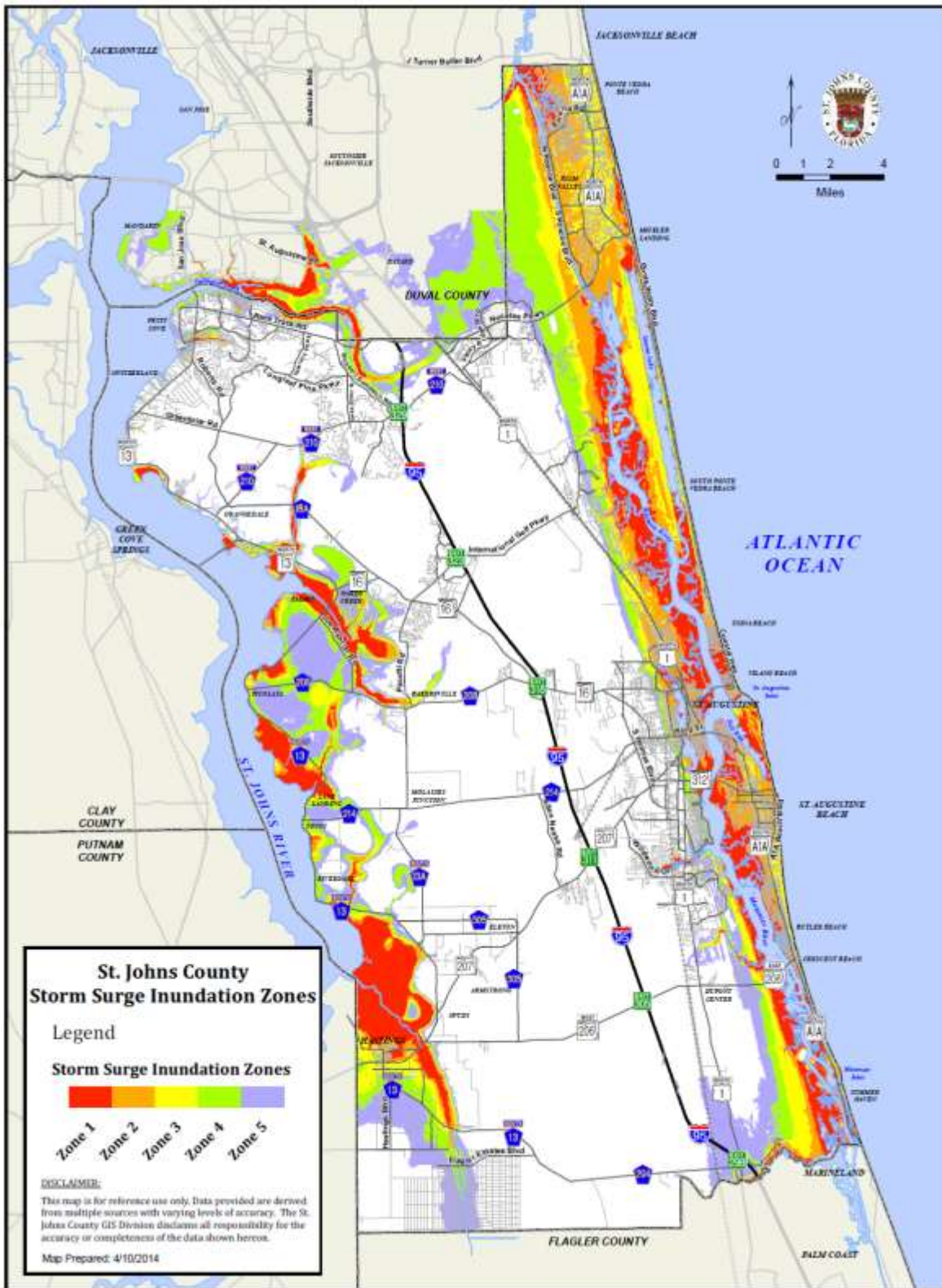
- All shorelines;
- Areas adjacent to the Intracoastal Waterway;



- Areas adjacent to the St. Johns River;
- Areas in and around the Town of Hastings.

It should also be noted that as a coastal county, all of St. Johns County is susceptible to high winds, but the areas noted may suffer greater impacts due to their location. The high winds also can be devastating to persons outside, in mobile homes or substandard structures, or in structures with unprotected exposures. A 140-mile per hour wind can produce as much as 60 pounds of pressure per square foot. With this kind of pressure, a structure, once compromised during a windstorm, will experience increasing internal pressure to the roof and walls. This could cause the roof to blow off the structure, the structure to completely fail, or the inside to be devastated by a wind tunnel effect. Since the last LMS update Tropical Storms Beryl and Debby both passed through St. Johns County, both caused only very minor wind damage. Please refer to the description listed under Hurricanes and Tropical Storms to see the impacts caused by high winds in these two tropical storms.

Map 1





## 2. Severe Weather

### a. Severe Thunderstorm and Lightning

A severe thunderstorm is defined as a thunderstorm containing one or more of the following phenomena: hail 1" or greater, winds gusting in excess of 57.5 mph, and/or a tornado. Severe weather can include lightning, tornadoes, damaging straight-line winds, and large hail. Most individual thunderstorms only last several minutes, however some can last several hours.

Long-lived thunderstorms are called supercell thunderstorms. A supercell is a thunderstorm that has a persistent rotating updraft. This rotation maintains the energy release of the thunderstorm over a much longer time than typical, pulse-type thunderstorms, which occur in the summer months. Supercell thunderstorms are responsible for producing the majority of severe weather, such as large hail and tornadoes (NOAA). 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 (NOAA). Strong squall lines can also produce widespread severe weather, primarily very strong winds and/or microbursts.

When a severe thunderstorm approaches, the NWS may issue alerts. Two possible alerts are:

- Severe Thunderstorm Watch - Conditions are favorable for the development of severe thunderstorms
- Severe Thunderstorm Warning - Severe weather is imminent or occurring in the area

Thunderstorms are common in St. Johns County, and area residents are quite familiar with them and the severe weather they can bring. During the time period of October 2004 – October 2014, St. Johns County experienced 78 thunderstorm events with winds gust over 50 knots. The highest recorded wind gust of 70 knots occurred in the Elkton Area July 2014. This event caused a partial collapse of a pole barn, some downed trees, and bent power poles; the dollar figure for the damage is unknown. There are two recorded injuries from a thunderstorm wind event, they occurred in January 2010 when two construction workers were blown off a highway overpass in the Durbin area and suffered minor injuries. Total property damage for all combined 78 events was estimated at \$22,000. There was no recorded crop damage.

Perhaps the most dangerous and costly effect of thunderstorms is lightning. As a thunderstorm grows, electrical charges build up within the cloud. Oppositely charged particles gather at the ground below. The attraction between positive and negative charges quickly grows strong enough to overcome the air's resistance to electrical flow. Racing toward each other, they connect and complete the electrical circuit. Charges from the ground then surge upward at nearly one-third the speed of light and produce a bright

flash of lightning (Cappella, 1997).

On average, more people are killed by lightning than any other weather event. Florida leads in the nation in lightning related deaths and injuries (National Lightning Safety Institute). Florida also has the most strikes, about 12 strikes per square kilometer per year in some places (National Lightning Safety Institute). As many as 1000 cloud-to-ground lightning strikes could occur within a 60-minute severe thunderstorm in St. Johns County. The peak months for lightning strikes are June, July, and August, but no month is safe from lightning danger.

During the time period of January 2010 – December 2014, St. Johns County experienced 8 lightning events as defined by the NWS. There are two recorded injuries from lightning strikes during this time period, and no fatalities. The following information describes the impacts from lightning since the last LMS update. On January 10, 2011 a golfer was struck by lightning on the 8th hole of the St. Johns Golf and Country Club golf course. He was transported to the hospital for treatment and later released. On October 1, 2012 a man was struck by lightning while flying a kite in a metal harness with his son near Vilano Beach. There was light rain at the time, and then the first observed lightning strike struck the man. CPR was administered at the scene, then he was transported to the hospital where he was in stable condition that by that evening. Total property damage for all 8 events was estimated at \$104,600. There was no recorded crop damage.

All areas of St. Johns County are equally susceptible to thunderstorms and lightning; as such a map of susceptible areas was excluded because it would simply be a map of St. Johns County in its entirety.

## **b. Tornadoes**

Although tornadoes in Florida are generally not as large and powerful as they are in the Midwest within the area known as “Tornado Alley”, they do occur and have caused significant damage. According to the Storm Prediction Center during the period between 1950 and 2013, Florida had a total of 3,176 reported tornadoes, an average of 66 per year. This ranks Florida third among the States in the number of tornados, behind Texas and Kansas. Further, tornadoes can be spawned by hurricanes and can cause major damage and loss of life. Tornados are most prevalent in central Florida and portions of the panhandle.

On February 1, 2007 NOAA began using the Enhanced Fujita Scale. The Enhanced F-scale still is a set of wind estimates (not measurements) based on damage. It uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators listed below. These estimates vary with height and exposure.

| Fujita Scale |                      |                     | Derived Enhanced Fujita Scale |                     | Operational EF Scale |                     |
|--------------|----------------------|---------------------|-------------------------------|---------------------|----------------------|---------------------|
| F Number     | Fastest ¼ mile (mph) | 3 Second Gust (mph) | EF Number                     | 3 Second Gust (mph) | EF Number            | 3 Second Gust (mph) |
| 0            | 40 - 72              | 45 - 78             | 0                             | 65 - 85             | 0                    | 65 - 85             |
| 1            | 73 - 112             | 79 - 117            | 1                             | 86 - 109            | 1                    | 86 - 110            |
| 2            | 113 - 157            | 118 - 161           | 2                             | 110 - 137           | 2                    | 111 - 135           |
| 3            | 158 - 207            | 162 - 209           | 3                             | 138 - 167           | 3                    | 136 - 165           |
| 4            | 208 - 260            | 210 - 261           | 4                             | 168 - 199           | 4                    | 166 - 200           |
| 5            | 261 - 318            | 262 - 317           | 5                             | 200 - 234           | 5                    | Over 200            |

### Enhanced F Scale Damage Indicators

| Number | Damage Indicator   | Abbreviation |
|--------|--|--------------|
| 1      | Small barns, farm outbuildings                           | SBO          |
| 2      | One- or two-family residences                            | FR12         |
| 3      | Single-wide mobile home (MHSW)                           | MHSW         |
| 4      | Double-wide mobile home                                  | MHDW         |
| 5      | Apt, condo, townhouse (3 stories or less)                | ACT          |
| 6      | Motel  | M            |
| 7      | Masonry apt. or motel                                    | MAM          |
| 8      | Small retail bldg. (fast food)                           | SRB          |
| 9      | Small professional (doctor office, branch bank)          | SPB          |
| 10     | Strip mall   | SM           |
| 11     | Large shopping mall                                      | LSM          |
| 12     | Large, isolated ("big box") retail bldg.                 | LIRB         |
| 13     | Automobile showroom                                      | ASR          |
| 14     | Automotive service building                              | ASB          |
| 15     | School - 1-story elementary (interior or exterior halls) | ES           |
| 16     | School - junior or senior high school                    | JHSH         |
| 17     | Low-rise (1-4 story) bldg.                               | LRB          |
| 18     | Mid-rise (5-20 story) bldg.                              | MRB          |
| 19     | High-rise (over 20 stories)                              | HRB          |
| 20     | Institutional bldg. (hospital, govt. or university)      | IB           |
| 21     | Metal building system                                    | MBS          |
| 22     | Service station canopy                                   | SSC          |
| 23     | Warehouse (tilt-up walls or heavy timber)                | WHB          |
| 24     | Transmission line tower                                  | TLT          |
| 25     | Free-standing tower                                      | FST          |
| 26     | Free standing pole (light, flag, luminary)               | FSP          |
| 27     | Tree - hardwood  | TH           |
| 28     | Tree - softwood  | TS           |

A review of records from the National Weather Service shows that between 1950 and 2014 St. Johns County has 50 recorded tornadoes, 2 of which occurred 2010 - 2014. On May 4, 2013 an EF0 tornado touched down in the Elkton area. A barn was severely damaged and a large barn was destroyed with noticeable debris lofted into nearby structures. A large tree was snapped at its base and fell on a mobile home causing significant damage by splitting the unit in two. Multiple trees were uprooted and fell on a boat. The damage was estimated to be around \$500,000. On July 21, 2013 a water spout came on land in the Riverdale area and became an EF0 tornado, no damage was reported. 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 is \$250,000 per event. Based on this historical evidence, the worst case scenario for St. Johns County would be an F3 Tornado based on the original Fujita Scale, cost estimates would vary greatly as it would be dependent on the location of the tornado, housing development vs. farm land, as thus a cost estimate cannot be calculated. All areas of St. Johns County are equally susceptible to tornados; as such a map of susceptible areas was excluded because it would simply be a map of St. Johns County in its entirety.

### **3. Freshwater Flooding**

Freshwater flooding is generally associated with small natural streams or other drainage systems that are overwhelmed by large amounts of runoff generated by short episodes of extremely heavy rainfall. Freshwater flooding of evacuation routes just prior to evacuation orders or during the latter evacuations can trap evacuees. Detailed below are some of the roads and areas of concern within the county.

Freshwater 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, Neighborhood to the west of Surfside Beach Park, and West Augustine.

Notable roadways include:

- Solana Road west of Sunset Drive
- Several sections of Roscoe Road which runs along the Intracoastal Waterway
- Greenbriar Road east of Roberts Road
- International Golf Parkway just west of the World Golf Village and a large section just west of US-1.

Freshwater flooding may inundate potential evacuation routes and prevent persons evacuating late from vulnerable areas. Flooded roads and storms can also contribute to fatal accidents. Freshwater flooding as well as coastal flooding is modeled by the Federal Emergency Management Agency (FEMA) as part of the National Flood Insurance Program (NFIP). Vulnerability to flooding is documented in the Flood Insurance Rate Maps delineating the 100-year flood (A and VE Zones) and the 500 year flood (X Zones). Map 2 illustrates the FEMA Flood Zones for St. Johns County. For specific water depths in flooding events you can refer to

the Flood Insurance Rate Maps. St. Johns County (unincorporated) can be found in Map(s) number 125147; City of St. Augustine (incorporated) in Map(s) number 125145; City of St. Augustine Beach (incorporated) in Map(s) number 125146; and Town of Hastings (incorporated) in Map(s) number 120282. This collection of maps is far too extensive to be included within this document and can be supplied upon request. The highest flood waters on record for St. Johns County occurred in Flagler Estates on September 14<sup>th</sup> – 15<sup>th</sup>, 2001 as a result 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. National Weather Service records indicate that flooding events occurred in 2010, 2012, and 2013. In January 2010 a strong cold front moved in the area causing an outbreak of severe thunderstorms. Flooding was reported on several roadways in the Hastings area, no damage was reported. Flooding in 2012 was from a stalled frontal boundary that caused scattered showers to linger in the area, standing water was noted in the downtown St. Augustine area, with an estimated \$1000 in damage. In May 2013 heavy rainfall created flooding and deep hail drifts of penny size hail caused extensive damage to cropland near Elkton, with severe financial impact to farmers in the area. Crop damage was estimated around 38 million dollars.

#### **a. Floodplains**

Map 2 shows those areas of St. Johns County that are within the A and VE Zones (100 year) and X Zones (500 year) floodplain as delineated by the Federal Emergency Management Agency (FEMA) as part of the National Flood Insurance Program (NFIP). These are areas that could experience flooding associated with heavy rainfall events which cause localized flooding from overflowing streams or ponds in low lying areas. In St. Johns County floodplains are associated with the St. Johns River and 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 that 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.

As a result a significant portion of the County's population is vulnerable to the effects of a 100 year flooding event. This could mean either that the dwelling units are directly impacted by being flooded, or that the property or accesses to the property are flooded resulting in health and safety hazards. Based on analysis completed for the Statewide Regional Evacuation Study in 2014, approximately 78,400 of the County's 200,000 residents, or 39% of the population, are vulnerable to freshwater flooding in the 100 year floodplain.



#### 4. Wildfires

The County is subjected to some form of wild fire each year. 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, primarily located in the western portions of the County. 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 which is actively managed for silviculture. When subdivisions are developed without clearing the wooded areas surrounding them the interface becomes extremely hazardous. Florida has a history of naturally occurring wildfires. The hot, wet summers following long periods of uninterrupted growth cause the buildup of 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 lightning. Once ignited, the underbrush can burn thousands of acres. Housing developments adjacent to areas with large amounts of underbrush are vulnerable to the fires.

The Keetch-Byran drought index was designed specifically for fire potential assessment. It is a number representing the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in deep duff and upper soil layers. It is a continuous index, relating to the flammability of organic material in the ground.

- 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 = 200 - 400: Typical of late spring, early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.
- 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.

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, ultimately 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. This was the last occurrence of a major wildfire since the 2010 LMS update. These wildfire events correlated with dry periods and the typical Florida dry season. Very active fire events in the past have commonly occurred in May-June.

Map 3 shows land use and land cover in St. Johns County. This illustrates the areas of the County dominated by large tracts of land still covered primarily with forests; these areas represent the primary places wildfire will occur. The interface between these areas and the urban areas indicate the area's most vulnerable to wildfires.





## 5. Human Caused Hazards

### a. Hazardous Materials

Hazardous materials are used to maintain the modern lifestyles of both urban and rural communities; in fact, as many as 50,000 new chemicals are created annually. 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. Similarly in urbanized areas of northeast Florida communities often use extremely hazardous chemicals, such as chlorine or sulfuric acid for treating drinking and wastewater. Safe drinking water and reduced levels of pollution in surface waters are the result. Industrial chemicals such as potassium cyanide (used in manufacturing medicines) and fluorine (used in rocket fuels) are essential to maintain modern lifestyles in the northeast Florida area. New industrial chemicals improve product durability and create alternatives to high cost organic products, making products affordable to a wider range within the general population.

However, these conveniences have increased vulnerability of the general population to exposure from an accidental release of hazardous materials.

Since 1988, there has been a fifteen percent increase in the number of registered facilities using extremely hazardous materials in Northeast Florida. Supplying these facilities require routinely transporting hazardous materials 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. This would include vulnerability from a release of hazardous materials during or following a major natural or man-made disaster. Facilities releasing materials during a major event can cause residual contamination. If a facility is damaged during a major event only to release a hazardous material once the event has past a much greater hazard to community is created. St. Johns County also has a railroad that runs the entire length of the County. Rail cars carry hazardous materials through the County multiple times each day increasing the chances for a hazardous materials incident.

As part of the *Comprehensive Emergency Management Plan*, facilities subject to the 1986 Emergency Planning and Community Right-To-Know Act are identified and the following information is obtained:

- The types of chemicals
- The type and design of the container
- Quantity of materials
- The nature of the hazard (vapors, mists, fire explosion etc.)

In addition a Vulnerability Analysis was completed and includes the following information:

- A vulnerability zone (radius) around the facility that could be affected by a release.

- Population within this zone.
- Property in the zone subject to damage.
- Potential environmental impacts within the zone.

And finally a Risk Analysis is completed which includes the following information:

- Probability of occurrence
- Estimates of injuries and deaths
- Impacts to critical facilities
- Impacts to property
- Impacts to environment

As of this writing St. Johns County has never experienced a large scale hazardous materials release, but one release of note happened August 2011. As fuel was being delivered to a gas station, the vapors ignited as the fuel spilled and caused several explosions and large fire. Foam was used to extinguish the fire but a great deal of fuel leaked into the surrounding wetlands. There was one injury and the gas station was a total loss. Dollar figures for damage estimates are not available for this incident.

St. Johns County Fire Rescue maintains a Hazardous Materials Team which responds to the smaller events that occur regularly.

## **b. Terrorism**

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. 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. The county and local emergency service departments will be the first to respond to an actual or suspected terrorism attack. There are 7 potential targets that are most vulnerable to a terrorist attack in St. Johns County as identified in the Terrorism Annex:

- Northrup Grumman Aircraft installation
- Flagler Hospital
- Florida National Guard Headquarters
- Florida National Guard Armory
- Schools
- Special Events
- County and City Government Complex

A Terrorism Response Annex has been created as an appendix to the St. Johns County Comprehensive Emergency Management Plan (CEMP) to provide St. Johns County with a continuing assessment of the community's vulnerability, and capability to respond to a

terrorism incident. The annex provides an assessment of the County’s critical facilities and vulnerable populations, specialized response capabilities of emergency response personnel, definitions of operational aspects used in response management, and federal, state, and local command structure roles and responsibilities. The Terrorism Annex also provides information on each type of weapon of mass destruction that may be used in a terrorism attack. Map 4 identifies the location of the facilities that have been deemed “Critical Facilities” by St. Johns County.

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 small pox, 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.

St. Johns County has never experienced an act of terrorism.

## **Map 4**

**Critical Facilities Map available upon request**

## 6. Drought / Heat Wave

Drought is a normal climatic occurrence that happens almost everywhere on the planet, although its characteristics vary throughout different regions. Drought is recognized as a deficiency of precipitation over an extended period of time, which could be an entire season or more. Drought not only has its physical effects on the environment, but also has social effects as well, and can often be exacerbated by human demand on water supply. There are different perspectives on drought, which include those from meteorological, agricultural, societal, and hydrologic perspectives. Periods of drought can affect crops, water supply, and can lead to increased hazard of wildfires. All of St. Johns County is susceptible to drought conditions and the hazards associated with them.

The Palmer Drought Severity Index (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

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.

Heat Wave is when temperatures are abnormally and uncomfortably hot for an extended period of time. This event could continue from one day to several weeks. Heat waves are often accompanied by high humidity and can have a great impact on lives, including heat strokes, heat exhaustion, and even death. On July 20<sup>th</sup>, 1986 St. Augustine hit a record high temperature of 103\* F; this temperature would represent the extreme heat extent.

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. All of St. Johns County is susceptible to the entire range of temperatures represented on the chart below describing heat index.

## Heat Index Chart (Temperature & Relative Humidity)

| Relative Humidity % | Temperature (*F) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|---------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                     | 90               | 91  | 92  | 93  | 94  | 95  | 96  | 97  | 98  | 99  | 100 | 101 | 102 | 103 | 104 | 105 |
| 90                  | 119              | 123 | 128 | 132 | 137 | 141 | 146 | 152 | 157 | 163 | 168 | 174 | 180 | 186 | 193 | 199 |
| 85                  | 115              | 119 | 123 | 127 | 132 | 136 | 141 | 145 | 150 | 155 | 161 | 166 | 172 | 178 | 184 | 190 |
| 80                  | 112              | 115 | 119 | 123 | 127 | 131 | 135 | 140 | 144 | 149 | 154 | 159 | 164 | 169 | 175 | 180 |
| 75                  | 109              | 112 | 115 | 119 | 122 | 126 | 130 | 134 | 138 | 143 | 147 | 152 | 156 | 161 | 166 | 171 |
| 70                  | 106              | 109 | 112 | 115 | 118 | 122 | 125 | 129 | 133 | 137 | 141 | 145 | 149 | 154 | 158 | 163 |
| 65                  | 103              | 106 | 108 | 111 | 114 | 117 | 121 | 124 | 127 | 131 | 135 | 139 | 143 | 147 | 151 | 155 |
| 60                  | 100              | 103 | 105 | 108 | 111 | 114 | 116 | 120 | 123 | 126 | 129 | 133 | 136 | 140 | 144 | 148 |
| 55                  | 98               | 100 | 103 | 105 | 107 | 110 | 113 | 115 | 118 | 121 | 124 | 127 | 131 | 134 | 137 | 141 |
| 50                  | 96               | 98  | 100 | 102 | 104 | 107 | 109 | 112 | 114 | 117 | 119 | 122 | 125 | 128 | 131 | 135 |
| 45                  | 94               | 96  | 98  | 100 | 102 | 104 | 106 | 108 | 110 | 113 | 115 | 118 | 120 | 123 | 126 | 129 |
| 40                  | 92               | 94  | 96  | 97  | 99  | 101 | 103 | 105 | 107 | 109 | 111 | 113 | 116 | 118 | 121 | 123 |
| 35                  | 91               | 92  | 94  | 95  | 97  | 98  | 100 | 102 | 104 | 106 | 107 | 109 | 112 | 114 | 116 | 118 |
| 30                  | 89               | 90  | 92  | 93  | 95  | 96  | 98  | 99  | 101 | 102 | 104 | 106 | 108 | 110 | 112 | 114 |

*Note: Exposure to full sunshine can increase HI values by up to 15° F*

People in urban areas are more susceptible to the effects of a heat wave due to the Urban Heat Island effect, which happens as a result of changes in their landscape. Buildings, roads, and other infrastructure replace open land and vegetation. Surfaces that were once permeable and moist become impermeable and dry. These changes cause urban regions to become warmer than their rural surroundings, forming an "island" of higher temperatures in the landscape. The environment, particularly agriculture interest including farms and ranches would likely suffer the greatest impacts from extended periods of drought and heat. Crops would fail and farm animals would suffer from a lack of vegetation to consume. Residents of St. Johns County could begin to see household water wells dry up. All of St. Johns County is susceptible to drought and heat wave conditions. Droughts occur slowly, over months to years and can continue on for many months and years. The drought noted in 2007 took many months to occur so it is very difficult to put an actual time on when it started or ended but it is safe to say that the extent of a drought could last a year or more with an extent of -4.0 extreme drought, on the Palmer Drought Severity Index. A heat wave is generally described as multiple days, up to weeks, of uncomfortable and abnormally hot temperatures, St. Johns Counties and its municipalities could expect a heat wave to meet these conditions. No Drought or heat wave event has occurred since the last LMS update.

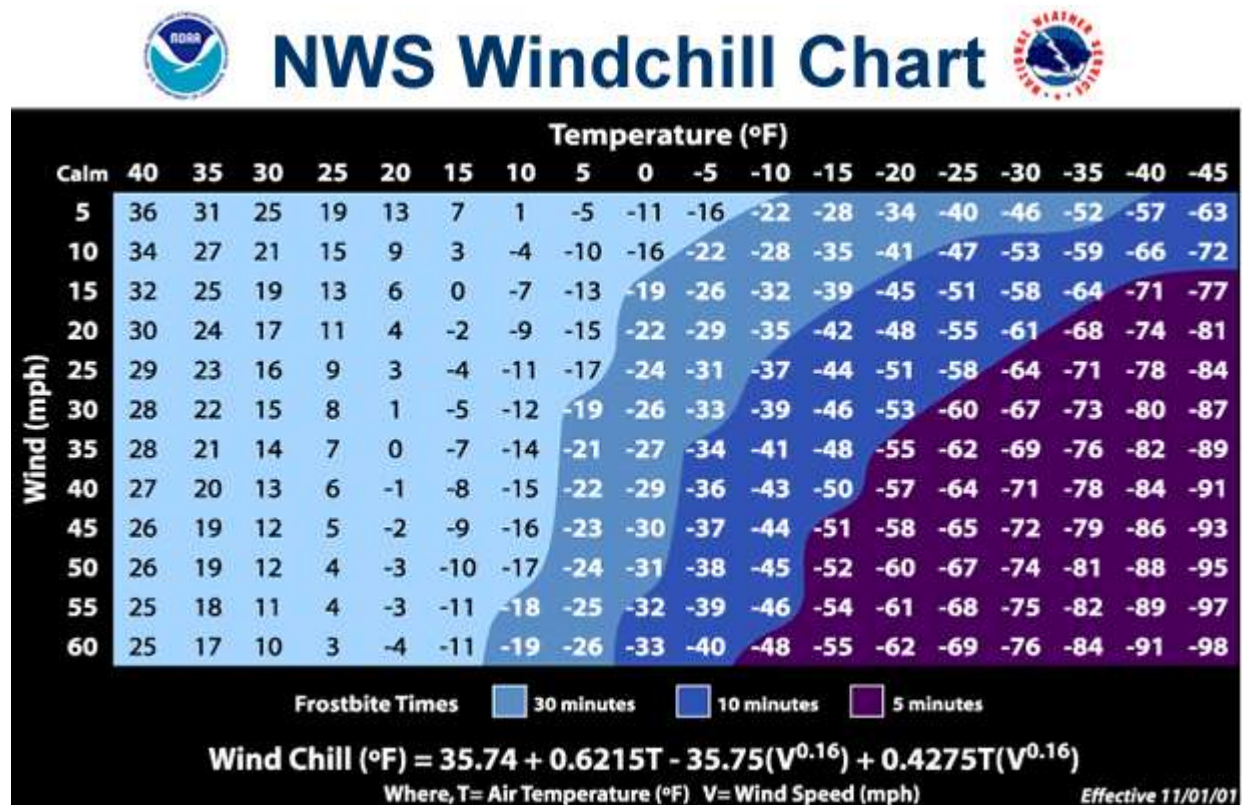
### 7. Winter Storm / Freeze

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. But 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 wide-spread area for a significant period of time. Freezing temperatures can damage agricultural crops and burst water pipes in homes and buildings. In St. Johns County we have 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. Some of the coldest ever recorded temperatures in St. Johns County were in January 1985. On January 21<sup>st</sup>, 1985, St. Augustine recorded a temperature of 10\* F and Hastings recorded a temperature of 12\* F. St. Johns County experienced an ice storm Christmas 1989. As a result Interstate 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, as a result roads were closed and power was out 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 the last LMS update

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. In St. Johns County one could experience Wind Chills between 36\* F and -11\* F. If conditions were right Wind Chills could fall even lower. Below is the National Weather Service Wind Chill Chart.



## **F. Summary**

The hazards detailed in the previous pages comprise the most likely hazards for St. Johns County. While other hazards such as sea-level rise, earthquakes, sinkholes, and tsunamis have the potential to occur the probability is so very low they were not examined in detail.

A great deal of development in St. Johns County has occurred along and near the County's coastline, particularly residential construction. All such structures are subject to the hazards of hurricanes and, accordingly, need to be constructed in conformance with stringent building codes. This is particularly true of structures in the storm surge zone. The storm surge has by far the most destructive power associated with a hurricane. The benefits of preserving the natural dune system have been shown to be enormous in mitigating storm surge hazard. Other actions such as elevating houses above the anticipated surge levels, building back from the shoreline, and using breakaway walls on lower levels all mitigate the effects of this hazard.

Second to the storm surge in power but yielding the potential for far-reaching and expensive damage are the heavy winds associated with a hurricane. Hurricane force winds, even a category 1 hurricane, directly striking the area will be felt throughout the County. Structures not built to withstand high winds are particularly vulnerable. Older, substandard, mobile homes and manufactured homes are dispersed throughout the County, all of which will be at risk in the event of a hurricane.

In addition to threats from hurricanes many structures are located in FEMA designated Flood Zones. Enforcing minimum floor elevations, relocating the extremely vulnerable or elevating structures minimizes the vulnerability to this threat.

Severe Thunderstorms, Lightening and Tornadoes are a hazard that can potentially threaten the entire county. Daily thunderstorms in the summer can turn severe and spawn tornadoes. Early warning can assist in keeping residents and visitors safe, and adhering to current building codes and adding lightening protection systems to structures can mitigate potential damage from these storms. Drought/Heat Wave, Winter Storm/Freeze also falls into the severe weather category of hazards and these hazards are some of the most difficult to mitigate and have a potential for large losses in agriculture.

Wildfires can be a particularly destructive hazard. Homes built in the urban/wildland interface are the most vulnerable to wildfires. Control burns and buffering will greatly reduce the threat of wildfires to the urbanized areas of the County.

Human Caused hazards such as hazardous materials and terrorism can affect the entire County. The vulnerable zones for each hazardous materials facility are mapped by facility for two reasons. First, unless the result of a catastrophic event or the intentional actions of an individual, a simultaneous release of hazardous materials by multiple sites is unlikely; second, the amount of overlap and complete coverage of the County by the hazards quickly renders the map useless.



Preparedness and prevention are the key mitigation factors for each hazard. Educating the population to the risk begins to mitigate the hazard. Unfortunately, some people are unable to respond to protective actions unassisted, or are not able to read literature intended to educate them to their risk. Many people at-risk throughout the County are transportation disadvantaged, handicapped, elderly, or economically disadvantaged, thus is makes it difficult for them to mitigate their risk in advance of the hazard.

Appendix A – St. Johns County Hazards Quick Reference Guide provides an overview of the impacts associated with various hazards.

## Section IV – Vulnerability and Loss Estimates

St. Johns County is a diverse county with areas ranging from urban to rural, and coastal to inland. While all St. Johns County residents are exposed to the hazards identified in this mitigation strategy to some degree, geographic location and other factors greatly affect individual vulnerabilities and probabilities relating to specific hazards. Factors influencing vulnerability include community location, type of construction, demographics, and cultural characteristics. The following section will discuss each hazards overall vulnerability for St. Johns County and the jurisdictions within.

### **A. Repetitive Loss Data**

Some areas of the County experience repetitive flooding from heavy rainfall, damage includes flooded roadways and homes.

The most well known area with repetitive flooding is the waterfront area of downtown St. Augustine which is very low and which sometimes 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.

According to information provided by the Florida Division of Emergency Management the City of St. Augustine Beach has had 2 losses on 1 Single Family Unit; The City of St. Augustine has had 44 losses on 14 properties – 12 Single Family Units, 1 Multi-Family Unit, 1 Non-Residential Unit; The Town of Hastings has had 2 losses on 1 Single Family Unit; and Unincorporated St. Johns County has had 120 losses on 45 properties - 39 Single Family Units, 4 Multi-Family Units and 2 Non-Residential Units. This information included properties with reported losses up to December 31, 2013. The types of properties that are included on this repetitive loss list include: Fifty-three (53) Single Family Units (SFU), Five (5) Multi-Family Units (MFU), and Three (3) Non-residential Units (NRU).

A detailed description of these repetitive losses is provided on the following table. Exact addresses are considered confidential and are thus not included.

## Repetitive Loss Summary for St. Johns County

Data as of 12/31/2013

| County Name        | Community Name               | Building Payments | Contents Payments | Total Payments | Average Payment | Losses | Properties |
|--------------------|------------------------------|-------------------|-------------------|----------------|-----------------|--------|------------|
| St. Johns County** | St. Augustine Beach, City Of | 8471.67           | 0.00              | 8471.67        | 4235.84         | 2      | 1          |
|                    | St. Augustine, City Of       | 304994.45         | 133191.54         | 438185.99      | 9958.77         | 44     | 14         |
|                    | Town of Hastings             | 9,547.23          | 0.00              | 9,547.23       | 4,773.62        | 2      | 1          |
|                    | St. Johns County             | 1725373.29        | 418613.70         | 2143986.99     | 17866.56        | 120    | 45         |

\* NOTE: ALL PAYMENTS ARE IN US DOLARS (\$)

\*\*NOTE: THE DATA CONTAINED ON THIS REPORT CONTAINS REPETITIVE LOSS PROPERTIES THAT HAVE NOT BEEN MITIGATED.

## B. Critical Facilities Inventory

According to information from the Florida Division of Emergency Management, critical facilities are defined as: those structures from which essential services and functions for victim survival, continuation of public safety actions, and disaster recovery are performed or provided. Shelters, emergency operation centers, public health, public drinking water, sewer and wastewater facilities are examples of critical facilities. Though not explicitly included in the definition, supporting life-line infrastructure essential to the mission of critical facilities must also be included in the inventory when appropriate.

Each local government must decide which of its facilities is critical. In light of this, St. Johns County has completed an inventory of critical facilities, which it deems are necessary to provide with extra protection in the event of a natural or man-made disaster. This inventory includes the following types of facilities:

|                             |                       |                           |
|-----------------------------|-----------------------|---------------------------|
| Airport                     | Group Quarters        | Parks                     |
| Boat ramps                  | Medical Services      | Schools                   |
| Correctional Facility       | Fire Stations         | Shelters                  |
| Churches                    | Government Buildings  | Sheriff's Department      |
| Clinics                     | Hazard Material Sites | Transportation Facilities |
| Communication stations      | Hospitals             | Water and Sewer           |
| Communication towers        | Industrial Parks      | Facilities                |
| Electrical Substations      | Landfills             | Sewer Lift Stations       |
| Emergency Operations Center | Landing Zones         |                           |
|                             | Nursing Homes         |                           |

Critical facilities table and map on file with St. Johns County Emergency Management.

### **C. Vulnerable Structures, Systems and Populations**

In addition to the repetitive loss properties and critical facilities identified by the County and municipalities there are other vulnerable structures, systems and populations that also need to be identified as being susceptible to damage and loss from hazard events. These structures, systems and populations include those non-repetitive loss properties that are subject to the hazards identified in this plan.

St. Johns County received the HAZUS-MH data from the Florida Division of Emergency Management and after comparison to our local data found too many inconsistencies and incorrect information for it to be useful. As a result, Emergency Management analyzed hazards for overall vulnerability and the results are detailed in the following pages.

Most hazards in St. Johns County have the potential to affect the entire county equally. However, there are some that may be more likely in one area of the County. For example, a hurricane would cause more damage to the coastal communities. For the purpose of this vulnerability analysis, the County has been divided into four geographical areas: Northern St. Johns County, Southern St. Johns County, Riverine St. Johns County, and Coastal St. Johns County.

In each of the hazards identified and defined, the latest occurrence of that event hazard is listed. For example the last hurricane/tropical storm to hit St. Johns County was Debby in 2012. Therefore, there would be no examples beyond that point.

In addition, the charts show probability of occurrence and impact. These will be rated as low = under 5% chance of occurring, medium, 5% - 15% chances of occurring, or High, greater than 15% chance of occurring annually. These rating respond with the information presented in Appendix A.

- An impact rating of “Low” for any hazard type means the hazard is not likely to have any measurable or lasting detrimental impact of a particular type and consequences will likely be rectified promptly with locally available resources. The chances here are less than 5%.
- An impact rating of “Medium” means there will likely be a measurable detrimental impact which may require some time to rectify and may require outside resources and/or assistance. The chances here are between 5% - 15%.
- An impact rating of “High” means the impact will likely be severe and of longer duration, and require substantial time, resources, and/or outside assistance to rectify. The chances are greater than 15%.
- Multiple ratings indicate detrimental impacts might easily vary within the range indicated.

## **1. Hurricanes and Tropical Storms**

Most hurricane experts feel we are entering a period of increased hurricane formation similar to the levels seen in the 1920s and 1940s. Current hurricane risk calculations are complicated by climatic factors suggesting the potential for even greater hurricane frequency and severity in the world's hurricane spawning grounds. Since 1995, there have been 62 Atlantic hurricanes, 12 of which occurred in 2010 alone. Global warming may cause changes in storm frequency and the precipitation rates associated with storms. A modest 0.9 degree Fahrenheit (0.5 degree centigrade) increase in the mean global temperature will add 20 days to the annual hurricane season, and increase the chances of a storm-making landfall on the U.S. mainland by 22%. The warmer ocean surface will also allow storms to increase in intensity, survive in higher latitudes, and develop storm tracts that could shift farther north, producing more U.S. landfalls.

Currently an average of 1.6 hurricanes strikes the U.S. every year. Major (Category 4 or 5 on the Saffir-Simpson scale) hurricanes strike the U.S. on the average of one every 5.75 years. Annually, hurricanes are estimated to cause approximately \$1.2 billion in damages. The proximity of dense population to the Atlantic Ocean, as well as the generally low coastal elevations, significantly increases the County's 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.

Hurricane damage is caused by two factors:

- High winds
- Storm surge

In the Local Mitigation Strategy both Storm Surge and High Winds are identified as hazards that are a result of Hurricanes. These two hazards vulnerability will be discussed here under the title hurricane.

### **High Winds**

Generally, it is the wind that produces most of the property damage associated with hurricanes, while the greatest threat to life is from 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, but from flying debris. Tree limbs, signs and sign posts, roof tiles, metal siding, and other loose objects can become airborne missiles that penetrate the outer shells of structures, destroying their structural integrity and allowing the hurricane winds to act against interior walls not designed to withstand such forces. Once a structure's integrity is breached, the driving rains associated with hurricanes can enter the structure and completely destroy its contents. Hurricane winds are unique in several ways:

- They are more turbulent than winds in most other type storms
- They are sustained for a longer period of time (several hours) than any other type of atmospheric disturbance

- They slowly change direction, thus they are able to penetrate the most vulnerable portion of a given structure.
- They generate large quantities of flying debris as the built environment is progressively damaged, thus amplifying their destructive power.

In hurricanes, gusts of wind can be expected to exceed the sustained wind velocity by 25 to 50 percent. This means a hurricane with sustained winds of 150 mph will have wind gusts exceeding 200 mph. The wind's pressure against a fixed structure increases with the square of the velocity. For example, a 100 mph wind will exert a pressure of approximately 40 lbs per square foot on a flat surface, while a 190 mph wind will exert a force of 122 lbs per square foot on that same structure. In terms of a four by eight foot sheet of plywood nailed over a window, there would be 1,280 lbs of pressure against this sheet in a 100 mph wind, and 2,904 lbs or 1.95 tons of pressure against this sheet in a 190 mph wind.

The external and internal pressures generated against a structure vary greatly with increases in elevation, shapes of buildings, openings in the structures, and the surrounding buildings and terrain. Buildings at ground level experience some reductions in wind forces simply because of the drag exerted by the ground against the lowest levels of the air column. High-rise buildings, particularly those located along the beachfront, will receive the full strength of a hurricane's wind on their upper stories. Recent studies estimate that wind speed increases by approximately 27 percent just 15 feet above ground level.

The wind stream generates uplift as it divides and flows around a structure. The stream following the longest path around a building, generally the path over the roof, speeds up to rejoin the wind streams following shorter paths, generally around the walls. This is the same phenomena that generate uplift on an aircraft's wing. The roof, in effect, becomes an airfoil that is attempting to take off from the rest of the building. Roof vortexes generally concentrate the wind's uplift force at the corners of a roof. These key points can experience uplift forces two to five times greater than those exerted on other parts of the roof.

Once the envelope of the building has been breached through the loss of a window, door, or roof damage, wind pressure on internal surfaces becomes a critical factor. Openings may cause pressurizing or depressurizing of a building. Pressurizing pushes the walls out, while depressurizing will pull the walls in. Damages from internal pressure fluctuations may range from blowouts of windows and doors to total building collapse due to structural failure.

During Andrew, catastrophic failure of one and two-story wood-frame buildings in residential areas was observed more than catastrophic failures in any other type of building. Single-family residential construction is particularly vulnerable because less engineering oversight is applied to its design and construction. As opposed to hospitals and public buildings which are considered fully engineered, and office and industrial buildings which are considered "marginally engineered," residential construction is considered "non-engineered." Historically, the bulk of wind damage experienced nationwide has occurred to residential construction. Fully engineered construction usually performs well in high winds due to the attention given to connections and load paths.

Hurricane winds generate massive quantities of debris, which can easily exceed a community's entire solid waste capacity by three times or more. This debris can cause environmental concerns due to the nature of the debris, some of which will be considered hazardous materials. The debris will also likely block roads, thus impacting recovery.

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 age and construction type of much of the housing along the coast in many of the other coastal communities, suggests these communities would suffer catastrophic damage by a major storm.

The population living in these coastal areas and other areas of the community, especially those in mobile/manufactured homes, and older structures are vulnerable to the effects of high wind if they do not evacuate when ordered to do so by officials.

### **Storm Surge**

Along the coast, storm surge is often the greatest threat to life and property from a hurricane. In the past, large death tolls have resulted from the rise of the ocean associated with many of the major hurricanes that have made landfall. Hurricane Katrina (2005) is a prime example of the damage and devastation that can be caused by surge. At least 1500 persons lost their lives during Katrina and many of those deaths occurred directly, or indirectly, as a result of storm surge.

Storm surge is an abnormal rise of water generated by a storm, over and above the predicted astronomical tides. Storm surge should not be confused with storm tide, which is defined as the water level rise due to the combination of storm surge and the astronomical tide. This rise in water level can cause extreme flooding in coastal areas particularly when storm surge coincides with normal high tide, resulting in storm tides reaching up to 20 feet or more in some cases.

The maximum potential storm surge for a particular location depends on a number of different factors. Storm surge is a very complex phenomenon because it is sensitive to the slightest changes in storm intensity, forward speed, size (radius of maximum winds), angle of approach to the coast, central pressure, and the shape and characteristics of coastal features such as bays and estuaries. Other factors which can impact storm surge are the width and slope of the continental shelf. A shallow slope will potentially produce a greater storm surge than a steep shelf.

Adding to the destructive power of surge, battering waves may increase damage to buildings directly along the coast. This water weighs approximately 1,700 pounds per cubic yard; extended pounding by frequent waves can demolish any structure not specifically designed to withstand such forces. The two elements work together to increase the impact on land because the surge makes it possible for waves to extend inland.



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 erosion would undermine the structures foundation, likely causing complete failure of the structures. 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. 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 two 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 wash over from storm surge, potentially undermining the roadway and causing complete failure. Each of the structures and the infrastructure identified in this narrative are vulnerable to storm surge as described above due to their proximity to the Atlantic Ocean.

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 structures foundations, likely causing complete failure. The 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. State Road A1A travels the entire length of the southern beaches and lies close to the water's edge just north of Matanzas Inlet; it is an evacuation route and main thoroughfare for this entire area and would be vulnerable to wash over from storm surge, potentially undermining the roadway and causing complete failure. Along with the previously identified structures there are 3 fire stations and the City of St. Augustine Beach Administration building and Police Station located in this area. Each of the structures and the infrastructure identified in this narrative are vulnerable to storm surge as described above by their proximity of the Atlantic Ocean.

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, The 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 year 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, is vulnerable to storm surge. The City of St. Augustine Administration, Police Department, and Fire Department are all located within the City as well. Due to the geographical location of the City each of these aforementioned structures and pieces of infrastructure is vulnerable to storm surge.

Currents created by storm surge combine with waves to severely erode beaches, especially those that suffer from erosion before a storm surge event. All beaches are susceptible to erosion, but some beaches are more vulnerable due to their current conditions. The beaches that will be most vulnerable to the effects of erosion caused by storm surge include South Ponte Vedra Beach, North Beach, Vilano Beach, St. Augustine Beach, and Summerhaven.

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, and would suffer catastrophic damage from an incoming storm surge; the docks in these marinas would also suffer severe damage or complete destruction.

In estuaries and fresh water marshes, salt water 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 salt water intrusion.

The people living in structures located in areas described above and noted in the storm surge map on page 42 are susceptible to effects of storm surge if they do not evacuate when order to do so by officials.

The widely accepted model that was developed by the National Oceanic and Atmospheric Administration, and used by the National Hurricane Center, is called the Sea, Lake and Overland Surges from Hurricanes (SLOSH) model. Map 1, on page 42 illustrates the storm surge potential in St. Johns County.

## **2. Severe Weather**

### **Severe Thunderstorms and Lightning**

The risk of severe thunderstorms and lightning is high in St. Johns County, but the vulnerability to St. Johns County and its municipalities is low, simply because this particular hazard generally affects a much smaller segment of the population at any given time and the effects can be managed with local resources with the recovery lasting days to weeks.

Lightning enters a structure in three main ways: a direct strike, through wires or pipes that extend outside the structure, and through the ground. Once in a structure, lightning can travel through the electrical, phone, plumbing, and radio/television reception systems. Lightning can also travel through any metal wires or bars in concrete walls or flooring.

Lightning can be one of the most dangerous and frequently encountered weather hazards. Deaths caused by lightning are second only to those weather-related deaths resulting from floods and flash floods. 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.

Individuals participating in the following recreational activities could be vulnerable to lightning including: golf, football, baseball, soccer, surfing, horseback riding, walking, jogging, tennis, boating, fishing, kite flying, kayaking, paddle boarding, beach activities, picnicking, camping, hiking, gardening, hunting, swimming, basketball, softball, cycling, lacrosse, wind surfing, lawn bowling, croquet, archery, beach volleyball, horse shoes, diving, skiing, track and field events and outdoor festivals. The areas these recreational activities occur are along 40 miles of Intracoastal Waterway, 42 miles of Atlantic Ocean coastline, 40 miles of riverine shoreline along the St. Johns River, 13 golf courses, along with public and private recreational facilities, school facilities, and parks located throughout the County. It is estimated that over 75% of our population participates in at least one of these recreational activities, and is thus vulnerable to lightning.

Occupations that are generally preformed outdoors would be the most susceptible to the dangers of lightning and include: Landscapers, tree trimmer, roofers, residential and commercial construction employees, lifeguards, utility workers (cable, telephone, electricity), delivery drivers, farmers, ranchers emergency workers (law enforcement and Emergency Medical Services), horse and carriage drivers, park rangers, marine industry employees, street performers, dog walkers, painters, outdoor advertising specialist, sanitation workers, parking attendant, tour guides, foresters, and road construction crews. It is estimated that 15-30% of the population works in one of these industries. These occupations occur throughout the County with no one area more vulnerable than another.

Annual property losses caused by lightning nationwide regularly total in the hundreds of millions of dollars. Communication equipment and computer systems/networks are getting more sophisticated and businesses rely on them quite heavily. The loss of a computer system and communication system can result in large business income losses in addition to the physical damage to the equipment and structures. Some of the most susceptible communications and computer systems are those used by local public safety. St. Johns County recently constructed a Motorola 800 MHz radio system with 11 new communications towers. These towers are equipped with lightening protection but if this were to fail, it would cripple public safety's ability to communicate. Often times these communication towers are also occupied by cell phone providers and a loss of communications from one of these towers could result in an economic loss to those cell phone companies. Another industry that may be affected by lightning is aviation. The Northeast Florida Regional airport has a full time

air traffic control tower and a loss of this tower and its communications could endanger aircraft coming into and out of the St. Augustine area.

Properties most likely to be struck by lightning are those that are located on higher ground or that project above surrounding properties such as chimneys, flagpoles, towers, water tanks, steeples, ridges and parapets. On flat-roofed buildings, the edge of the roof is the most likely area to be struck. Some of these structures include: Communication Towers (as previously discussed), The St. Augustine Amphitheater, The St. Augustine Lighthouse, Northeast Florida Regional Airport Air traffic Control Tower, the gun deck at the Castillo de San Marcos, World Golf Hall of Fame Tower and roof top restaurants. Several of these structures are popular tourism destinations and lightning would put any tourists visiting these structures in danger and if damaged would result in an economic loss to the tourism economy.

In St. Johns County and its municipalities generally severe thunderstorms are accompanied by lightning. Additional vulnerability from severe thunderstorms can be wind damage, less intense than what might be experienced in a hurricane but the effects of wind on structures will follow the same methodology as described in the high winds section of this vulnerability analysis. (Appendix A)

### **Tornadoes**

Historical data indicates the frequency of tornadoes in St. Johns County is relatively low. However, the vulnerability does exist as proven in by the 2 EF0 tornadoes that touched down in St. Johns County in 2013. Total damage estimates from these tornadoes were approximately \$500,000 and damage included secondary buildings such as barns and sheds. All of St. Johns County is vulnerable to tornadoes but some areas and structures are more vulnerable such as mobile/manufactured home communities and agriculture communities with large secondary structures such as barns and other substandard or older secondary structures. The agriculture community is located in the southwestern portion of the County, south of International Golf Parkway and west of Interstate 95. Individuals living in mobile/manufactured and older homes are more vulnerable 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 Subdivision, a large mobile home community, lying in the far southwestern corner of St. Johns County. Infrastructure such as power lines is also susceptible to damage from tornadoes due to flying debris. Power lines are located throughout the county with more power lines being located in the more densely populated areas of the County along the coast.

### **3. Freshwater Flooding**

Freshwater flooding is generally associated with small natural streams or other drainage systems that are overwhelmed by large amounts of runoff generated by short episodes of extremely heavy rainfall. Storm Surge flooding will not be addressed in this section as it was covered in the Hurricane vulnerability analysis. 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.

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, as a result of its proximity to the ocean its elevation lies at sea level. 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, Florida School for the Deaf and Blind, 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 year old, with many of them much older. The City of St. Augustine Administration, Police Department (including their PSAP), and Fire Department are all located within the City as well. As of 2013, over 13,000 people lived in the City of St. Augustine. 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 aforementioned structures and pieces of infrastructure, as well as the entire population, is vulnerable to fresh water flooding.

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 Deep Creek traverses the central area of the community. There are roughly 2,000 people residing in Flagler Estates, most of which are vulnerable to flooding.

Other areas of the County that have experienced significant flooding are the neighborhood surrounding the St. Augustine Amphitheater, Neighborhoods to the west of Surfside Beach Park, and West Augustine. The St. Augustine Amphitheater has experienced flooding inside the venue, if this were to happen when a concert was scheduled it could result in a large economic loss. These areas are vulnerable to flooding due to their elevation and inability to drain quickly.

### **Floodplains**

Freshwater flooding as well as coastal flooding is modeled by the Federal Emergency Management Agency (FEMA) as part of the National Flood Insurance Program (NFIP). Vulnerability to flooding is documented in the Flood Insurance Rate Maps delineating the 100-year flood (A and VE Zones) and the 500 year flood (X Zones). Map 2 on page 46 of this Strategy illustrates the FEMA Flood Zones for St. Johns County.

Areas within FEMA identified flood zones are most vulnerable to freshwater flooding. Homes in these Flood Zones are required to carry flood insurance because of the enhanced risk of flooding. Homes built on grade are more susceptible to flooding than homes that are elevated. Many of the areas in the County and municipalities that are the lowest in elevation, and as a result most susceptible to flooding, are lower income areas and a large portion of the housing stock is mobile and manufactured homes.

#### 4. Wildfires

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, primarily located in the western portions of the County. These are areas where subdivisions occur adjacent to large undeveloped areas of forestland. Much of this land is owned in vast swaths by large timber companies and is 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 (*Pinus palustris*), loblolly pine (*Pinus taeda*), pond pine (*Pinus serotina Michx*), slash pine (*Pinus elliotii*), sand pines (*Pinus clausa*) 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 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 aforementioned area is the St. Johns County Pet Center and the St. Johns County Stratton Road Transfer Station. They are surrounded on all sides 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. On page 48 you will find Map 3 Land Use/Land Cover Map which illustrates the areas located at the urban/wildland interface, structures and infrastructure located at the interface are the most vulnerable to wildfire.

## **5. Human Caused Hazards**

The following vulnerability analysis will be for Human Caused Hazards including both Hazardous Materials and Terrorism.

### **Hazardous Materials**

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; and
- The resources in terms of people and property that are in an area of possible impact from a hazardous materials release.

St. Johns County's vulnerability to impacts from hazardous materials releases is rated as medium. There are relatively few major generators of hazardous materials within the County but, the Florida East Coast Railroad traverses the County from North to South with the rail line passing through the middle of the City of St. Augustine and one of the largest population centers of the County. Cargo trains move large quantities of hazardous materials along this rail line multiple times a day, every day. Both US Highway 1 and Interstate 95 traverse St. Johns County from north to south, with trucks hauling hazardous materials daily. The southwestern portion of the County, in and around the Town of Hastings, has a large agricultural community which uses potentially hazardous materials in the farming process. These hazardous materials, if released, could affect individuals living in close proximity of the agricultural fields.

Some of the areas that have a higher vulnerability for hazardous materials accidents due to their proximity to the transportation network (both highway and rail) that pass through the County include St. Augustine and St. Johns County. Given the right set of circumstances, a hazardous materials release could produce significant detrimental effects on life and property in these communities. It is likely that the elderly, young and those with health problems would be the most vulnerable to a hazardous materials release. Public water supplies could potentially be at risk if a hazardous materials release occurred near one of the water plants or ground water supplies could be affected if the hazardous materials infiltrate the aquifer.

### **Terrorism**

The possibility for terrorism in St. Johns County does exist, but the County's risk and vulnerability to this hazard is low. The City of St. Augustine has a slightly higher vulnerability to terrorism since it is the Nation's Oldest City and draws tourism from all over the world, but this vulnerability is still considered low.

The warm temperatures, onshore winds, high rate of sunshine (UV exposure), and rainfall in St. Johns County make this area a less favorable target for biological or chemical terrorism than many other areas of the United States. The population here is dispersed when compared to major cities in the northeastern U.S., and the transportation system infrastructure is highly dependent upon individual vehicles. Both of these features make St. Johns County a less desirable target for transportation system or conventional type (bomb related) terrorist acts.

The most vulnerable structures, infrastructure, and populations are:

- Northrup Grumman Aircraft installation
- Flagler Hospital
- Florida National Guard Headquarters
- Florida National Guard Armory
- Schools
- Special Events
- County and City Government Complex

### **6. Drought / Heat Wave**

St. Johns County has a low-moderate vulnerability to the impacts from drought or heat wave due to the County's large agricultural land use in the west and urbanization in the east. St. Johns County has a potable water reserve, but many residents receive their water from personal wells and the County's public water supply is also drawn from wells. If a drought was so severe that wells began going dry this could become a significant problem. 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. The urbanized communities along the coast are less vulnerable economically due to their location and non-agricultural economic base. Potential impacts to St. Johns County's potable water supply by saltwater intrusion during drought conditions are generally low.



Heat waves are not uncommon in Florida but 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. Extended periods of extreme heat could also affect the power grid due to high demand for air conditioners.

## 7. Winter Storm / Freeze

St. Johns County has a moderate 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.

To supplement the information for the vulnerability analysis, information from the St. Johns County Property Appraisers Office has been compiled in the following table.

**St. Johns County Property Values (2014)**

| <b>St. Johns COUNTY</b>  | <b>Residential</b> | <b>Commercial</b> | <b>Industrial</b> | <b>Agricultural</b> | <b>Institutional</b> | <b>Government</b> | <b>Total</b>   |
|--------------------------|--------------------|-------------------|-------------------|---------------------|----------------------|-------------------|----------------|
| <b>Value (\$)</b>        | 19,244,910,250     | 1,451,447,764     | 221,328,363       | 905,627,310         | 462,432,261          | 1,137,963,440     | 23,423,709,388 |
| <b>Number of Parcels</b> | 87,100             | 2,843             | 369               | 1,656               | 478                  | 1,965             | 94,411         |

*\*Note – vacant parcels were not included in the analysis*

St. Johns County is currently using iDams software to create a more accurate vulnerability loss estimate. When this analysis is completed that information will be compiled into the Local Mitigation Strategy.

#### **D. Future Vulnerable Facilities and Loss Estimates**

To estimate future vulnerability and loss estimates several planning assumptions had to be made. For future vulnerability in St. Johns County only Developments of Regional Impact (DRI) were considered. Each DRI was then overlaid on a hazard map and the vulnerability of structures was determined by the general location in correlation with the hazard. The loss estimates were made by the compiling the total number of residential (single and multi-family) then comparing them to the average cost of each type of structure; single family - \$231,292 and multifamily - \$174,099; per the St. Johns County Property Appraisers Office Records as of October 2014. The Commercial Space is calculated using square footage and current market value in St. Johns County which averages approximately \$105 per square foot per Commercial Real Estate Companies.

Development of Regional Impact is a land use program adopted by the Florida Legislature in Florida Statute 380.06. The term "development of regional impact," as used in Florida Statutes, means any development which, because of its character, magnitude, or location, would have a substantial effect upon the health, safety, or welfare of citizens of more than one county. Due to these reasons we have chosen these areas to predict our future vulnerability and loss estimates. The following map identifies the location of all the Developments of Regional Impact currently approved and not yet completed in St. Johns County as of September 8, 2014.

Hurricanes (Storm Surge and High Wind) and Flooding (Floodplains) were the hazards used to determine future vulnerability and loss estimates. Tornadoes, Wildfires, Drought/Heat Wave and Winter Storm/Freezes pose a risk to the entire County including municipalities, thus future estimates are difficult if not impossible to determine. Information on vulnerability and loss estimates on future Infrastructure and Critical Facilities is not available at this time.



### Developments of Regional Impact in St. Johns County, Florida

| Approved Developments of Regional Impact                | Date Approved | Potential Residential Structures |               | Commercial Structures (Square feet) | Total Acres   | Storm Surge Zone | Flood Zone |
|---|---------------|----------------------------------|---------------|-------------------------------------|---------------|------------------|------------|
|   |               | Single Family                    | Multi-Family  |                                     |               |                  |            |
| Aberdeen  | 2003          | 1,623                            | 395           | N/A                                 | 1,313         | F                | AE, A, X   |
| Ashford Mills   | 2006          | 1,919                            | 714           | N/A                                 | 1,520         | A, F             | AE, A, X   |
| Bartram Park (partial – only areas in St. Johns County) | 2000          | 356                              | N/A           | 418,914                             | 128           | B                | AE, A, X   |
| Caballos Del Mar (Marsh Landing and Sawgrass)           | 1975          | 5,896                            | N/A           | UA                                  | UA            | A,B              | AE, A, X   |
| Cordova Palms   | 2010          | 750                              | UA            | 1,900,000                           | 581           | None             | A, X       |
| Durbin Crossing   | 2003          | 1,561                            | 947           | 200,000                             | 2,047         | None             | AE, A, X   |
| Julington Creek Plantation                              | 1982          | 6,292                            | N/A           | 391,950                             | 4,150         | A, F             | AE, A, X   |
| Marshall Creek (Palencia)                               | 1998          | 2,774                            | N/A           | 600,000                             | 2,683         | A, B, C          | AE, A, X   |
| Nocatee   | 2001          | 8,811                            | 3,228         | 4,090,000                           | 1,323         | D                | A, XS, X   |
| River Town  | 2004          | 3,700                            | 800           | N/A                                 | 4,170         | A, F             | A, AE, X   |
| Saint Johns   | 1991          | 7,200                            | N/A           | 5,615,000                           | 5,843         | A, F             | AE, X      |
| Silverleaf Plantation                                   | 2006          | 6,800                            | 3,900         | 1,740,000                           | 7,285         | None             | A, X       |
| St. Augustine Centre                                    | 1997          | 817                              | N/A           | 868,407                             | 315           | None             | A, X       |
| Twin Creeks   | 2005          | 2,000                            | 3,000         | 2,900,000                           | 3,050         | B                | A, X       |
| World Commerce Center                                   | 2002          | 1,156                            | N/A           | 3,534,188                           | 966           | None             | A, AE, X   |
| <i>Total</i>  |               | <i>51,655</i>                    | <i>12,984</i> | <i>22,258,459</i>                   | <i>35,374</i> |                  |            |

U/A – Information is unavailable

N/A – Not applicable – area does not have that particular type of development

Since all the approved Developments of Regional Impact fall into at least one hazard category all have been included in the future potential loss estimate which are as follows:

Residential Single Family - \$11,947,388,260

Residential Multi-Family - \$2,260,501,416

Commercial - \$2,337,138,195

Total Area - 34,793 acres

## Section V – Initiative Development and Selection

### 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 floods, accidental chemical releases and other natural and man made disasters. The mitigation initiatives that St. Johns County developed began with evaluating the guiding principles that were completed during the initial phases of the LMS process. The initiatives revolved around these principles regarding the reduction of County’s vulnerability to natural and man made hazards that exist. The Taskforce, comprised of a variety of people in the public and private sector, created the initiatives, which reflected the needs of the community. The Taskforce reviewed a number of documents including: Future Land Use policies, Land Development Regulations and data collected from the Department of Public Safety.

The Taskforce over the process of several meetings discussed and listed potential projects in St. Johns County, which are discussed in detail in the following section. The projects were both structural and non-structural mitigation projects. These projects were then discussed in the context of cost, responsible entity, implementation time, funding and areas affected. After all the data was compiled, the taskforce ranked the projects. Each of the projects was evaluated against 14 criteria ranging from cost of the initiative compared with the number of people to benefit to consistency to other plans and programs. Parts B and C below explains in more detail the scoring and prioritizing process and the table shows the criteria that the projects were ranked against. As maintenance of the document continues, these criteria will continue to be used to rank new projects that are supported by the Task Force for inclusion into the LMS. A standard form has been developed for submission of new projects for consideration by the Task Force to determine if it should be included in the LMS. The standard form will cover all the criteria that the projects are scored upon.

### B. Scoring and Prioritizing Projects

Each mitigation project chosen for inclusion in the Strategy by the Taskforce will benefit the community and preserve and protect life and property. However, each mitigation project represents a large investment of financial resources and/or personnel resources. Due to these facts a method to prioritize each project was adopted. This prioritization method will be a guide for those using the strategy. It will tell which projects have priority to be implemented when resources do become available for that type of project.

The Taskforce adopted a prioritization method early in the LMS process. The methodology has been reviewed and revised several times to produce a fair and easy to use system. The method considered and evaluated such factors as: consistency with the comprehensive plans, who would benefit by the project, availability of funding, and the time frame of implementing the project. The Task Force assigned a numerical figure ranking the project on the criteria mentioned earlier. The final ranking was drawn from the numerical figures assigned by the Taskforce.

The Task Force believes that project prioritization and reprioritization will be an ongoing responsibility. The completion of a project alone may be cause to reprioritize the remaining

projects. However, the likelihood is that as additional projects are defined and presented the list of prioritized initiative will grow and become refined. In a process that will evolve with the change prioritize of time and an evolving community.

### **C. Project Prioritization Methodology**

Hazard Mitigation Project Prioritization Method:

#### **1. Feasibility Assessment**

All potential mitigation efforts, whether educational, legislative, or structural, must meet certain standards to be considered as viable project or initiatives. Viability standards include the following:

- (1) Is the proposed project or initiative consistent with the Guiding Principles of St. Johns County Local Mitigation Strategy?
- (2) Does the project or initiative have clearly defined mitigation goals and objectives?
- (3) Does the project or initiative address a hazard to which the local community is clearly vulnerable?
- (4) Is the project or initiative technically feasible?
- (5) Is the project or initiative acceptable to, or does it have a reasonable expectation of gaining acceptance by the general public?
- (6) Can the project or initiative be accomplished without generating any major or prohibitive environmental impacts?

#### **2. Prioritization Criteria**

There are 12 categories which individual mitigation projects or initiatives are evaluated. Up to ten points may be awarded in categories one through four and categories six through nine; up to 15 points in category five, and up to five points each in the final three categories for a total possible point score of 110 points. Five point categories receive lower possible point scores because, while they are important considerations in terms of implementing mitigation projects or initiatives, they are not felt to be as critical as the preceding 10 categories. Detailed suggestions for scoring individual categories are presented below.

- (1) Containment within the Existing Comprehensive Growth Management Plans - Is the project or initiative consistent with or incorporated in an existing City or County Comprehensive Growth Management Plan.  
If not incorporated into an existing Comprehensive Plan, is the project or initiative proposed for incorporation through submittal of an Application for a Comprehensive Plan Amendment?  
If not incorporated into an existing Comprehensive Plan, is the project or initiative consistent with the applicable City or County Comprehensive Plan?

Projects or initiatives incorporated into an applicable Comprehensive Plan or proposed for incorporation through submittal of an amendment application will receive 10 points.

Projects consistent with but not incorporated into a Comprehensive Plan will receive 5 points.

- (2) Consistent with Existing Regulatory Framework – Is the project or initiative consistent with existing legal and regulatory framework of the governing jurisdiction?

Does a proposed project require any changes or waivers in existing building, zoning, or environmental statutes or ordinances? Projects which fit within the existing legal and regulatory framework will receive 10 points. Projects which are in conflict with the existing regulatory framework will receive lower point scores depending upon the seriousness and numbers of regulatory barriers to be overcome in implementing the proposed project.

- (3) Community Rating System (CRS) Credit - Does the proposed project or initiative provide credit points toward improving the St. Johns County CRS Classification and reducing flood insurance rates in the County?

The National Flood Insurance Program determines the rate communities pay for flood insurance based on a 10-Class system. Class 1 communities receive the most premium credit and class 10 communities receive the least. Communities can improve their classification by conducting activities to reduce flood losses. Communities are awarded “Activity Credit Points” for a variety of flood mitigation activities including public information activities, mapping and regulatory activities, and structural projects to reduce flood losses. Projects and initiatives yielding the maximum number of CRS “Activity Credit Points” will be awarded 10 points under this criterion. Those receiving lower CRS ratings will receive lesser scores.

- (4) Community Benefit – Does the project further one of the principle five goals of the LMS as described below select the best fit:

- I. Protect the lives of the residents of St. Johns County and its Municipalities (15 points).
- II. Protect property to ensure that its intrinsic value is preserved (14 points).
- III. Protect infrastructure so that it is available during and after a disaster (13 points).
- IV. Protect business activities so that they continue to provide economic strength to the community (12 points).
- V. Protect the environment to ensure that quality of life and economic well being are preserved (11 points).

- (5) Community Exposure – Does the project mitigate a frequently occurring, high risk, or specific problem to which a community is particularly vulnerable?

How frequently does the problem the project is designed to mitigate actually occur? A maximum of 10 points may be awarded in this category based on the amount of funding required balanced against the relative and repetitive exposure of the community as determined under the vulnerability assessment.

- (6) Effectiveness – What is the benefit/cost ratio of the project when applying the Federal Emergency Management Act (FEMA) “Cost-effectiveness of Hazard Mitigation Projects” guidelines?

FEMA has produced detailed guidelines for evaluation for evaluating the cost effectiveness of mitigation projects. All mitigation projects using FEMA funding must have a benefit/cost ratio greater than 1. The higher the benefit/cost ratio, the bigger the “bang for the buck.” A total of 10 points will be awarded in this category based on the following:

|                                     |             |
|-------------------------------------|-------------|
| Benefit/cost ratio = 4.0 or greater | = 10 points |
| Benefit/cost ratio = 3.0 to 3.9     | = 8 points  |
| Benefit/cost ratio = 2.0 to 2.9     | = 6 points  |
| Benefit/cost ratio = 1.0 to 1.9     | = 4 points  |
| Benefit/cost ratio = < 1.0          | = 0 points  |

- (7) Effective Life Expectancy – How long will the community continue to receive the benefits of a particular mitigation project or initiative?

All mitigation projects and initiatives have an effective life span. Conditions change, new technology becomes available, and physical structures wear out. All these factors determine how long a community will receive benefits from money invested in a mitigation measure. 2 points will be awarded for every five years of effective benefit, with a maximum benefit of 25 years or 10 points.

|  |             |
|--|-------------|
| Effective Life Span = Up to 25 or more | = 10 points |
| Effective Life Span = Up to 20 years   | = 8 points  |
| Effective Life Span = Up to 15 years   | = 6 points  |
| Effective Life Span = Up to 10 years   | = 4 points  |
| Effective Life Span = Up to 5 years    | = 2 points  |

- (8) Public Support – Does the project have demonstrated public support and a demonstrated need? A maximum of 10 points will be awarded to proposed projects based on their level of need and support as follows:

|           |             |
|-----------|-------------|
| Very High | = 10 points |
| High      | = 8 points  |
| Moderate  | = 6 points  |
| Low       | = 2 points  |

- (9) Funding Availability – Is funding currently available for this particular project? If funding is anticipated but currently not available, points will be awarded as follows:

|                      |            |
|----------------------|------------|
| Available in 1 year  | = 8 points |
| Available in 3 years | = 4 points |
| Available in 4 years | = 2 points |



- (10) Sponsorship – Does the project have an active sponsor that will take responsibility for its management and implementation?  
Up to 5 points will be awarded if a local government agency (City or County), or other entity identified by the funding source, will sponsor the project. An additional five points will be awarded to a project with a local sponsor willing to match funds with a funding entity.
- (11) Funding Source – Is there an identified funding source or entity for this project or initiative?  
Five points will be awarded to all projects and initiatives for which funding source or entity already exists with the express purpose to fund projects of this type, even if funds for this specific project or initiative have not been made available to date.
- (12) Time Frame for Accomplishing Objectives – How long will it take for the proposed mitigation project to accomplish its stated goal?  
Projects which can be accomplished quickly or have an inherent advantage over long term projects, although long term projects may ultimately be more beneficial to the community. The following weighted scale assigns points to proposed projects based on their duration.
- 1 year = 5 points
  - 2 year = 4 points
  - 3 year = 3 points
  - 4 year = 2 points
  - 5 year = 1 points

#### **D. Project Implementation**

In the project descriptions it provides information on who initiated the mitigation project and who will be responsible for overseeing the projects implementation. Individual agencies will be responsible for implementing the mitigation initiatives that they have had approved for funding.

ST. JOHNS COUNTY LMS  
POINT SYSTEM METHODOLOGY

| CRITERIA CATEGORY                             | 10 Points   | 8 Points                        | 6 Points                            | 5 points                                    | 4 Points                         | 3 Points | 2 Points             | 1 Point                                      | 0 Points                                 |
|---|---|---------------------------------|-------------------------------------|---|----------------------------------|----------|----------------------|--|--|
| Contained Within the Comprehensive Plan       | Incorporated into plan                                | NA                              | NA                                  | Consistent with plan but not incorporated   | NA                               | NA       | NA                   | NA   | Inconsistent with plan                   |
| Consistent with Existing Regulatory framework | Consistent  | NA                              | NA                                  | Partially Consistent                        | NA                               | NA       | NA                   | NA   | Inconsistent, many regulatory barriers   |
| Provide Community Rating System Credits       | Provides maximum number of CRS credits                | NA                              | NA                                  | Provides some CRS credits                   | NA                               | NA       | NA                   | NA   | Provides no CRS credits                  |
| Community Benefit                             | Protects lives of St. Johns Co. residents (15 points) | Protects Property (14 points)   | Protects Infrastructure (13 points) | Protects business activities (12 points)    | Protects environment (11 points) | NA       | NA                   | NA   | NA                                       |
| Community Exposure                            | Mitigates a hazard of high frequency and risk         | NA                              | NA                                  | Mitigates a hazard of moderate freq. & risk | NA                               | NA       | NA                   | Mitigates a hazard of low frequency and risk | Mitigates a hazard of negligible risk    |
| Effectiveness                                 | Benefit/cost ratio = 4.0 or greater                   | Benefit/cost ratio = 3.0 to 3.9 | Benefit/cost ratio = 2.0 to 2.9     | NA  | Benefit/cost ratio = 1.0 to 1.9  | NA       | NA                   | NA   | Benefit/cost ratio = <1.0                |
| Effective Life Expectancy                     | Up to 25 or More Years                                | Up to 20 Years                  | Up to 15 Years                      | NA  | Up to 10 Years                   | NA       | Up to 5 Years        | NA   | NA                                       |
| Public Support                                | Very High Public support                              | High Public support             | Moderate Public support             | NA  | NA                               | NA       | Low Public support   | NA   | NA                                       |
| Funding Availability                          | NA  | Available in 1 year             | Available in 2 years                | NA  | Available in 3 years             | NA       | Available in 4 years | Available in 5 years                         | NA                                       |
| Sponsorship                                   | Identified sponsor willing to match funds             | NA                              | NA                                  | Project has identified sponsor              | NA                               | NA       | NA                   | NA   | No identified sponsor                    |
| Identified Funding Source                     | NA  | NA                              | NA                                  | A funding source has been identified        | NA                               | NA       | NA                   | NA   | A funding source has not been identified |
| Time Frame For Accomplishing Objectives       | NA  | NA                              | NA                                  | 1 year                                      | 2 years                          | 3 years  | 4 years              | 5 years                                      | NA                                       |

## Section VI – Mitigation Initiatives

### A. Mitigation Initiatives

Mitigation initiatives are selected by the St. Johns County LMS Task Force and voted on and prioritized. The table shows each initiative's score and rank on the list.

### B. Completed, Deleted, and Deferred Mitigation Initiatives

The following table represents the Mitigation Initiatives from the previously approved Local Mitigation Strategy (2010). This list identifies which items have been completed, deleted, or deferred as of the current LMS update (2015). If the item has been deferred an explanation of why no changes were made is included. The complete list of current Mitigation Initiatives is found at the end of this document. (Items within the table in **bold** are categories and the items below are the projects that fall within the categories)

| <b>Mitigation Initiative 2010</b>  | <b>Status</b>                | <b>Comments</b>  |
|--|------------------------------|--|
| <b>Beach Nourishment</b>   |                              |  |
| -St. Augustine Beach (State Park to F St.)   | Deferred                     | No funding available   |
| -Restoration of Emergency Berms in Summer Haven  | Completed/Deferred           | Berms were restored/On-going need for continued restoration after coastal storms                                     |
| -Summer Haven  | Completed/Deferred           | Re-nourished with sand/On-going need for continued nourishment   |
| -Marineland – Area from north end of revetment to northern Town limits                                 | Deferred                     | No funding available   |
| -Surfside Area   | Deferred                     | No funding available   |
| -Walk-over @ Mariners Watch  | Deferred                     | No funding available   |
|  |                              |  |
| <b>Education and Training</b>  |                              |  |
| -Educate Prospective Home Buyers & Real Estate Professionals About Floodplains & Base Floor Elevations | Deferred (On-going)          | Project is on-going through our CRS program  |
| -Educate Residents Of Financial / Insurance Benefits Of Preparing Their Homes For Natural Disasters    | Deferred (On-going)          | Project is on-going through our public outreach programs   |
| - NIMS Compliance and Training   | Deferred/Complete (On-going) | Multiple NIMS Training Courses are held throughout the year. Through these training courses we become NIMS compliant |
|  |                              |  |
| <b>Enhance Emergency Communications</b>  |                              |  |
| -Interoperability/Interagency Communications   | Deleted                      | Project was not specific enough to be considered. Taskforce Members looking  |

|  |                     |   |
|--|---------------------|---|
|  |                     | into creating specific projects for this topic                                      |
|  |                     |   |
| <b>Expand/Enhance/Improve Utilities</b>  |                     |   |
| -Potable Water System Improvements in the Town of Hastings                     | Deferred            | No funding available  |
| -Upgrade faulty septic systems   | Deferred (on-going) | Septic tanks are replaced as improvements are made to properties – on-going         |
| -Electrical Utilities Underground - St. Augustine Beach along A1A              | Deferred            | No funding available  |
| - Electrical Utilities Underground - South Anastasia Island                    | Deferred            | No funding available  |
| - Electrical Utilities Underground – Ponte Vedra Beach                         | Deferred            | No funding available  |
| -Retrofit Collection Systems   | Deleted             | Merged into new project “upgrade faulty septic systems”                             |
|  |                     |   |
| <b>Hazardous Materials Mitigation</b>  |                     |   |
| -Education and Training for Hazardous Materials Incident Response Capability   | Deferred (on-going) | On-going through our Fire/Rescue and our LEPC committee                             |
|  |                     |   |
| <b>Flood/Repetitive Loss Mitigation</b>  |                     |   |
| -Flood Mitigation at S. Avenida Menendez Seawall Project                       | Completed           | Completed 2014  |
| -Purchase Excavation Equipment (backhoes, etc.) for Flood Mitigation           | Deferred (on-going) | Excavation Equipment is being purchased as funding becomes available                |
| -County Acquisition at Petty Branch Ravine Park (FCT Project)                  | Deferred            | Funding options are being explored  |
| -12 Oceanside Drive Flood Mitigation   | Deleted             | No longer a priority  |
|  |                     |   |
| <b>Infrastructure and Structure Improvements</b>                               |                     |   |
| -Retrofit Schools to increase Hurricane Evacuation Shelter spaces              | Deferred (ongoing)  | will continue with retro-fitting as money becomes available                         |
| -Improve Evacuation Route Signage  | Deferred (on-going) | As older signs wear out and new roads are built signs are being upgraded – on-going |
| -May Street @ Douglas (flooding) and at San Marco (constriction)               | Deferred            | Funding may become available in 2015  |
| -Install generator panel at critical facilities to accept temporary generators | Deferred            | No funding available  |
| -Mickler Road (from 210 to A1A) Improvements                                   | Deferred (started)  | Project is underway and nearing completion  |
| -Functional Needs Evacuation Shelter   | Deferred            | No funding available  |
| -Install system of Dry Fire Hydrants,  | Deferred            | No funding available  |

|  |                     |  |
|--|---------------------|--|
| including priming pumps in Flagler Estates Area  |                     |  |
| -A1A from Owens Avenue to SR 206 (Perform a safety study)  | Deferred            | No funding available   |
| -SR 206 evacuation improvements study from A1A to end of 206   | Deferred            | No funding available   |
| Upgrade signalization at A1A and Coastal Highway   | Completed           | Completed 2013   |
| Upgrade Signalization at A1A and Solano  | Completed           | Completed 2014   |
| Upgrade Signalization at US 1 and Health Park Blvd.  | Completed           | Completed 2014   |
| -Provide portable generators for St. Augustine Beach   | Deleted             | Project is now included in “Install generator panel at critical facilities to accept temporary generators” |
| Construct non-corrosive aluminum shelters over 2 Control Panels of Emergency Pumps in St. Augustine Beach. | Deleted             | No longer a priority   |
|  |                     |  |
| <b>Master Drainage Improvements</b>  |                     |  |
| -16 Mile Creek Surface Water Improvements  | Deferred            | Project is partially underway, awaiting more funding   |
| -Dam at Lake Belouthahatchee   | Deferred            | No funding available   |
| -Deep Creek Master Drainage Study  | Deferred            | Study is nearing completion, awaiting more funding   |
| -Set up pre-contracts for temporary flood pumps  | Deferred            | Contracts are being established on an on-going basis   |
| -Master plan for St. Augustine including incorporation of Maria Sanchez Lake                               | Completed           | Completed 2013   |
| -Flagler Estates Ashley Outfall  | Completed           | Completed 2014   |
|  |                     |  |
| <b>Planning</b>  |                     |  |
| Develop Post-Disaster Redevelopment Standards For Infrastructure And Structures                            | Deferred            | No funding available and a shortage of internal staff  |
|  |                     |  |
| <b>Wildfire Mitigation</b>   |                     |  |
| Pruning Trees and Clearing Brush near Structures   | Deferred (on-going) | On-going with control burns, mowing, and trimming  |
|  |                     |  |

## Section VII - Funding

### A. Funding Sources

The following table provides current information on sources of available funding that is used for hazard mitigation projects. The table includes the name of the grant, the sponsoring agency, type of assistance available and who is eligible. As additional or updated information becomes available the list will be amended accordingly.

| <b>NAME OF GRANT</b>                        | <b>SPONSORING AGENCY</b>              | <b>TYPE OF ASSISTANCE AVAILABLE</b> | <b>ELIGIBILITY</b>                                   |
|---|---------------------------------------|-------------------------------------|--|
| Hazard Mitigation Grant Program             | FEMA                                  | Monetary                            | Only after a disaster                                |
| Pre-Disaster Mitigation Program             | FEMA                                  | Monetary                            | Pre-Disaster   |
| National Flood Insurance Program            | FEMA                                  | Monetary and Technical              | Flood Insurance                                      |
| Flood Mitigation Assistance Program         | FEMA                                  | Monetary and Technical              | States and Communities                               |
| Repetitive Flood Claims                     | FEMA/National Flood Insurance Program | Monetary and Technical              | Individual flood claims reaching a pre-set threshold |
| Severe Repetitive Loss                      | FEMA/National Flood Insurance Program | Monetary and Technical              | Individual flood claims reaching a pre-set threshold |
| Residential Construction Mitigation Program | State of Florida                      | Monetary and Technical              | Assistance for individual hardening of homes         |

